Determinants of Cloud Computing Adoption in Higher Learning Institutions in Tanzania

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Abstract

This study examined the factors hindering the adoption of cloud computing in selected Higher Learning Institutions in Tanzania. The study was guided by the Technology–Organization–Environment (TOE) framework and the Technology Acceptance Model (TAM). A quantitative research approach employing a descriptive research design was adopted. Data were collected using structured questionnaires from 56 teaching and non-teaching staff with Information and Communication Technology (ICT) backgrounds drawn from the Tanzania Institute of Accountancy (TIA), Institute of Accountancy Arusha (IAA), and Institute of Finance Management (IFM). The collected data were analyzed using descriptive statistics and multiple regression analysis with the Statistical Package for Social Sciences (SPSS) version 25. The findings revealed that technology readiness had a positive and statistically significant influence on cloud computing adoption, indicating that institutional technological preparedness is the most important determinant of adoption. The study concludes that strengthening technology readiness through improved ICT infrastructure, institutional capacity, and technical competencies is essential for accelerating cloud computing adoption in Tanzanian Higher Learning Institutions. The study recommends increased investment in ICT infrastructure, continuous staff capacity building, the development of supportive national cloud computing policies, and stronger collaboration between higher learning institutions and cloud service providers to facilitate successful digital transformation.

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1. Introduction

The rapid advancement of Information and Communication Technology (ICT) has transformed the way organizations operate and deliver services across the globe (Laudon & Laudon, 2022). In Tanzania, the commitment to science, technology, and innovation was formally established through the National Science and Technology Policy of 1996, which aimed to transform the economy into a competitive and technology-driven economy (URT, 1996). This vision was further reinforced in the Tanzania Development Vision 2025, which emphasizes the importance of science, technology, and innovation in achieving sustainable socio-economic development (URT, 1998). Consequently, public and private institutions have increasingly integrated digital technologies into their operations to improve efficiency, accessibility, and service quality (World Bank, 2021). The expansion of internet connectivity and digital technologies has significantly influenced the higher education sector worldwide (UNESCO, 2023). Higher Learning Institutions (HLIs) are increasingly adopting innovative technologies to support teaching, learning, research, and administrative functions (Alharthi et al., 2017). The growing demand for uninterrupted academic and administrative services requires institutions to provide services beyond traditional office hours, enabling students and staff to access information and services anytime and anywhere (Sultan, 2010). The internet has become a critical platform for communication, collaboration, and knowledge sharing among academic stakeholders (Mell & Grance, 2011).

Globally, organizations are under increasing pressure to reduce operational costs, improve efficiency, and enhance competitiveness through digital transformation initiatives (Misra & Mondal, 2016). As a result, Information Technology (IT) managers are continuously seeking innovative solutions that can improve organizational performance while minimizing infrastructure and maintenance costs (Choudhary & Vithayathil, 2018). Among these innovations, cloud computing has emerged as one of the most transformative technologies for delivering computing resources and services over the internet (Buyya et al., 2009). The technology offers flexibility, scalability, cost savings, and improved accessibility to computing resources, making it attractive to organizations across various sectors (Marston et al., 2011).Cloud computing has been described as the realization of the long-standing vision of computing as a utility, where users can access computing resources on demand without owning the underlying infrastructure (Armbrust et al., 2010). Despite its growing popularity, scholars have provided various definitions of cloud computing depending on their perspectives and areas of application (Weinhardt et al., 2009). The most widely accepted definition is provided by the National Institute of Standards and Technology (NIST), which defines cloud computing as a model that enables ubiquitous, convenient, and 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 (Mell & Grance, 2011).

Furthermore, cloud computing services are delivered through three primary service models, namely Software as a Service (SaaS), Platform as a Service (PaaS), and Infrastructure as a Service (IaaS) (Bhanoo, 2009). The adoption of cloud computing has gained momentum because it enables organizations to access sophisticated computing resources without making substantial investments in hardware and software infrastructure (Oliveira et al., 2014). Cloud computing also enhances organizational agility by allowing institutions to scale computing resources according to changing demands (Gangwar et al., 2015). In educational institutions, cloud services facilitate e-learning platforms, online collaboration, virtual classrooms, data storage, and administrative information systems, thereby improving operational efficiency and educational service delivery (Masud & Huang, 2012).

