

Technology Readiness among Consumers in Oman: The Case of Adopting E-Services

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Abstract

The adoption and use of new technology have seen a rapid increase and evolution worldwide. This phenomenon is especially prevalent in developed countries. Therefore, this study examines the technology readiness in terms of e-Services adoption among Omanis. Based on the Technology readiness (TR) Index 2.0, the people's propensity to embrace and use e-Services in Oman is explored. The TR involves understanding four-dimension optimism, innovativeness, discomfort, and insecurity, explaining the readiness and use of e-Services in this study. Using a quantitative approach, SPSS performs fundamental descriptive analysis on 322 responses. Subsequently, further assessment is conducted using the Partial Least Square (SmartPLS) software. Thus, the analysis of this study consists of two stages: the assessment of measurement and the structural model. Findings suggest a strong relationship between optimism and innovativeness towards e-service adoption among Omanis, validating the proposed framework. Additionally, discomfort and insecurity are found to have no significant effect on the adoption of e-Services. These findings were then used as a basis to provide recommendations and facilitate government and other non-government agencies responsible for e-Services.

Keywords: technology readiness, e-Services adoption, technology adoption, SPSS, SmartPLS

1. Introduction

While the constantly evolving technological landscape poses threats to established business models, it offers several opportunities for implementing new services (Lai, 2016). Individuals' adoption and use of new technology are influenced by many attributes, including technology availability, consumer need, convenience, security, and other benefits. Thus, with the increase in labour cost and technological innovation, the growth of internet-based services, e-Services, is significantly high. In a broad sense, e-Services can be defined as a concept that involves an online application utilising information and communication technology (ICT) in various areas. Kvasnicova, Kremenova and Fabus (2016) mention that for many, e-Service can be potentially explained as e-government, e-commerce, and e-learning. In government agencies, e-Services are an essential tool that facilitates the provision of high-quality services to clients where it helps save time, increases efficiency, reduces cost, improves transparency besides offering real-time and accessible services to both citizens and residents (Alraja, Hammami, Chikhi, & Fekir, 2016). The e-Services technology is expected to continue to chart its implementation growth, especially consumer-business interactions. As of January 2020, Oman recorded approximately 4.66 million internet users, with an internet penetration rate of 92% (Datareportal.com, 2020). Hence, in the wake of the COVID-19 pandemic, this research develops a model that predicts and explain individual continuous intentions of adopting e-Services based on the Technology Readiness (TR) model (Parasuraman & Colby, 2014). This study assumes that Omanis' adoption of e-Services depends on expectations linked to innovativeness, optimism, discomfort, and insecurity, whereas Omanis will generally adopt e-Services if their expectations are met. This study focuses on the relationship between consumers and e-Services adoption in Oman, focusing on citizens.

1.1 Problem Statement

Consumers' confidence and acceptance in using technology are essential in developing new technology. Hamed (2017) describes the acceptance of technology as a function connected to user involvement in the system development. From the perspective of customer services roles, new electronic services such as e-government and similar web services have become increasingly popular. This phenomenon is visible when most developed nations,

such as the United States of America (USA) and most of Europe, have turned their service spaces into virtual environments where interactions between customers and service providers no longer require physical presence. Parasuraman and Colby (2001) contend that this migration from face-to-face contact to online methods has significant implications for managers, particularly when selecting technologies. The closure of government offices, businesses, schools due to the COVID-19 pandemic reinforces the importance of understanding the fundamental role of consumers' behaviour in adopting new technology or e-Services. To date, there is limited systematic research addressing the challenge Oman consumers (Omanis) face in adopting e-Services despite several kinds of literature (Jahangir & Begum, 2009; Haque et al., 2009) studying customers' reaction to new technology. A common term concerning these behaviours and reactions is "technology readiness", which refers to consumers' propensity to embrace and use new technology to accomplish daily goals (Parasuraman, 2000). In the light of these circumstances, this research significantly contributes to expanding the limited literature in the field, especially amid the Covid-19 pandemic.

1.2 Research Objectives

Based on the low adoption rate of e-Services among Oman's citizens, this study explores the variables that contribute to this situation from the citizens' point of view. Based on the main aim of this research, the following research objectives are outlined for the current study:

- 1) To examine the relationship between consumers' (Omanis) technology readiness and e-Services adoption in Oman.
- 2) To explore consumers' (Omanis) attitudes towards adopting e-Services in Oman.

1.3 Research Questions and Hypotheses

To meet the study objectives indicated in section 1.2, the following research questions (RQ) are formulated.

- 1) What is the relationship between consumers' (Omanis) technology readiness and e-Services adoption in Oman?
- 2) What is/are consumers' attitudes (s) towards the adoption of e-Services in Oman?

O' Leary (2004) argues that not every research question can/ should be converted into a corresponding hypothesis (H). Therefore, where suitable in the current study becomes appropriate, the research questions are converted into hypotheses as Creswell (2009) recommended.

