Factors determining user satisfaction of internet usage among public sector employees in Yemen

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Abstract: Internet technology has become an essential technological tool for individuals, organisations, and nations driving growth and prosperity. However, there are countries such as Yemen which have very low internet usage rates and which see little economic, social and cultural progress as a result. Therefore, this study has developed an integrated conceptual model based the DeLone and McLean information systems success model (DMISM), the unified theory of acceptance and use of technology (UTAUT) and task-technology fit (TTF) to predict the user satisfaction of internet. A survey questionnaire was used to collect primary data from 530 employees in all 30 government ministry institutions in Yemen. An analysis was conducted to examine the relationship between the variables of the proposed model, which includes initial exploratory factor analysis (EFA), confirmatory factor analysis (CFA) and structural equation modelling (SEM) via AMOS. The results indicated that system quality, information quality, task quality, and social quality are the four key determinants of employee satisfaction related to internet usage. The theoretical and practical implications are also discussed in this study.

Keywords: internet usage; user satisfaction; diffusion of innovation; DOI; Yemen.

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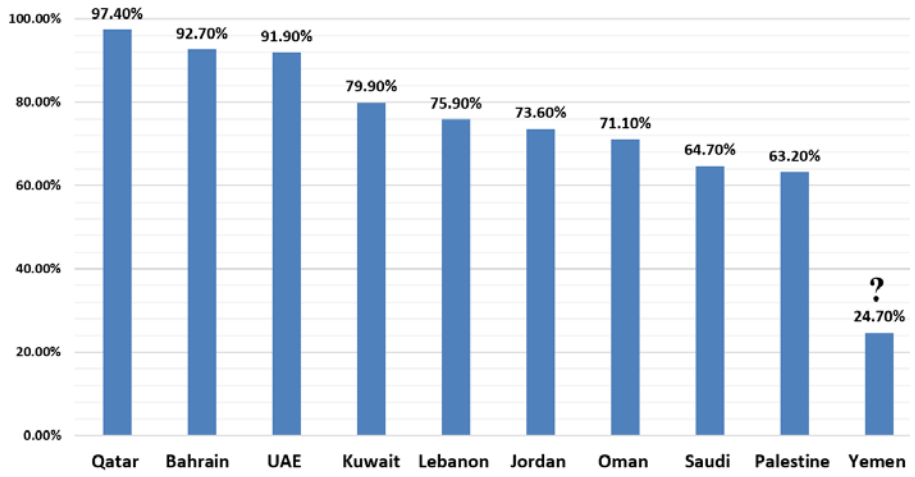
1 Introduction

The internet/World Wide Web (WWW) has rapidly become indispensable in the daily life of most individuals and has significantly impacted every facet of operations in organisations (Greengard, 2015; Annunziata, 2013). It has also become an essential element in knowledge management to improve knowledge acquisition, task efficiency,

communication quality and decision quality (Cheung et al., 2000; Parveen and Sulaiman, 2008; Curran et al., 2016).

While some 40% of the world population has an internet connection today and there is a high internet penetration of Yemen's neighbouring Arab countries such as Qatar (97.40%), Bahrain (92.70%), UAE (91.90%), Kuwait (79.90%), Lebanon (75.90%), Jordan (73.60%), Oman (71.10%), Saudi Arabia (64.70%) and Palestine (63.10%). Yemen has one of the world's lowest internet usage rates at 24.70% (see Figure 1), which is not even close to the world's average internet usage of 50.1% (Internet World Stats, 2016). Moreover, information technology usage within government institutions in Yemen is lagging behind neighbouring Arab countries (Isaac et al., 2017d), ranking only 132 out of 143 countries surveyed (Networked Readiness Index, 2015).

Figure 1 Internet technology usage as percentage of population: Yemen vs. Arab countries (see online version for colours)



Source: Internet World Stats (2016)

It is important to note that lack of technology usage can lead to low performance and low productivity (DeLone and McLean, 1992, 2003; Norzaidi and Salwani, 2009; Makokha and Ochieng, 2014) and there is a positive effect of technology usage on efficiency and effectiveness (Isaac et al., 2017a; Adeoti et al., 2010). Therefore, the purpose of this study is to assist policymakers in Yemen to come up with the suitable decisions and strategies to increase internet usage and accelerate the diffusion of the internet within the country.

In his theory of diffusion of innovations (DOI), Rogers (2003) proposed five stages of the technology adoption process:

1 knowledge (the person is first exposed to an innovation)

2 persuasion (the person developing an attitude towards the innovation)

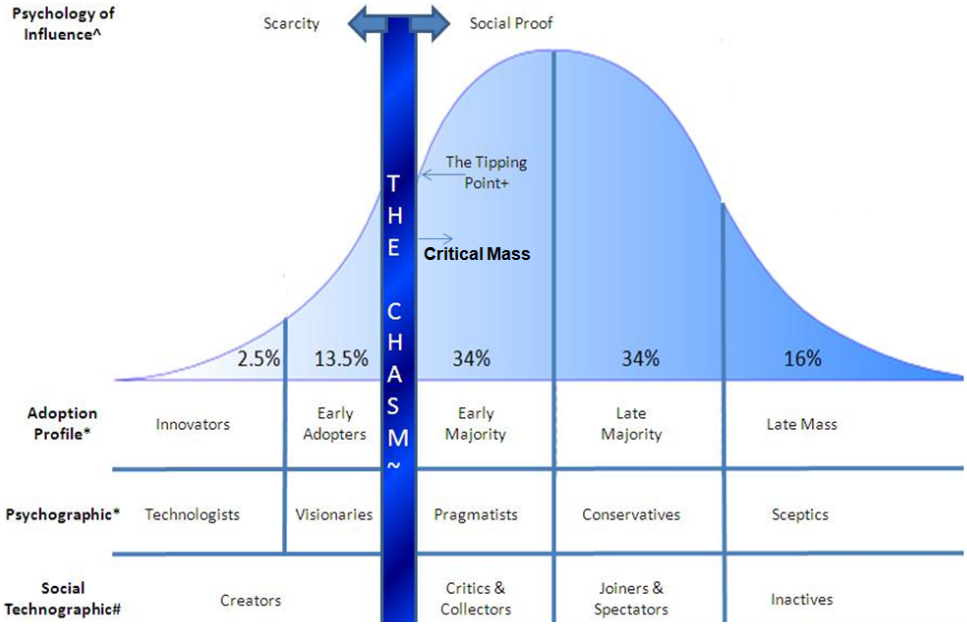
3 decision (the person decides to adopt or reject the innovation)

4 implementation (the person putting the innovation into practice)

5 confirmation (the person finalises his/her decision to continue using the innovation).

DOI has mentioned that adoption patterns are different between individuals, they can be classified into five adopter categories according to when they were first introduced to the innovation to the extent of its adoption, and this generally follows a bell-shaped curve when plotted over time on a frequency basis. The five categories, each with its own distinct characteristics, are innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%), and laggards 'late mass' (16%) and Yemen regarding the internet adoption nearly in the early adopters category. In his book *Crossing the Chasm*, Moore (2006) mentioned that for discontinuous or disruptive innovations, there exists a gap or chasm between the first two adopter groups (innovators/early adopters) as well as the early majority, as shown in Figure 2. The difficult stage in the diffusion process, which is known as 'the chasm' or 'the critical mass', is defined as the adoption of any new idea or new product after the early adopters' stage. This describes the stage of internet usage of Yemen today. Gladwell (2002), Moore (2006) and 'Maloney's 16% rule' (Maloney, 2010) talked about the same point from different perspectives, stating that once 16% adoption of any innovation is reached, the strategy has to be shifted based on scarcity, social proof and the interest of the accelerating DOI as presented in Figure 2.

