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Service Quality, Citizen Satisfaction, and Loyalty with Self-Service Delivery Options: A Strategic Imperative for Transforming E-Government Services

Akemi Takeoka Chatfield
University of Wollongong, akemi@uow.edu.au

Jazem Mutared Alanazi
University of Wollongong, jmra722@uowmail.edu.au

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Service Quality, Citizen Satisfaction, and Loyalty with Self-Service Delivery Options to Transforming E-Government Services

Akemi Takeoka Chatfield
University of Wollongong
akemi@uow.edu.au

Jazem Mutared Alanazi
University of Wollongong
King Saud University
jmra722@uowmail.edu.au

Abstract

With the growing recognition of the citizen's role in service demand and self-service delivery, there is an increased impetus on building citizen satisfaction and loyalty with government's e-services. With the global trend in transforming government services through e-government, research on citizen interactions with web-based self-service delivery options has been recently emerging in IS and e-government literatures. This study aims to contribute to post-adoption research by developing a model of citizen loyalty with government online self-service delivery options. We empirically test the proposed model through an analysis of 402 survey data collected from Saudi citizens/users of e-government transactional services. Multiple regression analysis results provide evidence that, as hypothesized, service quality and citizen satisfaction explain citizen loyalty with e-government services. We also find a moderating effect of citizen characteristics – age and education – on the strength of the model's two hypothesized relationships between service quality and loyalty and between citizen satisfaction and loyalty.

Keywords

E-government, service quality, citizen satisfaction, citizen loyalty, moderating effect of citizen characteristics

INTRODUCTION

Governments at all levels contribute significantly to the development and sustainability of the service economy (OECD 2000). Government agencies and departments have increasingly adopted and used digital innovation such as electronic government (or e-government) to enhance operational efficiency gains, productivity gains, service innovations and overall enhanced performance in public services. E-government research is a multi-disciplinary domain of action and study addressing "the use of information and technology to support and improve public policies and government operations, engage citizens, and provide comprehensive and timely government services" (Scholl 2007, p. 21; Scholl 2010). With the growing maturity of e-government research and practice, goals of e-government initiatives in many countries have shifted towards *transforming government* in such a way that it can provide citizen-centric, seamlessly integrated interoperable public services (United Nations 2010).

However, e-government research still lacks empirical studies that investigate post-adoption continuing use of Web 2.0-enabled interactive and transactional e-government systems and how this continuing use may contribute to e-government service sustainability (Detlor *et al.* 2013). In other words, prior research in e-government literature has taken a snapshot of the initial adoption of e-government services but what has been left out is the long-term citizen engagement and interactions with e-government self-service delivery systems. Furthermore, the promised benefits of e-government may be difficult to realize without continuing use of e-government services. For example, "government initiatives to implement ICT will not alter the state of digital inequality unless there is continued use" (Hsieh *et al.* 2008, p. 98).

Similarly, the IS literature shows the same lack of post-adoption research, resulting in the increased calls for post-adoption research by leading IS researchers. It has been held that long-term viability of an IS and its eventual success depend on its continued use rather than its first time use (Bhattacherjee 2001). The final stages of the information system life cycle 'post-adoption stages' have been largely ignored, with some significant implications for user effectiveness, the value extracted from IS investments, and organizational performance (Furneaux 2011). In consequence, limited attention has been directed toward conducting post-adoption research in the IS field. If management wants to promote continued IS use behaviour, it clearly needs to understand what drives it (Limayem *et al.* 2007).

Given the observed paucity of post-adoption research both in e-government and IS research literatures, this study aims to develop a conceptual model that explains citizen loyalty with e-government self-service delivery options in a research context of integrated interoperable transactional e-services provided via Saudi Ministry of Higher Education (MOHE) portal. We empirically test the proposed model through the linear multiple regression analysis of 402 survey responses collected from Saudi citizens/users of transactional e-services.

The remainder of this paper is structured as follows: the next section presents a review of the literatures on e-government self-service delivery options, citizen loyalty and its antecedents, and citizen characteristics as

moderators. The third section briefly presents a background on the Saudi Arabian government's integrated interoperable transactional e-government services provided via the Ministry of Higher Education portal as our research context. The fourth section describes our survey research methodology. The fifth section presents our results and the final section presents our discussion of the tested model and our conclusion including our research limitations and future research directions.

LITERATURE REVIEW

E-Government Self-Service Delivery Options

Electronic government (or, e-government) refers to "the use of information and technology to support and improve public policies and government operations, engage citizens, and provide comprehensive and timely government services" (Scholl 2007, p. 21; Scholl 2010). In the multi-disciplinary e-government research field, there is the growing recognition of the need for citizen-centric services from a citizen demand-side perspective (Reddick 2005) and the need to study citizen's role in service demand and self-service delivery options. In consequence, there is an increased impetus on building citizen satisfaction and loyalty with government's Web 2.0-enabled self-service delivery options. In a context of IT-mediated customer transactions with the business, marketing literature shows the increasing importance of high-quality technology-customer linkages in building customer loyalty and creating business value through better serving customers (Parasuraman & Grewal 2000). So while it is relatively straightforward to provide citizens with government websites for information access, there is the growing recognition that enhanced technological and organizational process integration and interoperability between government agencies and between the public sector and the private sector organizations such as banks is critically important to make e-government more successful in engaging citizens and providing integrated convenient and timely government services (Moon 2002; Lips *et al.* 2011).

