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Cloud computing acceptance among public sector employees

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ABSTRACT

Cloud computing is one of the platforms that drive organisations and users to be better prepared for a simpler computing platform and offers significant benefits to the quality of work. The transition from conventional computing to the virtual world helps organisations to maximise their potential. However, not all users can accept cloud computing adoption. Failure to understand the factors of user's acceptance will negatively impact the organisation's mission of empowering the technology. Therefore, this study proposes to assess to what extent the users are accepting cloud computing. This study adopts the unified theory of acceptance and use of technology (UTAUT) and six technological and human factors assessed for the Malaysian public sectors. Survey data from several ministries were analysed using partial least squares-structural equation modelling (PLS-SEM). The study found out that performance expectancy, compatibility, security, mobility, information technology (IT) knowledge, and social influence had a significant impact on the user's intention to accept cloud computing. The results of this study contribute to a clear understanding of the factors affecting the Malaysian public sectors about cloud computing.

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1. INTRODUCTION

Recent technological advancements have brought a new dimension to the patterns of computerisation. Previously, every organisation competed in the information communication and technology (ICT) infrastructure with a variety of tools, devices, hardware, software, and more. However, in today's rapidly changing technology, with the transition to the industrial revolution 4.0 (IR 4.0) environment, it has opened a new dimension to the world of computing. The emergence of cloud computing technology as a new platform for computing has opened the eyes of technology industry players to further benefit from this innovation. Many studies have proven that this technology provides many benefits to the industry and users such as its ability to reduce operating costs, improve collaboration, more secure security levels, and more mobile accessibility [1, 2]. Cloud computing allows more users and organisations to share resources that are optimised for their users. This scenario will reduce user dependence on hardware and software installed on an individual workstation.

In 2018, the Asia Cloud Computing Association (ACCA) report listed Southeast Asian countries in cloud computing implementation. The report placed Malaysia at 8th, far behind Singapore at the top [3]. The report stated that Malaysia had a high potential for developing cloud computing applications as Malaysia

government had a clear policy and strategy to enable the delivery of cloud-based public services as well as to drive the private sectors' adoption of cloud technologies. However, some focus needs to be improved, such as physical cloud infrastructure and internet speed to effectively reach the aims of the Malaysian Public Sector ICT Strategies [4].

The Government of Malaysia has introduced a cloud-based unified communication and collaboration services as an initiative to enhance cloud computing technology in the public sectors. This service is a platform that integrates all communication channels such as email, live telecast calls, video conferences, instant messaging, and big transfer files application. The centralisation of communication channels for ministries and government agencies in the cloud is an effort to optimise the use of existing resources as well as a more comprehensive saving effort. The implementation of the service known as MyGovUC covers all ministries and almost all federal-level agencies since 2017.

However, according to reports of impact studies conducted by the regulatory agency on the service, the use of this service was significantly lower than the number of account holders across Malaysia. The report found out that 75% of users only used email applications, while only 43% used teleconferencing applications and only half used big mail transfer applications. The study concluded that this service usage rates other than email were due to a lack of knowledge and skills among consumers, a lack of infrastructure that could support teleconference applications, and poor awareness of services.

Consequently, this study finds out that there is a significant problem in the adoption of cloud-based services as its implementation cannot be matched with the usage of services and applications offered. MAMPU's report [5] showed that there is a gap that needs to be addressed, which is to determine factors that influence these employees to accept cloud computing in their daily work. Then, a research model that could evaluate the public sector employees' acceptance of cloud-based services is developed, validated, and tested. This study aims to identify the factors that can be considered, which can affect the cloud-based applications used by the Malaysian public sectors. This study adopts the unified theory of acceptance and use of technology (UTAUT) and six technological and human factors assessed for the Malaysian public sectors.

2. LITERATURE REVIEW

2.1. Cloud computing background

Cloud computing can be defined as "a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction" [6]. Cloud computing is used to share resources (data and applications) in a cloud platform that host space over the internet. There are three types of deployment model; software as a service (SaaS), platform as a service (PaaS), and infrastructure as a service (IaaS) [6]. Besides, there are three types of service models in cloud computing; public cloud (provides services and infrastructure to the public and organisations in a shared manner), private cloud (provides dedicated services and support to one organisation), and hybrid cloud (a combination of public and private cloud). According to the report by RightScale [7], a public cloud used for the business sector is 33% compared to the hybrid cloud, which is 28% and private cloud, which is 17%.

