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CLOUD ADOPTION STRATEGIC PLANNING: LINEAR REGRESSION COEFFICIENT ANALYSIS

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Abstract:

The implementation of eLearning in cloud environments significantly gives the benefit to Institutions of Higher Learning (IHLs). However, operating in a cloud environment presents a challenge for the IHLs. By adopting a cloud environment, the cloud adoption process relies on IHL decisions. Therefore, the cloud strategy must be coordinated with the strategic planning of IHL initially from the employees' response to using the eLearning cloud environment. Thus, this study is conducted to identify the factor adoption in using eLearning in a cloud environment. The document analysis from a literature review is conducted to find out the factors influencing adoption in using cloud environments. Moreover, the appropriate model as a basic model needed in the adoption of the cloud environment is defining. Thus, as a result of document analysis, a few factors adopted were classified, and the TOE model is selected, consisting of technology, organization, and environment context in document analysis. Furthermore, a preliminary study was conducted using interviews with employees who have experience with cloud environments at IHLs. The purpose is to integrate conceptual defining factors between the literature review and preliminary study to formulate the significant factor adoption for cloud environments. The factor adoption is classified as an independent factor in adopting a cloud network environment. The primary analysis showed that employee factors are needed and interact with motivation, benefits, and user awareness. Furthermore, the validation study was conducted, and the interaction between the defined factors was analyzed to demonstrate their impact using linear regression coefficient analysis. Thus, the outcome of the study shows a factor adoption contributed to the adoption of the eLearning

cloud environment at IHL and gave the guidelines to IHL in implementing an eLearning in the cloud environment.

Introduction

The evolution of IT technology and infrastructure significantly shapes the structure and delivery of education (Li & Zhu, 2021). A cloud environment offers efficient utilization, with all network components being maintained and supervised by the cloud provider (Colombo et al., 2019). By utilizing a cloud environment, the IHL gains enhanced benefits for service maintenance, potentially reducing operational costs and thereby providing greater benefits to users (Zeng & Germanos, 2019b). The user can access the data anytime and anywhere due to the scalability of a cloud environment. Although the cloud provides many advantages, the IHL has challenges in adopting the cloud, especially the employee factor in adoption of the cloud environment at IHL (Tripathi et al., 2023). By adopting eLearning to a cloud environment, the process of cloud adoption depends on the IHL decision. Therefore, factor adoption is needed before adopting a cloud environment because it is hard to measure the success of factor adoption (A. Rahman & Pribadi Subriadi, 2022). Realize that it's important to recognize that there are several factors to consider before choosing a cloud environment.

Therefore, the cloud environment has a higher potential to implement for IHLs (Madhioub et al., n.d.). Since various IHLs hold different views on cloud environments, through the perception towards recognizing the usefulness and advantages of using these environments. This paper discusses the independent factors influencing eLearning cloud environment adoption using the TOE model consisting of technology, organization, and environment context. The analysis of factors was made using linear regression coefficient analysis to show the important factors before moving to the cloud environment. Moreover, the TOE model is selected because decision-makers prioritize it to achieve a sustainable competitive advantage within the organization through the adoption of a cloud environment (Tashkandi & Al-Jabri, 2015). Before transitioning to a cloud environment, motivation within the organization to utilize it is crucial; thus, the IHL should promote awareness regarding the motivation and advantages of utilizing the cloud, emphasizing its potential to enhance organizational proactivity while also saving resources (Deniswara, 2022).

Methodology

In this paper, the research methodology starts from answering the primary objective to identifying independent factors influencing cloud environment adoption. Then the study employs the linear regression coefficient analysis to examine the integration of the independent success factors for cloud adoption. The research starts with document analysis that reviews and analyzes a model to find the suitable model used to adopt new technology for the organization. Moreover, the model and success factor adoption are defined through analysis from the previous related papers. Moreover, the preliminary study was conducted to gather the stage opinion for the factor from the experts whether the factor defined from the document analysis is an important factor that influences the adoption of a cloud environment for IHL that can be integrated into the model selected. The outcomes of the interview served as a benchmark for

identifying the most impactful factors in the adoption of cloud environments. In the preliminary study, the interview was conducted with five interviewers from different IHLs who have experience in using cloud environments.