Citizen Loyalty: Dependent Variable

In order to develop a conceptual model that explains citizen loyalty (CL) with e-government self-service delivery options, we draw on marketing literature on customer loyalty as the dependent variable to explore the key definitions and salient antecedents. Customer loyalty is viewed as "the strength of the relationship between an individual's relative attitude and repeat patronage" (Dick & Basu 1994, p. 99). Customer loyalty is measured by retention rate and share of purchase (or repeat-purchase transactions). It is earned by the business through consistently delivering superior value. While high customer loyalty increases market share and revenues, it reduces the cost of acquiring new customers (Reichheld 1993). In consequence, customer loyalty is an important strategic objective for all managers (Cooil *et al.* 2007) and even a strategic mandate in today's highly complex and competitive service markets (Ganesh *et al.* 2000). Customer loyalty is also viewed as an integrative concept in building a brand community where many different types of customer relationships matter, for example, the relationship between the customer and the brand, the relationship between the customer and the firm, the relationship between the customer and the product in use, and even among fellow customers (Mc Alexander *et al.* 2002).

In contrast to customer loyalty, brand loyalty in consumer research seems to be more narrowly focused on the relationship between the customer and the brand. Similar to definitions of customer loyalty, there are various definitions of brand loyalty. Jacoby (1971) expressed loyalty as a biased behavioural purchase process that results from a psychological process. In addition, Engel and Blackwell (1982) defined brand loyalty as the preferential, attitudinal and behavioural response toward one or more brands in a product category expressed over a period of time by a consumer. Assael (1993, p. 87) suggested that loyalty is "a favourable attitude toward a brand resulting in consistent purchase of the brand over time". Oliver (1997, p. 392) suggested that loyalty is "a deeply held commitment to rebuy or repatronize a preferred product/service consistently in the future, thereby causing repetitive same-brand or same brand-set purchasing, despite situational influences and marketing efforts having the potential to cause switching behaviour".

By drawing on prior work by Mc Alexander *et al.* (2002) who have viewed customer loyalty as an integration of all the different customer relationships in the context of building brand communities, we have focused on the broader concept of CL, rather than the narrower definition of brand loyalty, as our study's dependent variable. We define it as "the strength of the relationship between an individual's relative attitude and *repeat patronage*" (Dick & Basu 1994, pp. 99, italics added for emphasis). Since our focus is repeat patronage (or continued use) of e-government self-service delivery (the citizen's relationship with the brand) options in a specific context of the Saudi (the citizen's relationship with the government) Ministry Portal (the citizen's relationship with the product in use), we need to measure the citizen's actual repeat-patronage behaviour. So citizen loyalty is measured using the survey questionnaire question on the frequency of citizen continued use of transactional e-services for the past three months.

Service Quality

The concept of service quality (SQ) has been widely studied in IS, e-government, and marketing literatures. In marketing literature *superior SQ* perceptions are related to distinct and actionable dimensions of service provision: outcome, interaction, and environmental quality (Brady & Cronin 2001). The survey studies by Brady & Cronin (2001; 2002) present strong evidence for the relationship between SQ and customer satisfaction. While there are a wide variety of definitions, drawing on prior research (Liu & Arnett 2000) in IS literature on e-commerce, we view SQ as an antecedent of CL and it is the combination of information quality (IQ) and system quality. In IS literature, IQ measures the information that the system produces and delivers (DeLone 1992). Similarly, in e-government literature, IQ refers to the quality of information that a government needs to make available on its website (Chutimaskul *et al.* 2005). So IQ measures the information accuracy (free from errors) and information timeliness (up-to-date). System quality (SYSQ) is concerned with the measure of the actual system which produces the output (DeLone 1992). SYSQ is defined as the features and performance of e-government websites from the citizen's point of view, and as the quality of e-government websites in use (Chutimaskul *et al.* 2005). SYSQ means system functionality (the system works correctly and provides necessary transactions). Therefore, in the context of this study, we define SQ as exhibiting the combined observable characteristics of information quality (accuracy and timeliness) and system quality (system works correctly and provides necessary transactions) from a citizen/user perspective.

There are challenges in studying and measuring SQ. Despite the many studies which show that SQ is a strong predictor of customer satisfaction (Cristobal *et al.* 2007; Au *et al.* 2008; Deng *et al.* 2010), most of those studies consider SQ as being interchangeable with either IQ or SYSQ, hence failing to consider both as salient dimensions or attributes of SQ. Moreover, even fewer studies explore this concept of SQ in the e-government context. However, there is a growing recognition of the importance of studying SQ in e-government research in transforming public services. For example, Kumar *et al.* (2007) argued for the importance of studying the relationship between SQ and citizen satisfaction with e-government services, but did not empirically test it. Similarly, Chutimaskul *et al.* (2009) underscored the importance of the relationship in the context of Thailand's e-government. In their empirical study, Sandoval-Almazan and Gil-Garcia (2010) found that the level of e-government SQ was significantly influenced by existing critical limitations related to infrastructure, use of software, and the development of their websites. In our study, SQ in the context of e-government self-services includes the information quality and system quality to comprehensively examine the e-government service quality. Therefore, the following two hypotheses are proposed:

H1a: SQ is positively associated with CL with e-government self-service delivery options.
H1b: SQ is positively associated with citizen satisfaction with e-government self-service delivery options.

