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Factors influencing the actual usage of e-government among employees within public sector organizations in the UAE

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***Abstract*---**Organizations are becoming flatter, more flexible and networked due to the advent of new technologies. Leaders in the United Arab Emirates (UAE) aim to be attain the first spot worldwide in terms of efficiency and effectiveness by focusing on long- term vision and strategy. However, the gap between the essential indicators of ICT towards UAE's government vision might affect the long-term goals. This study addresses the relationship between smart government effectiveness and knowledge management, while considering the role of institutional challenges as a moderator variable within the public sector in UAE. As a guide for the proposed model in this study, three acceptance models were implemented, namely, the unified theory of acceptance and use of technology (UTAUT), technology acceptance model (TAM), and DeLone and McLean model of information systems success (D&M IS Success Model) as guided for the proposed model. Additionally, quantitative data were collected in this study and analyzed using the Statistical Package for Social

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Science (SPSS) and Smarts software. Resultantly, the actual use of E-government was predicted and significantly associated with the change in “Influencing factors”, comprising system quality, information quality, service quality, and social influence. In conclusion, the research hypotheses were accepted as the findings revealed a statistical relationship between the actual use of E-government and influencing factors.

Keywords---influencing factors, actual usage, UTAUT, DeLone, McLean.

Introduction

The Internet is now considered a vital platform to acquire advanced knowledge, and to facilitate communication quality, task efficiency and decision quality, thereby playing the role of knowledge management systems (Cheung, Chang, & Lai, 2000; Parveen & Sulaiman, 2008; Curran, Fenton, & Freedman, 2016). The diverse activities of the internet include business, shopping, banking, stock trading, email, job search, product information, reading, and entertainment among others (Nie & Erbring, 2002).

The United Arab Emirates (UAE) government has reinstated that the nation’s vision and long-term goal is to be ranked as the top country worldwide in terms of efficiency and effectiveness. Nevertheless, achieving this goal might be challenging given the gap between the indicators concerning the significance of information and communications technology (ICTs) to the government’s vision. Moreover, the UAE is presently occupying the 10th spot in the world ranking based on the indicators of the impact of ICTs on various organizations in the country. In order to fill this gap, this study attempts to fill this gap by addressing the connection between smart government effectiveness and knowledge management, considering the role of institutional challenges as a moderator variable within the public sector in the UAE.

The factors impacting technology usage and success of information systems have been extensively identified using several models and theories, such as technology acceptance model (TAM) (Davis, 1989), unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, Davis, Davis, & Sam, 2003), and DeLone and McLean model of information systems success (D&M IS Success Model) (Delone & McLean, 2004) to mention a few. These findings have assisting in reducing the ambiguity associated with technology usage and other related issues. This study attempts to determine the effect of information quality, service quality, system quality, and social influence on the actual usage of E-government among employees within public sector organizations in the UAE.

Literature Review on Influencing Factors to the Actual Usage

System Quality (SYSQ)

The definition of system quality is the extent of which the E-government users are convinced with the E-government flexibility, ease of use, usefulness, enjoyable, security, price and speed (Kim et al., 2007; Sun et al., 2008; Zhao et al., 2013). System quality is considered crucial in the context of technology usage and satisfaction of consumers or users (Cheng et al., 2013; Shah and Attiq, 2016). A few authors have demonstrated that system quality has a significant impact on technology usage, task-technology fit and user satisfaction. For instance, system quality was identified as a predictor of technology usage and user satisfaction in a quantitative study by Wang and Lai (2014) in which 295 employee users were surveyed with respect to knowledge management systems. They employed SEM-AMOS as an analytical tool. Moreover, D'Ambra and Wilson (2011) found that technology characteristics positively affect task-technology fit in the context of the World Wide Web. A similar result was reported by Cheng et al. (2013), upon assessing system quality among 400 business executives by using a questionnaire for data gathering. Moreover, Makokha and Ochieng (2014), Yahya et al. (2013),Yahya et al. (2014) and Moketar et al (2016) highlighted that user satisfaction was significantly affected by system quality. The study applied a similar quantitateive approach and the relationships were analyzed using multiple regression. Finally, technology features impact positively on task-technology fit as found within the context of E-Books technology. Several authors have also emphasised the significance of of system characteristics (usefulness and ease of use) in the context of technology usage (D'Ambra et al., 2013; Roussou and Stiakakis, 2016; Anisur et al., 2016; Kristensen, 2016; Sarrab et al., 2016).

Information Quality (INFQ)

Information quality was defined in two articles (Lederer et al., 2000; Cheng et al., 2013) as the extent in which users of E-government are convinced that the E-government information is current, accurate and relevant. Wu and Wang (2006) also defined information quality as to how good the system is in terms of its output or content quality. On the other hand, Fan and Fang (2006) defined information quality as users' perception of the output of a measuring system in terms of its accuracy, reliability, consistency, and completeness. Additionally, the concept was defined by Mohammadi (2015) as the degree of which the users of the system are convinced that Internet contents are current, accurate, comprehensive, relevant, and organized. Meanwhile, Princely (2014) added more indicators to the definition, which is included comprehensibility, conciseness, relevance, useability, and availability. Other measures introduced byWang and Lai (2014), were logical, accuracy, sufficient, timely, and meeting the system users' needs.

