

INTERNET USAGE WITHIN GOVERNMENT INSTITUTIONS IN YEMEN: AN EXTENDED TECHNOLOGY ACCEPTANCE MODEL (TAM) WITH INTERNET SELF-EFFICACY AND PERFORMANCE IMPACT

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ABSTRACT: *With the Internet being one of the most significant modern inventions, impacting every part of daily life and every facet of an organization's operations, the main purpose of this study is to investigate the antecedent variables that affect internet usage and examine its impact on employee performance within government institutions, focusing particularly on Yemen. This study extends the technology acceptance model (TAM) with one antecedent variable to internet usage (internet self-efficacy) and one output variable (performance impact) and proposes a second-order model performance impact which contains three first-order constructs (knowledge acquisition, communication quality, and decision quality) in order to increase the power of explaining the output. A survey questionnaire was used to collect primary data from 530 internet users among employees within government ministries-institutions in Yemen. The subsequent analysis examined the relationship between the variables of the proposed model, which includes confirmatory factor analysis (CFA) and structural equation modelling (SEM) via AMOS. The results showed that the data fit the extended TAM model well, and the findings of the multivariate analysis demonstrated four main results. (1) Internet self-efficacy has a positive impact on perceived ease of use and perceived usefulness; (2) Perceived ease of use has great influence on perceived usefulness and actual usage of internet; (3) Perceived usefulness has a strong positive impact on actual usage of internet; and (4) Actual usage positively influences performance impact. The proposed model explains 60% of the variance in performance impact, and the theoretical and practical implications are discussed.*

Keywords: Internet usage, Performance impact, Internet self-efficacy, TAM, Yemen

1. INTRODUCTION

The Internet/World Wide Web (WWW) has rapidly become an indispensable adjunct in the daily life of most individuals and has significantly impacted every facet of operations in organizations [1]. However, Yemen has one of the lowest internet usage rates in the world at 24.70% [2]. Lack of technology usage can lead to low performance and low productivity [3-6].

Several theories and models have been developed and proposed in order to predict and explain user behaviour with technology. The technology acceptance model (TAM) [7-8] is considered the most influential and commonly employed theory to describe an individual's acceptance of information systems [9], with its focus on technological characteristics by proposing two main constructs, namely usefulness and ease of use. However, the TAM ignores other significant factors such as individual characteristics which play a major role in the context of technology usage [10-11]. The TAM is a well-known theory regarding the usage and adoption of information technology (IT) and has already been validated through several studies [12-20], but it fails to address the link between actual usage and performance [21], which is widely used to measure the success of information systems [22]. This study has extended the TAM with one antecedent variable to internet usage, which is internet self-efficacy [23, 10], and one output variable from the internet usage, performance impact [24-28].

This study attempts to achieve the following research objectives: (1) To examine the effect of internet self-efficacy on perceived ease of use and perceived usefulness in the internet context among employees. (2) To examine the effect of perceived ease of use on perceived usefulness, and actual usage of internet among employees. (3) To examine the effect of perceived usefulness on actual usage of the internet among

employees. (4) To examine the effect of actual usage of the internet on employees performance.

2. LITERATURE REVIEW

2.1 SELF-EFFICACY

Self-efficacy factor plays a major role in the context of technology usage and Information Systems (IS) [29], and in particular Internet self-efficacy (ISE) in the context of internet technology [23]. Self-efficacy is defined as the degree to which the users believe that they have the confidence to perform a specific task/job using the system [30]. ISE in this study is defined as an individual's judgment of his/her capability to use the Internet [31]. Self-Efficacy has been investigated through different indicators in previous IS literature (See Appendix B).

In a quantities study [32] the results show that self-efficacy significantly influences perceived ease of use and perceived usefulness. Consequently, the following hypothesis is proposed:

H1. Internet self-efficacy has a positive effect on perceived ease of use.

H2. Internet self-efficacy has a positive effect on perceived usefulness.