Figure 2 Characteristics of innovators and the secret to accelerating DOI (see online version for colours)



Source: Maloney (2010) based on Gladwell (2002), Moore (2006) and Rogers (2003)

The internet usage rate in Yemen is 24.70% which is almost at the critical mass stage, thus Rogers (2003) mentioned that organisations should have a social proof strategy in order to accelerate the diffusion of internet usage. In his bestselling book, *Purple Cow: Transform Your Business by Being Remarkable*, Godin (2009) proposes a specific social proof strategy by stating that any case of product diffusion in the early adopter's stage

would be a good strategy to focus and analyse the early majority and late majority. Godin also mentioned that this was applied during a period of time, known as 'TV-industrial complex', that is already gone by stating that "in a world of too many options and too little time, our obvious choice is to just ignore the stuff", Schwartz (2005) in his book *The Paradox of Choice: Why More is Less* agreed. Early majority and the late majority stages are not concerned about new ideas and new products due to the reason that they have less time but more choices compared to their previous time. Hence, when they have too little time and too many choices, the obvious and best decision is to just ignore almost everything. Godin proposed that the best strategy is to focus on early adopter satisfaction instead of focusing on early majority intention, in order to attract them to adapt to the product because early adopters care about new ideas and the new products. This study will examine the individual, organisational, social, and technological factors that could affect 'early adopter' employee satisfaction towards internet usage, considered to be the best way to accelerate the diffusion of internet usage among the early majority and late majority individuals due to the fact that it will attract and convince them to use internet technology. User satisfaction is widely used to measure the success of information systems (IS) (Montesdioca and Maçada, 2014). According to the scholars in the field of the IS such as Doll and Torkzadeh (1988) and DeLone and McLean (2003), user satisfaction is regarded as a key measure of the success of any system.

In developing countries, notable studies have been investigated the factors that influence the DOI, Al-Somali et al. (2009) in the context of internet banking in Saudi Arabia determined four essential factors namely social influence, computer self-efficacy, perceived usefulness and perceived ease of use, while Hanafizadeh et al. (2014) within the context of mobile-banking in Iran found that compatibility with lifestyle, usefulness, ease of use, need for interaction and perceived cost are the most important factors to determine the mobile-banking usage. Moreover, Farahat (2012) in the context of online learning in the Egyptian universities revealed that the factors that influence the students' usage of online learning are usefulness, ease of use and social influence.

According to Agarwal (2000), there are four categories that could influence the success of IS, namely individual, social, technology, and institutional characteristics. The literature is still rather limited in presenting a comprehensive picture of the issues related to IS (Wang and Lai, 2014). Most previous studies have focused on one, two, or three characteristics at most. For instance, Lai and Li (2005), Lin and Chang (2011) and Ramayah and Suki (2006) focused on technology characteristics, Huang et al. (2007), Ong and Lai (2006) and Suh and Han (2002) focused on technology and individual characteristics and Iqbal and Qureshi (2012) and Singh et al. (2006) focused on technology and social characteristics. Kim (2012), Kim et al. (2008), Lee and Kim (2009) and Pai and Huang (2011) focused on technology and institutional characteristics, Luarn and Lin (2005) focused on technology, institutional and individual characteristics and Son et al. (2012) focused on technology, institutional and social characteristics.

This study has developed a conceptual model based on three well-known models, namely DeLone and McLean information systems success model (DMISM) (DeLone and McLean, 2003), task-technology fit (TTF) (Goodhue and Thompson, 1995) and unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003). The DMISM has a widespread acceptance in IS success (Petter and McLean, 2009) and proposes three antecedence constructs in its updated model (system quality, information

quality and service quality), but it does ignore other important constructs such as individual characteristics (Roca et al., 2006; Zhao et al., 2011), task characteristics (Lee and Kim, 2009; Lu and Yang, 2014) and social characteristics (Cheng et al., 2013; Lian, 2015). TTF determines technological, individual and task characteristics as the main antecedence characteristics, but ignores the effect of other important characteristics such as social characteristics. This compares with UTAUT which brings together a range of theoretical frameworks and ideas and covers a wide range of characteristics (including individual, organisational and social) but disregards some of the critical characteristics such as task and technology characteristics. This study will fill the above-mentioned gaps (see Table 1). While the literature is still rather limited in terms of presenting a comprehensive picture of the issues related to user satisfaction in the use of technology in organisations (Wang and Lai, 2014), this study to the best of our knowledge can be considered as one of the first studies to identify various factors affecting such use among public sector employees in developing countries, from an integrated individual, technological, social, and organisational perspective based on the well-known models DMISM, UTAUT and TTF.

Table 1 Theoretical gaps and the proposed model for closing the gaps

Theory/model and source	*Antecedent factors*			
	Technology characteristics	*Individual characteristics*	*Organisational characteristics*	*Social characteristics*
DMISM (DeLone and McLean, 1992)	√	gap	gap	gap
TTF (Goodhue and Thompson, 1995)	√	√	gap	gap
UTAUT (Venkatesh et al., 2003)	√	gap	√	√
Proposed model	√	√	√	√

The research objectives of this study are:

1 to examine the effect of system quality on user satisfaction

2 to examine the effect of information quality on user satisfaction

3 to examine the effect of service quality on user satisfaction

4 to examine the effect of task quality on user satisfaction

5 to examine the effect of top management quality on user satisfaction

6 to examine the effect of individual quality on user satisfaction

7 to examine the effect of social quality on user satisfaction.

If the main variables of this study are found to possess significant relationships with employee satisfaction, a few recommendations will be made to ensure that such usage is efficient and effective. Further, this research may also assist and serve as guidance to other sectors and industries, especially those connected with the internet usage.

2 Literature review

2.1 System quality on user satisfaction

The system quality factor plays a major role in the context of technology and IS success (Glood et al., 2016). It is defined in this study as the degree to which the internet users are convinced of internet flexibility, its ease and enjoyment of use, its usefulness, security, price and speed (Alrajawy et al., 2016; Mutahar et al., 2016; Kim et al., 2007; Sun et al., 2008; Zhao et al., 2011). In the previous literature, system characteristics have been widely studied through different indicators such as adaptability, reliability, integration, and accessibility (Sun and Mouakket, 2015), speed and price (Sun et al., 2008), security (Salisbury et al., 2001) and ease of use and usefulness (Isaac et al., 2016a; Ramayah, 2006; Ramayah and Lo, 2007; Ramayah et al., 2005). There have also been numerous studies conducted on the influence of system quality on user satisfaction (Isaac et al., 2017b) and while Wang and Lai (2014) found a positive relationship between system quality and user satisfaction seems to exist in the context of knowledge management systems in organisations. DeLone and McLean (1992, 2003) are considering as the essential and classical studies that proved the positive effect of system quality on user satisfaction, which emphasised by other studies (Nikhashemi et al., 2013; Sahadev and Purani, 2008; Cho et al., 2015; Lwoga, 2013; Makokha and Ochieng, 2014). However, there are some studies which have obtained an opposite result that system quality does not influence user satisfaction (Sun et al., 2008; Chi, 2013; Khayun and Ractham, 2011). Therefore, the following hypothesis is proposed:

H1 System quality has a positive effect on user satisfaction.