Table 1. Formulation of research questions and hypotheses according to Creswell's (2009) recommendation

RQ1. What is the relationship between consumers technology readiness and e-Services adoption in Oman?	H1. Innovativeness is positively related to e-Services adoption. H2. Optimism is positively related to e-Services adoption. H3. Discomfort is negatively related to e-Services adoption. H4. Insecurity is negatively related to e-Services adoption.
RQ2. What is the attitude of consumers towards the adoption of e-Services in Oman?	Not Applicable.

1.4 The Significance of the Study

This research is essential in many ways since its findings can help Oman's government officials and non-government organisations, emphasising the necessity of e-Services adoption, particularly as the pandemic continues. More specifically, this study identifies the significant factors responsible for citizens' influence on e-Services adoption in the country. The current study's findings serve as evidence to facilitate the government and policymakers to enhance and implement better e-Services, leading to a higher level of adoption among citizens and residents. According to Alsaif (2013), a successful implementation of e-Services will only reap full benefits if adoption levels remain continuously high.

2. Technology Readiness Model

People's willingness to adopt and use new technologies to achieve daily goals is referred to as technology readiness (TR) (Liljander et al., 2006). Parasuraman (2000) categorises technology readiness into four essential components: optimism, innovativeness, discomfort, and insecurity. The four components are further described as follow:

- 1) Innovation: a proclivity to be the first to use new technology (a tendency to be a technology pioneer and thought leader).
- 2) Optimism: a positive view of the technology (belief in increased control, flexibility, and efficiency induced by technology).
- 3) Discomfort: a presumption of being overwhelmed by technology; a sense of not having control over the technology.
- 4) Insecurity: is the distrust and doubt of technology's ability to perform effectively and safely.

Optimism and innovativeness, according to Parasuraman and Colby (2015), are positive drivers of the technology readiness index (TRI) because they inspire customers to embrace technological services and have a good attitude toward technology. In contrast, discomfort and insecurity are inhibitors that increase customers' reluctance and lessen their intention to adopt new technology (Parasuraman & Colby, 2015). In this sense, the technology readiness model can be said to define users according to four groups, distinguished by personality traits involving motivators and inhibitors of new technology usage (Parasuraman, 2000; Parasuraman & Colby, 2001). The significance of ICT has prompted researchers (Kim, Kim, Moon, & Chang, 2014; Jaafar et al., 2007) to have addressed relevant technological issues in emerging economies for the last couple of decades. Their findings, alongside those of Parasuraman and Colby (2015), suggest TR's potential in determining technology readiness among individuals.

2.1 Innovativeness

According to Garcia and Calantone, as stated in Buyle, Van Compernelle, Vlassenroot, Vanlischout, Mechant, and Mannens (2018), "innovativeness" is commonly employed to assess the novelty of innovation, with more innovative items being labelled with a higher degree of novelty. As a result, creative and innovative users are more likely to absorb new ideas sooner and more efficiently than others (Rogers, 2003). Parasuraman and Colby (2015) argue that creativity lies in the inclination "towards being a thought pioneer and an innovation pioneer," often synonymously describing a bold, innovative user. Additionally, Parasuraman (2000) introduced the technological dimension and referend as "a propensity of being a technology pioneer and influencer", while the works of Alharbi and Sohaib (2021); Venkatesh and Bala (2012) found a direct correlation between technology readiness and business process standard adoption. We suggest the following hypothesis based on these findings:

H1. Innovativeness is positively related to e-Services adoption.

2.1.1 Optimism

According to Scheier and Carver (1985), optimistic people expect "good things to happen rather than terrible things to happen." Optimists' approaches to the world are impacted by their attitude towards risk perception and acceptance of technology. Additionally, Parasuraman (2000) describes optimism as related to a "positive view towards technology and trust that it will offer people more efficiency, flexibility and control", where optimism is deemed to impact technology readiness positively. e-Services adoption is positively influenced by optimism, according to Alharbi and Sohaib (2021); Buyle et al. (2018); Hallikainen and Laukkanen (2016); Parasuraman and Colby (2015). As a result, we suggest the hypothesis below:

H2. Optimism is positively related to e-Services adoption.

2.1.2 Discomfort

Attributes related to discomfort are often linked to "a perceived lack of control regarding technology and the sense of being overwhelmed by it" (Parasuraman & Colby, 2015; Parasuraman, 2000). Mukherjee and Hoyer (2001) denote that highly complex features in technology products harm the product evaluation due to the cost involved in the user's learning process. Parasuraman (2000) defined the "apparent absence of command over innovation and sentiments of being overpowered by it" as an indication of uneasiness. Consumers experiencing discomfort are predicted to distrust innovative technology, development, changes and may develop technophobia (Parasuraman, 2000). Alharbi and Sohaib (2021), in their study on cryptocurrency adoption, find that discomfort will have a non-positive effect on technology adoption, prompting consumers to develop a generally negative perception when there is an innovation. Following these premises, the following hypothesis is proposed:

H3. Discomfort is negatively related to e-Services adoption.