2.2 PERCEIVED EASE OF USE

Perceived ease of use is defined as the degree to which a person believes that using a particular system would be free of effort [7]. There is a claim in IS literature that the higher the perceived ease of use of any system, the higher the perceived usefulness [33-35], and this is supported by [36] in the context of e-learning. The relationship between perceived ease of use and perceived usefulness has been studied many times in the context of IS, finding that there is a positive relationship between the two variables [37-42]. This contrasts with another study which found that perceived ease of use

does not influence perceived usefulness [43]. Therefore, the hypothesis is proposed as follows:

H3. Perceived ease of use has a positive effect on perceived usefulness.

There have been numerous studies conducted on the influence of perceived ease of use on actual usage. According to [44] a positive relationship between perceived ease of use and system usage seems to exist in the context of internet technology. In different contexts and technological applications, many studies have emphasized that perceived ease of use positively influences actual usage [12, 35, 45-48]. However, there are other studies which obtained an opposite result, namely that perceived ease of use does not influence actual usage [49]. Consequently, the following hypothesis is proposed:

H4. Perceived ease of use has a positive effect on actual usage of the internet.

2.3 PERCEIVED USEFULNESS

Perceived usefulness is one of the fundamental antecedent factors of technology usage and adoption [15, 17, 50-53]. It is defined as the degree to which a person believes that using a particular system would enhance his or her job performance [7]. A study conducted by [49] showed that perceived usefulness has a positive influence on actual usage within the context of intranet technology in Korea. Another study indicated that in the context of internet technology usage there is a positive relationship between perceived usefulness and actual usage [53], confirming other studies [12, 25, 45, 47-48, 54]. Hence, it is hypothesized as follows:

H5. Perceived usefulness has a positive effect on actual usage of the internet.

2.4 ACTUAL USAGE

According to [44], actual usage is defined as the usage frequency of technology and usage times. One of the most important directions for future research in the topic of technology usage is to investigate the impact of system usage on IS success factors such as performance [55], and a few studies have proposed a theoretical model to consider the impact of actual usage on performance [24, 56]. In a quantitative study [5] indicate that there is a positive impact of actual usage on individual performance, a finding in common with other studies which found a significant relationship between system use and performance [6, 24, 57-62]. However, there are studies which found that actual usage does not predict performance [11, 63-64]. Consequently, the following hypotheses are proposed:

H6. Actual usage of the internet has a positive effect on employees Performance.

2.5 Performance Impact

There are numerous studies in the literature in the context of IS which focus on system usage as output construct [52, 65-66], but they neglect to examine the consequences of that actual usage through its impact on performance [21], and it is recommended to measure the success of information systems [22]. There are few notable earlier studies which focused on performance as an output variable in the context of IS [5, 24, 56]. This study contributes to the body of knowledge and fills a gap by addressing the link between actual usage and individual performance within organizations. The construct of performance impact is defined as the degree to which

system usage has an effect on knowledge acquisition, communication quality and decision quality [11, 27].

One of the contributions of this study relates to the examination of performance impact. While previous studies have evaluated performance as a first-order construct with multiple indicators [10, 24, 25, 27] this study takes this a step forward to deal with performance impact construct as a second-order model containing three first-order constructs (knowledge acquisition, communication quality, and decision quality) with each of these three variables having multiple indicators. This step is made in order to increase the power of explaining the output through the model of performance impact.

3. RESEARCH METHOD

3.1 OVERVIEW OF THE PROPOSED MODEL

This study has applied the TAM by [7, 8] as an underpinning model in the context of internet technology usage among employees within government institutions in Yemen. It also contributes to the body of IS knowledge by extending the TAM with one antecedent variable to internet usage (internet self-efficacy) [10, 23] and one output variable (performance impact) [24, 26-28]. In addition, it is proposing performance construct as a second-order model containing three first-order constructs (knowledge acquisition, communication quality, and decision quality) in order to increase the power of explaining the output through the model of performance impact.