2.2 Information quality on user satisfaction

Information quality is one of the fundamental antecedents of user satisfaction (Wu and Wang, 2006). In this study, it is defined as the degree to which internet users are convinced that internet information is up-to-date, accurate, relevant and precise (Cheng et al., 2013; Lederer et al., 2000). A previous study by Wang and Liao (2008) showed that information quality has a positive influence on user satisfaction within the context of e-government systems in Taiwan, and is in agreement with other studies which found that information quality is able to predict user satisfaction (Wang and Lai, 2014; Wu and Wang, 2006; Fan and Fang, 2006; Khayun and Ractham, 2011; Cho et al., 2015; Lwoga, 2013; Makokha and Ochieng, 2014). However, Cheng et al. (2013) found no relationship between information quality and user satisfaction. Therefore, the hypothesis is proposed as follows:

H2 Information quality has a positive effect on user satisfaction.

2.3 Service quality on user satisfaction

This study defines service quality as the degree to which internet users believe that both organisational and technical infrastructure exists to support the use of the internet (Lee and Kim, 2009; Lian, 2015; Nistor et al., 2014; Pai and Huang, 2011). The service quality factor is substantial in the context of technology success (Gopinathan and Raman, 2016;

Rotich et al., 2016). An appropriate service from their organisation is required for employees to adopt any innovations, to ensure that the technology is fully utilised. According to Cho et al. (2015), in the context of ISs usage in Korea, a positive relationship between service quality and user satisfaction was found, while the claim that service quality seems to have a positive effect on user satisfaction is supported by a number of previous studies (DeLone and McLean, 2003; Wang and Lai, 2014; Cheng et al., 2013; Nikhashemi et al., 2013; Khayun and Ractham, 2011; Makokha and Ochieng, 2014). However, some other studies found that service quality does not affect user satisfaction (Wang and Liao, 2008; Lwoga, 2013). Consequently, the following hypothesis is proposed:

H3 Service quality has a positive effect on user satisfaction.

2.4 Task quality on user satisfaction

Another important factor that influences user satisfaction is task quality, broadly described as those actions that are carried out by individuals in turning inputs into outputs (Goodhue and Thompson, 1995). In this study, task quality is defined as the degree to which internet users deal with ill-defined job problems and cooperate with other members to accomplish the tasks (Kim et al., 2007; Lee et al., 2011; Lee and Kim, 2009; Norzaidi et al., 2007). Task equivocality and task interdependence have been found in previous studies as a key success indicators for IS within organisations (Norzaidi et al., 2007; D'Ambra et al., 2013; McFarland and Hamilton, 2006) especially in the context of WWW (D'Ambra and Wilson, 2011; Lu and Yang, 2014). Therefore, the fourth hypothesis of this study is stated as follows:

H4 Task quality has a positive effect on user satisfaction.

2.5 Top management quality on user satisfaction

Top management quality or top organisational support is considered highly imperative in terms of the study of technology usage within an organisation (Anandarajan et al., 2002; Sucahyo et al., 2016). In this study, top management quality is defined as the degree to which internet users in organisations are encouraged and recognised by top management (Son et al., 2012; Wang and Lai, 2014). According to Wang and Lai (2014), top organisational support is found to be a major factor for the successful adoption of IS. Etezadi-Amoli and Farhoomand (1996) state that organisational support can lead to better user performance, while Son et al. (2012) found a positive relationship between the top management support and perceived usefulness. In contrast, Anandarajan et al. (2002) found that organisational support does not influence user satisfaction. Consequently, the following hypothesis is proposed:

H5 Top management quality has a positive effect on user satisfaction.

2.6 Individual quality on user satisfaction

Individual characteristic is a significant variable related to any technology usage and satisfaction (Mahdavian et al., 2016; AdomakoKankam et al., 2016; Chen et al., 2016). Certain kinds of skills and knowledge are required when trying to adopt new practices,

hence, individual quality has to be considered in achieving a successful IS organisation (Isaac et al., 2017c; Faqih, 2016). This study examined individual quality through self-efficacy, defined as the degree to which internet users believe that they have the ability to perform a specific task or job using the internet (Cheng, 2011; Zhao et al., 2011). Previous empirical studies found a positive relationship between individual characteristics and user satisfaction. According to Ogara et al. (2014), individual characteristics predict user satisfaction. However, Anandarajan et al. (2002) indicate that individual characteristics do not have any influence on user satisfaction. Hence, it is hypothesised as follows:

H6 Individual quality has a positive effect on user satisfaction.

2.7 Social quality on user satisfaction

Social quality (family, friends and colleagues pressure) in the IS domain is essential to influence individuals to use the system, and this can also lead to user satisfaction (Keeton, 2008; Mutahar et al., 2017a, 2017b). In this study, social quality is defined as the degree to which internet users perceive the importance of family, friends, and colleagues influence on their use of the internet (Cheng et al., 2013; Venkatesh et al., 2012). A previous study has shown that social pressure has a positive influence on user satisfaction within the context of ISs in Hong Kong (Venkatesh et al., 2011), similar to other studies which found that social characteristics predict user satisfaction (Chen et al., 2012; Ogara et al., 2014). There are, however, other studies which obtained an opposite result, that social characteristics do not influence user satisfaction (Hsu and Lin, 2015; Revels et al., 2010; Roca et al., 2006). Consequently, the following hypothesis is proposed:

H7 Social quality has a positive effect on user satisfaction.

2.8 User satisfaction

Evaluating IT through user satisfaction has been widely conducted to measure the success of IS (DeLone and McLean, 2016; Montesdioca and Maçada, 2014). User satisfaction is defined as the degree to which internet users are satisfied with the decision to use the internet because it meets their expectations (Wang, 2008; Wang and Liao, 2008; Roca et al., 2006). Many studies have proven that user satisfaction can be influenced by system quality (Cheng et al., 2013), information quality (Wang and Liao, 2008), service quality (Cho et al., 2015), task quality (Lee et al., 2011), top management quality (Wang and Lai, 2014), individual quality (Ogara et al., 2014), social quality (Chen et al., 2012). Hence, the focus of this study has been to examine these seven hypotheses.

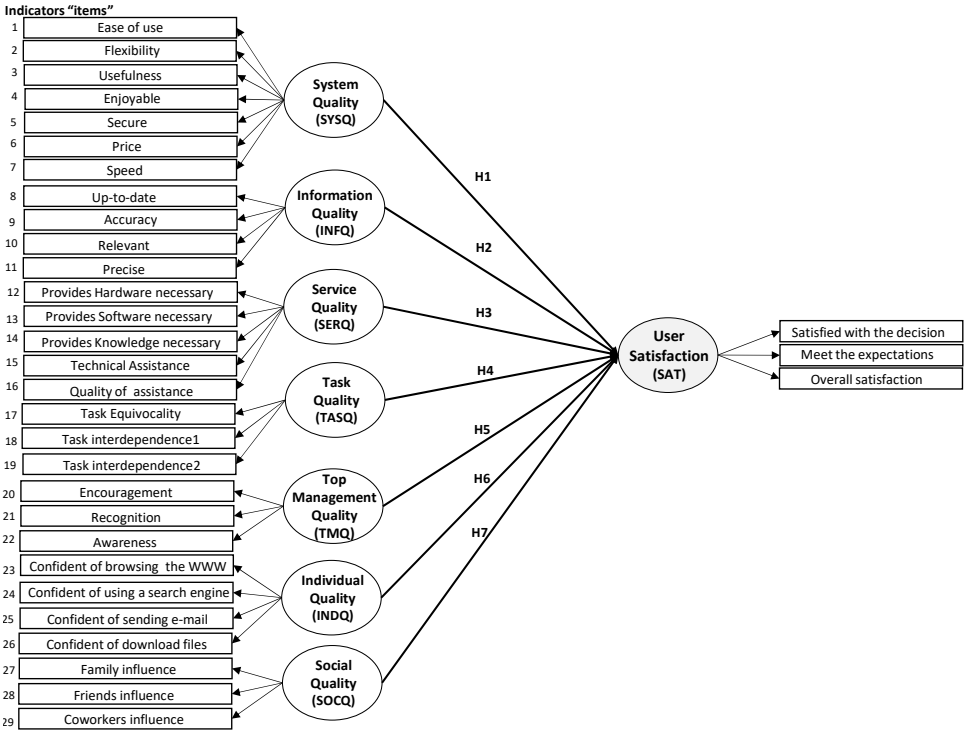
3 Research method

3.1 Overview of the proposed research model

A conceptual model of employee satisfaction towards internet usage in organisations was developed based on the three theoretical perspectives DMISM (DeLone and McLean,

2003), TTF (Goodhue and Thompson, 1995), and UTAUT (Venkatesh et al., 2003). As can be seen in Figure 3, the proposed model extends the original DMISM (system, information, and service quality) by including four additional constructs (task, top management, individual and social quality), which cover four important characteristics (technology, organisational, individual and social) in order to achieve a successful IS (Agarwal, 2000).