Citizen Satisfaction

The concept of customer/user/employee satisfaction has been widely studied in many fields of study, including marketing, commerce, management, and IS. One of the early and highly cited definitions of satisfaction is provided by Locke (1976) in the context of job performance. Satisfaction is defined as "a pleasurable or positive emotional state resulting from the appraisal of one's job" (Locke 1976, p. 1300). Oliver (1981, p. 29) extended this definition in the context of the consumption context as "the summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience". Both definitions emphasize a psychological or affective state related to and resulting from a cognitive appraisal of the expectation performance discrepancy 'confirmation' (Bhattacherjee 2001). In the context of this study, citizen satisfaction is defined as a pleasurable or positive emotional state resulting from the appraisal of using transactional e-government self-services delivery options to achieve the citizen's personal task such as seeking conference travel reimbursement from government.

Based on Fishbein and Ajzen's (1975) theory of reasoned action, satisfaction indicates positive attitude, which will increase positive behavioural intentions. According to Oliver (1997) in the consumer satisfaction research, satisfied, rather than unsatisfied, customers are more likely to stay loyal to the product or service, such as making repeat purchases of the same product or service. Likewise, it is expected that satisfied IS users are more likely to commit to continued use of that system or technology (Thong *et al.* 2006). In the IS literature, the relationship between satisfaction and continued use has been studied which is grounded in Expectation Confirmation Theory (ECT) (Bhattacherjee (2001); Hsu *et al.* (2004); Thong *et al.* (2006); Limayem *et al.* (2007); Venkatesh and Goyal (2010); Alawneh *et al.* (2013); Reddick and Roy (2013); Stone and Baker-Eveleth (2013). In these studies, satisfaction is a strong antecedent of the intention to continued use. In our study, therefore, we propose the following hypothesis on citizen satisfaction (CS) as an antecedent of CL:

H2: CS positively correlates with CL with e-government self-service delivery options.

Citizen Characteristics

When government agencies, government departments and e-government researchers shift their attention towards citizen-centric e-government service provision, away from traditional government-centric service provision (Reddick 2005), it becomes more important to facilitate citizen engagement and to understand the citizen's role in service demand and self-service delivery options. E-government research has not systematically studied the impact of citizen characteristics (CC) on the use of e-government services or the outcome of using e-government services. However, marketing literature shows strong evidence for the moderating effect of customer characteristics on the relationship between customer satisfaction and repeat purchase behaviour (Mittal & Kamakura 2001) and the moderating effects of customer income and length of relationship with the firm negatively influencing the relationship between customer satisfaction and loyalty (Cooil *et al.* 2007). Similarly, another survey analysis results find that the relationship between customer satisfaction and repeat purchase behaviour is contingent on the moderating effects of customer characteristics such as customer involvement and household income as well as other moderators such as convenience and competitive intensity of the market (Seiders et al. 2005). So in this study, we explore the moderating effect of citizen characteristics, such as gender, age, education, and length of stay for the study on the postulated relationships between SQ and CL and between CS and CL as follows:

H3a: CC positively moderates the relationship between SQ and CL.
H3b: CC positively moderates the relationship between CS and CL.

In summary, we have developed a research model that aims to explain citizen loyalty with e-government self-service delivery options. Figure 1 shows this model. In Figure 1, SQ at the left-side of CL represents a supply-side (government) construct largely under government control, whereas both CS at the right-side of CL and CC located directly below CS represent demand-side (citizen) constructs (Reddick 2005) which are largely under citizen control.
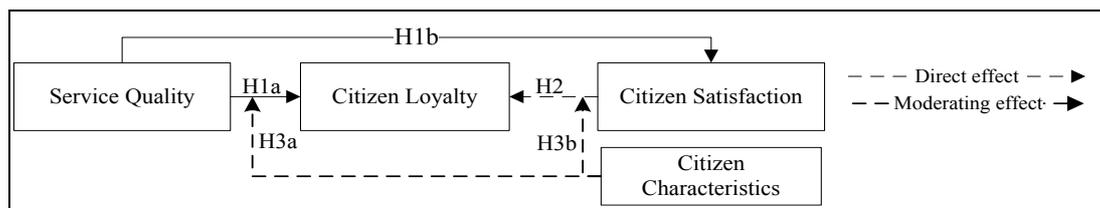

Figure 1 A research model of citizen loyalty

MOHE: INTEGRATED INTEROPERABLE TRANSACTIONAL E-SERVICES

'Saudi', is an integrated e-government portal launched in 2006 (Saudi E-government National Portal 2012). It provides convenient access to e-government services not only for citizens but also residents, Saudi government agencies (both e-service employees and managers), domestic businesses, overseas governments and businesses, and international visitors/tourists. This integrated and interoperable portal strategy has been chosen by government to make all e-services provided by different government agencies easily accessible by users anytime and anywhere via the Internet and smart mobile phone devices. The Saudi government has integrated different portals operated by Saudi Ministries and government agencies to provide: (a) frequently updated news and information about new e-services provided by government agencies; (b) a directory of government agencies; and (c) links for Saudi regulations, laws, plans and initiatives, and (d) frequently used links to MOHE Portal and websites of its external stakeholders, such as domestic universities and overseas banks. E-government services via the HOHE Portal provide a research context for this study.

The implementation of 'Saudi' aimed to radically improve government transparency in public services and to empower citizens and other stakeholders by providing enhanced accessibility to existing e-government services. Prior to the Saudi National Portal implementation, e-government services were delivered through a wide range of disjoined portals operated by different government agencies (United Nations 2004).