Moreover, the validation process is conducted by distributing the questionnaire. The IT officers from UPSI and OUM were chosen based on their experiences in handling the cloud environment. The purpose is to evaluate the results of the preliminary study. The total number of respondents selected is based on the total numbers of the population. The size of the population taken for the validation process is shown in Figure 1, where N is the population size and S is the sample size of the population (Krejcie & Morgan, 1970). The percentage taken from the population is required to get a representative of the sampling.

N	S
10	10
15	14
20	19
25	24
30	28
35	32
40	36
45	40
50	44
55	48
60	52

Figure 1: Sample Size of Population

In this study, the population size of the IT officers at the two IHL is less than 60, based on an interview during the preliminary study. After distributing the questionnaire survey, 50 respondents answered; 25 were respondents from UPSI, and the other 25 were from OUM. After the respondents completed and returned the questionnaire, the data were analyzed using linear regression coefficient analysis, which served as the basis for adopting strategic planning for cloud implementation (Telukdarie & Munsamy, 2024). It was utilized to assess the adoption of success factors within the TOE model (Technology-Organization-Environment), which impact the adoption of employee factors encompassing awareness, benefits, and motivation (Aziz, 2020). The primary purpose of employing this technique is to identify the minimum number of factors within a set that exhibit the strongest correlation with the independent factor, as elucidated by these factors. Figure 2 shows the methodology process for this study.
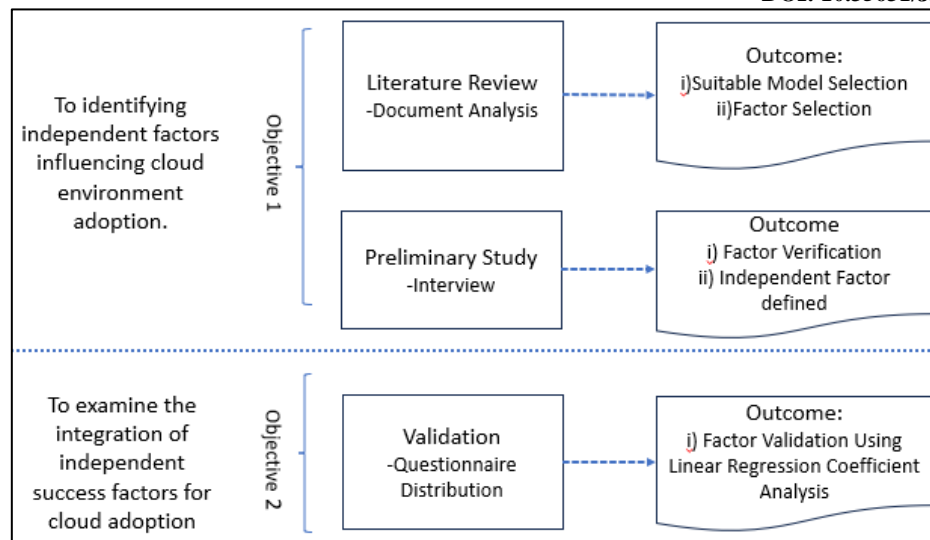
Figure 2: Methodology Process

Result and Discussion

From the document analysis, the TOE model was selected as an appropriate model giving a guide in adopting new technology in the context of technological, organizational, and environmental (Mrhaouarh et al., 2018). Moreover, from the analysis of previous related papers, eleven factors of adoption consist of awareness, motivation, business needs, security, cost-saving, strategy planning, usefulness, vendor, control, benefit, and innovation are defined. The result analysis selects eight success factors for adoption given the value of frequency greater than 50%, which are awareness (50%), benefit (75%), motivation (50%), security (92%), business needs (50%), strategy planning (50%), cost-saving (83%), and vendor selection (50%). Furthermore, the factor adoption that consists of 50% measurement of frequency analysis was highlighted and selected as a factor adoption in using a cloud environment.