A few MIS researchers have investigated the association between information quality and usage, user satisfaction and task-technology fit. For instance, Wang and Lai (2014) in their quantitative study among 295 employees reported that both user satisfaction and usage were affected by information quality. Moreover, Norzaidi et al. (2007) found that technology characteristics positively affect task-technology fit. However, in the context of an ERP system, Fan and Fang (2006) found that information quality predicts user satisfaction in a quantitative study with the questionnaire method among 202 end- users. Cheng et al. (2013), however, found the opposite, i.e. information quality does not predict user satisfaction in a survey method among 400 business executives.

Service Quality (SERQ)

Service Quality refers to the degree of which users of E-government perceive the availability of an organizational and technical infrastructure to sustain and support the use of E- government (Nistor et al., 2014; Lian, 2015). Service quality construct is regarded as one of the most crucial components in the context of technology usage and satisfaction (Wang and Liao, 2008). The most recent service quality studies focusing on technology usage, user satisfaction, and task-technology fit are summarized in Table 2.3.

Several studies have been conducted to assess the impact of service quality construct on usage, user satisfaction, and task-technology fit. For example, Khayun and Ractham (2011) surveyed 77 active users using a quantitatively designed questionnaire and demonstrated that user satisfaction and usage were positively affected by service quality. Likewise, the significance of the organizational and technical infrastructure in supporting the system users was reinstated by Tarhini et al. (2016).

Social Influence (SI)

The degree in which users of E-government perceive that others (family, friends, and colleagues) believe they should use the E-government is known as social influence (SI) (Venkatesh et al., 2012; Cheng et al., 2013). A few previous studies have demonstrated the association between actual usage and the social influence construct. For instance, Ogara et al. (2014) in a survey study among 239 students, in the context of mobile instant messaging, found that social presence and social influence predict user satisfaction. Furthermore, Cheung et al. (2000) employed the questionnaire method to assess the association between social factor and usage in the context of the Internet and the World Wide Web. Moreover, a quantitative study through the questionnaire method among 327 Facebook users indicated that social characteristics influence task-technology fit (Lu and Yang, 2014).

Although Venkatesh et al. (2011) found, in the context of information systems, that social quality (social influence) positively affect user satisfaction, Revels et al. (2010) found the opposite in the context of mobile services. They found that no link exists between social quality (image) and user satisfaction. Besides, another study in the context of IT usage among 143 computer users found that social pressure does not influence user satisfaction but influence usage (Anandarajan et al., 2002).

Methodology/ Experimental

The methodology adopted for this paper is the mixed method which involves the collection, analysis and interpretation of data using both quantitative and qualitative methods to try to address a research question. The quantitative analysis is used by translating the collected data into accessible statistics to measure or quantify the research question. Qualitative analysis is typically an exploratory method, used to acquire experts 'overall understanding, explanations and views (specialized people who are knowledgeable of the study's objective).

Data Collection

Several methods are used in gathering data, ranging from physical experiment, observation, self-administered questionnaire (paper form or electronic/online), and combined methods (Sekaran & Bougie, 2013). The study problem or background can only be resolved if the appropriate data collection technique is employed (Tull & Hawkins, 1984). Surveys have been established as the most acceptable method of acquiring or generating primary data (Zikmund, Babin, Carr, & Griffin, 2010).

A quantitative approach was used in this study for the data collection in accordance with the rules of statistical surveys. Non-Internet survey methods or Internet survey forms are both relevant for the execution of surveys. Personal interviews, interviews, self-administered questionnaire, structured observations, and telephone are some of the non-Internet survey techniques.
In contrast, internet survey is administered online and entails the generation of a Web-based or mail panel. Self-administered questionnaire was more reliable in this study as the time restrictions and allocated budget could not support the use of structured interviews with university students' scale.

Population refers to the entire group of people, events, or things of interest that the researcher intends to investigate (Sekaran & Bougie, 2013). The population of this study is the e- government services users among employees within Road and Transport Authority in Dubai.

Variable measurement

A 5-point Likert scale was used as the measuring scale in this study, ranging from 1 = strongly disagree to 5 = strongly agree. The instruments used in measuring the respective variables in this study are presented in the next subsections.

System Quality (SYSQ)

Table 3.1 shows the measuring instrument for system quality, comprising three items; ease of use (Zhou, 2011), flexibility (Mohammadi, 2015), and understandable (Ngai et al., 2007).

Table 1: Instrument for system quality

Item	Measure	Rating Scale	Scales of Measure	Source
SYSQ1	E-government services are easy to use.	**5**-point Likert scale: from (1) Strongly disagree to (**5**) Strongly agree	Interval Scale	(Zhou, 2011) (Mohammadi, 2015) (Ngai et al., 2007)
SYSQ2	E-government services be flexible for interactive purposes.			
SYSQ3	I have clear and understandable interaction with E-government services			

Information Quality (INFQ)

Table 3.2 shows the instrument used in measuring information quality. It contains five items; up-to-date (Lin and Wang, 2012), accurate (Lin et al., 2011), relevant, comprehensive, and organized (Mohammadi, 2015).

Table 2: Instrument for information quality

Item	Measure	Rating Scale	Scales of Measure	Source
INFQ1	The E-government services provides up-to-date information.	**5**-point Likert scale: from (1) Strongly disagree to (5) Strongly agree	Interval Scale	(Lin and Wang, 2012) (Lin et al., 2011) (Mohammadi, 2015)
INFQ2	The E-government services provides accurate information.			
INFQ3	The E-government services provides relevant information.			
INFQ4	The E-government services provides comprehensive knowledge.			
INFQ5	The E-government services provides organized knowledge.			