The MOHE Portal (http://www.mohe.gov.sa) is linked directly from the 'Saudi' National Portal. MOHE provides integrated interoperable e-government services to all its stakeholders: not only students who are enrolled in the domestic universities and students studying overseas but also academic institutions, Saudi cultural missions overseas, domestic and overseas banks in which students hold accounts, and healthcare service providers for students. Many of the e-government services are integrated transactional e-services, which are provided through the MOHE Portal for easy access, even via smart mobile phone devices. According to the MOHE (2013), the Ministry's Portal provides informational and transactional e-services for four types of student users who are Saudi citizens. In addition to the Saudi students, the MOHE Portal is also used by the local Saudi universities and educational institutions. The MOHE provides them its e-services through two e-government systems: the Private University Licensing system and the Seminar and Conference System. Moreover, the MOHE Portal is also used by the Saudi

Arabian Cultural Missions (SACM) located overseas. SACM are quasi-government organizations established by the MOHE to manage Saudi students' pathways from start to finish to ensure successful degree completion during their course of study abroad (SACM 2012). The MOHE Portal will provide 97 different e-services to all SACM worldwide. Integrating the existing government publications downloaded from the MOHE Portal (http://www.mohe.gov.sa). We have created Figure 2 to illustrate the integrated interoperable e-government services accessible via the MOHE Portal.
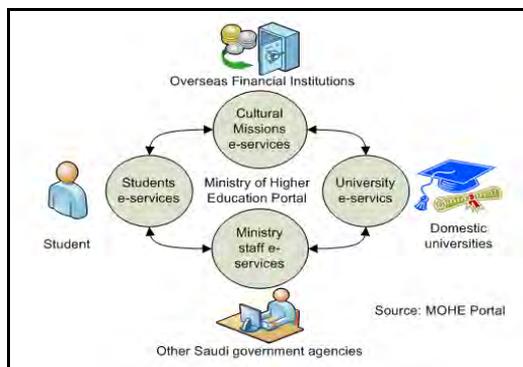

Figure 2 Integrated e-government services at the Ministry of Higher Education Portal

RESEARCH METHODOLOGY

Survey Instrument

The survey items were adopted from several prior empirical studies published in the IS literature: 4 items for measuring service quality (Chutimaskul *et al.* (2005); 3 items for measuring satisfaction (Bhattacherjee (2001); 1 item used to measure customer loyalty (Limayem *et al.* 2007). Table 1 shows a selective sample of questionnaire items which were adapted to better fit to our research context.

Table 1: Selective sample of questionnaire items

Code	Item
SQ1	Information on the MOHE Portal is accurate.
SQ2	Information on the MOHE Portal is up-to-date.
SQ3	The MOHE Portal always works properly without service disruption or downtime.
SQ4	The MOHE Portal enables me to complete all necessary transactions online.
CS1	I am pleased with the overall use of the MOHE Portal.
CS2	I feel satisfied about my overall experience of using the MOHE Portal.
CS3	Overall, I am satisfied with Saudi e-government services which include other government Portals besides the MOHE Portal.
CL	In the last 3 months, how often did you access the Ministry of Higher Education (MOHE) Portal?

The validity of the survey is strengthened not only though extensive literature review but also through field testing. In this study the survey instrument was reviewed and tested by academics and professionals in information systems field in a pilot study. This pilot study was to ensure the error free and understandable items for this survey study.

In addition, choosing the right questionnaire language is very important. That is because the survey respondents will be asked to provide their views and perceptions and what they think. In order to achieve this, the questionnaire language should be fully understood by the respondents (Oppenheim 2000). He also argued for the importance of matching between the respondents' educational level and the use of scientific terms or idioms in the questionnaire. In other words, all the terms used in the questionnaire should be fully understandable by the respondents. Cavana et al (2001) also claim that choosing the questionnaire words would depend on the respondents' educational level, the usage of terms and idioms in the culture and the frames of reference of the respondents. For instance, even in one language, but in two cultures, some particular words will be understood differently by the two groups of cultures. If some questions either are not understood or are interpreted differently by the respondents, the researcher will be obtaining the wrong answer to the questions and responses will be biased (Cavana *et al.* 2001). Since all the Saudi students studying in Australia are Saudi citizens, all questionnaire items were translated into Arabic with the availability of the English version of the questionnaire. In general, Saudi citizens studying abroad have an adequate level of experience in using the Internet and are familiar with transactional e-services provided via the MOHE Portal. They are asked questions about their use, assessment of MOHE e-service quality, satisfaction with online interactions and transactions, loyalty to the self-service delivery options, and actual use of e-services for the past three months.

In empirical study it is very important to ensure the reliability of items. This means that the measurement items are truthfully measuring the same construct. SPSS21 was used to calculate Cronbach's alpha to measure the internal consistency of all items in our survey instrument. Table 2 shows the analysis results of the reliability coefficients of our scale. The lowest Cronbach's alpha is .759 of the scale (SC1), which aims to measure the construct, Citizen Satisfaction. According to prior research, however, the level of .759 is regarded as an acceptable reliability coefficient (Miller *et al.* 2011). Based on the reliability analysis, therefore, no item contributes to a low internal consistency. In summary, the survey instrument items are reliable to measure the constructs in the model.