2.1.3 Insecurity

Insecurity is often identified with the occasion of "distrusting of technology and scepticism about its ability to work properly" (Parasuraman, 2000). Now and then, consumers who feel insecure do demonstrate their readiness to rely on innovation. However, the combination of safety concerns, negative technological consequences and the

need for assurance induces scepticism among consumers concerning technology usage (Parasuraman, 2000). Haddad, Ameen, Isaac, Alrajawy, Al-Shbami, and Midhun Chakkaravarthy (2019) reported that insecure consumers are linked to both ambiguous and generally low utilisation of innovation. Furthermore, insecure customers often embrace innovation enthusiastically, but only when no more decisions are made. With regards to measures of innovativeness, unique effects relating to insecurity have been widely researched (Haddad et al., 2019). Godoe and Johansen (2012), alongside Walczuch et al. (2007) as cited in Haddad et al. (2019), confirmed that identifying insecurity is not fundamental where despite what is expected, “one could expect that individuals will realise fundamental estimation for a framework that pays little heed to how things are being handled”. Gelderman et al. (2011) observed a low effect of insecurity and believed the measure to be inconsistent and weak, confirming the findings of Godoe and Johansen (2012) and Walczuch et al. (2007). They concluded that insecurity is a negative contributor that should be combined with the much more substantial part of discomfort due to its shortcomings (Haddad et al., 2019). Nonetheless, Parasuraman and Colby (2015), in their TR re-assessment 2.0, discovered that insecurity is strongly linked to a lack of trust in innovation and a lesser willingness to use it. This identification establishes a negative connection between insecurity and the general acknowledgement of advances (Alharbi & Sohaib, 2021), prompting us to propose the following hypothesis:

H4. Insecurity is negatively related to e-Services adoption.

The findings of these exploratory research corroborate the emerging themes in earlier technology readiness research, implying that positive and negative beliefs are put together to connect to impact technology behaviour (Parasuraman & Colby, 2015).

2.2 Unified Theory of Acceptance and Use of Technology (UTAUT)

Venkatesh et al. (2003) presented UTAUT based on communication, psychology, and sociology ideas. While most previous models seek to explain user behaviour using a range of independent factors, the UTAUT proposes four constructs that are direct predictors of usage behavioural intention: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). UTAUT also incorporates elements from eight different technology acceptance models, including the theory of reasoned behaviour, technology acceptance model, motivational model, theory of planned behaviour, a model that combines planned behaviour and technology acceptance model, model of PC usage, innovation diffusion theory, and social cognitive theory. According to Alhujran (2009), managers can utilise UTAUT to assess the possibility of technological acceptance in their organisation.

2.3 E-Services in Oman

The government of Oman has been attempting to create a comprehensive framework and successful implementation of e-Services in the country, particularly in light of the Covid-19 pandemic, which has impacted government operations and revenue as well as the lives of individuals. Evidence of this effort is in the launching of the vision 2040 in the hopes of improving the country’s global standing (OmanObserver, 2020). Oman Vision 2040 emphasises the country’s participation as a developed country (in the top 20 from the top 40 in Vision 2030) by promoting economic competitive strength and social well-being, stimulating growth, and fostering trust in all economic, social, and developmental connections around the world. A large number of Oman internet users as of January 2020 indicates a promising future concerning the use of the internet to access e-Services in the country. The Oman government has initiated a considerable effort in encouraging the use of ICT to meet its goals and provide organised services to its stakeholders. For commercial and administrative purposes, most of the government, corporate, and international organisations in Oman have effective computer systems. Large corporations have spent a lot of money on computer systems and software to support their business transactions (Parker & Castelman, 2007). The e-Services portal aims to provide a one-stop online public services platform with an integrated transaction system for the convenience of citizens and residents. The National statistics online, the national registration system for higher education, DIAM e-Services Portal, Academic e-Services, Royal Oman Police (ROP) e-Services, Health, and a variety of other e-Services are among the services available. Furthermore, the infrastructural development, especially in the ICT sector, prompted the Oman government to deliver several interactive and online transactional services with the recent implementation of VAT which was in effect on 16 April 2021. These services are fully operationalised with electronic payment, submission of statistical information, the contribution of social security welfare, and job applications.

Oman was ranked favourably on the E-government Development Index (EGDI) in the United Nations E-Government Report 2020 (Source: 2020 United Nations E-Government Survey), however infrastructure issues could hinder the development of other e-Services. Several studies (Hamed AL-Shukri Udayanan, 2019; Parasuraman & Colby 2015; Alraja et al., 2015; Venkatesh et al., 2003) show that direct determinants of usage

intention and behaviour, such as optimism, innovativeness, discomfort, insecurity, trust on the internet, trust in government, information quality, privacy, performance expectancy, effort expectancy, social influence, and facilitating conditions, have significant influences on usage intention. On the other hand, issues such as awareness, used models, desired infrastructure, integration process, and differences in political, cultural, technical, and organisational sources all provide problems in the implementation of e-Services (Alraja et al., 2015).

