

Organization Culture: Mediator of Information Technology (IT) Competence and IT Governance Effectiveness

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Abstract : Spending thousands of dollars on IT resources in advanced institutes of learning necessitates IT control. Preliminary studies in Ugandan public universities have revealed the ineffective utilization of IT resources. Besides, IT governance issues with IT competence and organization culture remain outstanding in the literature. This research paper examined the mediation effect of organization culture in the relationship between information technology (IT) competence and IT governance effectiveness in Ugandan public universities. The purpose of the research paper was to examine the role of organization culture in the relationship between IT competence and IT governance effectiveness. The paper adopted the MedGraph program, Sobel tests, and Kenny and Baron approach to testing for mediation effects. In it the findings, it is impeccable that IT competence and organization culture are valid drivers of IT governance effectiveness. However, organizational culture reveals partial mediation in the IT competence and IT governance effectiveness relationship. To effectively achieve IT governance effectiveness, it means senior management requires IT knowledge, which is a vital ingredient of IT competence. Moreover, organizations today ought to adopt cultures to have them competitive in their businesses, with IT operations not in isolation. We should know that testing the mediating outcome of organization culture in the association between IT competence and IT governance effectiveness, is a new study in the universities context. However, the empirical investigation in this research depends profoundly on public universities. Future research in private universities is vital to compare results.

Keywords: Organization culture, IT Competence, IT Governance, Effectiveness, Mediating effect, Universities, Uganda

Introduction

Organizations are reliant on Information Technology (IT) to realize the quality and improved service delivery (De Haes *et al.*, 2013). Accordingly, IT is critical in organizations' sustainability, thereby crafting a necessity for dependency on IT (Wu *et al.*, 2015). Consequently, dependence on IT, and this pervasiveness demands IT governance (ITG) responsiveness (DeHaes & VanGrembergen, 2015) with educational institutions not exclusive. Congruent with Bajgoric (2014), ITG is a tool that controls and manages the existing hardware and software IT resources, and also involving individuals allocated with IT-linked policymaking in supporting institutional strategies. According to Weill & Ross (2004), value arising out of ITG outcome is due to effective ITG. IT systems offer more conducive environments for instruction, learning, and investigation while supporting administrative processes (Wilmore, 2014). Wilmore (2014) asserts that universities are complex organizations with IT systems comprising a diversity of platforms, educational infrastructure, and other sets of know-how that require adequate IT and appropriate IT platforms for goal fulfillment.

However, the utilization of IT facilities can be influenced by a unique culture since it arbitrates management participation in IT roles and ITG effectiveness. Thus, culture influences how organization functions, innovate, and accepts change, and as such, persuades strategic preparations (Armstrong, 2006). Several authors suggest scope and attributes of organizational culture. Hofstede (2003, 2010) researched extensively on national culture.

Meanwhile, Cameron & Quinn (2011) suggested six dimensions of organizational culture. Cameron & Quinn (2011) framework is entrenched in extensive research covering areas of corporate culture as well as aligns with acknowledged cultural themes. In other words, Cameron & Quinn (2011) emphasize the manner individual's reason, their beliefs, values and assumptions, and information processing. The dimensions include: - dominant characteristics, organizational leadership, and management of employees, organization glue, strategic emphasis, and criteria for success. These classifications produced two main cultural scopes, both with a competing value. One cultural dimension is internally or outwardly focused while the other aspect considers stability and flexibility within the organization. It is essential to state that Cameron & Quinn (2011) never approved any single perfect culture.

On the other hand, most IT governance initiatives require desirable behavior and personnel in IT processes for appropriate control and guidance. This control and direction need IT competence. Davis (2013) state that IT competence is indispensable to deliver value in IT investments. The scenario explains why, with the enormous expenditures on IT, investigators and consultants are seeking to understand affiliation concerning IT competence and performance. IT competence is imperative to an organization as it supports understanding of valued and non-copied assets that have effects on IT investments and organizations' performance outcomes (Crawford, Leonard & Jones, 2011). Zehir, Muceldili, Akyuz & Celep (2010) emphasize that IT-based resources are physical resources that cover physical IT infrastructure modules, or intangible IT assets comprising of information assets. IT-based resources can similarly unfold as human-IT resources encompassing practical and decision-making IT skills (Zehir *et al.*, 2010). Ross *et al.* (1996) define IT competence as the capability over control of IT-related costs and the ability to deliver suitable systems by applying IT. The application of IT is to improve on the organizations' strategies through IT usage.