Table 2: Reliability coefficients of scale (Cronbach's alpha)

Construct	Mean	Std. Deviation	Cronbach's Alpha if Item Deleted	Cronbach's Alpha
Service Quality (SQ)				.838
SQ1	4.60	1.591	.769	
SQ2	4.50	1.565	.773	
SQ3	3.96	1.789	.769	
SQ4	5.10	1.502	.769	
Citizen Satisfaction(CS)				.800
CS1	5.21	1.456	.759	
CS2	5.18	1.472	.760	
CS3	4.34	1.848	.772	

Data Collection

Like other government agencies, the MOHE provides citizen-centric e-services to Saudi citizens. While the MOHE Portal is accessed by the different stakeholders as discussed earlier in this paper, the intended user populations of the MOHE's e-services are Saudi citizens, who are awarded the opportunity to pursue higher education degrees either domestically or abroad. In this study, therefore, our target population is the reported 8,157 Saudi citizens who are studying in Australia according to the Saudi Cultural Mission, Canberra as of 2012. We refer to the target population as Saudi citizens rather than as students, because many of them have taken leave from their full-time paid employment in Saudi Arabia (e.g. university lecturer) to study in Australia. These Saudi citizens studying in Australia are widely distributed in different geographic areas across Australia, making paper-based questionnaire impractical and costly. We have adopted online survey approach via the use of Survey Monkey website to collect data from the target population. Since all the 8,157 Saudi citizens have access to the Internet through their university email account, online survey is thought to maximize our aim of reaching the target population.

Each city or town with a university has an official Saudi Club with an official website and forum. An Arabic email invitation to participate in our online survey was distributed to the 8,157 target population though their Saudi clubs. The email has an embedded link to the online survey website. With the cooperation from all the Saudi Clubs throughout Australia, the online survey invitation reached the target population for this study. The survey responses were collected for the period of two months via the Survey Monkey website and downloaded to the Excel spreadsheet. All the statistical analyses on the survey response data were performed using SPSS21. In addition, in order to ensure the integrity of the data, the IP address of each respondent was recorded to prevent any respondent from filling the survey more than once.

Survey Respondents

A total of 402 survey returns were completed online through our online survey host website as a part of a larger-scale online survey research project. Table 3 shows salient characteristics of our survey respondents: gender, age, education, and length of stay in Australia. First, our survey respondents are predominantly males (87.3%), which fairly represent this research's target population and Saudi Arabia's citizen population which has been successful in being accepted to study abroad. Second, of the five age groups, nearly 67% of our survey respondents are predominantly 25-29 years old (33.8%) and 30-34 years old (33.1%). The age distribution of our study sample fairly represents the general population of Saudi Arabia, since 44.8% of the national population distributions in 2013 are 25-54 years old and the median age for Saudi males is 27 years old (CIA Factbook 2013). Third, of six categories in the length of stay in Australia, the combined total of the top three categories shows that 74.1% of our survey respondents stay in Australia from 3 years (37.8%), 4 years (20.1%) and 2 years (16.2%). Finally, the education level completed by our survey respondents is high with 71.6% having held either Master's degree (42.5%) or Bachelor's degree (29.1%).

Table 3: Survey respondent characteristics

		Frequency	Percent			Frequency	Percent
Gender	Male	351	87.3		3 years	152	37.8
	Female	51	12.7		4 years	81	20.1
Age	25-29	136	33.8	Length of Stay	2 years	65	16.2
	30-34	133	33.1		1 year or less	49	12.2
	20-24	60	14.9		More than 5 years	31	7.7
	35-39	52	12.9		5 years	24	6.0
	40 and above	21	5.2	Education	Master's degree	171	42.5
					Bachelor's degree	117	29.1
					Diploma	50	12.4
					High school	40	10.0
					Doctoral degree	24	6.0

RESULTS

Table 4 shows the correlation matrix for all the constructs in the research model shown in Figure 1. The strongest correlations at the 0.01 level of significance include the correlation between SQ and CS (.596) and the correlation between CS and CL with e-government self-service delivery options (.451). Citizen characteristics, especially age and education, also correlate positively with CL (.134 and .157, respectively) at the 0.01 level. Age also positively relates to CS (.105) at the 0.05 level of significance. Interestingly, length of stay in Australia has negative correlations with both CS (-.089) and CL (-.065), although they are not statistically significant at the 0.05 level. This means that the longer they stay in Australia, the more dissatisfied they are with the MOHE e-services and the less loyal they become in terms of the frequency of continued use of e-government self-service delivery options.

Table 4: Correlations matrix

	Age	Education	Length of stay	Citizen Loyalty	Citizen Satisfaction	SQ
Age	1	.513**	.096	.134**	.105*	.097
Education	.513**	1	.191**	.157**	.055	.022
Length of stay	.096	.191**	1	-.065	-.089	-.096
Citizen Loyalty	.134**	.157**	-.065	1	.451**	.368**
Citizen Satisfaction	.105*	.055	-.089	.451**	1	.596**
SQ	.097	.022	-.096	.368**	.596**	1

** Correlation is significant at the 0.01 level (2-tailed).
 * Correlation is significant at the 0.05 level (2-tailed).

Multiple regression analysis was performed in this research to test the hypothesized relationships in the research model. Table 5 below shows the summary results of this multiple linear regression analysis. To test hypothesis 1a, which explores the direct association between SQ and CL, a regression between SQ and CL is calculated, resulting in R^2=0.219 and β= 0.172. Hypothesis 1b is to test the direct relationship between SQ and CS, with the observed R^2= 0.360 and β= 0.601. Hypothesis 2 is to test the relationship between CS and CL, showing R^2=0.219 and β= 0.394. Hypothesis 3a is to test the moderating effect of CC on the hypothesized relationship between SQ and CL, showing R^2=0.239 and β= 0.397. Similarly, Hypothesis 3b is to test the moderating effect of CC on the hypothesized relationship between CS and CL, resulting in R^2=0.239 and β= 0.477. Based on the statistical analysis results, all hypotheses in our research model have been accepted. We found that R^2 of CL was improved from 0.219 to 0.239 when we added CC as moderators. In summary, Figure 3 shows the model results with citizen characteristics as moderators.