Figure 3 The proposed research model



3.2 Development of instrument

A 32-item questionnaire was developed for this study, incorporating the four main constructs of the proposed conceptual model adopted from existing literature, and refined to fit with the context of this study. A pre-testing step was conducted before distributing the questionnaire instrument to a wider group. 25 questionnaires were distributed to university students from Yemen, who is presently studying in Malaysia. Their comments and recommendations were taken into consideration in order to fine-tune the questionnaire, particularly with regards to its length, the question sequence, and the resolution of any mistakes or confusing items. The final version was then pilot-tested to examine internal consistency, and out of the 60 surveys subsequently distributed among Yemeni employees in the Ministry of Communication and Information Technology, 58 were returned with complete and valid data. Beside the pilot test taking feedback comments into consideration, the validation of the measurement was done using

Cronbach's alpha which measures the reliability (internal consistency) of the constructs. For the final questionnaire, all the constructs reliability had acceptable value, because the individual Cronbach's alpha coefficients exceeded the recommended value of 0.7 (Nunnally and Bernstein, 1994). This study used a seven-point Likert scale, ranging from 1 (strongly disagree) to 7 (strongly agree), to answer the questionnaire items. A Likert scale and other types of interval-type scales are extensively used in organisational research since they lend themselves to more sophisticated data analysis (Sekaran and Bougie, 2012). Please refer to Appendix 1 for the instruments.

3.3 Data collection

The targeted population was approximately 6,090 of internet users among Yemeni employees in the head offices of 30 government ministries (called Dwa'win) at the time this study was conducted. The adequate sample size for each Ministry was selected based on the total number of employees, and the data was collected using a self-administered paper questionnaire, distributed personally to employees to motivate them and clarify any doubts. The main reason for choosing this method of delivery was that it provides a high predictive value for assessing the efficiency of participants, especially when the target subject under study is related to an individual's perception, belief and opinion (Yalcinkaya, 2007).

A total of 700 questionnaires were distributed, and 530 sets were returned of which 508 responses were useful for analysis. The final sample size was considered adequate (Tabachnick and Fidell, 2012; Krejcie and Morgan, 1970). The response rate of this study is 76%, which is considered very good (Baruch and Holtom, 2008) by comparison with other studies found in the relevant literature. 22 returned questionnaires were rejected, 12 because of missing data for more than 15% of the questions, four considered as outliers and six straight lining. The demographic profile of the respondents 281.1% (412) were male and 18.9% (96) female. 1.4% were less than 20 years old, 28.3% between 20 and 29 years, 53.9% between 30 and 39, 12.6% between 40 and 49, and 3.7% were 50 years and above. In terms of educational background, 10.4% had a high school certificate, 8.7% had a diploma, 72.2% had a bachelor degree (the majority of participants) and the remaining 8.7% has finished postgraduate studies.

4 Data analysis and results

The purpose of the analysis is to examine the relationship between the variables of the proposed model, which involves the initial exploratory factor analysis (EFA), confirmatory factor analysis (CFA), and structural equation modelling (SEM) via AMOS 21.0. Meanwhile, Kline (2010) suggested using either EFA or CFA, but not necessarily both techniques. This study follows the recommendation of Worthington and Whittaker (2006) to conduct EFA on different samples (192 sample size), followed by CFA and SEM (508 sample size). The data analysis starts by conducting a descriptive analysis via SPSS 23 in the next section, followed by the three levels of analysis of EFA, CFA and SEM which involves the same procedure performed in the previous studies (Kafetzopoulos, 2015).

4.1 Descriptive analysis

Table 3 presents the mean and standard deviation of each variable in the current study. Respondents were asked to indicate their opinion in the context of internet usage based on the measurement of a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). The information quality records the highest mean score of 5.49 out of 7.0, with a standard deviation of 1.140 which indicates that the respondents are aware of the quality the internet information. Top management quality records the lowest mean score of 2.90 out of 7.0 with a standard deviation of 1.461, indicating that the respondents are dissatisfied with the role of the leaders, especially in terms of encouragement and recognition. The results also show the overall mean score of the respondents for internet system quality recorded at 5.24 with a standard deviation of 1.094. In this study, the respondents seem to find that the internet is easy and enjoyable to use, flexible and useful. However, they also noted that the internet is not secure and the speed is very slow. Because of the slow speed of internet access provided by their organization, they also think that the internet subscription for better internet speed is not reasonably priced if they have to subscribe using their own money. As regards service quality, the respondents agreed that they possess the necessary hardware, software, and knowledge, but they are not satisfied with the level and quality of technical assistance. It can be concluded that the level of individual quality in regards to the confidence respondents in using the internet is high, as is the level of social quality which describes the influence of family, close friends, and co-workers. In general, the results indicate that the overall respondent means score for user satisfaction in the current study is 5.16 with a standard deviation of 1.228. Hence, it can be concluded that the level of satisfaction of the respondents regarding internet usage is high.

4.2 Exploratory factor analysis

Principal axis factoring was conducted on the 32 items with oblique rotation (Promax). There are two types of rotation to use in EFA (orthogonal and oblique). Some scholars argue that oblique rotation is always the appropriate method because factor inter-correlations are the norm in social sciences, and if the factors happen to be uncorrelated both orthogonal and oblique yield the same result (Costello and Osborne, 2005). Regarding the significant factor loadings for every item, this study follows the criteria of Hair et al. (2010) based on sample size. While the sample size of this study is 192 for the EFA, therefore, the significant factor loadings are 0.40. In addition, this study used a fixed number of factors to extract. The results regarding the statistical assumption for EFA are:

- the sample size is 192, which is enough to conduct EFA (Tabachnick and Fidell, 2012)
- Bartlett's test of sphericity is sig. ($p < 0.001$) (Field, 2013)
- Kaiser-Meyer-Olkin (KMO) value is 0.902 which is marvellous (Kaiser, 1974; Hutcheson and Sofroniou, 1999)
- communalities value for every item is > 0.5 (Field, 2013)
- total variance explained is 68.04%, which is > 50% (Podsakoff and Organ, 1986)

- the variance for the first factor is 32.6%, which is < 50% (Podsakoff and Organ, 1986).