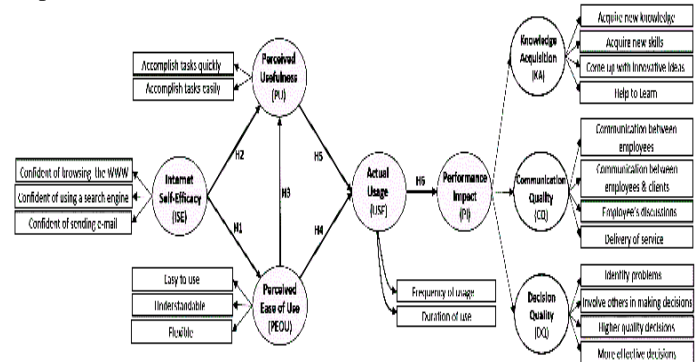


Fig (1) Proposed research model

3.2 DEVELOPMENT OF INSTRUMENT

A 22-item questionnaire was developed for this study. Because the respondents were Arab-speaking, it was imperative that it be accurately translated from English to Arabic. Back translation was used in this study, a procedure commonly used in cross-cultural surveys to test the accuracy of the translation [67]. Individual scale items are listed in Appendix A.

This study applied multi-item Likert scales which have been widely used in the questionnaire-based perception studies [36]. Unlike actual usage which is measured using a 5-point ranking scale, other variables are subjectively measured using the 7-point Likert Scale, with 7 being 'Strongly Agree' and 1 being 'Strongly Disagree'. For this study, a pre-testing was conducted with 25 university students from Yemen to resolve any ambiguity associated with wording or measurement. Then the items were pilot-tested to examine their internal consistency. Out of 60 surveys administered to Yemeni employees in the Ministry of Communication and

Information Technology, 58 were returned with complete and valid data. In the final questionnaire, all items had acceptable reliability, as the individual Cronbach’s alpha coefficients of the constructs, which ranged from 0.744 to 0.910, were all greater than the recommended value of 0.7 [68].

3.3 DATA COLLECTION

The targeted population was approximately 6,090 of Yemeni internet users in head offices of all 30 government ministries (called Dwa’win) at the time this study was conducted. The adequate sample size for each Ministry was based on the total number of employees, and the data was collected using a self-administered questionnaire. This was distributed personally to employees to motivate them and clarify any doubts. The main reason for choosing personal delivery of the questionnaire this provide a high predictive value for assessing the efficiency of the individuals in various departments, especially when the target subject under study is related to individual perceptions, beliefs and opinions [69].

A 700 questionnaires were distributed and 530 sets were returned, of which 508 were useful for analysis. The final sample size was considered adequate [70-71], and the response rate was 76%, which is considered very good [72] in comparison to other studies found in the relevant literature. A total of 22 questionnaires were deleted, 12 removed because of missing data for more than 15% of the questions, 4 were considered as outliers and 6 straight lining. Demographic profile of respondents shows that 412 (81.1%) were male and 96 (18.9%) female. 1.4% were less than 20 years old, 28.3% between 20 and 29, 53.9% between 30 to 39 years, 12.6% between 40 and 4 and 3.7% being 50 years and above. In terms of education background, 10.4% had high school certificate, 8.7% had a diploma, 72.2% had a bachelor degree (the majority of participants), with the remaining 8.7% having finished postgraduate studies.

4. DATA ANALYSIS AND RESULTS

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 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Perceived ease of use recorded the highest mean score of 5.88 out of 7.0, with a standard deviation of 1.174, indicating that the respondents consider the internet easy to use, understandable and flexible. The perceived usefulness mean score was of 5.33 out of 7.0 with a standard deviation of 1.545, indicating that the respondents believed the internet helped them to accomplish tasks quickly and easily. Moreover, the results showed the overall mean score of the respondents for internet self-efficacy to be 5.056 with a standard deviation of 1.340, indicating that the respondents are confident in browsing the WWW, using a search engine and sending e-mail. Performance impact recorded mean scores of 5.067 out of 7.0 points with a standard deviation of 1.409, indicating that the employees strongly agreed that using the Internet helped in; communication quality, knowledge acquisition and decision quality.

This study, which used the Average Variance Extracted (AVE) to test convergent validity, showed that all AVE values, ranging from 0.52 to 0.77 were higher than the recommended value of 0.50 [86]. The convergent validity for all constructs has therefore successfully fulfilled, exhibiting adequate convergent validity (see Table 2).