Moreover, the preliminary study analysis shows the independent factors based on an employee context are added to the TOE context as it contains the success factor adoption that contributes to the cloud factor adoption (Khan & Mahmood, 2018). The analysis shows the employee context is the factor that contributed for IHL to successfully transform into a cloud environment. Moreover, the preliminary study showed that to successfully move to the cloud, the organization must prioritize the employees and underscore their significance. If the awareness, motivation, and benefits can be understood, then the IHL can succeed in realizing its mission (Panyam et al., 2021). The preliminary study analysis shows awareness refers to the knowledge, competencies, and skills in solving difficult tasks using different techniques. Furthermore, sufficient training gives benefits to users by providing them with increased exposure and motivation on installation and configuration procedures (Wan et al., 2022). Thus, it can give exposure and motivation on how to manage the work balance for the employees. Therefore, quick and efficient tasks can be provided by a cloud environment, giving more benefit to IHL. Figure 3 shows independent factors consisting of the TOE context and employee context that consist of awareness, motivation, and benefit as important factors that need to be considered in the adoption of cloud infrastructure for IHL. Hence, cloud environments offer numerous advantages, but IHL requires comprehension and support from employees to effectively utilize them (McGrath et al., 2017). Therefore, cloud environments

give more benefits, but IHL needs understanding and support from employees in using a cloud environment (Aziz et al., 2017).
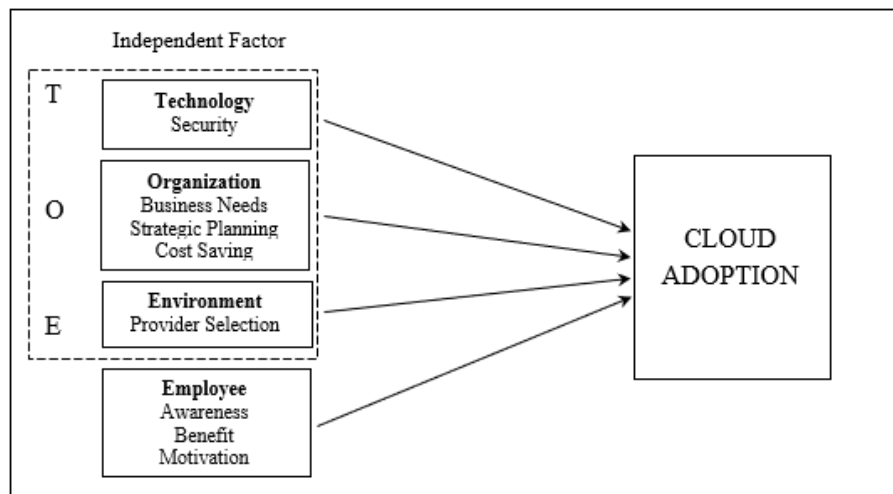

Figure 3: Cloud Adoption Independent Factor

Moreover, the validation stage was conducted. In the questionnaire for the validation stage, there are a few sections where the important factors were stated as a success factor for adoption in a cloud network environment. Section A is the demographic information, and Section B is for the factor adoption of the cloud network environment that is divided into B1: awareness, B2: benefit, and B3: motivation. As for other sections, it consists of Section C: Business Needs, Section D: Cost Saving, Section E: Security, Section F: Strategic Planning, and Section G: Criteria of Provider Selection. The analysis shows the number of factors adopted, which starts from Section B until Section G. Table 1 sub-categories in the questionnaire design.

Table 1: Questionnaire Design

No	Section
1	B: Employee
	B1: Awareness
	B2: Benefit
	B3: Motivation
2	C: Business Need
3	D: Cost Saving
4	E: Security
5	F: Strategic Planning
6	G: Criteria of Provider Selection

Moreover, the result was analysed in the validation stage using linear regression coefficient analysis. The analysis was used to support the results of the preliminary study as previously discussed. It was applied to examine the success factor adoption of the TOE factor that influences the success factor adoption of the employee factor. Additionally, the purpose of this technique is to identify the minimum number of factors within a set of strongest correlations with the independent factor. Thus, Table 2 shows all of the employee context factors clarified; almost 76% of the variance shows success factor adoption. Through analysing the coefficient magnitude, the factor with the highest value of the standardized beta coefficient would indicate

the greatest variation or impact on the independent factor. As considered by the factors, awareness is observed to have the largest effect with a standardized beta of 0.608 as compared to the degree of motivation and benefit with the standardized beta only at 0.158 and 0.085.