Table 2 Pattern matrix for the full model

	Factor							
	1	*2*	*3*	*4*	*5*	*6*	*7*	*8*
SYSQ1	.922							
SYSQ4	.788							
SYSQ3	.705							
SYSQ2	.640							
INFQ4		.842						
INFQ1		.819						
INFQ3		.766						
INFQ2		.737						
TMQ1			.913					
TMQ3			.869					
TMQ2			.853					
SERQ1				.878				
SERQ2				.842				
SERQ3				.841				
SAT3					.892			
SAT1					.889			
SAT2					.775			
INDQ2						.902		
INDQ1						.714		
INDQ3						.642		
SOCQ2							.945	
SOCQ1							.687	
SOCQ3							.661	
TASQ2								.910
TASQ3								.733
TASQ1								.599

Notes: Extraction method: principal axis factoring.
Rotation method: Promax with Kaiser normalisation.
Rotation converged in six iterations.
Factor loading less than 0.4 suppressed.

Pattern matrix presented in Table 2 shows the factor loadings after rotation. The items that cluster on the same components suggest that factor 1 represents a system quality (explained by 33.802% of the total variation). Factor 2 represents information quality (8.728%), factor 3 represents top management quality (6.756%), factor 4 represents service quality (5.380%), factor 5 represents user satisfaction (4.696%), factor 6 represents individual quality (3.712%), factor 7 represents social quality (2.935%), and

finally factor 8 represents task quality (2.298%). All eight factors are explained 68.31% of the total variation. Out of the 32 items, six items were removed (SYSQ5, SYSQ6, SYSQ7, SERQ4, SERQ5, and INDQ4) due to the low loading or cross-loadings. Please refer to Appendix 2 for the final result of EFA.

4.3 Measurement model assessment and CFA

4.3.1 Model fit indicators

As shown in Table 3, all the goodness-of-fit indices exceeded their respective common acceptance levels as suggested by previous research, thus demonstrating that the measurement model exhibited a fairly good fit with the data collected (X^2/df = 1.58, CFI = 0.980, RMSEA = 0.034, GFI = 0.938, AGFI = 0.920, NFI = 0.948, TLI = 0.976, IFI = 0.980, PNFI = 0.791 and PGFI = 0.725). The absolute fit indices show that the chi-square is not significant. But despite this, the model still fits because when large samples are used the chi-square statistic nearly always rejects the model (Bentler and Bonnet, 1980; Jöreskog and Sörbom, 1993). The chi-square is sensitive to sample size > 200 (Byrne, 2010) and the sample size for this study is 508. Therefore, the evaluation of the psychometric properties of the measurement model in terms of construct reliability, indicator reliability, convergent validity and discriminant validity could be proceeded with.

Table 3 Goodness-of-fit indices for the measurement model

Fit index	*Cited*	*Admissibility*	*Result*	*Fit (yes/no)*
X^2			429.354	
DF			271	
P value		> .05	.000	No
X^2/DF	Kline (2010)	1.00–5.00	*1.58*	*Yes*
RMSEA	Steiger (1990)	< .08	*.034*	*Yes*
SRMR	Hu and Bentler (1999)	< .08	.033	Yes
GFI	Jöreskog and Sörbom (1993)	> .90	.938	Yes
AGFI	Jöreskog and Sörbom (1993)	> .80	.920	Yes
NFI	Bentler and Bonnet (1980)	> .80	.948	Yes
PNFI	Bentler and Bonnet (1980)	> .05	.791	Yes
IFI	Bollen (1990)	> .90	.980	Yes
TLI	Tucker and Lewis (1973)	> .90	.976	Yes
CFI	Byrne (2010)	> .90	*.980*	*Yes*
PGFI	James et al. (1982)	> .50	.725	Yes

Notes: X^2 = chi square, DF = degree of freedom, GFI = goodness-of-fit, NFI = normed fit index, IFI = the increment fit index, TLI = Tucker-Lewis coefficient index, CFI = comparative-fit-index, RMSEA = root mean square error of approximation, SRMR: standardised root mean square residual, PNFI = Parsimony normed fit index, AGFI =adjusted goodness of fit index.
The indexes in italics are recommended since they are frequently reported in literature.

Source: Awang (2014)

4.3.2 Reliability and validity assessment

The assessment of measurement model was done through construct reliability as well as validity (including convergent and discriminant validity). For construct reliability, this study tested the individual Cronbach's alpha coefficients to measure the reliability of each of the core variables in the measurement model. The results indicate that all the individual Cronbach's alpha coefficients ranging from 0.798 to 0.903 were higher than the suggested value of 0.7 (Kannan and Tan, 2005; Nunnally and Bernstein, 1994). Additionally, for testing construct reliability all the composite reliability (CR) values ranging from 0.82 to 0.92 were higher than 0.7 (Werts et al., 1974; Kline, 2010; Gefen et al., 2000), which adequately indicates that construct reliability is fulfilled as shown in Table 4. Therefore, the achieved Cronbach's alpha and CR for all constructs were considered to be sufficiently error-free.

Factor loading was used to test *indicator reliability*. High loadings on a construct indicate that the associated indicators seem to have much in common, which is captured by the construct (Hair et al., 2017). Factor loadings greater than 0.50 were considered to be very significant (Hair et al., 2010). The loadings for all items exceeded the recommended value of 0.5 as shown in Table 4. The loading for the remaining items in the model has therefore fulfilled all the requirements.

For testing *convergent validity* (the extent to which a measure correlates positively with alternative measures of the same construct), this study used the average variance extracted (AVE), and it indicated that all AVE values were higher than the suggested value of 0.50 (Hair et al., 2010) ranging from 0.580 to 0.769. The convergent validity for all constructs has been successfully fulfilled and adequate convergent validity exhibited as Table 4 shows.

Discriminant validity is defined as the extent to which the measures are not a reflection of some other constructs, which is indicated by the low correlations between the measure of interest and the measures of other constructs (Cheunga and Lee, 2010). By using the Fornell and Larcker (1981) criterion, the discriminant validity of the measurement model was checked. As shown in Table 5, the correlations between the factors ranging from 0.063 to 0.753 are smaller than the square root of the AVE estimates which are in the range of 0.761 to 0.877. This indicates that the constructs are strongly related to their respective indicators compared to other constructs of the model (Fornell and Larcker, 1981), thus suggesting a good discriminant validity. In addition, the correlation between exogenous constructs is less than 0.85 (Awang, 2014). Hence, the discriminant validity of all construct is fulfilled.

4.4 Structural model assessment

The goodness-of-fit of the structural model was comparable to the previous CFA measurement model. In this structural model, the values are recorded as $X^2/df = 1.584$, CFI = 0.980, and RMSEA = 0.034. These fit indices provide the evidence of adequate fit between the hypothesised model and the observed data (Byrne, 2010).

This study evaluated the structural model in order to test the hypotheses. As shown in Figure 4 and Table 6, four out of the seven hypotheses are supported. System quality (β = .37, $p < 0.001$), information quality (β = .32, $p < 0.001$), task quality (β = .09, $p < 0.05$), and social quality (β = .12, $p < 0.05$) all have a positive relationship with user satisfaction. Therefore, H1, H2, H4, and H7 are supported, while H3, H5, and H6 are not supported.