Table 2: Loading, cronbach’s Alpha, CR and AVE

Construct	Item	Factor Loading (>0.5)	M	SD	α (> 0.7)	CR (> 0.7)	AVE (> 0.5)
PEOU	PEOU1	0.69	5.88	1.174	0.837	0.846	0.649
	PEOU2	0.87					
	PEOU3	0.84					
PU	PU1	0.89	5.33	1.545	0.871	0.871	0.772
	PU2	0.86					
USE	USE1	0.84	3.36	1.012	0.744	0.763	0.618
	USE2	0.73					
ISE	ISE1	0.71	5.056	1.340	0.804	0.810	0.588
	ISE2	0.85					
	ISE3	0.74					
PI	PI1	0.87	5.067	1.409	0.910	0.748	0.515
	PI2	0.93					
	PI3	0.89					
	PI4	0.82					
	PI5	0.84					
	PI6	0.85					
	PI7	0.85					
	PI8	0.87					
	PI9	0.90					
	PI10	0.83					
	PI11	0.85					
	PI12	0.87					

Note: Note: M=Mean; SD=Standard Deviation, α = Cronbach’s alpha; CR = Composite Reliability, AVE = Average Variance Extracted $CR = (\sum K)^2 / ((\sum K)^2 + (\sum 1 - K^2))$, $AVE = \sum K^2 / n$. where K= factor loading of every item, n= number of item in a model
Key: ISE: internet self-efficacy, PU: perceived usefulness, PEOU: perceived ease of use, USE: actual usage, PI: performance impact.

The discriminant validity of the measurement model was checked using the Fornell-Larcker criterion. As shown in Table 3, the correlations between the factors ranging from 0.379 to 0.703 are smaller than the square root of the average variance extracted estimates which are in the range of 0.718 to 0.8879. This indicates that the constructs are strongly related to their respective indicators compared to other constructs of the model [87], thus suggesting a good discriminant validity. In addition, the correlation between exogenous constructs is less than 0.85 [82]. Hence, the discriminant validity of the overall quality construct is fulfilled.

Table 3: Results of discriminant validity by fornell-larcker criterion for the model

	Factors					
		1	2	3	4	5
		PEOU	PU	ISE	PI	USE
1	PEOU	0.806				
2	PU	0.491	0.879			
3	ISE	0.699	0.416	0.767		
4	PI	0.425	0.703	0.476	0.718	
5	USE	0.379	0.543	0.435	0.628	0.786

Note: Note: Diagonals represent the square root of the average variance extracted while the other entries represent the correlations.
Key: ISE: internet self-efficacy, PU: perceived usefulness, PEOU: perceived ease of use, USE: actual usage, PI: performance impact.

4.2 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 $X^2/df = 2.885$, CFI = 0.95, and RMSEA = 0.061. These fit indices provide the evidence of adequate fit between the hypothesized model and the observed data [75]. Thus, the path coefficients of the structural model could now be examined.