2.4 Research Framework

While the advancement of e-Services has gained traction among researchers around the world, literature on e-Services adoption in Oman accounting for the consumers' viewpoint remains limited (Parasuraman & Colby, 2015). Furthermore, the lack of an integrated research model has also fractured a unified research stream (Chan, 2000). The proposed research framework in the current study presents a hypothesised relationship between constructs identified in the relevant literature. The TR 2.0 Model, according to Parasuraman and Colby (2014), can be used to assess technology readiness levels within a population, a country, a special demographic group of interest (e.g., Asian Americans in the United States, teenagers, seniors), a profession (e.g., teachers, software developers, doctors, clinicians), or a target market or segment (e.g., consumers of superior-tech products). Upon reviewing sufficient past literature, the researchers also establish TR 2.0 as most suitable for the current study as it aligns with the research focus and has proven to be a robust predictor of technology-related behavioural intentions as well as the realisation of actual behaviours (Parasuraman & Colby, 2015). The current study accounts for innovativeness, optimism, discomfort, and insecurity in determining the adoption of e-Services among Oman consumers using the proposed study framework, a total of four hypotheses were investigated. (See Figure 1). Since this process involves the development of multi-item scales to measure constructs, there is a need to develop a specific set of measures for e-Services as proposed by Colesca & Dobrica (2008) who believe that stakeholders may require different criteria to measure each construct.

The focus of this research is to find out how ready consumers are for e-Services in Oman and their attitudes toward the e-Services. However, because there is no comparable technique in the literature, the researchers devised a model based on Technology Readiness 2.0 with an ideal premise and conducted a survey focusing on Oman's citizens (Rigopoulos, Psarras, & Askoun, 2008). Drawing on past studies, the e-Services adoption constructs in this study is as presented in Figure 1. Similarly, the criteria to measure each construct include the adaptation of the criteria used in related studies as well as the results of relevant empirical studies.

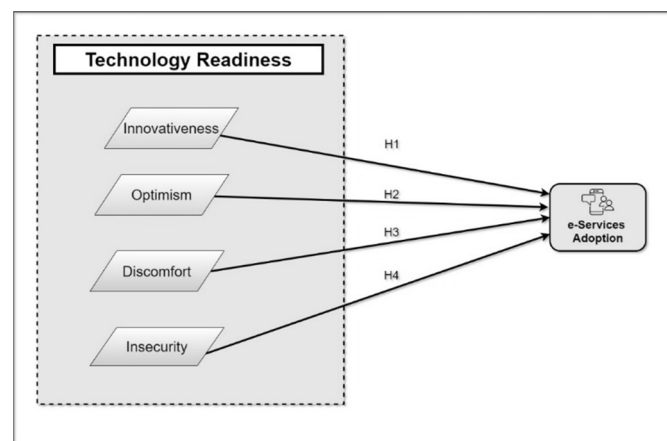


Figure 1. The proposed research framework for the current study

3. Research Methodology

Sekaran (2006) defined research methodology as “an organised, systematic, critical, scientific enquiry or investigation into specific problem undertaken to find answers or solutions”. In line with the main objective of this study and the components that will be adopted in the technology readiness model, the data collection procedure involves utilising online survey. This study employs a quantitative stance that aligns with the research direction and objectives highlighted in section 1.2. A self-administered questionnaire instrument was then developed and distributed to different participants. In adopting the general assumption that citizens view the adoption of e-Services differently, the adoption process involved will also be different (Parasuraman & Colby, 2015). Furthermore, this study adopts a deductive reasoning approach, examining theories related to Technology Readiness and technology adoption. The research philosophy of a particular study is usually deciphered via two

methods of reasoning, namely deductive and inductive reasoning. Deductive reasoning involves testing a hypothesis where theories are confirmed through acceptance or rejection of hypothesis and allows for replication of findings. The hypothesis in this study is founded on the notion that citizens' perceptions of e-Services influence individuals' willingness to accept them. Inductive reasoning, on the other hand, is more open-ended, intending to discover and understand new phenomena.

3.1 Target Population & Sample Size

The target population in this study is Omanis, with a reported population of 2,738,629, according to the National Centre for Statistics and Information (NCSI) (2021). For most studies, Rosco (1975) recommends a sample size of greater than 30 but less than 500. Sekaran and Bougie (2016); Sekaran (2006), argue that a larger sample size of more than 500 could pose a serious problem. Adhering to the limit of 30 to 500 samples, a 10% sample size from the parent population is recommended, Hence, the sample size for this research is 385 samples upon using Raosoft's (2010) common sample size calculator.

3.2 Data Collection & Analytical Tools

An online survey questionnaire was used to collect the main data for this research. The questions and items in the research instrument utilised in this study are linked to the independent and dependent variables. A total of 322 responses were collected, representing a response rate of 84%, where the survey is distributed via a dedicated website designed specifically for the research. The link containing the questionnaire was also distributed to ensure the minimum sample size has been met. The use of an online survey was intended to facilitate the collection of responses, and participants were encouraged to provide feedback that accurately reflected their genuine opinions. Additionally, using an online survey also reduces the health risk posed by the Covid-19 pandemic. All filled responses were downloaded into a CSV (comma-separated values) file for coding and analysis, this process utilised the Statistical Package for Social Sciences (SPSS). Subsequently, the SmartPLS software was employed for further assessment, because SmartPLS is known for its user-friendliness, robustness, and incremental feature in predicting endogenous variables (Ringle et al., 2015; Hair et al., 2017).