Despite its numerous benefits, cloud computing adoption remains associated with several challenges and uncertainties (Chang et al., 2013). Organizations often express concerns regarding data security, privacy, regulatory compliance, service reliability, vendor dependence, and loss of control over organizational information assets (Brender & Markov, 2013). These concerns are particularly important for educational institutions, which handle large volumes of sensitive academic and administrative data (Al-Ruithe et al., 2018). Consequently, decisions regarding cloud computing adoption require careful evaluation of technological, organizational, and environmental factors (Low et al., 2011).

In the context of higher education, cloud computing has the potential to support institutional transformation by enhancing accessibility, collaboration, and innovation while reducing IT-related costs (Njenga et al., 2019). However, the adoption rate and implementation success vary significantly across institutions due to differences in technological readiness, organizational capabilities, regulatory environments, and stakeholder perceptions (Gangwar et al., 2015). Understanding these factors is therefore essential for institutions seeking to maximize the benefits of cloud computing technologies. In Tanzania, several Higher Learning Institutions have initiated digital transformation programs aimed at improving teaching, learning, and administrative efficiency (TCU, 2023). Nevertheless, the extent of cloud computing adoption and the factors influencing its implementation remain inadequately documented within the higher education sector (Njenga et al., 2019). Institutions such as Tanzania Institute of Accountancy (TIA), Institute of Accountancy Arusha (IAA), and Institute of Finance Management (IFM) increasingly rely on information technology services to support academic and administrative functions, making cloud computing an important strategic consideration (TCU, 2023). Therefore, examining the factors hindering cloud computing adoption in these institutions is necessary to provide evidence-based recommendations for enhancing technology adoption and improving institutional performance.

2. Review of Related Literature and Theoretical Framework

2.1 Technology–Organization–Environment (TOE) Framework

The Technology–Organization–Environment (TOE) framework, developed by Tornatzky and Fleischer (1990), explains how technological, organizational, and environmental factors influence the adoption and implementation of innovations within organizations (Tornatzky & Fleischer, 1990). The technological context focuses on the availability, compatibility, complexity, and relative advantages of a technology that may facilitate or hinder its adoption (Low et al., 2011). The organizational context considers factors such as top management support, organizational readiness, financial resources, ICT infrastructure, and employee competencies that affect innovation adoption decisions (Oliveira et al., 2014). The environmental context encompasses external factors including government regulations, competitive pressure, vendor support, and industry characteristics that shape organizational technology adoption behavior (Low et al., 2011). The TOE framework has been extensively applied in studies examining cloud computing adoption because it provides a comprehensive understanding of the technological, organizational, and environmental determinants influencing adoption decisions (Gangwar et al., 2015). In the context of this study, the TOE framework provides the theoretical foundation for examining how technology readiness, perceived barriers, and regulatory support influence cloud computing adoption in Higher Learning Institutions (HLIs) in Tanzania (Low et al., 2011). The framework further suggests that successful adoption of cloud computing depends on the interaction between internal organizational capabilities and external environmental conditions (Oliveira et al., 2014).

2.2 Technology Acceptance Model (TAM)

The Technology Acceptance Model (TAM), developed by Davis (1989), explains users' acceptance and utilization of information technologies by focusing on their perceptions and attitudes toward a particular system (Davis, 1989). The model posits that technology adoption is primarily determined by two key constructs: perceived usefulness and perceived ease of use (Davis, 1989). Perceived usefulness refers to the extent to which an individual believes that using a specific technology will enhance job performance and productivity (Davis, 1989). Perceived ease of use refers to the degree to which an individual believes that using a technology will be free from effort and complexity (Venkatesh & Davis, 2000). According to TAM, users are more likely to adopt a technology when they perceive it as useful and easy to use (Wong & Hiew, 2005). The model has been widely employed in studies investigating the adoption of information systems, e-learning platforms, mobile technologies, and cloud computing services (Alharbi & Drew, 2014). In this study, TAM complements the TOE framework by explaining how academic and administrative staff perceive cloud computing technologies and how these perceptions influence their willingness to adopt and use cloud-based services in Higher Learning Institutions in Tanzania (Davis, 1989). The model therefore provides valuable insights into the behavioral factors affecting cloud computing adoption among users within educational institutions (Venkatesh & Davis, 2000).