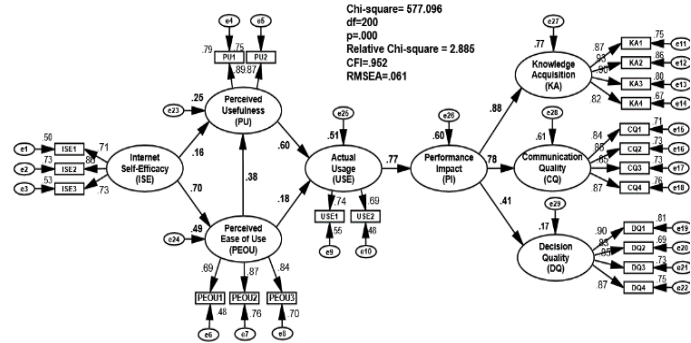


Fig (2) Research structural model results

The hypotheses of this study were tested using structural equation modelling via AMOS as presented in Figure 2. The structural model assessment as shown in Table 4 provides the indication of the hypotheses tests. And all six hypotheses are supported. Internet self-efficacy significantly predicts perceived ease of use and perceived usefulness, hence, H1 and H2 are accepted ($\beta = .70, p < 0.001$), and ($\beta = .16, p < 0.05$) respectively. Also, perceived ease of use significantly predicts perceived usefulness and actual usage, so H3 and H4 are supported ($\beta = .38, p < 0.001$) and ($\beta = .18, p < 0.001$) respectively. Perceived usefulness significantly predicts actual usage, so, H5 is accepted ($\beta = .60, p < 0.001$). Moreover, actual usage significantly predicts performance impact, thereby supporting H6 ($\beta = .77, p < 0.001$). Note that the direct effect of perceived usefulness on actual usage is much stronger than perceived ease of use as evident from the values of path coefficient. This is consistent with previous research which found that perceived usefulness plays a more significant and stronger role than perceived ease of use. In addition, it is evident that internet self-efficacy has more influence on perceived ease of use than perceived usefulness.

Table 4: Structural path analysis result

DV	IV	β	S.E	C.R	p	Decision		
H1	PEOU	<---	ISE	.70	.052	11.175	***	Supported
H2	PU	<---	ISE	.16	.095	2.184	*	Supported
H3	PU	<---	PEOU	.38	.117	4.920	***	Supported
H4	USE	<---	PEOU	.18	.055	3.360	***	Supported
H5	USE	<---	PU	.60	.040	9.921	***	Supported
H6	PI	<---	USE	.77	.050	7.185	***	Supported

***p<.001; **p<.01; *p<.05, S.E = Standard Error, C.R = Critical Ratio

Key: : ISE: internet self-efficacy, PU: perceived usefulness, PEOU: perceived ease of use, USE: actual usage, PI: performance impact

The R² value indicates the amount of variance of dependent variables which is explained by the independent variables. Hence, a larger R² value increases the predictive ability of the structural model. According to [88], it is crucial to ensure that the R² values should be high enough for the model to achieve

a minimum level of explanatory power. And [89] recommended that the R² values should be equal to or greater than 0.10 in order for the explained variance of a particular endogenous construct to be deemed adequate, while [90] suggested that R² is substantial when it is greater than 0.26 with acceptable power above 0.02, according to [90] that R² is substantial when it greater than 0.65 with acceptable power above 0.19. However, [85] recommend that R² has to be larger than 0.75 in order to be deemed substantial with acceptable power above 0.25. Table 6 shows the result of R² values are high enough for the model to achieve an acceptable level of explanatory power. Note that the highest variance explained in endogenous construct found in the performance impact (60%) by exogenous constructs actual usage. Followed by the variance explained in actual usage (51%) by perceived usefulness and perceived ease of use.

5. DISCUSSION AND IMPLICATIONS

5.1 DISCUSSION

In this empirical study, employee usage of internet technology within government institutions in Yemen was analysed. This study proposed an extended model of the original TAM by adding internet self-efficacy as an antecedent variable and performance as a consequence variable to actual internet usage. It provides a good explanation of performance, and a significant amount of variance (60%) in performance impact was explained.

Findings Related to Objective 1: The first objective of this study was to examine the effect of internet self-efficacy on perceived ease of use and perceived usefulness in the context of employee internet usage. This objective was achieved by testing the hypothesis (H1) and (H2) respectively. This study showed that internet self-efficacy had significant effects on perceived ease of use and perceived usefulness, support prior research [91- 93]. It indicated that the more confident employees are in browsing the WWW, using a search engine, and sending e-mail, the more the internet becomes easy to use, understood, flexibility, and accomplishing tasks more quickly and easily.

Findings Related to Objective 2: The second objective of this study was to examine the effect of perceived ease of use on perceived usefulness, and the actual usage of internet among employees. This objective was achieved by testing hypothesis (H3) and (H4) respectively. Firstly, perceived ease of use was found to positively affect perceived usefulness. This indicated that the easier the internet is to use, the more useful employees feel the internet is. This finding is consistent with previous studies [37-38, 40-42]. However, the result which related to the positive effect of perceived ease of use on perceived usefulness was inconsistent and conflict with [43] who found that perceived ease of use does not affect perceived usefulness. This contradictory finding suggests that the effect of perceived ease of use on perceived usefulness may be different across context and technology applications. Secondly, this current study found that the perceived ease of use has a positive effect on actual usage of internet technology. This impact is supported by previous studies [12, 35, 45, and 47]. The result suggests that the more employees perceive the internet as easy to use,

understandable and flexible, the more they will use the internet (frequency of usage and duration of use). However, this result contradicts [49], who found that there is no relationship between perceived ease of use and system usage. This paradoxical result may suggest that perceived ease of use is not enough to drive someone to use the internet without the awareness of the usefulness of the Internet.