2.2. Information technology innovation acceptance

The acceptance of new technologies by consumers or organisations varies depending on how technology is going them perform the task faster and better [8]. The skill and magnitude of technology are tools to facilitate the job, but in many issues and situations, its efficacy and benefits for users are subjective. Davis [9] defined acceptance as the user's decision on how and when to use the innovations. Thinking at the issues which often prevent users from embracing and using technologies, many concerns need to be addressed before users or organisations in adopting cloud computing. Multiple studies were done to assess the user's acceptance of cloud computing at both individual levels [10, 11] and organisational levels [12, 13]. Additionally, these studies incorporated other factors which may influence the acceptance of the user in diverse situations. Theory of reasoned action [14], Theory of planned behavior [15], technology acceptance model [9], diffusion of innovation [16], and task-technology fit [17] are among the theories used in the acceptance of innovation. Meanwhile, UTAUT [18] is a great research framework incorporating eight acceptance theories based on groundbreaking studies of individual acceptance. The UTAUT is intended to explain the user's intention to use an IS and subsequent behaviour. Thus, UTAUT is adopted in this study as an underlying theoretical framework to explore the acceptability of users of cloud computing in the Malaysian public sector.

2.3. UTAUT

Venkatesh *et al.* [18], developed UTAUT, which clarified the user's intention to use IS and subsequent usage behaviour. The strength of UTAUT is that it focuses on so many models and gives an investigator a wider view of all current models [19]. Applied research has been comprehensive on the UTAUT model. This

model offers a framework that does not only describes information technology (IT) and IS adoption but also explains how these technologies and systems are used [20]. The UTAUT model contributes substantially to the study of technology acceptance and uses because it can integrate different TAMs [18]. Table 1 shows the authors, areas of study, and results of the study that used the UTAUT framework in their study. The results of previous studies using the UTAUT framework showed different research findings, especially with various suggestions on other factors relevant to the context of the study.

Table 1. The studies that used the UTAUT framework

Author	Area of study	Results/Findings
[21]	RFID usage in HEI	All four factors of UTAUT are significant in the study.
[22]	e-Learning adoption	All four factors of UTAUT are significant in the study.
[23]	On-demand services user acceptance	Using UTAUT2 and incorporated with DOI. Significant factors: personalisation, compatibility, social influence, and perceived risk.
[24]	Mobile banking adoption	Using UTAUT2. Significant factors: Performance expectancy, effort expectancy, social influence, habit, hedonic motivation, and perceived risk.
[25]	Impact of social media technology	Incorporated with other factors. Significant factors: utilitarian value, hedonic value and social influence.
[26]	Web-based services acceptance	All four factors of UTAUT are significant in the study.
[27]	Online banking adoption	Incorporated with other factors. Significant factors: brand trust, performance expectancy, perceived risk, initial trust.
[28]	Internet banking adoption	Incorporated with other factors. Significant factors: performance expectancy, effort expectancy, compatibility, innovativeness, and perceived technology security.

3. RESEARCH MODEL AND HYPOTHESIS DEVELOPMENT

This study proposes a research model to understand the cloud computing acceptance trend in the Malaysian public sectors. It is comprised of three factors that originate from the UTAUT model, namely performance expectancy, effort expectancy, and social influence. They have also incorporated six additional factors (compatibility, security, mobility, IT knowledge, top management support and awareness) that derive from a related study in cloud computing acceptance. Figure 1 depicts the proposed model of the study.