Table 4 Mean, standard deviation, loading, Cronbach's alpha, CR and AVE

Construct	*Item*	*Loading (above 0.5)*	*M*	*SD*	*α (> 0.7)*	*CR (> 0.7)*	*AVE (> 0.5)*
System quality	SYSQ1: ease of use	0.83	5.24	1.094	0.881	0.881	0.650
	SYSQ2: flexibility	0.83					
	SYSQ3: Usefulness	0.81					
	SYSQ4: enjoyable	0.75					
Information quality	INFQ1: up-to-date	0.84	5.49	1.140	0.897	0.897	0.686
	INFQ2: accuracy	0.84					
	INFQ3: relevant	0.80					
	INFQ4: precise	0.83					
Service quality	SERQ1: provides hardware necessary	0.89	4.94	1.050	0.886	0.889	0.727
	SERQ2: provides software necessary	0.86					
	SERQ3: provides knowledge necessary	0.81					
Task quality	TASQ1: Task equivocality	0.71	5.42	0.953	0.798	0.804	0.580
	TASQ2: task interdependence1	0.85					
	TASQ3: task interdependence2	0.73					
Top management quality	TMQ1: encouragement	0.91	2.90	1.461	0.909	0.909	0.769
	TMQ2: Recognition	0.85					
	TMQ3: awareness	0.86					
Individual quality	INDQ1: confident of browsing the WWW	0.72	5.06	1.340	0.804	0.810	0.588
	INDQ2: confident of using a search engine	0.84					
	INDQ3: confident of sending e-mail	0.74					
Social quality	SOCQ1: family influence	0.73	5.09	1.336	0.821	0.827	0.616
	SOCQ2: friends influence	0.84					
	SOCQ3: co-workers influence	0.78					
User satisfaction	SAT1: satisfied with the decision	0.87	5.16	1.228	0.903	0.903	0.757
	SAT2: meet the expectations	0.87					
	SAT3: overall satisfaction	0.86					

Notes: M = Mean; SD = standard deviation, α = Cronbach's alpha; CR = composite reliability, AVE = average variance extracted
SYSQ: system quality, INFQ: information quality, SERQ: service quality, TASQ: task quality, INDQ: individual quality, SOCQ: social quality, TMQ: top management quality, SAT: user satisfaction.
The measurement used is seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree).
All the factor loadings of the individual items are statistically significant ($p < 0.01$).
$CR = (\sum K)^2 / ((\sum K)^2 + (\sum 1 – K^2))$, $AVE = \sum K^2 / n$, where K = factor loading of every item, n = number of item in a model.

Table 5 Results of discriminant validity by Fornell-Larcker criterion for the model

	Factors	*1*	*2*	*3*	*4*	*5*	*6*	*7*	*8*
		TMQ	*SYSQ*	*INFQ*	*SERQ*	*INDQ*	*TASQ*	*SOCQ*	*SAT*
1	TMQ	*0.877*							
2	SYSQ	0.179	*0.807*						
3	INFQ	0.216	0.753	*0.828*					
4	SERQ	0.063	0.348	0.409	*0.853*				
5	INDQ	0.237	0.522	0.592	0.283	*0.767*			
6	TASQ	0.094	0.372	0.469	0.341	0.325	*0.761*		
7	SOCQ	0.224	0.523	0.461	0.291	0.572	0.286	*0.785*	
8	SAT	0.172	0.687	0.673	0.304	0.441	0.398	0.465	*0.870*

Notes: Diagonals represent the square root of the average variance extracted while the other entries represent the correlations.
SYSQ: system quality, INFQ: information quality, SERQ: service quality, TASQ: task quality, TMQ: top management quality, INDQ: individual quality, SOCQ: social quality and SAT: user satisfaction.

System quality, information quality, service quality, task quality, individual quality, social quality, and top management quality explaining 54% of the variance in user satisfaction. The R^2 values achieved an acceptable level of explanatory power as recommended by Cohen (1988), Chin (1998) and Hair et al. (2013) indicating a substantial model.

Figure 4 Research structural model results

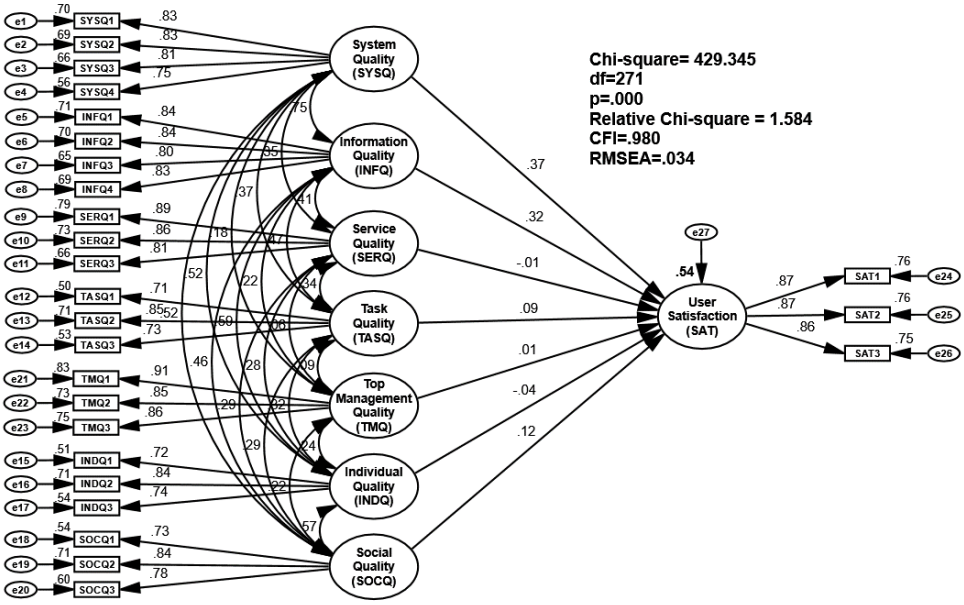


Table 6 Structural path analysis result

Hypothesis	*Dependent variables*	*Independent variables*	*Estimate B (path coefficient)*	*S.E*	*C.R (t-value)*	*Decision*
H1	SAT	SYSQ	.37	.074	5.463***	Supported
H2	SAT	INFQ	.32	.076	4.386***	Supported
H3	SAT	SERQ	.01	.048	0.296	Not supported
H4	SAT	TASQ	.09	.067	1.994*	Supported
H5	SAT	TMQ	.01	.030	0.293	Not supported
H6	SAT	INDQ	.04	.058	0.744	Not supported
H7	SAT	SOCQ	.12	.052	2.279*	Supported

Notes: ***p < .001; **p <.01; *p < .05, S.E = standard error, C.R = critical ratio.
SYSQ: system quality, INFQ: information quality, SERQ: service quality, TASQ: task quality, INDQ: individual quality, SOCQ: social quality, TMQ: top management quality and SAT: user satisfaction

5 Discussion and implications

5.1 Discussion

The aim of this study was to shed some light on the set of factors that determine employee satisfaction with internet usage. It integrated both theoretical perspectives and empirical findings of the research on internet usage. It also provides a good explanation of employee satisfaction based on the significant amount of variance (54%) in user satisfaction. Hence, the following indicators are considered important to be promoted to the employees.

System quality was hypothesised to be positively related to user satisfaction with internet usage in organisations. This study has successfully supported the hypothesis, in which system quality is proven to have the strongest positive effect on user satisfaction compared to any other determinants within the model. If the internet system is easy and enjoyable to use, flexible and useful, this will lead to a higher level of user satisfaction with internet usage among the employees in public sector organisations. This finding concurs with other works (Chakraborty and Sengupta, 2014; Wang and Liao, 2008; Wu and Wang, 2006; Cho et al., 2015; Lwoga, 2013; Makokha and Ochieng, 2014) which consider system quality as a very important factor in predicting user satisfaction. However, this finding does contradict of Sun et al. (2008), Chi (2013) and Khayun and Ractham (2011) who found that there is no relationship between system quality and user satisfaction. It appears that belief in system quality has a more dominant influence on user satisfaction compared to other factors in the context of internet usage within government organisations, and therefore, government authorities should pay more attention to promoting internet system quality in government organisations.