3. Methodology

This study employed a descriptive research design to examine the factors hindering the adoption of cloud computing in Higher Learning Institutions (HLIs) in Tanzania, as the design enables the collection, organization, and description of data to explain the phenomenon under investigation. A quantitative research approach was adopted because it allows the collection of numerical data and facilitates objective analysis of factors influencing cloud computing adoption. The study was conducted at Tanzania Institute of Accountancy (TIA), Institute of Finance Management (IFM), and Institute of Accountancy Arusha (IAA) because these institutions utilize information technology services and provide an appropriate context for examining cloud computing adoption. The target population comprised 81 teaching and non-teaching staff with Information and Communication Technology (ICT) backgrounds, including 53 teaching staff and 28 non-teaching staff drawn from the three institutions. The study employed both purposive and simple random sampling techniques, whereby purposive sampling was used to identify respondents with relevant ICT knowledge while simple random sampling ensured that each eligible respondent had an equal chance of participating in the study. Although questionnaires were distributed to all 81 potential respondents, 65 respondents completed and returned the questionnaires, exceeding the minimum sample size of 56 respondents determined using Yamane's (1967) formula at a 5% margin of error. Primary data were collected through structured online questionnaires administered using Google Forms, while secondary data were obtained from books, journal articles, dissertations, research reports, conference proceedings, and other documentary sources. Prior to the actual data collection, a pilot study was conducted to assess the clarity, relevance, and adequacy of the questionnaire items, leading to refinement of ambiguous questions and instructions. Quantitative data were analyzed using Statistical Package for Social Sciences (SPSS) version 25 and Microsoft Excel, where descriptive statistics such as frequencies, percentages, tables, and figures were generated to facilitate interpretation of findings. The study ensured reliability through the application of Cronbach's Alpha coefficient to assess the internal consistency of the measurement scales, where a coefficient value of 0.70 or above was considered acceptable. Validity was ensured through careful questionnaire design, alignment of questionnaire items with study objectives, expert review, and pilot testing to ascertain that the instrument adequately measured the intended constructs. Furthermore, the study adhered to ethical research principles by obtaining informed

consent from participants, guaranteeing confidentiality and anonymity of respondents, ensuring voluntary participation, and using the collected information strictly for academic purposes. These ethical considerations were intended to protect participants from harm while enhancing the credibility and integrity of the research findings.

4. Findings

4.1.1 Demographic information of the study

Table presents the demographic characteristics of the 56 respondents who participated in the study. The findings indicate that respondents were drawn from the three selected Higher Learning Institutions, namely Tanzania Institute of Accountancy (TIA), Institute of Accountancy Arusha (IAA), and Institute of Finance Management (IFM). The largest proportion of respondents (39.3%) came from IAA, followed by TIA (32.1%) and IFM (28.6%). This relatively balanced distribution suggests that the views collected adequately represent the selected institutions and minimize the likelihood of institutional bias. Regarding gender, the findings reveal that male respondents constituted the majority with 58.9%, while female respondents accounted for 41.1% of the sample. The relatively high participation of both genders indicates that the study captured diverse perspectives regarding cloud computing adoption. The dominance of male respondents may be attributed to the higher representation of males in Information Technology-related fields within Higher Learning Institutions.

The age distribution shows that the majority of respondents (51.8%) were between 35 and 44 years, followed by those aged 25–34 years (35.7%). Respondents aged 45 years and above accounted for 10.7%, while only 1.8% were between 18 and 24 years. These findings imply that most participants were mature individuals with substantial professional experience and institutional knowledge, enabling them to provide informed responses concerning cloud computing adoption. In terms of educational qualifications, the findings indicate that the majority of respondents (53.6%) possessed a Master's degree, while 21.4% held a Bachelor's degree and 14.3% had PhD qualifications. A smaller proportion held Diploma qualifications (8.9%) and Postgraduate Diplomas (1.8%), while none had Certificate-level education. This educational profile demonstrates that respondents were highly educated and therefore capable of understanding and evaluating issues related to cloud computing adoption.