Table 5: Multiple linear regression analysis summary

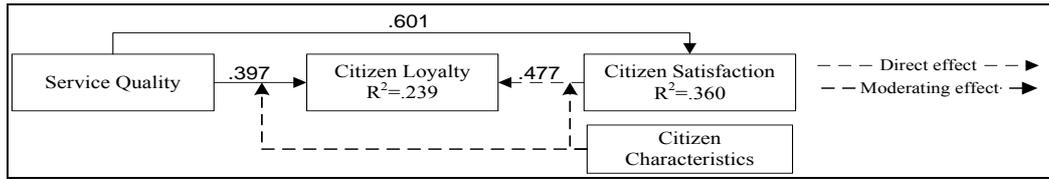| Relationship	Type	DV R^2	β	Significance	Hypothesis	Supported
SQ→CL	Direct	0.219	0.172	.006	H1a	Yes
SQ→CS	Direct	0.360	0.601	.000	H1b	Yes
CS→CL	Direct	0.219	0.394	.000	H2	Yes
SQ→CC→CL	Moderate	0.239	0.397	.006	H3a	Yes
CS→CC→CL	Moderate	0.239	0.477	.000	H3b	Yes

Figure 3 Tested research model of citizen loyalty to e-government self-service delivery options

DISCUSSION

This study developed a new research model for explaining citizen loyalty to e-government self-service delivery options. The proposed model was validated through multiple regression analysis of the 402 online survey data collected from Saudi citizens who have been studying in Australia. The research model holds that the relationships between SQ and CL and between CS and CL are positive and statistically significant at the 0.01 level and that SQ alone can explain 36% of the variance of the CS construct measured in this survey study. This finding on SQ as a significant antecedent of CS is consistent with the marketing literature reviewed earlier in this paper and the recent e-government literature (Alawneh et al. 2013). The research model also explains that both SQ and CS are positively related to CL and that they can explain approximately 24% of the variance of the CL construct when we combine SQ and CS jointly. Therefore, based on our validated model we hold that SQ and CS are significant antecedents which can explain CL.

This study also found statistical evidence for the positive moderating effects of citizen characteristics, namely age and education, but not length of stay, on the hypothesised relationship between SQ and CL and on the hypothesised relationship between CS and CL. This means that both mature age and higher educational level positively moderate the strength of these hypothesised relationships. On the other hand, while it was not statistically significant, length of stay has a negative moderating effect on these hypothesised relationships. While this finding needs further investigation, it is plausible that the longer the survey respondents stay in Australia, the more they become aware of the quality of Australian e-government services and hence the more astute they become in evaluating their experiences of the MOHE e-government self service delivery options.

However, the model's overall R^2 of .239 suggests that it needs further investigation into other construct(s) that may better explain the dependent variable, CL. In marketing literature, Burnham *et al.* (2003) conclude that switching costs explained the variance more than customer satisfaction. They identify three types of switching costs: (1) procedural switching costs, such as the loss of time and effort; (2) financial switching costs; and (3) relational switching costs, including psychological or emotional discomfort due to the loss of personal identity and the breaking of relational bonds. While our study did not consider the construct of switching costs as an antecedent of citizen loyalty in our research model, our future research directions need to investigate the effect of including switching costs in the model. Furthermore, marketing literature shows that effective complaint handling is important to increase customer commitment and build customer loyalty (Tax *et al.* 1998; Homburg & Fürst 2005). Recently, Saudi government has established a centralized customer complaint handling centre for responding to citizen complaints about either poor or inadequate public services. Most recently, Saudi government has adopted social media channels to speed up the handling of citizen complaints on public services.

With the growing recognition of the citizen's role in service demand and self-service delivery, there is an increased impetus on building citizen satisfaction and loyalty with government's e-services. With the global trend in transforming government services through e-government, research on citizen interactions with web-based self-service delivery options has been recently emerging in IS and e-government literatures. This empirical research has contributed to the literature by providing statistically significant evidence that supports the important roles of enhanced service quality and citizen satisfaction with e-services in building strong relationships with the citizens/users so that they would remain loyal and committed to the e-government self-service delivery options. These research findings have important public policy implications for transforming public services through e-government services. Citizen loyalty with e-government self-service delivery options can be enhanced by improving service quality and increasing citizen satisfaction with the e-government self-service delivery options. Since citizen loyalty was measured by the frequency of using transactional e-services via the MOHE Portal for the past three months (prior to the survey response), enhanced citizen loyalty will likely influence continued use of e-services over time. Finally, government needs to pay closer attention to citizen characteristics in designing new e-services and improving existing e-services so as to increase citizen loyalty with e-government self-service delivery options.

CONCLUSION

This study aimed to contribute to the literature on post-adoption research in the e-government context by developing and empirically testing a new model of citizen loyalty with government online self-service delivery options. We

found positive evidence supporting the importance of understanding the roles of superior service quality and high-level citizen satisfaction with e-government services in increasing citizen loyalty with e-government self-service delivery options and hence continued use over time. We conclude that government needs to pay closer attention to achieving superior service quality, high-level citizen satisfaction, and high-level citizen loyalty with e-government self-service delivery options as a strategic imperative for transforming e-government services. We also conclude that government needs to pay renewed attention to citizen characteristics in order to better understand the different needs of their citizens based on their characteristics.