Table 2: Regression Coefficient Between Technology(security) Factor and Employee Factor

Employee Context and factor related	Unstandardized Coefficients			Standardised Coefficients	
	B	Std. Error	Beta	t	Sig.
(Constant)	-1.243	4.299		-.289	0.774
Awareness	0.608	0.208	0.565	2.929	0.005
Benefit	0.085	0.238	0.058	0.355	0.724
Motivation	0.158	0.096	0.209	1.652	0.105
R^2	0.761				
R^2 adjusted	0.578				

The result shows the awareness of employees about the security of using the cloud-based is important, followed by the motivation to use the cloud and the benefits given by the cloud (Anglano et al., 2020). Thus, the findings indicate that employee awareness, encompassing their knowledge and skills, is crucial for selecting a suitable service provider in terms of security with a strong record of achievement and reliability (M. M. Rahman et al., 2023). Therefore, establishing a service-level agreement between the selected provider and the IHL is essential to guarantee security measures in the adoption of a cloud environment (Devi, 2016). The motivation of the employee increased by the technology ability provided by the cloud environment besides the abilities of the knowledgeable employee in handling the data security and provider selection (Alshammari et al., 2017). Therefore, the level of the security capability and authorization can be improved. The data can be recovered immediately, and the reporting was given quickly to users. Thus, the regression between the technology context, which consists of security factors, and the employee context, which consists of awareness, benefit, and motivation factors, shows the significant regression coefficient and essential. It can be shown in the form of a graph in Figure 4.
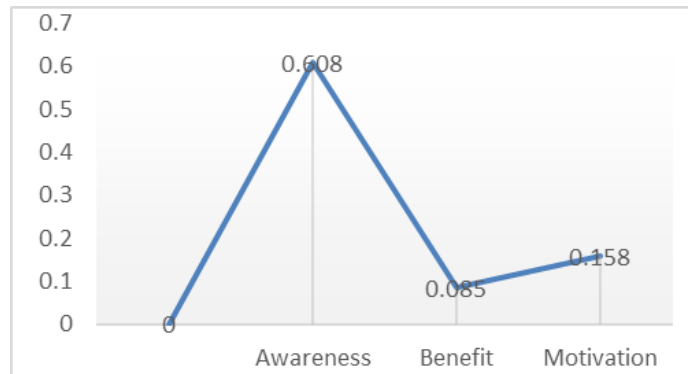
Figure 4: Technology Security) Factor and Employee Context Factor Related

Table 3 shows the regression coefficient between the organizational context consisting of business need, cost saving, and strategy plan factor and the employee context consisting of awareness, benefit, and motivation factor. The employee context factors are shown for nearly 80% of the variance in the option of success factors. As considered by the factors, the benefit is observed to have the largest effect with a standardized beta of 0.460, followed by the awareness with a standardized beta of 0.334. However, the motivation shows a negative standardized beta which is -0.140.

Table 3: Regression Coefficient Between Organization (Business Need, Cost Saving, Strategy Plan) Factors and Employee Factor

Employee Context and factor related	Unstandardized Coefficients			Standardized Coefficients	
	B	Std. Error	Beta	t	Sig.
(Constant)	8.476	2.579		3.287	0.002
Awareness	0.334	0.124	0.480	2.680	0.010
Benefit	0.460	0.143	0.487	3.214	0.002
Motivation	-0.140	0.57	-0.287	-2.440	0.019
R^2	0.798				
R^2 adjusted	0.637				

Hence, in Figure 5, show the regression coefficient between the organization factor and the employee factor. The graph showed the benefits factor offered by the cloud, and the awareness among employees in using a cloud environment can impact the organizational context, where it can help the IHL in fulfilling business needs, strategic plans, and achieving cost savings(Yang et al., 2021). The employees who have experience and skills in handling cloud environments can help in improving the capability of the IHL(Wang et al., 2017). The use of the cloud environment can provide various benefits in enhancing the internal organization capability, which consists of business needs, cost savings, and strategy planning(Encalada et al., 2017). Meanwhile, the motivation factor, which consists of technology ability provided by the cloud environment, has not been fully utilized in assisting in refining the organizational context. It is important to consider comprehensively how improvements should be made to address it.
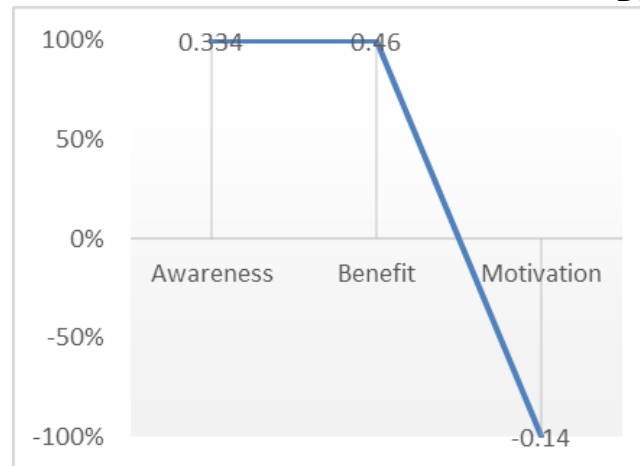
Figure 5: Organization (Business Need, Cost Saving, Strategy Plan) Factors and Employee Factor