The findings further show that academic staff constituted the majority of respondents (66.1%), whereas non-academic/supporting staff accounted for 33.9%. Since academic staff are often involved in teaching, research, and the use of educational technologies, their participation provided valuable insights into the adoption of cloud computing in Higher Learning Institutions. Similarly, the inclusion of non-academic staff with ICT backgrounds enriched the study by providing technical and administrative perspectives. With regard to work experience, the findings reveal that 33.9% of respondents had worked in their institutions for 6–10 years, while 25.0% had served for 2–5 years and another 25.0% had worked for more than 10 years. Respondents with less than two years of experience accounted for 16.1%. These results indicate that the majority of participants had considerable organizational experience, suggesting that they were familiar with institutional ICT practices and capable of providing reliable information regarding factors influencing cloud computing adoption. Overall, the demographic characteristics indicate that the study involved respondents with adequate educational qualifications, professional experience, and institutional knowledge. Consequently, the data collected are considered reliable and appropriate for examining the factors influencing cloud computing adoption in Higher Learning Institutions in Tanzania.

Variable	Category	Frequency (n)	Percentage (%)
Institution	Tanzania Institute of Accountancy (TIA)	18	32.1
	Institute of Accountancy Arusha (IAA)	22	39.3
	Institute of Finance Management (IFM)	16	28.6
	Total	**56**	**100.0**
Gender	Male	33	58.9
	Female	23	41.1
	Total	**56**	**100.0**
Age Group	18–24 years	1	1.8
	25–34 years	20	35.7
	35–44 years	29	51.8
	45 years and above	6	10.7
	Total	**56**	**100.0**
Education Level	Certificate	0	0.0
	Diploma	5	8.9
	Bachelor Degree	12	21.4
	Postgraduate Diploma	1	1.8
	Master's Degree	30	53.6
	PhD	8	14.3
	Total	**56**	**100.0**
Employment Status	Academic Staff	37	66.1
	Non-Academic/Supporting Staff	19	33.9
	Total	**56**	**100.0**
Duration at Organization	Below 2 years	9	16.1
	2–5 years	14	25.0
	6–10 years	19	33.9
	Above 10 years	14	25.0
	Total	**56**	**100.0**

Source: *Field Data 2026*

4.1.2 Model Summary of Factors Influencing the Adoption of Cloud Computing

Table 4.2 shows the model summary of multiple regression analysis on the influence of technology readiness, perceived barriers, government policy and vendor support in adopting cloud computing in higher learning institutions. The results show that the multiple correlation coefficient ($R = 0.828$) is a good sign of the strong positive correlation between the independent variables and the adoption of cloud computing. This indicates that the chosen predictor variables as a whole are closely related to the adoption of cloud computing. The coefficient of determination ($R^2 = 0.686$) indicates that about 68.6% of the variance in the adoption of cloud computing is accounted for by the technology readiness and perceived barriers, government policy and support from vendors. The other 31.4% of the variation is due to other factors not explained by the regression model. In addition, the adjusted R^2 is 0.661, suggesting that, when adjusted for the number of predictors in the model, the independent variables account for about 66.1% of the variance in cloud computing adoption, and the model has a high level of explanatory power. The standard error of the estimate is relatively low (0.24460) and this suggests that the values predicted by the regression model are very close to the values observed, reflecting a close fit for the regression model.

Table 4.2 Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.828[a]	.686	.661	.24460

a. Predictors: (Constant), Vendor Support, Government Policy, Perceived Barriers, Technology Readiness

b. Dependent Variable: Adoption of Cloud Computing

Source: *Field Data 2026*

4.1.3 Overall Significance of the Regression Model for Cloud Computing Adoption

The result of Analysis of Variance (ANOVA) is shown in table 4.3 that is used to determine the overall statistical significance of the multiple regression model. The results show that the regression model is significant ($p < 0.001$) with an F-statistic of 27.847. This suggests that the technology readiness, perceived barriers, government policy and vendor support have a significant influence on the adoption of cloud computing in higher learning institutions. The regression sum of squares (6.664) is much larger than the residual sum of squares (3.051), indicating that the model accounts for a significant amount of the variance in the dependent variable. Thus, the null hypothesis, which stated that all regression coefficients are simultaneously equal to zero is rejected and it means that at least one of the independent variables is a significant factor in explaining the use of cloud computing. These findings validate the use of regression model to analyse the factors affecting the adoption of cloud computing in higher learning institutions.