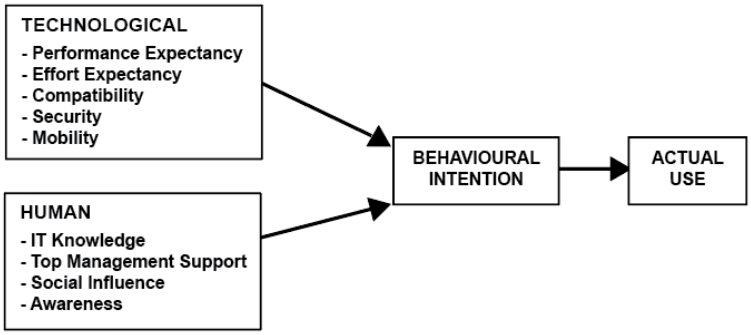

Figure 1. Research proposed model

3.1. Technological factors

The technological factors focus on technological aspects linked to cloud computing, features, and factors that make this technology acceptable. These factors include performance expectancy, effort expectancy, compatibility, security, and mobility. Each factor is explained by the basis of the selection of those factors. The hypothesis of these factors to the acceptance of cloud computing technology is also included in this section.

a. Performance expectancy

Performance expectancy refers to the degree to which cloud computing is used in daily work, thus strengthening the perceptions of individuals about innovations. Venkatesh *et al.* [18] also stressed that the performance expectancy, as one assumes, the program would help them to achieve job performance gains. This aspect also helps people who embrace innovation to have clear advantages compared to others [29]. Before using cloud computing, the positive impacts are among the most important things organisations evaluate. The organisation is looking for lucrative returns, and much investment is proliferating. Therefore, it is appropriate to argue that performance expectation has a positive impact on the acceptance of cloud computing. Hence, the

study proposes that: H1. Performance Expectancy has a positive influence on behavioural intention to accept cloud computing.

b. Effort expectancy

Effort expectancy described the degree of ease associated with system use [18]. User experience is important to indicate an individual's comfort while using technology. The invention should be useful and helpful. However, innovation is hard to accept because it is difficult to learn, not user-friendly, and too complex. It would not fully exploit new technology. Bozan *et al.* [30] addressed this component as one of the key factors and found out that it had changed considerably among users in their relationship with behavioural intentions. Thus, individuals with adequate expectations of effort have a more definite intention towards accepting cloud computing. Hence, the study proposes that: H2. Effort Expectancy has a positive influence on behavioural intention to accept cloud computing.

c. Compatibility

According to Rogers [16], compatibility refers to the degree of perceived innovation by current values, past experiences, and desires of future adopted people. A less vague concept of a future supporter is more compatible. Technology can either be consistent or incompatible 1) with sociocultural values or beliefs, 2) with innovations that had previously been implemented or 3) with user requirements for innovation. Sallehudin [31] explained that compatibility of the technological innovation with an existing infrastructure or technology either sped up or delayed its organisational acceptance rate. In additions, it is essential to ensure that existing infrastructure and systems are perfectly fit for the innovations to be applied so as not to be harmful after they are used. Hence, the study proposes that: H3. Compatibility has a positive influence on behavioural intention to accept cloud computing.

d. Security

Security aspects are critical in ensuring the protection of data and information stored in cloud computing. Information system and technology security generally focus on protecting three main aspects of security, namely confidentiality, integrity, and availability or known as "CIA" [32]. According to Singh *et al*. [33], the cloud model based on the virtual machine environment reveals stored and shared data on the cloud becomes vulnerable for the security breach. Therefore, it is essential for a standard security mechanism that can be applied and implemented by all stakeholders, including service providers. Hence, the study proposes that: H4. Security has a positive influence on behavioural intention to accept cloud computing.

e. Mobility

Mobility allows applications to use cloud computing to conveniently connect over the internet, which is one of the technology features. Taib *et al*. [34] stated mobility as a ubiquitous connection which allows users to access anytime and anywhere using the services remotely. Furthermore, mobility is the main predicted factor for the adoption of the new mobile innovation by potential users. This should be an indicator of user acceptance as reviewed by Saxena [35], which stressed the importance of mobility factor to implement new mobile and electronic innovation. Hence, the study proposes that: H5. Mobility has a positive influence on behavioural intention to accept cloud computing.