3.3 Research Instrument

According to Parasuraman and Colby (2015); Hayduk and Littvey (2012); (Aizen & Fishbein, 1980) a 25-item survey questionnaire was developed as the research instrument for this study. The questionnaire is divided into three sections: background information, technology readiness constructs, and e-Services adoption attitude questions. The first half comprises five closed-ended items, whereas the second section, which deals with technological readiness, has 16 rating-scale items 1. (Strongly Disagree) 2. (Disagree) 3. (Neutral) 4. (Agree) 5. (Strongly Agree) (Parasuraman & Colby, 2014). Four items in the section on e-Services adoption attitude have a rating scale to record participants' responses. The decision to utilise the multi-item Likert scale is based on the works of Lee, Yoon, and Lee (2009). Previous studies (Isaac, Abdullah, Ramayah, Mutahar, & Alrajawy (2017); Ameen & Ahmad (2014)) suggested using a Likert scale to assess constructs, with 5 representing "Strongly Agree" and 1 representing "Strongly Disagree."

4. Data Analysis and Result

4.1 Respondents' Background Information

4.1.1 General Demographic Characteristics of the Sample

Table 2. Characteristics of the Sample

		Frequency	Percentage (%)
Gender	Female	163	50.6%
	Male	159	49.4%
Age	<20	78	24.2%
	21 – 40	230	71.4%
	41 – 60	14	4.3%
	>60	0	0.0%
Educational Level	Bachelor's Degree and above	90	28.0%
	Diploma	183	56.8%
	High School	48	14.9%
	Primary Certificate or lower	1	.3%
Occupation	Government Employee	50	15.5%
	Private Employee	22	6.8%
	Self-employed	10	3.1%
	Student	205	63.7%
	Unemployed	35	10.9%
Years of Internet Use	<5 years	50	15.5%
	>10 years	134	41.6%
	5 - 10 years	134	41.6%
	No experience	4	1.2%

4.1.2 Gender and Age

Out of the completed 322 responses, 159 (49.4%) participants are male, while 163 participants (50.6%) identified as female. Additionally, the respondents' age ranges across four different age groups where the most respondents are between the age of 21-40 (71.4%), followed by those aged 20 years or less (24.2%) and those from the age group of 41-60 (4.3%). There were no respondents above the age of 60 in the study.

4.1.3 Educational Level and Occupation

The results indicate that most respondent holds a Diploma qualification (56.8%). The rest possess a bachelor's degree and above (28%), high school qualification (14.9%) or a primary certificate (.3%). In terms of occupation, most respondents were students (63.7%), while the remaining respondents are either government employees (15.5%), unemployed (10.9%), private employees (6.7%) or self-employed (3.15).

4.1.4 Years of Internet Use

Findings show that 15.5% of the respondents used the internet for a period less than five years, while those who used the internet for 5-10 years constitute 41.6% of the overall figure. Similarly, 41.6% of respondents have been using the internet for more than ten years, while 1.2% have never used the internet. This means that 83.2% of respondents have used the internet for more than 5 years.

4.2 Attitude towards E-Services Adoption

The respondents were also investigated on their attitude towards e-Services adoption in the country where the results generated an overall positive attitude. As demonstrated, 73% of respondents want to use e-Services, 71% believe that using e-Services is more efficient than using the manual approach, 73% have positive feelings when using e-Services, and 79 per cent enjoy using e-Services. Extending the statistical investigation further, Table 3. shows the factors that influence e-Service adoption using the coefficient of variation (CV), with the lowest coefficient being more reliable and consistent. A consistent factor that is reported to influence the adoption of e-Services is that they enjoyed using e-Services (22.22) and the positive feelings they have when using e-Services

(22.98). The factor of intention to use e-services (24.51) does not support the adoption of e-Services.

Table 3. Attitude towards e-services

Reasons	Mean	Sd	Cv=(sd/mean) x 100
I intend to use new e-services	4.00	.981	24.51
To me, using e-services is more efficient instead of the manual procedure	4.02	.950	23.65
I have a positive feeling towards the use of e-services	4.07	.935	22.98
I enjoyed using e-services	4.15	.922	22.22

4.3 Assessment of Measurement Model

The SmartPLS is selected to further analyse the data due to its robustness and incremental character in predicting endogenous variables (Hair et al., 2017). As mentioned earlier, the analysis of the current study consists of two stages: assessment of measurement model and assessment of the structural model. More specifically, the SmartPLS was employed to assess the reliability and validity as part of the assessment of the measurement model. Figure 2. depicts the research model and the assessment's value.