Service Quality (SERQ)

Table 3.3 shows the instrument for the measurement of service quality. It contains three items; responsiveness (Chiu et al., 2007; Cheng, 2011; Lin et al., 2011), functionality (Pituch and Lee, 2006; Zhou, 2013), interactivity (Lin and Wang, 2012; Pituch and Lee, 2006).

Table 3: Instrument for service quality

item		Rating Scale	Scales of Measure	Source
SERQ1	E-government are useable anytime, anywhere and unlimited.	Point rt scale: om		(Lin et al., 2011) (Pituch and Lee, 2006)

SERQ2	Multimedia (audio, video, and text) types of course content are offered by E-government services.	(1) Strongly disagree to (**5**) Strongly agree	Interval Scale
SERQ3	The E-government services system enables interactive communication.		

Social Influence (SI)

Table 3.4 shows the instrument for the measurement of social influence, comprising a 5-point Likert scale and interval scales.

Table 4: Instrument for social influence

item	Measure	Rating Scale	Scales of Measure	Source
SI1	My supervisor believes that I should use E-government services.	**5**-point Likert scale: from (1) Strongly disagree to (**5**) Strongly agree	Interval Scale	(Cheng, 2011)
SI2	My colleagues posit that I should use E-government services.			
SI3	My close friends are of the opinion that I should use E-government services.			
SI4	My family believe that I should use E-government services.			

Data Analysis

Several statistical methods were used in this study to analyse the gathered data and to test the hypotheses. The next chapter provides an in-depth explanation of the results derived from the data collected in the present study.

Data Preparation for Analysis

The Statistical Package for Social Science (Version 22.0) was used for the data preparation and analysis. The SPSS computer program facilitates data coding and entry, as well as checking for missing data and applying value replacement procedures. Next, the standardized value (Z-Score) was applied to determine the outliers while multivariate outliners were checked using the Mahalanobis distance score. Finally, the unengaged responses were identified and deleted.

Linear regression

A simple linear regression was employed to test direct associations between the dependent variable (actual use) and independent variables (system quality, information quality, service quality, social impact).

Step 1: Simple Linear Regression Analysis Model

The regression analysis depicts the direction and magnitudes of the association between independent and dependent variables, thereby providing guidelines to draw causal conclusions. Simple linear regression is used to assess the correlation between variables and contracts of a theoretical model. Simple linear regression is the least squares method in statistics of a linear relationship between an explanatory and an independent variable. A simple adjective means that a dependent variable is associated with a predictor (an independent variable). Linear regression is crucial in predicting the magnitude and direction of changes in the outcome or dependent variable as the independent variable changes.

Statistical and mathematical modeling consist of independent and dependent variables, and the model assesses how the latter depends or changes with the former. The parameter who variation is being assessed is the dependent variable, whereas the input data, causes, or potential factors are the independent variables. These variables are the possible causes of changes in the outcome or measured event, which are then tested in the regression model. Under certain scenarios, independent variables could be introduced for their possible interference effect, without directly examining their influence (Carlson, 2006).

This analysis was performed to assess the linear regression equation between the dependent (Y) and independent (Xn) variables as presented below:

Y (dependent variable) = $\alpha + \beta$ X (independent variable) / α (intersection y) and β (slope).

Simple linear regression produces the "best" match for data points, which is represented here as the least squares method by a line that minimizes he sum of the squares of the residuals of the linear regression model.

Step 2: ANOVA Output

ANOVA reflects if statistically significant part of the variance between independent and dependent variables is explained by the regression model. Specifically, the analysis compares the extent in which the linear regression model predicts the outcome based on the mean values or estimates. The regression model can be checked if it is statistically significant ($p <.05$) based on the degree of correlation R between the independent and dependent variables. The decision to either accept the alternative hypothesis or not depends the outcomes in the regression analysis. The test of the alternative hypothesis become stronger as the p-value decreases.

Step 3: Residual Plots for Regression Analysis

The assessment of the residual graph is the final step in testing the regression model. This procedure was performed to ensure that (a) the data conformed to normality test and normally distributed (b) the variables are not altered systematically with the predicted values. The waste should not be systematically low or high. This graph assists in testing the assumption of homosexuality: the residue should not be systematically changed at any predicted value, and the residual distribution should remain the same for all predictions. Residual diagrams allow researchers to assess whether the observed error corresponds to an unpredictable (random) error.

Waste must be reset within the set values, meaning the model is the appropriate average for all computed values. It is assumed that accidental errors lead to errors that are normally distributed.

Residual = Observed Data: Estimates that represent an error in the estimation of estimates for actual (observed) data.

Results and Discussion

Linear Regression Analysis

The relationship between system quality and actual use
Using the simple linear regression, three analyses were conducted in this section to assess the relationship between actual use and system quality. The analyses included a regression model summary, ANOVA output, and residual plots for regression analysis, which were employed to examine the following hypothesis:

H1: System quality affects actual use in a statistical relationship.
H0 (Null Hypothesis): System quality does not affect actual use and no statistical relationship does exist between them.

As shown in Figure 1, a regression analysis was performed to test the relationship between system quality and actual use. It was hypothesized that a statistical and casual relationship exists between the two variables. Thus, the alternative hypothesis (H1) may be proven to be true or false.