3.2. Human factors

Human factors are viewpoints in assessing human response to technology. There are four factors; IT knowledge, top management support, social influence, and awareness. Each human factor is explained by the basis of the selection of those factors. The hypothesis of these factors to the acceptance of cloud computing technology is also included in this section.

a. IT Knowledge

Each individual must be armed with IT knowledge in order to accept new technology. The potential of employees to utilise technology should be observed in order not to disrupt their adoption. According to Sallehudin *et al.* [31], technology-savvy employees will lead to the adoption of IT technologies through knowledge and innovation transformation. Competent staff can develop innovation and the need for new technologies. This scenario provides the employee with added value in constantly seeking space to improve work productivity. The internal expertise or IT knowledge of employees in the company is another key element. The adoption of innovation is also expected to have an impact on IT or non-IT employees [36]. Hence, the study proposes that: H6.IT knowledge has a positive influence on behavioural intention to accept cloud computing.

b. Top management support

Support from top management is important for the successful implementation of innovation in the organisation. Top management is a higher-level group managing the policies and decisions of the organisation. A great move in the acceptance process is critical, and it will lead to the successful implementation of any project. According to Sallehudin *et al.* [31], in the decision process, the power of top management serves as an agent of transition. Top management support in cloud computing implementation can ensure employees'

efficiency and reaction. Thus, this factor refers to how the top management support affects the daily tasks of the individual employee. Hence, the study proposes that: H7. Top Management Support has a positive influence on behavioural intention to accept cloud computing.

c. Social influence

According to Venkatesh *et al.* [18], social influence refers to the degree to which a person sees what others think about how the new system should be used. In this study, social influence tests how people are affected by their environments by motivating them to consider and use cloud-based applications. A study by Farah *et al.* [24] showed that the user relies heavily on feedback and experience from others who use new technology in the first place. The study also showed that the most significant factor in estimating the outcome for a user to take mobile applications is social influence. Hence, the study proposes that: H8. Social Influence has a positive influence on behavioural intention to accept cloud computing.

d. Awareness

Awareness refers to the extent to which a person is aware of cloud-based applications services. Implementing innovation will not work unless the innovation is used. Therefore, it is essential to provide people with knowledge of the technologies. The use of new technology should not only be acknowledged to users but also the opportunities to be utilised. When users realise the benefits of one technology, they are motivated and attempt to use it. Hence, the study proposes that: H9. Awareness has a positive influence on behavioural intention to accept cloud computing.

4. RESEARCH METHODOLOGY

Quantitative data were collected using a questionnaire, and SmartPLS 3.2 software was used to analyse the data and validate the research model. However, before that, three activities need to be considered to ensure that the research objectives are met. These activities include instrument development, sample preparation, and data collection. Besides, common method bias is also emphasised in this study as it involves single-source research.

4.1. Instrument development

Based on the seven factors included in the measurement model, the instrument was developed to collect data. Items of measurement for each factor were adopted from previous studies and had gone through a validity and reliability process, which were face validity and expert content validity [37].

4.2. Sample

The study population comprises of Malaysian public sectors' employees who are using MyGovUC application services. In order to determine the sample size, the G*Power software has been used to calculate the minimum required sample size with effect size medium (0.15), the power needed as 0.8 and eleven predicators. The minimum number of respondents needed is 114. The individual sample is a public sector staff comprising various positions from various government agencies that use MyGovUC services in their daily work. Respondents must be of those who have access to MyGovUC and are experienced in using MyGovUC. A convenience sampling and snowball technique were employed as they helped make the survey material easier to distribute to target groups. Convenience sampling is a type of sampling whereby recruiting the respondents that are most easily accessible [38]. Snowball technique involves the recruitment of respondents who in turn, recruit other respondents.

4.3. Data collection

The data collection was done via three approaches which are surveying using Google Form, emailing the questionnaire to the public relations officer (PRO) of each ministry for the escalation within the ministry as well as distributing the paper surveys at the ministry offices. A total of 200 paper surveys were distributed, and 190 forms were returned (95% response rate). A total of 169 responses were received from Google form, resulting in a total of 359 responses. This response rate is above Baruch's [39] recommendation of between 50% and 80% for an overall survey response. Only eight responses were rejected for not meeting the set criteria and having incomplete answers. As a result, a total of 351 valid questionnaires with a response rate of 94% were used for further data analysis. The respondents' profile of the study is shown in Table 2.