Table 4.3 Analysis of Variance

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	6.664	4	1.666	27.847	.000[b]
	Residual	3.051	51	.060		
	Total	9.716	55			

a. Dependent Variable: Adoption of Cloud Computing

b. Predictors: (Constant), Vendor Support, Government Policy, Perceived Barriers, Technology Readiness

Source: *Field Data 2026*

4.1.4 Effects of Technology Readiness, Perceived Barriers, Government Policy, and Vendor Support on Cloud Computing Adoption

Table 4.4 illustrates multiple regression coefficients of the individual effects of technology readiness, perceived barriers, government policy and vendor support on cloud computing adoption. Based on the regression results, technology readiness is positively and statistically significant ($\beta = 0.683, B = 0.349, t = 4.261, p < 0.001$) to cloud computing adoption. This discovery indicates that those institutions that are better equipped with technological infrastructure, technical expertise and organizational readiness are more likely to adopt cloud computing technologies. Specifically, holding other factors constant, the more technology ready one is, the more likely they are to adopt cloud computing by 0.349 units of change. The standardized coefficient also shows that technology readiness has the highest coefficient of all the variables in the model.

Perceived barriers, however, were seen in a positive but insignificant way on the cloud computing adoption ($\beta = 0.036, B = 0.024, t = 0.282, p = 0.779$). The positive coefficient shows that increases in perceived barriers correspond with increases in slightly lower rate of adoption, but the

high p value indicates that this is not a statistically significant relationship. Hence, the barriers to cloud computing adoption do not fully account for the differences in cloud computing adoption across the sampled higher learning institutions.

Likewise, government policy did not have a significant impact on cloud computing adoption ($\beta = -0.041, B = -0.025, t = -0.311, p = 0.757$). The negative coefficient indicates that respondents' perceptions of government policies have a marginal effect in reducing the adoption of cloud computing. But, due to the non-statistical significance of the relationship, it is not possible to conclude that the government policy has a direct effect on the adoption of cloud computing in the study context.

Additionally, the support by vendors was positively associated with the use of cloud computing ($\beta = 0.245, B = 0.138, t = 1.887, p = 0.065$). While the coefficient shows vendor support to have a positive impact on adoption of cloud computing, this is not at the traditional 5% level of statistical significance. However, this p-value is near the threshold of significance, meaning that vendor support may be a significant factor in the adoption of cloud computing and could be more statistically significant with a larger sample or in other institutional settings.

The regression analysis in Table 4.4 shows that only one variable, namely technology readiness, is statistically significant in predicting adoption of cloud computing. Perceived barriers and government policy show positive and negative relationships with cloud computing adoption, respectively, but neither are statistically significant at the 5% level of significance. The relationships between perceived barriers and cloud computing adoption, and between government policy and cloud computing adoption are positive and negative, respectively; neither relationship is statistically significant at the 5% level of significance. The results suggest that the technological infrastructure, ICT skills and readiness of the institutions are more likely to be important in cloud computing adoption than the other factors included in this study in higher learning institutions.

Table 4.4 Multiple Regression

		Unstandardized Coefficients		Standardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.511	.464		3.260	.002
	Technology Readiness	.349	.082	.683	4.261	.000
	Perceived Barriers	.024	.086	.036	.282	.779
	Government Policy	-.025	.081	-.041	-.311	.757
	Vendor Sopport	.138	.073	.245	1.887	.065

a. Dependent Variable: Adoption of Cloud Computing

Source: *Field Data 2026*

Discussion of the findings

The findings revealed that technology readiness had a positive and statistically significant influence on cloud computing adoption in Higher Learning Institutions ($\beta = 0.683$, $p < 0.001$), indicating that institutions with adequate ICT infrastructure, technical expertise, and organizational preparedness are more likely to adopt cloud computing technologies. This finding supports the Technology–Organization–Environment (TOE) framework, which argues that technological readiness is a prerequisite for successful innovation adoption (Tornatzky & Fleischer, 1990). It is also consistent with Oliveira et al. (2014), who reported that organizations possessing compatible technological infrastructure and sufficient technical capabilities experience fewer implementation challenges, thereby increasing the likelihood of cloud computing adoption.