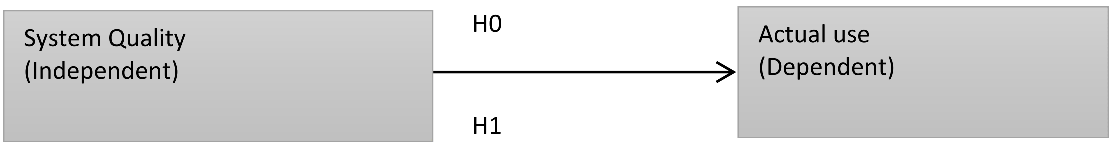

Figure .1: Regression model between system quality and actual use

Model summary of simple linear regression

The summary of the regression model shows information about correlation coefficient of determination (R2) which tells the degree of interpretation and correlation coefficient (R) as shown in Table 5.

Table 5: Simple linear regression output showing the model summary and association between actual use and system quality

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.490a	.240	.238	.51922

a. Predictors: (Constant), System Quality

Table 5 presents the R and R square values, depicting how the variability between actual use and system quality is predicted in the regression model. Based on the correlation coefficient (R= 0.490), a moderate degree of correlation was observed between actual use and system quality. On the other hand, the "R Square" in the model summary signifies the total discrepancy and variance in the actual use that is explained by the independent variable (system quality). The magnitude of R2 = 0.240 suggests that 25% of the change in the value of actual use can be interpreted by the variance in system quality. The unrelated random variability to system quality might explain the value of the residual variance in actual use, which was 76%.

Furthermore, the magnitude of adjusted R2 indicates that 23.1% of the variance between system quality and actual use were predicted, thus reflecting a small difference (0.002≈0) between the actual R2 and adjusted R2 in the SPSS regression output. Thus, it is concluded that a good degree of regression model fit has been obtained between system quality and actual use.The ANOVA output. The next step is examining the degree of significance based on ρ-value in regression model between system quality and actual use. It is vital for the data fit to be verified. As shown in Table 6, if the P-value is less or equal to 0.05, then the alternative hypothesis (H4) is true while the null-hypothesis (H0) is rejected.

Table 6: ANOVA output

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	32.202	1	32.202	119.451	.000b
	Residual	102.174	379	.270		
	Total	134.376	380			

a. Dependent Variable: Actual use
b. Predictors: (Constant), System quality

The data of the ANOVA output in Table 6 shows the magnitude of Sig. ≤ 0.05. Hence, the dependent variable is predicted significantly well by the regression model, which means a good fit for the data is gained. In the output of ANOVA, the F-ratio is used to test the validity of the hypothesis where the effects between the two variables are real. In other words, the relationship is due to a significant statistical relationship. In addition to that, the magnitude of F ratio = 119.451, where F ≥ 1.0. Thus, it is concluded that the variation between system quality and actual use is due to a statistical relationship according to the assumption in the alternative hypothesis. As mentioned earlier, the larger the F value, the likelihood is greater that system quality affects actual use and both variables have a strong correlation which is not due to random cause, which is the same result of ANOVA output associated with the hypothesis (H1).

Regression coefficients

The table of coefficients is used in the regression analysis to assess the degree of correlation between system quality and actual use. Regression coefficients are necessary to understand the strength of influence by system quality on the dependent variable (system quality). Moreover, the magnitude of standard and unstandardized regression coefficients B and Beta tell whether the relationship between system quality and actual use are statistically significant (Sig ≤ 0.05). If

Sig. ≥ 0.05 then the relationship between these two variables does not exist. Table 4.42 indicates the output of regression coefficients.

Table 7: Coefficients of regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.518	.163		9.329	.000
	System Quality	.485	.044	.490	10.929	.000

a. Dependent Variable: Actual use

The equation of the regression model is presented as follows:

Y (dependent variable) = B+ B1 * X1 (independent variable) Actual use = 1.518 + 0.485 * System quality

Based on the data shown in Table 7, a statistically significant relationship is present between system quality and actual use, evident by the B value (unstandardized regression coefficient = 0.485 p ≤ 0.000). Hence, an increase unit in the system quality results in 0.485 increment in actual use. In other words, actual use is found to be predictable by the change in system quality and the relationship between them is significant because of the magnitude of Sig. ≤ 0.000. Thus, the hypothesis (H1) is true. Finally, the last step in regression analysis is the evaluation of residual (errors) plot. As shown in Figure 4.15, most of the residuals of the regression equation are centred around zero, and throughout the whole range of fitted residual, the values are not systematically distributed. Therefore, a good degree of relationship between system quality and actual use was indicated based on the centered distribution of residuals values.