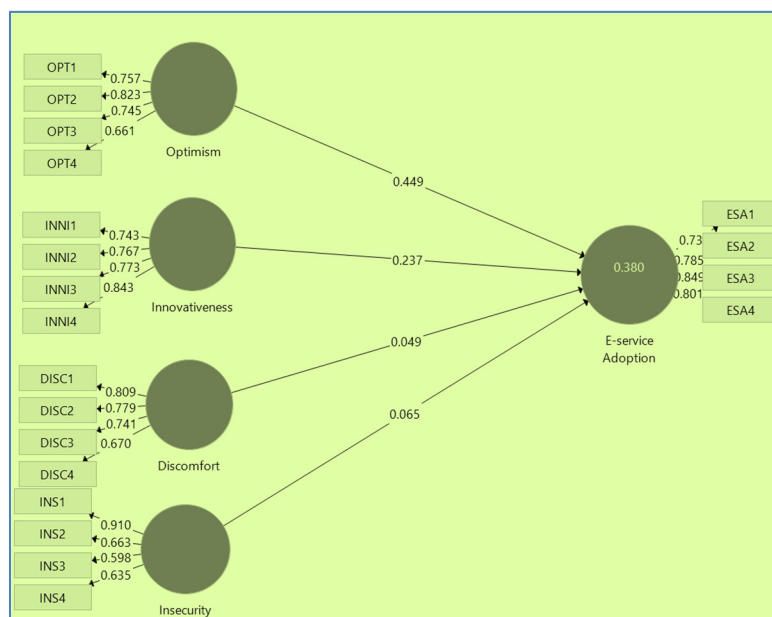


Figure 2. Research model with values

4.3.1 Items Loading

Table 4 illustrates the factor loadings for each item where all loadings were recorded to be above .60, indicating a good convergent validity in the model.

Table 4. Items loading

	Disc omfo rt	e- Services Adoption	Innovat iveness	Inse curit y	Opti mis m
When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I am being taken advantage of by someone who knows more than I do [DIS1]	0.809				
Technical support lines are not helpful because they don't explain things in terms I understand [DIS2]	0.779				
Sometimes, I think that technology systems are not designed for use by ordinary people [DIS3]	0.741				
There is no such thing as a manual for a high-tech product or service that's written in plain language [DIS4]	0.67				
I intend to use new e-Services [ESA1]		0.737			
To me, using e-Services is more efficient instead of the manual procedure [ESA2]		0.785			
I have a positive feeling towards the use of e-Services [ESA3]		0.849			
I enjoyed using e-Services [ESA4]		0.801			
Other people come to me for advice on new technologies [INN1]			0.743		
In general, I am among the first in my circle of friends to acquire new technology when it appears [INN2]			0.767		
I can usually figure out new high-tech products and services without help from others [INN3]			0.773		
I keep up with the latest technological developments in my areas of interest [INN4]			0.843		
People are too dependent on technology to do things for them [INS1]				0.91	
Too much technology distracts people to a harmful point [INS2]				0.66	
Technology lowers the quality of relationships by reducing personal interaction [INS3]				0.59	
I do not feel confident doing business with a place that can only be reached online [INS4]				0.63	
New technologies contribute to a better quality of life [OPT1]					0.75
Technology gives me more freedom of mobility [OPT2]					0.82
Technology gives people more control over their daily lives [OPT3]					0.74
Technology makes me more productive in my personal life [OPT4]					0.66
					1

Notes. **Discomfort (DISC), **Innovativeness (INNI), **Insecurity (INS), **Optimism (OPT), **e-Services Adoption.

4.3.2 Reliability of Variables & Convergent Validity

Table 5. Reliability & convergent validity

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Discomfort	0.746	0.769	0.838	0.565
e-Services Adoption	0.804	0.806	0.872	0.631
Innovativeness	0.789	0.802	0.863	0.612
Insecurity	0.725	1.096	0.8	0.507
Optimism	0.74	0.756	0.835	0.561

Table 5 shows the Cronbach alpha and composite reliability for all variables, which indicate the measurement tool's dependability. Because an AVE value of higher than 0.5 implies good convergent validity, all of the values are greater than 0.70, showing satisfactory reliability (Hair et al., 2017). Cronbach Alpha, on the other hand, has been used to analyse the internal coherence (consistency) of the questionnaire's various scales. The greater the scale's internal consistency, the more effective the questionnaire is at measuring a concept, resulting in more reliable data and findings. Tavakol and Dennick (2011) proposed that an acceptable and reliable Cronbach value should not be below 0.70. Similarly, Leowenthal (2004) argues that an alpha coefficient of .60 is acceptable, while Ramayah (2011) contends that a Cronbach Alpha coefficient value of more than .70 is considered good and a value of more than .50 is acceptable.

4.3.3 Fornell-Larcker Criterion of Discriminant Validity

Table 6. Discriminant validity based on the Fornell-Larcker criteria

	Discomfort	e-Services Adoption	Innovativeness	Insecurity	Optimism
Discomfort	0.751				
e-Services Adoption	0.263	0.794			
Innovativeness	0.438	0.438	0.783		
Insecurity	0.068	0.152	0.075	0.712	
Optimism	0.235	0.563	0.388	0.146	0.749

To ascertain the discriminant validity for this study, the Fornell-Larcker (1981) criteria was employed. The finding suggests that all relevant values are greater than the inter-item correlation, with the square root of the AVE in bold and the inter-variable correlation in other values. The criteria require the bolded values to be higher than the values in their respective rows and column. Hence, the values generated in this study fulfil this requirement and indicate a good discriminant validity.