4.3. Common method bias

Method bias can be an issue since the data collection only involved a single source. Harman's single factor test was carried out to determine whether bias was on the questionnaire data. Bias occurred when Harman's single factor test resulted in the variance value greater than 40% [40]. In this research, Harman's single factor test showed that the first factor had a value of 37.10% variance (less than the 40% limit of the

total variance). In this regard, the results of this test showed that the method of sampling of this study was independent of the common bias variant.

Table 2. Total of respondents ($N = 351$)

Demographic	Category	Frequency
Gender	Male	148
	Female	203
Age	Less than 25	55
	26-35	142
	36-45	111
	More than 46	39
	N/A	4
Academic Qualification	Diploma	76
	Bachelor	146
	Master	74
	PhD	15
	Others	40

5. DATA ANALYSIS AND RESULTS

This study employs a PLS-SEM data analysis approach to measure the factors that influence a user's intention to accept cloud computing. The PLS-SEM is chosen in this study because its goals are to predict key target variables, and the research model is an extension of an existing theory [41]. Therefore, predicting factors that influence the intention of the consumer to consider cloud computing is appropriate for the objective of this study. This study assesses multivariate normality using online Web Power tools. The analysis shows that the p-value of Mardia's multivariate skewness and kurtosis coefficients are less than 0.05, which confirm multivariate non-normality data. The result is available at https://webpower.psychstat.org/models/kurtosis/results.php?url=1367ad76416b40c8f6d4e2750c8804f2.

5.1. Measurement model

As recommended by Ramayah *et al.* [42], the analysis should be carried out in three main assessment criteria, namely the internal consistency reliability, convergent validity, and discriminant validity. Table 3 shows the validity of the measurement model by measuring the loadings, composite reliability (CR), average variance explained (AVE), and variance inflation factors (VIF). Based on [43], values in Table 3 are passed the threshold value for all criteria. Thus, the measurement model is accepted. The list of measurement items can be found at https://bit.ly/2O3Mb3e. The study reports the discriminant validity using the heterotrait-monotrait (HTMT) ratio. If the HTMT value is greater than 0.85 [44], it indicates a severe issue in discriminant validity. Table 4 shows that discriminant validity has been established as all values are less than 0.85.

5.2. Structural model

The collinearity test is performed before the evaluation of the structural model. As indicated in Table 2, the results of collinearity test (VIF) are lower than the threshold value of 5.0 [43]. The structural model was assessed using the standard beta value, t-values, predictive relevance (Q^2), and the effect sizes (f^2). Table 5 shows the assessment results of the structural model for all hypotheses.

It is shown that PER, COM, SEC, MOB, ITK, and SOC have a significant relationship with the intention to accept cloud computing with PER ($\beta = 0.235,\ t = 3.324,\ p < 0.05$), COM ($\beta = 0.123,\ t = 1.731,\ p < 0.05$), SEC ($\beta = -0.136,\ t = 2.943,\ p < 0.05$), MOB ($\beta = 0.429,\ t = 8.051,\ p < 0.05$), ITK ($\beta = 0.086,\ t = 1.938,\ p < 0.05$), and SOC ($\beta = 0.810,\ t = 2.667,\ p < 0.05$. Thus, H1, H3, H4, H5, H6, and H8 are supported, while H2, H7, and H9 are rejected.

5.3. Evaluating the effect sizes

The value for the determination coefficient ($R^2 = 0.632$) is the sum of variance in the dependent variable structure described in the research model by all the independent variables. This study suggests that the independent variables (PER, COM, SEC, MOB, ITK, and SOC) normally explain 63.2% of variances in intention. As per Hair *et al.* [43], Q^2 refers to the measure of how the model and its parameter estimates and reconstructs well-observed values. The model has predictive relevance where the value of $Q^2 > 0$. Since the value of Q^2 is 0.567, the cross-validated redundancy measures indicate that the structural model for this study has predictive relevance. The details results were presented in Table 6.