Similarly, objectives to achieve ITG effectiveness are economical IT usage, actual IT usage for development, and active IT usage for asset deployment and operation (Bowen, Cheung & Rohde, 2007). Other objectives include compliance with legal and supervisory requirements (Turel & Bart, 2014). IT governance effectiveness study reflects the extent to which IT resources are deployed and also utilized. Accordingly, Bianchi, Sousa & Pereira (2017) regard the efficient use of IT to reflect control of IT costs commensurate with productivity. It also mirrors IT resources, such as capabilities and knowledge used to support work methods and processes across the organization. Tiwana & Kim (2015) emphasize that the attainment, placement, and usage of IT investments have to be useful so that organizations can benefit from it. IT investment effectiveness is provided by IT governance (Robinson, 2005). Buchwald, Urbach, Ahlemann (2013) state that the degree to which IT conveys proper amenities operations and besides goals defines ITG effectiveness.

However, these governance mechanisms of IT have not solved several problems underlying the notions of governance in most organizations, thus agency theory. As such, IT governance instruments impact decisions prepared by supervisors whenever there is a separation of proprietorship and mechanisms (Lunardi *et al.*, 2009). ITG offers tools for aiding planned conclusions concerning IT investments that are accountable by shareholders and top management (Chong & Duong, 2017). Additionally, IT governance also facilitates corporate policies, organizational processes, and procedures for the effective utilization of IT resources in organizations.

Wu, Straub & Liang (2014) presented a study involving governance mechanisms and organization performance relationships with strategic-alignment as mediators. Furthermore, (Lunardi *et al.*, 2016) analyzed several IT governance mechanisms that constitute antecedents (e.g., strategic business-IT alignment) of IT governance effectiveness. Higher institutions of learning are inclined to the clan cultures and congruent leader behavior among top management leadership (Kaufman, 2013 and Hartnell & Kinicki, 2011).

Despite substantial investment by the government of Uganda in IT initiatives across public universities with the hope of improving general administration, financial management, reporting, and accountability, persistent challenges hindering the effective utilization of these IT resources remain. The government of Uganda has identified IT as the key driver for growth, propelling the attainment of vision 2040, where Uganda is to become a fully middle-income economy. Though, ineffective utilization of the IT resources is likely to hurt the governments' realization of the vision 2040. Several researchers have established a mediating role between IT governance structure and performance, either monetary or non-monetary (Weill & Ross, 2004). However, it is still unclear how the part played by organization culture as a mediator, impacts ITG effectiveness through IT competence aspects. Thus a gap that, in essence, requires bridging.

Information Technology (IT) Competence and Organization Culture

The growing interest in studying the organization culture is through belief and the organization's effectiveness. The influence of organizational culture is significant as it would sway the direction of managerial competence and capabilities since organizations have distinct personalities that are primarily shaped by its senior management (Sheikhhalizadeh & Tojari, 2013 & Tojari *et al.*, 2011). Organizations define achievement as a result of human competence, solidarity, promise, efficiency, apprehension for individuals to succeed in the marketplace and outpace competition that influences decision-making (Cameron & Quinn, 2011). Furthermore, this is towards an adhocracy culture (Cameron & Quinn, 2011) characterized by an active, direct behavior, thereby building promise to an organization and its goals. The approach university top management

responds to how employees react to situations in achieving organizational objectives. Universities are increasingly using information technology for nearly all their processes that require IT competence.

The organization culture and IT competence relationship exist. Organizations ought to emphasize the acquisition of new resources and technologies with new competencies that create new challenges. These new competencies support the notion that emphasizes competitive engagements, achievement, and organizational longevity and stability (Cameron & Quinn, 2011). Meanwhile, Gregory *et al.* (2009) indicate that organizational culture made the circumstances for determining internal effectiveness. The culture at a university level requires internal efficiency associated with IT competence as IT knowledge, IT skills, and IT abilities (Kwantes & Boglarsky, 2007). Similarly, organizations have tended to cement their culture with technological advancements.

Tippins & Sohi (2003) emphasized the need to be knowledgeable about the value of IT in supporting organizational activities, the new trend in computer-based innovations applicable, and the overall IT budget in an organization. Furthermore, Tippins & Sohi (2003) stressed the necessity for awareness concerning IT risks organizations where they are exposed to and also the organizational IT policies. The recognition of IT values, IT budgets, IT risks, and understanding of these risks are essential for corporate culture and IT competence consideration. There is evidence that leader behavior leading to organizational success and effectiveness correlates with organizational culture (Sarros, Gray, & Densten, 2002; Tsai, 2011; Sheikhalizadeh & Tojari, 2013; Tojari, Sheikhalizadeh & Zarei, 2011). Therefore, the study hypothesizes that:

Hypothesis 1. Information technology competence positively relates to organizational culture in Ugandan public universities.