Table 4 demonstrates the regression coefficient between environment context, which consists of provider selection factor, and employee context, which consists of awareness, benefit, and motivation factor. The result shows employee context factors account for nearly 85% of the variance in the adoption of success factors. Considering the factors listed in the table above, it is evident that benefit has the most significant impact, with a standardized beta of 1.689, followed by motivation at 0.812. Conversely, awareness exhibits a negative standardized beta of -0.321.

Table 4: Regression Coefficient Between Environment (Provider Selection) Factor and Employee Factor

Employee Context and factor related	Unstandardized Coefficients			Standardized Coefficients	
	B	Std. Error	Beta	t	Sig.
(Constant)	35.849	6.639		5.400	0.000
Awareness	-0.321	0.320	-0.157	-1.001	0.322
Benefit	1.686	0.368	0.607	4.579	0.000
Motivation	0.812	0.148	0.564	5.491	0.000
R^2	0.850				
R^2 adjusted	0.722				

Figure 6 shows the regression coefficient between environment (Provider Selection). The graph indicates benefit and motivation exhibit a positive regression coefficient compared to awareness concerning the environmental factor, which is provider selection(Zeng & Germanos, 2019a). Moreover, the result shows the services provided by the cloud can motivate the employees to use the new technology that is more beneficial to them compared to the traditional network environment (Al-kfairy et al., n.d.).
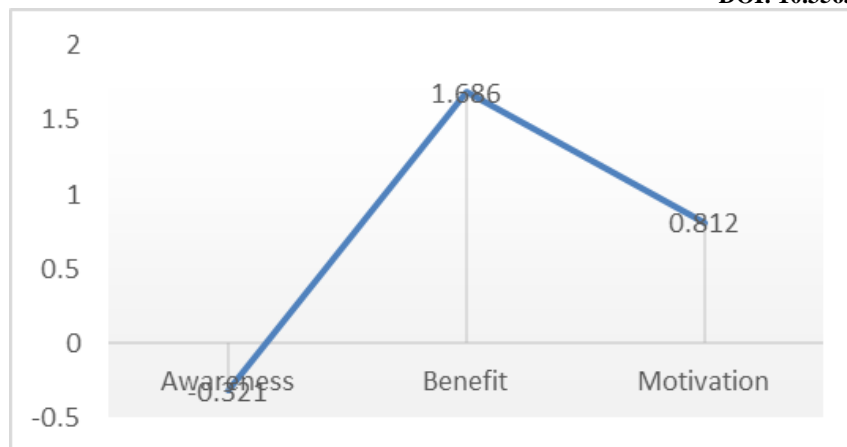
Figure 6: Organization Environment (Provider Selection) Factor and Employee Factor

Conclusions

In conclusion, the adoption of eLearning cloud environments has the potential to enhance the efficiency and effectiveness of educational delivery. IHLs can achieve the significant benefit of cost savings and facilitate greater flexibility in service maintenance. However, the successful adoption of cloud environments presents several challenges. This study highlights the importance of independent factors that influence cloud adoption based on the selected Technology-Organization-Environment (TOE) model. This study identified key success factors: awareness, motivation, benefits, security, business needs, strategy planning, cost-saving, and vendor selection. Moreover, awareness is a significant factor, emphasizing the need for IHLs to focus on enhancing employee knowledge and competencies regarding the cloud environment. The linear regression coefficient analysis at the validation stage shows that awareness and benefit are crucial factors for successful cloud adoption, followed by motivation. Overall, the study provides valuable insights into the factors the IHLs should consider when adopting a cloud environment. By addressing these factors in using a cloud environment, IHLs can make the most of its benefits, leading to better efficiency and improved educational results.

Acknowledgement

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