Similarly, Gangwar et al. (2015) found that technological readiness is among the strongest determinants of cloud computing adoption because organizations with adequate technological capabilities are better positioned to exploit cloud-based services. Ibrahim et al. (2023) further concluded that organizational readiness, ICT infrastructure, and staff competencies significantly accelerate cloud computing adoption in higher education institutions. Likewise, Santos et al. (2024) observed that technological readiness consistently emerges as one of the most influential determinants of cloud adoption across educational institutions because it facilitates system compatibility, scalability, and ease of implementation. These findings imply that Tanzanian Higher Learning Institutions should prioritize investment in ICT infrastructure, staff capacity building, and institutional technological preparedness before embarking on large-scale cloud computing implementation.

The study further found that perceived barriers had a positive but statistically insignificant influence on cloud computing adoption ($\beta = 0.036$, $p = 0.779$). This suggests that although respondents acknowledged concerns such as security risks, data privacy, implementation costs, and service provider reliability, these concerns were not sufficiently strong to explain differences in cloud computing adoption among the selected institutions. This finding contrasts with Brender and Markov (2013), who identified data security, privacy, and loss of organizational control as major obstacles to cloud adoption. Similarly, Al-Ruithe et al. (2018) argued that concerns regarding confidentiality and regulatory compliance remain among the primary barriers to cloud implementation, particularly within institutions managing sensitive academic information. However, the present finding agrees with Santos et al. (2024), whose systematic review concluded that although security and privacy concerns remain important, their influence varies across institutional contexts and tends to diminish where organizations possess adequate technological capabilities and organizational readiness. This may indicate that the selected Higher Learning Institutions have developed sufficient ICT competence to manage perceived technological risks effectively.

The findings also indicated that government policy had a negative but statistically insignificant influence on cloud computing adoption ($\beta = –0.041$, $p = 0.757$). This implies that existing government regulations and policy initiatives neither significantly promote nor inhibit cloud computing adoption within the surveyed institutions. The finding differs from Low et al. (2011), who found that supportive government policies and regulatory environments significantly facilitate technology adoption by reducing uncertainty and encouraging organizational investment. Likewise, Ibrahim et al. (2023) emphasized that government support and regulatory frameworks are important environmental factors influencing cloud computing adoption in higher education institutions. The insignificant relationship observed in this study may suggest that Tanzanian Higher Learning Institutions rely more on their internal technological capabilities than on external policy interventions when making cloud adoption decisions. It may also indicate the absence of comprehensive national cloud computing policies, incentives, and implementation guidelines specifically targeting higher education institutions.

Furthermore, vendor support was found to have a positive but statistically insignificant influence on cloud computing adoption ($\beta = 0.245$, $p = 0.065$). Although vendor support approached statistical significance, the findings indicate that it was not a major determinant of cloud computing adoption among the participating institutions. This finding partially agrees with Oliveira et al. (2014), who reported that service provider support contributes positively to cloud computing implementation by providing technical assistance, training, and maintenance services. Similarly, Ibrahim et al. (2023) found that vendor support enhances organizational confidence in adopting

cloud technologies through continuous technical support and capacity building. The relatively high regression coefficient observed in this study suggests that vendor support may become statistically significant in studies involving larger samples or a wider range of institutions. These findings imply that while vendor support remains beneficial, institutional technological readiness remains the dominant factor influencing cloud computing adoption.

Overall, the regression model explained approximately 68.6% of the variation in cloud computing adoption ($R^2 = 0.686$), indicating that technology readiness, perceived barriers, government policy, and vendor support collectively provide substantial explanatory power for cloud computing adoption in Higher Learning Institutions. The model was statistically significant ($F = 27.847$, $p < 0.001$), demonstrating that the selected independent variables jointly influence cloud computing adoption. These findings support the Technology–Organization–Environment (TOE) framework proposed by Tornatzky and Fleischer (1990), which argues that technology adoption results from the interaction of technological, organizational, and environmental factors. Nevertheless, the findings demonstrate that technological readiness exerts a considerably stronger influence than environmental factors such as government policy and vendor support in the Tanzanian higher education context. This observation is consistent with Santos et al. (2024), who concluded that technological readiness remains the most robust predictor of cloud computing adoption across educational settings, while the effects of environmental factors are often context-dependent.