Findings Related to Objective 3: The third objective of this study was to examine the effect of perceived usefulness on actual usage of the internet among employees. This objective was achieved by testing the hypothesis (H5). This current study found that perceived usefulness has a positive effect on actual usage. This impact is supported by previous studies [12, 25, 45, 47], and is explained by the fact that when employees perceive the internet as a useful tool, this leads to increasing their frequency and the duration of internet use.

Findings Related to Objective 4: The fourth objective of this study was to examine the effect of actual usage of the internet on employees' performance. This objective was achieved by testing the hypothesis (H6). This current study found that actual usage has a positive effect on performance, and this impact is also supported by previous studies [6, 24-25, 58-61]. It is also explained by the fact that when employees within government institutions increase their internet usage frequency and use it longer, this leads to an improvement in their performance in knowledge acquisition (acquire new knowledge and skills, come up with innovative ideas, help to learn), communication quality (communication between employees and between employees and clients, employees discussions and delivery of service), and a moderate increase in decision quality (identifying problems, involving others in decisions-making, leading to better quality decisions). Although many studies support the positive impact of actual usage on performance, [11] found the opposite, that there is no relationship between actual usage and performance impact. In addition, [63] indicated that overall actual usage does not predict performance impact. However, this current study does support the claim of a positive relationship between system use on performance in the context of internet technology among employees in government institutions in Yemen.

5.2 IMPLICATIONS FOR RESEARCH

This study provides strong support that the TAM predicts system usage of internet technology among employees in government Institutions. The findings also add to the existing body of research by examining the effects of internet self-efficacy as an antecedent variable on the TAM. Further, the main contribution of this study is to addressing the theoretical link between system usage and individual performance. In addition, this study contributes to the literature of IS by proposing a second-order model of performance impact (contain three first-order construct; knowledge acquisition, communication quality and decision quality), in order to increase the power of explaining the output by the model. Thus future research can use the proposed second-order model to better understand of performance impact. The extended TAM model with consequences of usage through performance impact and internet self-efficacy as an antecedent variable enhances our understanding of

information technology (IT) usage, and can aid efforts to promote internet usage in organizations.

5.3 IMPLICATIONS FOR PRACTICE

The results will also allow practitioners to realize the factors that enhance employee' performance. The findings should be very useful not only at the individual or organizational level, but also for the Yemeni Government, as they highlight the importance of information technology and how it effects on the quality of work. Therefore, the information from these findings should encourage and support the formation of future policy, not only at an organizational level but also at the National level. If the government utilizes these findings by setting up strategies to promote Internet usage, this may in turn improve professional practice, personal development and the quality of working life.

This research is deemed to be not only timely but also conducted in the right place. It is expected that key findings, especially the proposed model, will help in supporting government and national policies in Yemen, especially the policy to increase ICT usage as part of the job at all levels of organizations, and also the national policy of e-government. The evidence shows a link between ICT usage and better performance and productivity [4, 5, 11, 24, 56, 60-61]. While Yemen is facing difficulties in many aspects, increased ICT usage such as the internet can lead to social, economic and political development [94], and increased internet usage could be a major contributing factor for development, as studies showed that there is a link between internet usage and national income [95].

6. LIMITATIONS AND SUGGESTIONS FOR FUTURE WORK

One of the limitations of this study is that data was gathered by cross-sectional and was not longitudinal in nature. Therefore, there is ambiguity on whether usage is affected by expectations or vice versa. As [96] mentioned, there are biases when the researcher uses self-reported measures of usage because generally they are found to differ from the true score of system usage. Future research should also aim to apply the proposed extended TAM model with other technology applications such as mobile learning, or other sectors such as the private sector. This will enhance the ability of the model to thoroughly explain the performance impact in the IS context.