Information quality was also posited to be positively related to user satisfaction on internet usage in organisations. This study supports the hypothesis, that if the information is perceived as up-to-date, accurate, relevant, and precise, this will lead to a higher level of user satisfaction among employees. This finding is consistent with previous studies (DeLone and McLean, 1992, 2003; Wang and Lai, 2014; Wu and Wang, 2006; Fan and

Fang, 2006; Khayun and Ractham, 2011; Cho et al., 2015; Lwoga, 2013; Makokha and Ochieng, 2014), although it does contradict some other studies such as Cheng et al. (2013).

Service quality was also posited to be positively related to user satisfaction with internet usage in organisations, but this study found that the hypothesis is not supported, that service quality does not have a significant direct influence on user satisfaction. That is similar to previous studies in the IS context (Wang and Liao, 2008; Lwoga, 2013), but is inconsistent with most of the previous studies in IS where a strong association was found between service quality and user satisfaction (DeLone and McLean, 2003; Wang and Lai, 2014; Cheng et al., 2013; Nikhashemi et al., 2013, Khayun and Ractham, 2011; Makokha and Ochieng, 2014). This finding implies that while organisations may provide substantial user support related to internet usage, it is not sufficient to shape employee belief and affect their satisfaction with internet usage.

Task quality was hypothesised to be positively related to user satisfaction with internet usage in organisations, and this study found that the hypothesis is supported. These corroborates the results of previous studies which indicate that task quality plays a major role in the IS context (Lee et al., 2011; Norzaidi et al., 2007; D'Ambra et al., 2013; McFarland and Hamilton, 2006; D'Ambra and Wilson, 2011; Lu and Yang, 2014). Hence, it can be concluded that the more the employees have to deal with ad hoc, non-routine business problems and interdependence, the more they will be satisfied with using the internet because those working in organisations need the internet to deal with difficult tasks.

Top management quality was hypothesised to be positively related to user satisfaction with internet usage in organisations, but this study found that the hypothesis is not supported. Similar findings were revealed by other IS studies (Anandarajan et al., 2002), implying that encouragement and recognition from the top management are necessary for determining actual usage of the internet (Anandarajan et al., 2002), but not enough to affect employee satisfaction. This finding was inconsistent with the study of Etezadi-Amoli and Farhoomand (1996) which indicates that organisational support could lead to better user performance.

Individual quality was hypothesised to be positively related to user satisfaction with internet usage in organisations. This study found this hypothesis was not supported. The finding revealed that individual quality (confidence in browsing the WWW, using a search engine and sending e-mail) does not have a significant direct influence on user satisfaction, and is similar to previous studies in the IS context (Anandarajan et al., 2002). However, it was inconsistent with Ogara et al. (2014) who found a strong association between individual characteristics and user satisfaction. One conceivable clarification for this is that employee quality related to self-confidence changes as employee experience of using the internet accumulates. This, in turn, allows understanding and learning more about it. However, this accumulated experience and knowledge may then increase employee expectations and diminish satisfaction. It can also be argued that the individual characteristic does not directly influence user satisfaction, but rather actual usage of the system (Lee et al., 2011) which then leads to user satisfaction (Hou, 2012; Norzaidi and Salwani, 2009).

Social quality (pressure from family, friends and colleagues) was also posited to be positively related to user satisfaction of internet usage, and this study found that the hypothesis was supported. This indicates that the more family, friends and co-workers

perceive that using the internet is a good idea; the higher the level of user satisfaction with internet usage is generated among employees. This finding is consistent with previous studies (Venkatesh et al., 2011; Chen et al., 2012; Ogara et al., 2014), although it contradicts some other studies in the IS context (Hsu and Lin, 2015; Revels et al., 2010; Anandarajan et al., 2002; Roca et al., 2010).

The problem of inconsistent results here may be resolved when it is realised that models of technology usage do not serve equally across context (Al-Qeisi, 2009; Kripanont, 2007; Straub et al., 1997) and as this study is probably one of the first initiatives to examine the extended DMISM in the context of Yemen, this may explain this result.

5.2 Implications for research

This study highlights the significance of considering user satisfaction as a key measure of any system success when evaluating user behaviours in the context of IS adoption, something which has received relatively little attention (Wixom and Todd, 2005). There are several implications for any research linked to the evaluation of the success of internet usage. First, the literature in the IS context is still rather limited, not offering a comprehensive picture of the topics which are related to technology usage and satisfaction in organisations (Wang and Lai, 2014). The proposed conceptual model is considered multi-dimensional because it includes the critical variables that influence employee satisfaction with using the internet by considering technological, individual, social and organisational dimensions.

Second, the proposed model which integrates the three well-known models DMISM, UTAUT and TTF could be adopted to explain similar related topics and contexts. Moreover, it could also be used to not only to explain the technology related to the internet but also other technology applications such as mobile learning, ERP system and PC usage.

Third, the variance explained by the proposed model in the current study for the output user satisfaction is 54%. The predictive power of the model in this study has therefore a higher ability to explain and predict user satisfaction than obtained from some of the previous studies with different variances explained recorded for user satisfaction: 44% (Wang and Lai, 2014), 38% (Ogara et al., 2014), 35% (Son et al., 2012), 30% (Chan et al., 2010), 29% (Shiau and Chau, 2012) and 9.1% (Lee and Lehto, 2013). This study shows evidence that the proposed model can be more effective in predicting user satisfaction, especially within the internet context compared to other models in the previous literature.

5.3 Implication for practice

Yemen has a long-term strategy to improve and reform its ministries and institutions, to deliver better public services for all its citizens and gain recognition around the world for developing a reliable and efficient administration and government. However, not all the goals aimed at improving the governmental functions have yet been achieved. The implications of the key findings of this study provide significant benefits, not only for individual employees but also for the Yemeni public sector as well as the country, if information technology is fully utilised. A number of practical implications were noted, including encouraging employees to make full use of the internet in their work as well as

improve their professional practice, professional development and overall quality of work. Significantly, the implications of using the proposed integrated model which provides an understanding of the relationships of key determinants and user satisfaction will help promote internet usage in the government ministries and may be applied to all public sectors in the country. This study also provides useful information on how to promote the usage of the internet, based on the important factor that the more employees perceive the quality (system, information, task and social), the more satisfied they will feel, leading to better performance. (DeLone and McLean, 2003; Norzaidi and Salwani, 2009; Son et al., 2012; Hou, 2012; Wang and Liao, 2008; Fan and Fang, 2006; Xinli, 2015; Khayun and Ractham, 2011).

5.4 Implication for policy

According to Kunniger and Walwyn (2017), rapid and pervasive technology diffusion presents one of the more difficult challenges for innovation policy for developing countries. As the Yemeni public organisations lagging behind regarding the efficiency and effectiveness (Isaac et al., 2016b) and Sawang et al. (2017) found that changes in China's reform policies had a significant influence on the national innovation capability. Policies in Yemen should be reformed in order to be more effective reaching its desired outcomes and enhance the DOI. Policies by all levels must promote internet as being easy to use, flexible, useful and enjoyable. Moreover, promoting that information and knowledge on the internet are up-to-date, accurate, relevant and precise. In addition, policies should be written with an understanding of the contexts in which they are to be implemented to allow enhancing the DOI at the local level, meaning that policies should be considering social influence as one of the main drivers of DOI, as Hofstede et al. (2010) categorised Yemen as a country with low individualism traits where social influence, loyalty, and strong relationships are high, this indicates that in order for a new technology to be adopted and used it has to be compatible with social norms. The other policy implication that government should be considering is that employees satisfaction of Internet usage relies on task equivocality and task interdependence. The more employees deal with non-routine business problems and they have to cooperate with other members to accomplish their tasks, the more employees are satisfied with internet usage, which leads to better performance.