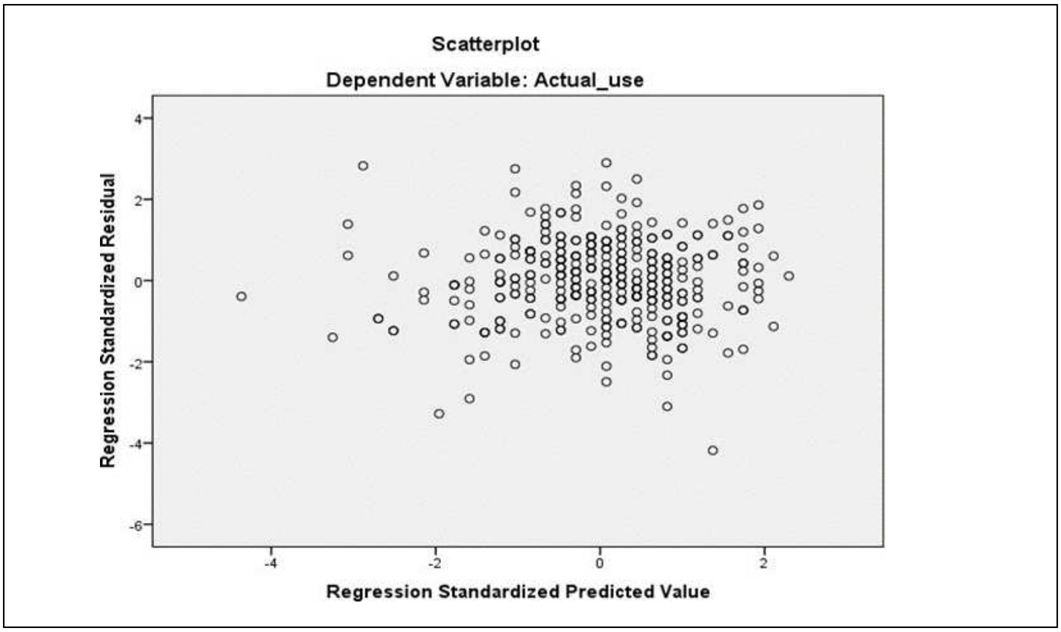

Figure 2: The scatterplot of residuals

The relationship between information quality and actual use

Using the simple linear regression, three analyses were conducted in this section to assess the relationship between actual use and information quality. The analyses included a regression model summary, ANOVA output, and residual plots for regression analysis, which were employed to examine the following hypothesis:

H2: Information quality affects actual use in a statistical relationship.
H0 (Null Hypothesis): Information quality does not affect actual use and no statistical relationship does exist between them. It was hypothesized that a statistical and casual relationship exists between the two variables. Thus, the alternative hypothesis (H1) may be proven to be true or not true.

Model summary of simple linear regression

The summary of the regression model shows information about the correlation coefficient of determination (R2) which tells the degree of interpretation and correlation coefficient (R) as shown in Table 4.43.

Table 8: Simple linear regression output showing the model summary and association between actual use and information quality

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
2	.468a	.219	.217	.52622

a. Predictors: (Constant), Information quality
b. Dependent Variable: Actual use

Table 8 shows the R and R square values, indicating the extent in which the variability between information quality and actual use in the regression model. Based on the correlation coefficient (R= 0.468), a moderate degree of correlation was observed between actual use and information quality. Likewise, the "R Square" in the model summary reflects the total discrepancy and variance in the actual use that is explained by the independent variable (information quality). The magnitude of R2 = 0.219 means that 21.9% of the change in the value of actual use can be interpreted by the variance in information quality. The residual variance in actual use = 78.10% is supposed to be caused by unrelated random variability in information quality.

Additionally, the magnitude of adjusted R2 indicates that 21.7% of the variance between information quality and actual use were predicted, thus reflecting a small difference (0.002≈0) between the actual R2 and adjusted R2 in the SPSS regression output. Thus, it is concluded that a good degree of regression model fit has been obtained between information quality and actual use.

The ANOVA output

The next step is examining the degree of significance based on ρ-value in the regression model between information quality and actual use. This analysis is vital to verify if the data fit with the regression equation. If the P-value is less than or equal to 0.05, then the alternative hypothesis (H2) is true and null- hypothesis (H0) is rejected.

Table 9: ANOVA output

Model	Sum of Squares	Df	Mean Square	F	Sig.
Regression	29.426	1	29.426	106.266	.000b
Residual	104.950	379	.277		
Total	134.376	380			

a. Dependent Variable: Actual use
b. Predictors: (Constant), Information quality

The data of the ANOVA output in Table 4.44 shows that the magnitude of Sig. ≤ 0.05.

Thus, the dependent variable is predicted significantly well by the regression model, which means a good fit for the data is gained. In the output of ANOVA, the F-ratio is used to test the validity of the hypothesis where the effects between the two variables are real. In other words, the relationship is due to a significant statistical relationship. In addition to that, the magnitude of F ratio = 106.266, where F ≥ 1.0. Thus, it is concluded that the variation between information quality and actual use is due to the statistical relationship according to the assumption in the alternative hypothesis. As mentioned earlier, the larger the F value, the likelihood is greater that information quality affects actual use and both variables have a strong correlation which is not due to a random cause, which is the same result of ANOVA output associated with the hypothesis (H2).

Regression coefficients

The table of coefficients is used in the regression analysis to assess the degree of correlation between information quality and actual use. Regression coefficients are necessary to understand the strength of influence by information quality on the dependent variable (information quality). Moreover, the magnitude of standard and unstandardized regression coefficients B and Beta tell whether the relationship between information quality and actual use are statistically significant (Sig ≤ 0.05). If the P-value is higher than 0.05, then no significant association between the two variables. The output of coefficients of regression is presented in Table 4.45.