5. Conclusion of the Study

The study concludes that technology readiness is the most critical factor influencing the adoption of cloud computing in Higher Learning Institutions in Tanzania. Institutions with adequate ICT infrastructure, skilled personnel, and organizational preparedness are significantly more likely to adopt cloud computing technologies than those with limited technological capacity. Conversely, perceived barriers, government policy, and vendor support were found to have no statistically significant influence on cloud computing adoption within the selected institutions, although vendor support demonstrated a positive relationship that approached statistical significance.

Furthermore, the study concludes that while technological, organizational, and environmental factors collectively explain a substantial proportion of the variation in cloud computing adoption, institutional technological readiness remains the dominant determinant. This finding underscores the importance of strengthening internal technological capabilities rather than relying solely on external policy interventions or vendor assistance. The significant overall regression model indicates that the Technology–Organization–Environment (TOE) framework provides an appropriate theoretical basis for understanding cloud computing adoption in Tanzanian Higher Learning Institutions.

Overall, the study concludes that successful adoption of cloud computing in Higher Learning Institutions requires sustained investment in ICT infrastructure, continuous staff training, and enhanced institutional readiness. Strengthening these internal capabilities will enable institutions to maximize the benefits of cloud computing, improve operational efficiency, support quality teaching and research, and accelerate digital transformation within Tanzania's higher education sector. Based on the findings of this study, the following recommendations are proposed:

Higher Learning Institutions should prioritize investment in ICT infrastructure, including reliable internet connectivity, modern computing facilities, and secure cloud-compatible systems, to enhance technology readiness, which was identified as the most significant predictor of cloud computing adoption. Institutions should also strengthen their organizational readiness by allocating adequate financial resources for digital transformation initiatives.

Institutional management should provide continuous training and capacity-building programs for academic and non-academic staff to improve cloud computing knowledge, technical competencies, and confidence in using cloud-based applications. Regular professional development will enhance staff preparedness and maximize the benefits of cloud technologies.
The Government of Tanzania, through the Ministry of Education, Science and Technology and relevant ICT regulatory bodies, should formulate and implement comprehensive policies and guidelines that support cloud computing adoption in Higher Learning Institutions. Such policies should include data security standards, privacy regulations, implementation frameworks, and financial incentives to encourage digital transformation.
Cloud service providers (vendors) should strengthen technical support services by offering affordable cloud solutions, continuous technical assistance, customized training, and timely maintenance services tailored to the specific needs of Higher Learning Institutions. Improved collaboration between vendors and institutions will facilitate smoother implementation of cloud computing technologies.
Higher Learning Institutions should establish clear institutional strategies for digital transformation that integrate cloud computing into teaching, learning, research, and administrative operations. Such strategies should include regular assessment of institutional technology readiness and mechanisms for monitoring and evaluating cloud computing implementation.
Future researchers should conduct similar studies using larger sample sizes and include public and private Higher Learning Institutions from different regions of Tanzania to improve the generalizability of the findings. Future studies may also examine additional factors such as organizational culture, top management support, cybersecurity preparedness, financial capacity, and user attitudes, which may further explain variations in cloud computing adoption beyond those investigated in the current study

References

Alharbi, S. T., & Drew, S. (2014). Using the Technology Acceptance Model in understanding academics' behavioural intention to use learning management systems. *International Journal of Advanced Computer Science and Applications, 5*(1), 143–155.

Al-Ruithe, M., Benkhelifa, E., & Hameed, K. (2018). Current state of cloud computing adoption—An empirical study in major public sector organizations of Saudi Arabia (KSA). *Procedia Computer Science, 130*, 731–737. https://doi.org/10.1016/j.procs.2018.04.129

Armbrust, M., Fox, A., Griffith, R., Joseph, A. D., Katz, R., Konwinski, A., Lee, G., Patterson, D., Rabkin, A., Stoica, I., & Zaharia, M. (2010). A view of cloud computing. *Communications of the ACM, 53*(4), 50–58. https://doi.org/10.1145/1721654.1721672