Table 3. Measurement model result

Construct	#	Loading (>0.5)	CR (>0.7)	AVE (>0.5)	VIF (<0.5)
Performance Expectancy (PER)	1	0.860	0.791	0.938	3.008
	2	0.913			
	3	0.906			
	4	0.877			
Effort Expectancy (EFF)	1	0.880	0.776	0.945	3.534
	2	0.894			
	3	0.864			
	4	0.899			
	5	0.867			
Compatibility (COM)	1	0.851	0.795	0.939	3.105
	2	0.877			
	3	0.922			
	4	0.914			
Security (SEC)	1	0.844	0.713	0.952	1.855
	2	0.862			
	3	0.871			
	4	0.875			
	5	0.818			
	6	0.872			
	7	0.791			
	8	0.818			
Mobility (MOB)	1	0.901	0.817	0.957	1.889
	2	0.899			
	3	0.915			
	4	0.895			
	5	0.910			
IT Knowledge (ITK)	1	0.878	0.788	0.949	1.661
	2	0.894			
	3	0.893			
	4	0.859			
	5	0.913			
Top Management Support (TOP)	1	0.858	0.718	0.939	2.598
	2	0.883			
	3	0.780			
	4	0.888			
	5	0.803			
	6	0.867			
Social Influence (SOC)	1	0.841	0.746	0.922	3.047
	2	0.888			
	3	0.871			
	4	0.854			
Awareness (AWA)	1	0.835	0.663	0.887	2.312
	2	0.716			
	3	0.862			
	4	0.836			
Behavioural Intention (BEH)	1	0.922	0.881	0.957	1.000
	2	0.949			
	3	0.944			
Actual Use (USE)	1	0.938	0.755	0.901	-
	2	0.929			
	3	0.722			

Table 4. Discriminant validity–HTMT analy

	USE	AWA	COM	EFF	ITK	MOB	PER	BEH	SEC	SOC	TOP
USE											
AWA	0.681										
COM	0.699	0.547									
EFF	0.131	0.101	0.208								
ITK	0.697	0.652	0.713	0.171							
MOB	0.600	0.674	0.484	0.066	0.524						
PER	0.603	0.517	0.680	0.207	0.758	0.457					
BEH	0.633	0.588	0.743	0.148	0.823	0.484	0.819				
SEC	0.422	0.555	0.439	0.171	0.534	0.423	0.517	0.597			
SOC	0.614	0.727	0.609	0.126	0.619	0.499	0.588	0.678	0.640		
TOP	0.453	0.599	0.525	0.165	0.525	0.465	0.555	0.601	0.605	0.818	

Note: Criteria: discriminant validity is established at $HTMT_{0.85}$

Table 5. Path coefficient result

Hypotheses	Relationship	β	SE	t-value	p-value	Decision
H1	PER → BEH	0.235	0.071	3.324	0.000	Supported
H2	EFF → BEH	0.081	0.061	1.320	0.093	Unsupported
H3	COM → BEH	0.123	0.071	1.731	0.042	Supported
H4	SEC → BEH	-0.136	0.046	2.943	0.002	Supported
H5	MOB → BEH	0.429	0.053	8.051	0.000	Supported
H6	ITK → BEH	0.086	0.044	1.938	0.026	Supported
H7	TOP → BEH	-0.027	0.061	0.434	0.332	Unsupported
H8	SOC → BEH	0.180	0.068	2.667	0.004	Supported
H9	AWE → BEH	-0.027	0.053	0.509	0.305	Unsupported
H10	BEH → USE	0.626	0.044	14.380	0.000	Supported

Table 6. Result of the effect size of each hypothesis

Path	Relationship	f^2	Decision	R^2	Q^2
H1	PER → BEH	0.054	Small		
H3	COM → BEH	0.014	Small		
H4	SEC → BEH	0.029	Small		
H5	MOB → BEH	0.285	Medium		
H6	ITK → BEH	0.013	Small		
H8	SOC → BEH	0.031	Small		
H10	BEH → USE		Supported	0.632	0.567
	Actual Use		Supported	0.359	0.291

For the effect size, the (f^2) represents the relative impact of an independent variables on a dependent variable. As set by [45], the f^2 is measured by 0.02 representing small to medium, 0.15 represents medium to large, and 0.35 represents large effect. The supported independent variables (PER, $f^2 = 0.054$; COM, $f^2 = 0.014$; SEC, $f^2 = 0.029$; ITK, $f^2 = 0.013$; SOC, $f^2 = 0.031$) have small effect size on the dependent variable. There is only MOB ($f^2 = 0.285$) that has a medium effect size on the dependent variable. The R^2 for behavioural intention and actual use is 0.632 and 0.359, respectively, which is acceptable.