Table 10: Coefficients of regression

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.786	.147		12.172	.000
	Information quality	.420	.041	.468	10.309	.000

a. Dependent Variable: Actual use

The following equation shows the regression model:
Y (dependent variable) = B+ B1 * X1 (independent variable) Actual use = 1.786 + 0.420 * Information quality

Table 10 shows the B (unstandardized regression coefficient) was statistically significant ($B = 0.420$ $\rho \leq 0.000$). Therefore, if information quality increases by a magnitude of 1unit, actual use rises by 0.420. In other words, a change in the information quality will significantly affect the actual use. Thus, the hypothesis (H2) is true. Finally, the last step in regression analysis is the evaluation of residual (errors) plot. As shown in Figure 4.17, most of the residuals of the regression equation are centred around zero, and throughout the whole range of fitted residual, the values are not systematically distributed. Conclusively, a good degree of relationship between information quality and actual use was indicated based on the centered distribution of residuals values.

The relationship between service quality and actual use

Using the simple linear regression, three analyses were conducted in this section to assess the relationship between actual use and service quality. The analyses included a regression model summary, ANOVA output, and residual plots for regression analysis, which were employed to examine the following hypothesis:

H3: Service quality affects actual use in a statistical relationship.
H0 (Null Hypothesis): Service quality does not affect actual use and no statistical relationship does exist between them.

In the following regression analysis, the output of a simple linear regression model between service quality and actual use is evaluated. It was hypothesized that a statistical and casual relationship exists between the two variables. Thus, the alternative hypothesis (H1) may be proven to be true or false.

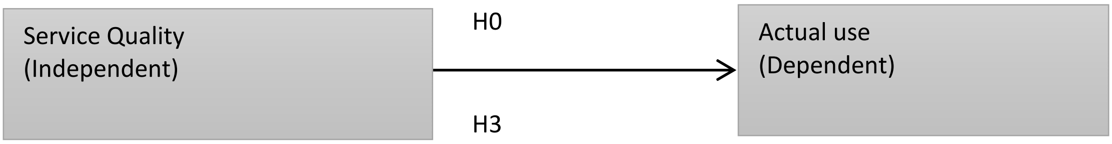

Figure 3: Regression model between service quality and actual use

Model Summary of Simple Linear Regression

The summary of the regression model shows information about the correlation coefficient of determination (R2) which tells the degree of interpretation and correlation coefficient (R) as shown in Table 11.

Table 11: Simple linear regression output showing the model summary and association between actual use and service quality

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
3	.516a	.267	.265	.50992

a. Predictors: (Constant), Service quality

b. Dependent Variable: Actual use

The predictive capacity of the variability between service quality and actual use in the regression model is indicated by the R and R2 values. Based on the correlation coefficient R = 0.516, a moderate degree of correlation between service quality and actual use is determined. The "R Square" revealed the degree or extent in which the total discrepancy in the actual use can be explained by service quality. The magnitude of R2 = 0.267 suggests that 26.70% of the change in the value of actual use can be explained by the variance in service quality. The residual variance in actual use = 73.30% is supposed to be caused by unrelated random variability in service quality.

Additionally, the magnitude of adjusted R2 indicates that 26.5% of the variance between service quality and actual use were predicted, thus showing a small difference (0.002≈0) between the actual R2 and adjusted R2 in the regression output. Therefore, a good degree of regression model fit was obtained between service quality and actual use.

The ANOVA output

The next step is examining the degree of significance based on ρ-value in the regression model between service quality and actual use. This analysis is pertinent to verify if the data fit with the regression equation. If the P-value is less than or equal to 0.05, then the alternative hypothesis (H2) is true and null-hypothesis (H0) is rejected. The data of the ANOVA output in Table 4.47 shows that the magnitude of Sig. ≤ 0.05. Thus, the dependent variable is predicted significantly well by the regression model, which means that a good fit for the data is gained.

Table 12: ANOVA output

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	35.829	1	35.829	137.796	.000b
Residual	98.547	379	.260		
Total	134.376	380			

a. Dependent Variable: Actual use
b. Predictors: (Constant), Service quality

As mentioned earlier, the F-ratio is used to test the validity of the hypothesis where the effects between the two variables are real: In other words, the relationship is due to a significant statistical relationship. In addition to that, the magnitude of F ratio = 137.796, where F ≥ 1.0. In conclusion, a statistical and significant association was observed between service quality and actual use in line with the assumption in the alternative hypothesis. As mentioned earlier, the larger the F value, the likelihood is greater that service quality affects actual use and both variables have a strong correlation which is not due to a random cause, which is the same result of ANOVA output associated with the hypothesis (H3).

Regression coefficients

The table of coefficients is used in the regression analysis to evaluate the degree of correlation between service quality and actual use. Regression coefficients are necessary to understand the strength of influence by service quality on the dependent variable (service quality). Moreover, the magnitude of standard and unstandardized regression coefficients B and Beta tell whether the relationship between service quality and actual use are statistically significant (Sig ≤ 0.05). If the P-value is higher than 0.05, then no significant association is present between the two variables. Table 4.48 indicates the output of regression coefficients.

The regression equation of this model is as follows:

Y (dependent variable) = B+ B1 * X1 (independent variable) Actual use = 1.664 + 0.461 * Service quality

Table 4.48 shows that coefficient B (unstandardized regression coefficient) is statistically significant (B = 0.461 ρ ≤ 0.000).