Bhanoo, S. (2009). Cloud computing. *Communications of the ACM.*

Brender, N., & Markov, I. (2013). Risk perception and risk management in cloud computing: Results from a case study of Swiss companies. *International Journal of Information Management, 33*(5), 726–733. https://doi.org/10.1016/j.ijinfomgt.2013.05.004

Buyya, R., Yeo, C. S., Venugopal, S., Broberg, J., & Brandic, I. (2009). Cloud computing and emerging IT platforms: Vision, hype, and reality for delivering computing as the fifth utility. *Future Generation Computer Systems, 25*(6), 599–616. https://doi.org/10.1016/j.future.2008.12.001

Chang, V., Walters, R. J., & Wills, G. (2013). The development that leads to the cloud computing business framework. *International Journal of Information Management, 33*(3), 524–538. https://doi.org/10.1016/j.ijinfomgt.2013.01.005

Choudhary, V., & Vithayathil, J. (2018). The impact of cloud computing: Should the IT department be organized as a cost center or a profit center? *Journal of Management Information Systems, 30*(2), 67–100. https://doi.org/10.2753/MIS0742-1222300203

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319–340. https://doi.org/10.2307/249008

Gangwar, H., Date, H., & Ramaswamy, R. (2015). Understanding determinants of cloud computing adoption using an integrated TAM–TOE model. *Journal of Enterprise Information Management, 28*(1), 107–130. https://doi.org/10.1108/JEIM-08-2013-0065

Laudon, K. C., & Laudon, J. P. (2022). *Management information systems: Managing the digital firm* (17th ed.). Pearson.

Low, C., Chen, Y., & Wu, M. (2011). Understanding the determinants of cloud computing adoption. *Industrial Management & Data Systems, 111*(7), 1006–1023. https://doi.org/10.1108/02635571111161262

Marston, S., Li, Z., Bandyopadhyay, S., Zhang, J., & Ghalsasi, A. (2011). Cloud computing—The business perspective. *Decision Support Systems, 51*(1), 176–189. https://doi.org/10.1016/j.dss.2010.12.006

Masud, A. H., & Huang, X. (2012). An e-learning system architecture based on cloud computing. *World Academy of Science, Engineering and Technology, 62*, 74–78.

Mell, P., & Grance, T. (2011). *The NIST definition of cloud computing* (Special Publication 800-145). National Institute of Standards and Technology. https://doi.org/10.6028/NIST.SP.800-145

Misra, S. C., & Mondal, A. (2016). Identification of a company's suitability for the adoption of cloud computing and modelling its corresponding return on investment. *Mathematical and Computer Modelling, 53*(3–4), 504–521. https://doi.org/10.1016/j.mcm.2010.03.037

Njenga, K., Garg, L., Bhardwaj, A., Bawa, S., & Prakash, S. (2019). Cloud computing adoption in higher learning institutions in Kenya: Hindering factors and recommendations for the way forward. *Telematics and Informatics, 38*, 225–246. https://doi.org/10.1016/j.tele.2018.10.007

Oliveira, T., Thomas, M., & Espadanal, M. (2014). Assessing the determinants of cloud computing adoption: An analysis of the manufacturing and services sectors. *Information & Management, 51*(5), 497–510. https://doi.org/10.1016/j.im.2014.03.006

Sultan, N. (2010). Cloud computing for education: A new dawn? *International Journal of Information Management, 30*(2), 109–116. https://doi.org/10.1016/j.ijinfomgt.2009.09.004

Tornatzky, L. G., & Fleischer, M. (1990). *The processes of technological innovation*. Lexington Books.

United Republic of Tanzania. (1996). *National science and technology policy*. Ministry of Science, Technology and Higher Education.

United Republic of Tanzania. (1998). *The Tanzania Development Vision 2025*. Planning Commission.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science, 46*(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

Weinhardt, C., Anandasivam, A., Blau, B., & Stößer, J. (2009). Business models in the service world. *IT Professional, 11*(2), 28–33. https://doi.org/10.1109/MITP.2009.21

Wong, C. C., & Hiew, P. L. (2005). Mobile entertainment: Review and redefine. In *Proceedings of the 4th International Conference on Mobile Business* (pp. 187–192). IEEE. https://doi.org/10.1109/ICMB.2005.64