6. DISCUSSION

Several insightful results can be summarised in this study. In the technological context, the intention to embrace cloud computing is positively linked to four constructs (performance expectancy, compatibility, security, and mobility). These findings underpin several previous studies [12, 31, 34]. Mobility ($\beta = 0.429$, $f^2 = 0.285$) is the most significant factor affecting the intention of accept cloud computing based on effect size analysis. This may result due to the accessibility of each employee through personal devices such as smartphones and tablets, which makes it easy for them to access the information they need. Therefore, cloud computing needs to be further supported by service providers and organisations to ensure smoother mobile connectivity for consumers in order to achieve more advantages by using this technology.

The following supportive result is performance expectancy with $\beta = 0.235$ and $f^2 = 0.054$, which has a positive relation to cloud computing acceptance. These findings confirm the outcomes and results of other scholars [24, 26]. Therefore, performance expectations significantly affect the intention of accepting cloud computing. With the optimism and positive attitude towards technology, consumers will be more comfortable doing good work and achieve better work quality. An excellent performance will lead to overall organisational excellence. While compatibility and security have a positive relationship with the acceptance of cloud computing with $\beta = 0.123$ and $f^2 = 0.014$, and $\beta = -0.136$ and $f^2 = 0.029$, respectively, it still affects the size of the behavioural intention. This is possible because there is still a sense of uneasiness and concern for cloud computing capabilities compatible with the current work environment and security offered.

However, two factors (top management support and awareness) that were expected to be positive did not occur in this study. The top management support factors showed a non-significant relationship to cloud computing acceptance denying studies from Alharbi *et al.* [29]. However, this finding is consistent with studies by Tajudeen [46]. This may be so due to employees' feeling that their top management is not playing a role in providing clarity and is less supportive when they are having problems.

Unfortunately, the awareness factor also does not support the hypothesis of this study. Although this factor is highlighted in the impact report of the ICT regulatory authorities in Malaysia, this study shows that awareness does not affect the intention of accepting cloud computing in the public sector. However, it can be concluded that despite some non-significant factors, efforts to continue to promote and improve the use of cloud-based applications should be continued by providing accurate disclosures and information about this technology.

7. CONCLUSION AND FUTURE RESEARCH

This study aims to identify the factors that can be considered, which can affect the cloud-based applications used by the Malaysian public sectors. The problems raised in the MAMPU report can be addressed by identifying factors that influence the Malaysian public sector to accept cloud-based services. Such variables are evaluated with the study model, and substantial test results will be taken into account in order to address the problems associated with the implementation of cloud services.

The current study proposes a model with the UTAUT and other various factors to investigate user behaviours towards the acceptance of cloud computing. The proposed model affects user's intention directly and positively. This study has identified the factors of user's intention of cloud computing acceptance such as performance expectancy, effort expectancy, compatibility, security, mobility, IT knowledge, top management support, social influence, and awareness. The results of the SEM reveal that performance expectancy, compatibility, security, and mobility have a significant influence on cloud computing acceptance. This study has also revealed that IT knowledge and social influence are the factors that enhance user's intention behaviour towards the use of cloud-based application services.

For future work, it is recommended that two groups of respondents are required to complete the survey to address the common method bias issues. Furthermore, this research has employed a quantitative data collection approach and work will be done in the future to evaluate the model by applying both the qualitative and quantitative approach. With these approaches, it may be helpful to provide a more in-depth explanation of the quantitative studies results. The qualitative part may include interview sessions and verification of quantitative research results by several experts in related fields, including CIOs of the public sector agencies.

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