4.3.4 HTMT Ratio Discriminant Validity

Table 7. Discriminant validity: HTMT ratio

	Discomfort	E-service Adoption	Innovativeness	Insecurity	Optimism
Discomfort					
e-Services Adoption	0.327				
Innovativeness	0.566	0.54			
Insecurity	0.18	0.149	0.11		
Optimism	0.314	0.717	0.515	0.147	

Additionally, the heterotrait-monotrait (HTMT) ratio was also considered as shown in Table 7, where all values are less than 1, representing a good and established discriminant validity (Franke & Sarstedt, 2019). The researchers evaluated the structural model for hypotheses testing in the following sections after establishing that the measurement model yields good reliability, convergent validity, and discriminant validity.

4.4 Assessment of Structural Model

The multicollinearity assessment, t-test, path coefficient, coefficient of determining (R^2), effect size (f^2), and the

model's predictive relevance are all part of the structural model assessment (Q^2). Hypothesis testing was also done using the bootstrapping method.

4.4.1 Multicollinearity

Table 8. Multicollinearity

	Discomfort	e-Services Adoption	Innovativeness	Insecurity	Optimism
e-Services Adoption					
Innovativeness		1.385			
Optimism		1.203			
Discomfort		1.246			
Insecurity		1.023			

The generated VIF ranges from 1 to 10 based on the collinearity statistics output. As a result, it can be determined that the data set has no multicollinearity symptoms. The VIF value threshold should be 5, according to Hair et al. (2017) and Ringle et al. (2015). There are no multicollinearity issues in the data because the VIF values are all less than 3 (<3) in this case.

4.4.2 Hypothesis Testing: Path Coefficient (Structural Model)

The hypotheses in the study are tested using the SmartPLS software, where optimism, innovativeness, insecurity, and discomfort are independent variables while e-Services adoption is the dependent variable.

Table 9. Hypothesis testing: Path Coefficient

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ((O/STDEV))	P Values	F-square
Innovativeness -> e-Services Adoption	0.236	0.235	0.054	4.349	0	0.065
Optimism -> e-Services Adoption	0.451	0.451	0.051	8.842	0	0.273
Discomfort -> e-Services Adoption	0.046	0.053	0.051	0.914	0.361	0.003
Insecurity -> e-Services Adoption	0.065	0.076	0.054	1.202	0.229	0.007
R-square = .379						
Q-Square = .226						

H3 and H4 can be ruled out based on Table 9, as there is a difference in the adoption of e-Services between the variables. Discomfort ($\beta=0.046$, $p>0.05$) and insecurity ($\beta=0.065$, $p>0.05$) had positive but insignificant effects on e-Services adoption, according to the findings. Furthermore, optimism ($\beta=0.451$, $p=0.05$) and innovation ($\beta=0.236$, $p=0.05$) have a favourable and substantial effect on e-Services usage.

According to Hair et al. (2017), the R^2 , F^2 , and Q^2 should be investigated and reported. As per the R-square values in this study, IV account for 37.9% of the variation in the DV. The f^2 values, on the other hand, show the predictive power of the IV on the DV, where the f-value in this study is reported to be above .02 for inventiveness and optimism, demonstrating small to medium effects. Generally, the f-square value of 0.02 is considered a small effect, 0.15 as medium effects, and 0.35 are considered as large effect sizes (Cohen, 1988; Roldán & Sánchez-Franco, 2012). Finally, Q-square values represent the predictive relevance of the model based on the construct of the sample (Hair et al., 2017). In this investigation, the Q-square value represents the predictive relevance of the model, with a value greater than 0 indicating strong predictive relevance.

Table 10. Summary of hypotheses testing

Hypothesis. No.	Statement	Remarks
H1	Innovativeness is positively related to e-Services adoption.	H1 supported
H2	Optimism is positively related to e-Services adoption.	H2 supported
H3	Discomfort is negatively related to e-Services adoption.	H3 Not supported
H4	Insecurity is negatively related to e-Services adoption.	H4 Not supported

5. Discussion, Conclusion & Recommendation

5.1 Discussion of the Main Findings

The analyses and findings of this empirical study show the link between consumer technology readiness and e-Services adoption, as well as consumer attitudes regarding e-Services adoption in Oman. The study investigates the potential of using the TR Model to predict Omanis willingness to adopt e-Services, where it is considered one of the first studies to do so in the context of Oman. The TR 2.0 scale employed is the most recent scale developed by Parasuraman and Colby (2015). This scale is more compact and better suited to modern technological advancements such as the internet, cell phones, tablets, and the applications created for those platforms.