Although the study provides important managerial and government policy implications for improving government e-services, it has two research limitations. First, the scales used to measure service quality did not comprehensively measure system functionality and dependability. Second, while the age distribution of our study sample fairly represents the general population's age distribution in Saudi Arabia, our study sample was predominantly males and highly educated Saudi citizens with high-level computer efficacy. While the latter may not invalidate the study's conclusion, they may not fully represent the current and the potential users of other e-services provided by other Ministries and agencies in Saudi Arabia. Our future research directions include the consideration of the construct of switching costs, the development of scales that would measure service quality more comprehensively in a context of e-government services, and testing the model developed in this study against new survey data from less educated Saudi citizens but who have adequate access to the Internet and Saudi e-government services.

REFERENCES

Alawneh, A., Al-Refai, H. and Batiha, K. 2013. "Measuring User Satisfaction from e-Government Services: Lessons from Jordan," *Government Information Quarterly* (30:3), pp 277-288.

Assael, H. 1993. *Consumer Behavior and Marketing Action*. Boston, MA: PWS-KENT Publishing Company.

Au, N., Ngai, E. W. T. and Cheng, T. C. E. 2008. "Extending the Understanding of End User Information Systems Satisfaction Formation: An Equitable Needs Fulfillment Model Approach," *MIS Quarterly* (32:1), pp 43-66.

Bhattacherjee, A. 2001. "Understanding Information Systems Continuance: An Expectation Confirmation Model," *MIS Quarterly* (25:3), pp 351-370.

Brady, M. and Cronin, J. 2001. "Some New Thoughts on Conceptualizing Perceived Service Quality: A Hierarchical Approach," *Journal of Marketing* (65:3), pp 34-49.

Brady, M. and Cronin, J. 2002. "Performance-Only Measurement of Service Quality: A Replication and Extension," *Journal of Business Research* (55:1), pp 17-31.

Burnham, T., Frels, J. and Mahajan, V. 2003. "Consumer Switching Costs: A Typology, Antecedents, and Consequences," *Journal of the Academy of Marketing Science* (31:2), pp 109-126.

Cavana, R. Y., Delahaye, B. L. and Sekaran, U. 2001. *Applied Business Research: Qualitative and Quantitative Methods*. San Francisco, CA: Wiley and Sons.

Chutimaskul, W., Papasratorn, B. and Wangpipatwong, S. 2009. "Quality Enhancing the Continued Use of E-Government Web Sites: Evidence from E-Citizens of Thailand," *International Journal of Electronic Government Research* (5:1), pp 19-35.

CIA Factbook. 2013. Retrieved 3 December, 2012, from https://www.cia.gov/library/publications/the-world-factbook/geos/sa.html.

Cooil, B., Keiningham, T., Aksoy, L. and Hsu, M. 2007. "A Longitudinal Analysis of Customer Satisfaction and Share of Wallet: Investigating the Moderating Effect of Customer Characteristics," *Journal of Marketing* (71:1), pp 67-83.

Cristobal, E., Flavián, C. and Guinalíu, M. 2007. "Perceived e-Service Quality (PeSQ): Measurement Validation and Effects on Consumer Satisfaction and Web Site Loyalty," *Managing Service Quality* (17:3), pp 317-340.

DeLone, W. H. and McLean, E.R. 1992. "Information Systems Success: The Quest for the Dependent Variable," *Information System Research* (3:1), pp 60-95.

Deng, L., Turner, D. E., Gehling, R. and Prince, B. 2010. "User Experience, Satisfaction, and Continual Usage Intention of IT," *European Journal of Information Systems* (19:1), pp 60-75.

Detlor, B., Hupfer, M. E., Ruhi, U. and Zhao, L. 2013. "Information Quality and Community Municipal Portal Uuse," *Government Information Quarterly* (30:1), pp 23-32.

Dick, A. and Basu, K. 1994. "Customer Loyalty: Toward an Integrated Conceptual Framework," *Journal of the Academy of Marketing Science* (22:2), pp 99-113.

Engel, J. F. and Blackwell, R. D. 1982. *Consumer Behaviour*. New York: The Dryden Press.

Fishbein, M. and Ajzen, I. 1975. *Belief, Attitude, Intention, and Behavior: An Introduction to Theary and Research*. Boston: Addison-Wesley.

Furneaux, B. M. 2011. "An Exploration of Organizational Level Information Systems Discontinuance Intentions," *MIS Quarterly* (35:3), pp 573-598.

Ganesh, J., Arnold, M. and Reynolds, K. E. 2000. "Understanding the Customer Base of Service Providers: An Examination of the Differences between Switchers and Stayers," *Journal of Marketing* (64:3), pp 65-87.

Homburg, C. and Fürst, A. 2005. "How Organizational Complaint Handling Drives Customer Loyalty: An Analysis of the Mechanistic and the Organic Approach," *Journal of Marketing* (69:3), pp 95-114.

Hsieh, J. J., Rai, A. and Keil, M. 2008. "Understanding Digital Inequality: Comparing Continued Use Behavioral Models of the Socio-Economically Advantaged and Disadvantaged," *MIS Quarterly* (32:1), pp 97-126.

Hsu, M. H, Chiu, C. M and Ju, T. L. 2004. "Determinants of continued use of the WWW: an integration of two theoretical models," *Industrial Management + Data Systems* (104:8/9), pp 766-775.