Table 13: Coefficients of regression

	Unstandardized	Standardized		

Model	Coefficients		Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1.664	.140		11.927	.000
Service quality	.461	.039	.516	11.739	.000

a. Dependent Variable: Actual use

Therefore, if service quality increases by a magnitude of 1unit, actual use rises by 0.461. In conclusion, actual use was predicted by the change in service quality and the association both variables were statistically significant ($P \leq 0.000$). Hence, the hypothesis (H3) is true. Finally, the last step in regression analysis is the evaluation of residual (errors) plot as shown in Figure 3.

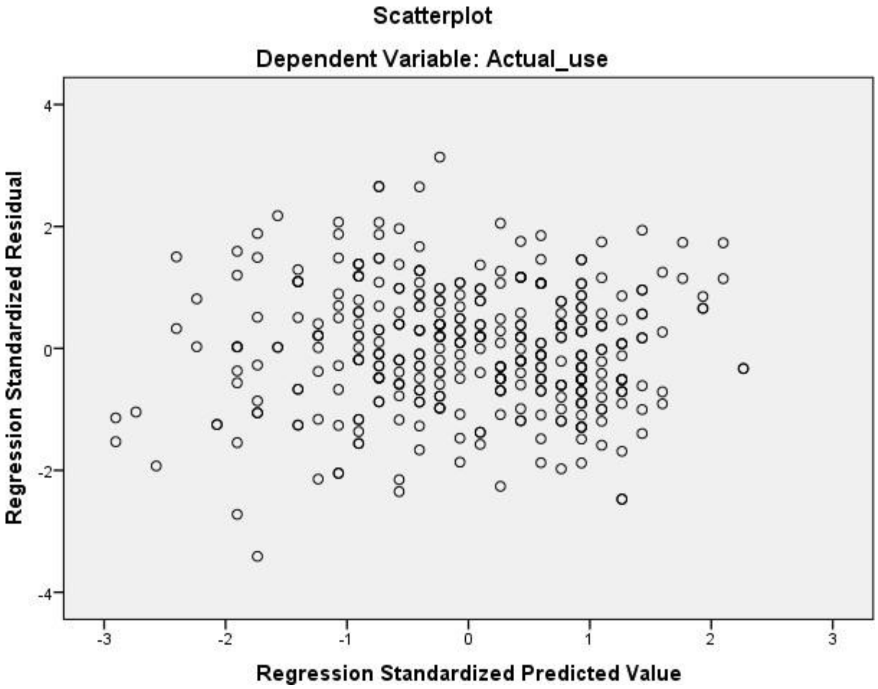

Figure 4: The scatterplot of residuals

It is evident in Figure 4 that most of the residuals of the regression equation are centred around zero, and throughout the whole range of fitted residual, the values are not systematically distributed. Therefore, a good degree of relationship between service quality and actual use was indicated based on the centered distribution of residuals values.

The relationship between social influence and actual use

Utilizing the simple linear regression, three analyses were conducted in this section to assess the relationship between actual use and social influence. The analyses included a regression model summary, ANOVA output, and residual plots for regression analysis, which were employed to examine the following hypothesis:

H4: Social influence affects actual use in a statistical relationship.
H0 (Null Hypothesis): Social influence does not affect actual use and no statistical relationship does exist between them.

As shown in Figure 4.20, a regression analysis was performed to test the relationship between social influence and actual use. It was hypothesized that a statistical and casual relationship exists between the two variables. Thus, the alternative hypothesis (H1) may be true or not true.

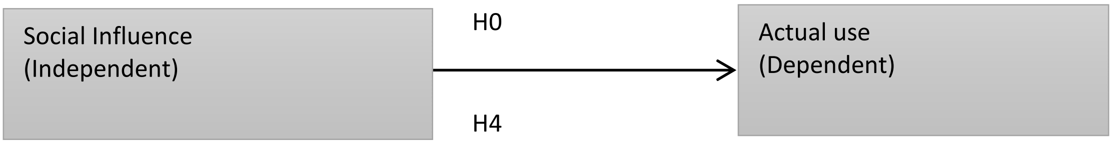

Figure 5: Regression model between social influence and actual use

Model summary of simple linear regression

The summary of the regression model shows information about the correlation coefficient of determination (R2) which tell the degree of interpretation and correlation coefficient (R) as shown in Table 14.

Table 14: Simple linear regression output showing the model summary and association between actual use and social influence

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
4	.506a	.256	.254	.51372

a. Predictors: (Constant), Social influence
b. Dependent Variable: Actual use

Table 14 presents the R and R square values, indicating how the variability between social influence and actual use is predicted in the regression model. Based on the correlation coefficient (R= 0.506), a moderate degree of correlation was observed between actual use and social influence. Meanwhile, the "R Square" in the model summary signifies the total discrepancy and variance in the actual use that is explained by the independent variable (social influence). The magnitude of R2 = 0.256 suggests that 25.60% of the change in the value of actual use can be interpreted by the variance in social influence. The residual variance in actual use = 74.40% is supposed to be due to unrelated random variability to social influence.

Furthermore, the magnitude of adjusted R2 indicates that 40% of the variance between social influence and actual use were predicted, thus specifying a small difference (0.002≈0) between the actual R2 and adjusted R2 in the SPSS regression output. Thus, it is concluded that a good degree of regression model fit has been obtained between social influence and actual use. This is another indicator that H4 is true.

The ANOVA output

Next is evaluating the ANOVA output by examining the degree of significance based on ρ-value in the regression model between social influence and actual use. This is an important test to verify if the data fit the regression equation. As shown in Table 15, if the P-value is less or equal to 0.05, then the alternative hypothesis (H4) is true while the null-hypothesis (H0) is rejected.