5.2 Technology Readiness and E-Services Adoption

When it comes to the use of e-services or technology, Oman, as a member of the Gulf Corporation Council (GCC), lags behind advanced countries like the United States and several European countries; nonetheless, e-Service adoptions range from country to country. The study findings indicate that e-Services adoption is still evolving because different factors influence e-Services or technology adoption in different countries (Kutty, 2021; Hadad et al., 2019; Alraja et al., 2015). Offering an insight into the role of the technology readiness model, the findings of this study revealed that innovation has an affirmative effect ($\beta=.236$, $p<.05$) on e-Services adoption in Oman. This outcome is supported by several earlier studies (Alharbi & Sohaib, 2021; Hadad et al., 2019; Buyle et al., 2018; Alraja et al., 2015; Parasuraman & Colby, 2015; Venkatesh & Bala, 2012). Similarly, optimism affects the adoption of e-Services among Omanis in the country ($\beta=.451$, $p<.05$) where this finding is supported by studies conducted by Alharbi and Sohaib (2021); Hadad et al. (2019); Buyle et al. (2018); Alraja et al. (2015); Parasuraman and Colby (2015). These findings indicate that Omanis are motivated to use new technologies to help the country implement better e-Services technologies.

Discomfort and insecurity, on the other hand, were reported not to affect Omanis' adoption of e-Services ($\beta=.046$, $p>.05$) and insecurity ($\beta=.065$, $p>.05$), respectively. These results can be attributed to the e-Services technology, especially when they find technology too complicated for an average person or when they presume that technology lowers the quality of personal interaction. These findings align with the works by Alharbi and Sohaib (2021); Parasuraman and Colby (2015); Kotler, Armstrong, Ang, Leong, Tan, and Ho-Ming (2012). According to Alharbi and Sohaib (2021); Parasuraman and Colby (2015), insecurity is inextricably linked to a lack of trust in technology, which reduces the willingness to adopt innovation.

5.3 Attitude towards E-Services Adoption

In terms of attitude, many Omanis agree to the benefit of using e-Services as the result shows respondents of the study strongly agree and accept these e-Services. It can be concluded that the main attitudes related to Omanis are "they enjoyed using the e-services" with a coefficient of variation (CV) of 22.22 followed by the positive feelings they have towards the use of e-services (22.98) as presented in Table 3. These findings are consistent with Hamed AL-Shukri Udayanan's (2019) research into the factors that influence internet shopping in Oman. The perceived advantage includes higher efficiency, positive feelings, and enjoyment of using service, among others. With proper implementation of e-service, more Omanis will be more inclined to use the service (AlAwadhi & Morris, 2012). In particular, these attitudes can facilitate the fast adoption of e-Services, especially when it is obvious that many factors limit the adoption of such services.

5.4 Conclusion & Recommendation

A total of four factors were investigated and established in this study using the TR 2.0 model to measure Omanis' readiness for the adoption of e-Services. Findings confirm that Innovativeness and Optimism are positively significant to the adoption of e-Services, implying that both variables are driving forces to e-Services adoption. As a result, H1 and H2 are fully supported in this study because they are consistent with previous research (Hadad et al., 2019; Buyle et al., 2018; Alraja et al., 2015; Parasuraman & Colby, 2015). Meanwhile, the Insecurity and Discomfort shows little or insignificant effort on e-Services adoption, the H3 and H4 are not supported

(Parasuraman & Colby, 2015; Kotler, Armstrong, Ang, Leong, Tan, & Ho-Ming, 2012). However, the H3 and H4 do not match the findings of Haddad et al. (2019). Although the findings are consistent with earlier studies, this is the first of its kind. The study's questions were answered, and factors affecting e-Services adoption in Oman were recognised. The government of Oman can use this information to boost e-Service adoption, particularly among Omanis who are concerned about security and discomfort when using e-Services. Through three views, this study also proposes solutions that can be positively adopted when it comes to e-Services. According to the authors, if the recommendations are implemented, the efficiency, efficacy, and quality of e-Services adoption in Oman will improve.

- Societal awareness: It is recommended that the government employ an effective and attractive marketing program to promote e-Services where the government should concentrate more on the benefit of e-Services, including convenience, timeliness, and secure transactions. (AlAwadhi & Morris (2012) suggest the integration of e-Services into the high school curriculum to prepare young Omanis for the future. Furthermore, to avoid scepticism of e-Services among citizens, the government should also enhance public trust and satisfaction by regulating private sectors to improve the transparency and efficiency of their services.
- e-Services efficiency: Because the success of e-Services adoption depends on its efficiency, there should be a collaboration between government agencies and non-governmental agencies on information and knowledge-sharing to help deliver efficient customer service.
- Enhancing websites: The web application needs to be improved to accommodate users in a friendly and convenient manner. Thus, government or policymakers must consider a variety of users, including disabled individuals, emphasising the security and responsiveness of the website and application. An interactive website offers functional features with a concise procedure that will not repel users. Furthermore, information should be frequently updated to ensure consistency in the content and structure of the website.
- To effectively promote the adoption of e-Services, the implementation should be tailored to citizens' needs and desires, considering cultural, religious, traditional, and other relevant factors.

5.5 Limitations & Direction for Future Research

The study population was limited to Oman citizens only limiting the generalisability of the results. Future research should include various sample populations from around the country to have a more comprehensive understanding of the elements that may influence e-Service usage. Despite the model's successful application in this study, future research should look at other variables such as mediating or moderating variables, as well as experimenting with various statistical tests.

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