Jacoby, J. 1971. "Brand Loyalty: A Conceptual Definition", *Proceedings of American Psychological Association*.

Kumar, V., Mukerji, B. and Irfan, B. 2007. "Factors for Successful E-government Adoption: A Conceptual Framework," *The Electronic Journal of e-Government* (5:1), pp 63–76.

Limayem, M., Hirt, S. G. and Cheung, C. M. K. 2007. "How Habit Limits the Predictive Power of Intention: The Case of Information Systems Continuance," *MIS Quarterly* (31:4), pp 705-737.

Liu, C. and Arnett, K. 2000. "Exploring the Factors Associated with Web Site Success in the Context of Electronic Commerce," *Information and Management* (38:1), pp 23-33.

Locke, E. A. 1976. "The Nature and Causes of Job Satisfaction," *Handbook of Industrial and Organizational Psychology*, M. D. Dunnette (ed). New York: Reinhart & Winston**,** pp 1297-1349.

Mc Alexander, J., Schouten, J. and Koenig, H. F. 2002. "Building Brand Community," *Journal of Marketing* (66:1), pp 38-54.

Miller, V. D., Poole, M. S. *et al*. 2011. "Advancing Research in Organizational Communication Through Quantitative Methodology," *Management Communication Quarterly* (25:1), pp 4-58.

Ministry of Higher Education. 2013. The Ministry of Higher Education Portal.   Retrieved 1 February, 2012, from http://www.mohe.gov.sa.

Mittal, V. and Kamakura, W. 2001. "Satisfaction, Repurchase Intent, and Repurchase Behavior: Investigating the Moderating Effect of Customer Characteristics," *Journal of Marketing Research* (38:1), pp 131-142.

Moon, M. J. 2002. "The Evolution of E-Government among Municipalities: Rhetoric or Reality?," *Public Administration Review* (62:4), pp 424-433.

OECD 2000. *The Service Economy*. Paris: Business and Industry Policy Forum Series.

Oliver, R. L. 1981. "Measurement and Evaluation of Satisfaction Processes in Retail Settings," *Journal of Retailing* (57:3), pp 25-48.

Oliver, R. L. 1997. *Satisfaction: A Behavioral Perspective on the Customer*. Boston: McGraw-Hill.

Oppenheim, A. N. 2000. *Questionnaire Design, Interviewing and Attitude Measurement.* London: Pinter Pub Ltd.

Parasuraman, A. and Grewal, D. 2000. "The Impact of Technology on the Quality-Value-Loyalty Chain: A Research Agenda," *Journal of the Academy of Marketing Science* (28:1), pp 168-174.

Reddick, C. G. 2005. "Citizen Interaction with E-government: From the Streets to Servers?," *Government Information Quarterly* (22:1), pp 38-57.

Reddick, C. G. and Roy, J. 2013. "Business Perceptions and Satisfaction with E-government: Findings from a Canadian Survey," *Government Information Quarterly* (30:1), pp 1-9.

Reichheld, F. 1993. "Loyalty-Based Management.," *Harvard Business Review* (March-April), pp 64-73.

SACM. 2012. The Saudi Arabian Cultural Mission.   Retrieved 1 February, 2011, from http://www.sacm.org.au.

Sandoval-Almazan, R. and Gil-Garcia, J. R. 2010, "Assessing Local E-Government: an Initial Exploration of the Case of Mexico', *Proceedings of the 4th International Conference on Theory and Practice of Electronic Governance*, ACM.

Saudi E-government National Portal. 2012.   Retrieved 5 October, 2012, from http://www.saudi.gov.sa.

Scholl, H. J. 2007. "Discipline or Interdisciplinary Study Domain? Challenges and Promises in Electronic Government Research," *Digital Government: E-Government Research, Case Studies, and Implementation*. L. B. H. Chen, V. Gregg, R. Traunmuller, S. Dawes, E. Hovy, A. Macintosh, and C.A. Larson (eds). New York: Springer**:** 19-40.

Scholl, H. J. 2010. "E-Government Information, Technology, and Transformation," *Advances in Management Information Systems*, Vladimir Zwass (ed.). New York: ME. Sharpe.

Seiders, K., Voss, G., Grewal, D. and Godfrey, A. L. 2005. "Do Satisfied Customers Buy More? Examining Moderating Influences in a Retailing Context," *Journal of Marketing* (69:4), pp 26-43.

Stone, R. W. and Baker-Eveleth, L. 2013. "Students' Expectation, Confirmation, and Continuance Intention to Use Electronic Textbooks," *Computers in Human Behavior* (29:3), pp 984-990.

Tax, S. S., Brown, S. W. and Chandrachekaran, M. 1998. "Customer Evaluations of Service Complaint Experiences: Implications for Relationship Marketing," *The Journal of Marketing,*(62), April, pp 60-76.

Thong, J. Y. L., Hong, S. J. and Tam, K. Y. 2006. "The Effects of Post-Adoption Beliefs on the Expectation-Confirmation Model for Information Technology Continuance," *International Journal of Human-Computer Studies* (64:9), pp 799-810.

United Nations 2004. *Global E-Government Readiness Report*. USA.

United Nations 2010. *United Nations E-Government Survey*. USA.

Venkatesh, V. and Goyal, S. 2010. "Expectation Disconfirmation and Technology Adoption: Polynomial Modeling and Response Surface Analysis," *MIS Quarterly* (34:2), pp 281-303.

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