Table 15: ANOVA output of social influence

Model		Sum of Squares	df	Mean Square	F	Sig.
4	Regression	34.355	1	34.355	130.178	.000b
	Residual	100.021	379	.264		
	Total	134.376	380			

a. Dependent Variable: Actual use
b. Predictors: (Constant), Social influence

It is evident that the magnitude of Sig. ≤ 0.05. Thus, the dependent variable is predicted significantly well by the regression model, which means a good fit for the data is gained. Additionally, the F-ratio is applied to assess the validity of the hypothesis by checking if the association between the dependent and independent variables (social influence and actual use) is significant. Also, the magnitude of F ratio = 130.178, where F ≥ 1.0. The larger the F value, the likelihood is greater that social influence affects actual use and both variables have a strong correlation which is not due to random cause. This is the same result of the ANOVA output associated with the hypothesis (H4).

Regression coefficients

Table 16 indicates the regression coefficients to assess the degree of correlation between social influence and actual use. It is found that the strength of influence by social influence on actual use is strong. Moreover, the magnitude of standard and unstandardized regression coefficients B and Beta tell whether the relationship between social influence and actual use are statistically significant (P ≤ 0.05). If the p-value is greater less than or equal to 0.05 as observed in the present scenario, then a statistically significant association exists actual use and social influence. Table 4.21 indicates the output of regression coefficients.

Table 16: Coefficients of regression between social influence and actual use

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		

1	(Constant)	1.729	.138		12.541	.000
	Social influence	.465	.041	.506	11.410	.000

a. Dependent Variable: Actual use

The following equation present the model:

Y (dependent variable) = B+ B1 * X1 (independent variable) Actual use = 1.729 + 0.465 * Social influence

As shown in Table 16, B (unstandardized regression coefficient) is statistically significant ($B = 0.465$ $\rho \leq 0.000$), which indicates that social influence increases by a magnitude of 1unit, actual use rises by 0.465. Thus, social influence is a predictor of actual use and the association is statistically significant based on the p-value ($P \leq 0.000$). Hence, the hypothesis (H1) is true. Finally, it is found that the values of the residuals are not systematically distributed.

In line with the centered distribution of residuals values, Figure 4.21 depicts the a good degree of relationship between actual use and social influence. As shown in this figure, most of the residuals of regression equation are centered around zero and are throughout the whole range of fitted residual, which apply for the fit of data in the regression model only.

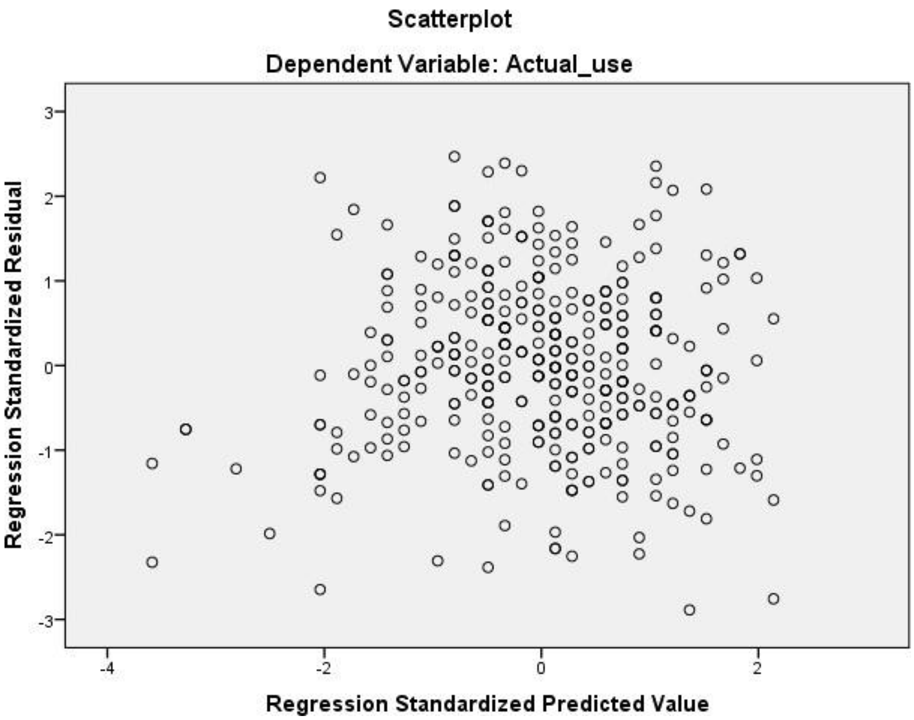

Figure 6: The scatterplot of residuals

Conclusion

This study revealed that information quality, system quality, service quality and social influence were the influencing factors of the actual use of E-government. Therefore, the hypotheses in this study is true which indicates a statistical relationship between influencing factors and actual use of E-government. These findings indicate that an increase in the influencing factors will have a positive impact by increasing the use of E-government in RTA.

Moreover, the outcome of this study highlighted the factors that increase actual usage performance should be very useful at both the individual and organizational level for emphasizing the importance of the effect of E-government services on the speed and quality of work. Positive effects such as better service delivery and people empowerment via information access and participation in public and policy decision-making will take place as E-government services disseminate information to citizens effectively.

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