6 Limitations and suggestions for future work

The primary limitation of this study is the inability to generalise the results of the population because quota sampling was employed. Moreover, this research measured internet technology usage in general and did not focus on any specific service of internet technology. It is important to note that different forms of internet technology service may have different usage and adoption processes.

Future research should also aim to replicate this study with other technology applications or other sectors such as a private sector. This will enhance the ability of the model to thoroughly explain the user satisfaction in the IS context. While service quality was not found to be an important factor in this study, it has been found to be a key factor influencing user satisfaction in countries other than Yemen such as Taiwan (Wang and

Lai, 2014), China (Cheng et al., 2013) and Malaysia (Nikhashemi et al., 2013). Therefore, future research should be conducted to investigate the impact of service quality on user satisfaction by conducting cross-cultural studies, and indeed a cross-cultural validation is required for greater generalisation of the proposed model by using a considerable sample gathered elsewhere.

7 Conclusions

As the world is increasingly becoming as one village because of the internet revolution, progress in information and communication technology is more readily transferable. Because of this free-flowing knowledge, it is natural that Yemeni perceptions, expectations, and quality of life will change. This study proposes an integrated research model based on the well-known models DMISM, UTAUT and TTF, validated by a comprehensive and multidimensional model of employee satisfaction with internet usage within the public sector in Yemen. It was developed by considering the technological, individual, social, and organisational dimensions, and sought to untangle the specific constructs which provide a deeper perspective on the factors essential to employee satisfaction in order to accelerate diffusion of internet usage. The conceptual model demonstrates the role of seven quality factors (system, information, service, task, individual, social, and top management) which are argued to have the ability to influence user satisfaction. The results indicate that only four of these factors (system, information, task, and social) are key determinants of employee satisfaction with internet usage. The findings of this study provide several important implications for government research and practice.

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Appendix 1

Table A1 Instrument for variables

Variable	*Item and measure*	*Rating scale*	*Source*
System quality	(Ease of use): I find it easy to use the internet to find what I want. (Flexibility): I find the internet to be flexible to interact with. (Usefulness): I think using the internet is useful to me. (Enjoyable): I think using the internet is enjoyable. (Secure): I think using the internet is secure. (Price): internet subscription is reasonably priced. (Speed): I think the internet speed is satisfactory.	7-point Likert scale: (1) strongly disagree to (7) strongly agree	Venkatesh and Morris (2000), Kim et al. (2007), Zhao et al. (2011), Sun et al. (2008), Cheng et al. (2006), Yu (2012)
Information quality	(Up-to-date): internet provides up-to-date information. (Accuracy): internet provides accurate information. (Relevant): internet provides relevant information. (Precise): internet provides the precise information I need.	7-point Likert scale: (1) strongly disagree to (7) strongly agree	Lederer et al. (2000), Cheng et al. (2013), Wang and Liao (2008), Lin et al. (2011)
Service quality	(Provides hardware necessary): organisation provides the hardware necessary to use the internet. (Provides software necessary): organisation provides the software necessary to use the internet. (Provides knowledge necessary): organisation provides the knowledge necessary to use the internet. (Technical assistance): if I have technical difficulties in using the internet, the technical support personnel will be easy to reach at any time. (Quality of assistance): if I have technical difficulties in using the internet, the technical support personnel will provide a satisfying response.	7-point Likert scale: (1) strongly disagree to (7) strongly agree	Pai and Huang (2011), Lee and Kim (2009), Lian (2015), Nistor et al. (2014), Khechine et al. (2014), Ifinedo (2012)

Table A1 Instrument for variables (continued)

Variable	*Item and measure*	*Rating scale*	*Source*
Task quality	(Task equivocality): I frequently deal with ad hoc, non-routine business problems. (Task interdependence 1): I usually have to cooperate with other members to accomplish my tasks. (Task interdependence 2): the way I perform my job will have obvious effects on the performance of other members.	7-point Likert scale: (1) strongly disagree to (7) strongly agree	Kim et al. (2007), Lee et al. (2011), Lee and Kim (2009), Norzaidi et al. (2007, 2009)
Individual quality	(Confident of browsing the WWW): I feel confident browsing the WWW. (Confident of using a search engine): I feel confident finding information by using a search engine (e.g. Google). (Confident of sending e-mail): I feel confident sending and receiving e-mail messages. (Confident of download files): I feel confident downloading and uploading files from the web.	7-point Likert scale: (1) strongly disagree to (7) strongly agree	Zhao et al. (2011), Cheng (2011)
Social quality	(Family influence): my family thinks that using the Internet is a good idea. (Friends influence): my close friends think that using the Internet is a good idea. (Co-workers influence): my co-workers think that using the internet is a good idea.	7-point Likert scale: (1) strongly disagree to (7) strongly agree	Pahnila et al. (2011), Venkatesh et al. (2012), Cheng et al. (2013), Cheng (2011)
Top management quality	(Encouragement): top management is encouraging me to use the internet for job-related work. (Recognition): top management recognises my efforts in using the Internet for job-related work. (Awareness): top management is aware of the benefits that can be achieved with the use of the internet.	7-point Likert scale: (1) strongly disagree to (7) strongly agree	Son et al. (2012), Wang and Lai (2014)
User satisfaction	(Satisfied with the decision): my decision to use the internet was a wise one. (Meet the expectations): the internet has met my expectations. (Overall satisfaction): overall, I am satisfied with the internet.	7-point Likert scale: (1) strongly disagree to (7) strongly agree	Wang and Liao (2008), Wang (2008), Roca et al. (2006)

Appendix 2

Table A2 Final result of EFA for the full model

Factors	*Loading*
Factor 1: System quality	
Item 1: SYSQ1 – ease of use	0.922
Item 2: SYSQ2 – flexibility	0.640
Item 3: SYSQ3 – usefulness	0.705
Item 4: SYSQ4 – enjoyable	0.788
Item 5: SYSQ5 – secure	Deleted
Item 6: SYSQ6 – price	Deleted
Item 7: SYSQ7 – speed	Deleted
Factor 2: Information quality	
Item 8: INFQ1 – up-to-date	0.819
Item 9: INFQ2 – accuracy	0.737
Item 10: INFQ3 – relevant	0.766
Item 11: INFQ4 – precise	0.842
Factor 3: Top management quality	
Item 12: TMQ1 – encouragement	0.913
Item 13: TMQ2 – recognition	0.853
Item 14: TMQ3 – awareness	0.869
Factor 4: Service quality	
Item 15: SERQ1 – provides hardware necessary	0.878
Item 16: SERQ2 – provides software necessary	0.842
Item 17: SERQ3 – provides knowledge necessary	0.841
Item 18: SERQ4 – technical assistance	Deleted
Item 19: SERQ5 – quality of assistance	Deleted
Factor 5: User satisfaction	
Item 20: SAT1 – satisfied with the decision	0.889
Item 21: SAT2 – meet the expectations	0.775
Item 22: SAT3 – overall satisfaction	0.892
Factor 6: Individual quality	
Item 23: INDQ1 – confident of browsing the WWW	0.714
Item 24: INDQ2 – confident of using a search engine	0.902
Item 25: INDQ3 – confident of sending e-mail	0.642
Item 26: INDQ4 – confident of download files	Deleted
Factor 7: Social quality	
Item 27: SOCQ1 – family influence	0.687
Item 28: SOCQ2 – friends influence	0.945
Item 29: SOCQ3 – co-workers influence	0.661
Factor 8: Task quality	
Item 30: TASQ1 – task equivocality	0.599
Item 31: TASQ2 – task interdependence1	0.910
Item 32: TASQ3 – task interdependence2	0.733