7. CONCLUSION

Internet technology has been described as most likely to be the greatest invention of this generation [97]. As studies have shown, internet technology has the potential to improve most aspects of our social, economic and cultural life [98]. Internet usage is also linked to national income [95], and there is a significant impact of internet usage on organizational performance [99-100]. As Yemen is facing a variety of challenges, the internet can contribute to overcome some of these difficulties. This study proposes an extended original TAM model with internet self-efficacy as an antecedent variable, and evaluation of IS usage factors through performance among employees within public sector organizations. Representing a 76% response rate, a total of 508 valid questionnaires were collected and the subsequent examined the relationship between the variables of the proposed model, including confirmatory factor analysis

(CFA), and structural equation modeling (SEM) via AMOS. The result found that there is a positive relationship between internet self-efficacy on one side, and perceived ease of use and perceived usefulness on the other side. Perceived ease of use positively influences perceived usefulness and actual usage. Perceived usefulness predicts actual usage. Actual usage of the internet has a significant impact on individual performance (knowledge acquisition, communication quality, and decision quality). Therefore, it is evident from the empirical findings that adoption of internet usage seems to be fairly successful within organizations, and this can be further enhanced when organizations place an emphasis on internet usefulness and ease of use making employees aware and actively encouraging them. The findings of this study can provide policymakers with important insights on how to more successfully design and implement information technology within their organizations, and how to encourage top managers to ensure that employees are more likely to use the internet and thereby enhancing knowledge acquisition, improve communication quality and make better decisions.

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9. APPENDIX

July-August

Appendix A
Instrument for variables

Variable	Item & Measure	Rating Scale	Source
Perceived ease of use	PEOU1: Learning to use the Internet is easy for me. PEOU2: My interaction with the Internet is clear & understandable. PEOU3: I find the Internet to be flexible to interact with.	7-point Likert scale: (1) Strongly disagree to (7) Strongly agree	[65, 101, 102]
Perceived usefulness	PU1: Internet helps me to accomplish my tasks more quickly. PU2: Using Internet make it easier to complete my tasks.	7-point Likert scale: (1) Strongly disagree to (7) Strongly agree	[44,53]
Internet self-efficacy	ISE1: I feel confident browsing the World Wide Web (WWW). ISE2: I feel confident finding information by using a search engine (e.g. Google). ISE3: I feel confident sending & receiving e-mail messages.	7-point Likert scale: (1) Strongly disagree to (7) Strongly agree	[10, 23]
Actual usage	USE1 (Frequency) : How often do you use the internet? <input type="checkbox"/> Don't use <input type="checkbox"/> Once each month <input type="checkbox"/> Once each week <input type="checkbox"/> once each day <input type="checkbox"/> several times in day USE2 (Time) : How often do you use the internet each time? <input type="checkbox"/> Don't use <input type="checkbox"/> less than 1 hour <input type="checkbox"/> 1-2 hours <input type="checkbox"/> 3- 4 hours <input type="checkbox"/> More than 5 hours	5-point scale	[103]
Performance impact	KA1: Internet helps me acquire new knowledge. KA2: Internet helps me acquire new skills. KA3: Internet helps me to come up with innovative ideas. KA4: Internet helps me to learn. The use of Internet improves CQ1: communication between employees. CQ2: The use of Internet improves communication between the employees and the clients. CQ3: The use of Internet improves employee's discussions. CQ4: The use of Internet improves the delivery of service. DQ1: Internet helps me identify problems. DQ2: Internet helps me involve others in making decisions. DQ3: Internet helps me make higher quality decisions. DQ4: Internet helps me make more effective decisions.	7-point Likert scale: (1) Strongly disagree to (7) Strongly agree	[24, 25- 28]

Appendix B

Indicators of Self-Efficacy in previous IS literature

Reference	Indicators				
	Skills	Knowledge	Ability	Confident	Comfortable
[104]	√		√	√	
[66]	√			√	√
[43]				√	
[105]			√		
[106]	√	√		√	
[23]				√	
[10]				√	
[20]				√	
[107]	√			√	√
[108]				√	
[109]				√	
[110]				√	
[111]				√	
[30]				√	
[29]	√	√			
[103]	√	√	√	√	√
[112]			√		

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