Organization Culture, IT Competence and IT Governance Effectiveness

Beytekin *et al.* (2010) argue that organizational culture has grown to be very crucial in the evaluation of the universities. Cameron & Freeman (1991) suggest different philosophy or culture categories are interrelated to advanced levels of performance on different useful measurements. Kuh & Whitt (1988) define college culture as familiar shapes of customs, morals, philosophies, and norms that provide behavioral guidance to society. Cameron & Quinn (2006, 2011) stress that the glue holding institutions include loyalty, improvement assurance, and progress employing and highlighting achievement accomplishments while adhering to formal rules and policies. Beytekin *et al.* (2010) submit that organization culture profiles relationships, operational procedures, and policymaking in a university, thereby affecting the individual's behavior and organizational performance. University stakeholders perform a significant part in philosophy development, and that culture is the key to success at a university level (Beytekin *et al.*, 2010). Similarly, Kezar & Eckel (2002) concur that the reasonable advancement of academies globally steered shifting the landscape of advanced learning. Thus, IT governance initiatives can affect governance performance and, consequently, the organization's performance (Lunardi *et al.*, 2014). Bartell (2003) and Cameron & Ettington (1988) also concur that a strong culture allows deliberations on divergent opinions and approaches that inspire leaders and stakeholders on the quality of decision making and thereby associated with organizational excellence. University leaders play a decisive part in determining and strengthening cultural philosophy (Schein, 1994). Some studies that scrutinized organization culture and organization performance relationships found that a stronger culture could lead to high organizational performance (Sadri & Lees, 2001; Sorensen, 2002). Management scholars have emphasized the role culture play in enforcing behaviors of managers, which also affects the abilities, skills, and knowledge, which increases the managers' efficiency and effectiveness (Longest & Friede, 2002). Culture can play a part in achieving IT governance effectiveness at a university level. Thus:-

Hypothesis 2. Information technology competence mediates the relationship between organizational culture and IT governance effectiveness in Ugandan public universities.

Study design and methodology

The hypotheses in this study were addressed through a cross-sectional design and quantitative research designs. A cross-sectional research design allows for a large data amount collected over a limited period. Furthermore, glitches arising from data collection instruments are minimized compared to a longitudinal study (Creswell, 2012). According to Creswell (2003), quantitative research embrace inquiry approaches like experiments and surveys besides collects data on prearranged tools appropriate for relatively large samples.

Target population involved management group participants in the nine (9) public Universities. These include both academic and administrative. The universities' human resource manuals do not specify the minimum and maximum number of staff on university management teams. However, the institutions were chosen based on mandate stated in the Universities and Other Tertiary Institutions Act, 2001 of Uganda. At least each of the regions in Uganda has a university represented. Based on both the existing academic and administrative units in 9 public universities, the study population was 162, with the highest and lowest number of respondents is 28 and 13, respectively. Howes *et al.* (2009) stress that a sample frame serves as a target population comprising a list of all individuals/units. We used a sample frame that included all the vice-chancellors and their deputies, principals, deans and directors, academic heads of departments, especially where there were Schools and other leaders of sections. The leaders of other sections included administrators such as staff in the Offices of University Secretaries, Librarians, University Bursars, and Academic Registrars, collected among others. A convenience sampling technique was appropriate for this study. Convenience sampling involves selecting members of the target population that meet specific criteria, such as easy accessibility to the researcher and affordability (Dörnyei & Griffee, 2010). From 9 public universities in Uganda, a total of 162 staff constituted a population. However, out of 162 respondents, 97 valid questionnaires were returned, hence, giving a response rate of 82.2%, which is satisfactory for analysis of data according to Roscoe (1975) rule of thumb.

The study adapted and modified a survey from previous studies that used the 5-Likert scale with Strongly Agree (SA) = 5 and Strongly Disagree (SD) = 1. Thus with the usage of the 5-Likert scale, reliability, comparability, and consistency are valid justifications commonly recommended from prior studies (Dillman *et al.*, 2009) to measure attitude. The survey instrument was validated by experts in IT governance for clarity. These content experts did not involve any of the respondents. The value of Cronbach Alpha (CA), computed through SmartPLS, were all found to be higher than the recommended 0.70 to achieve the measurement model reliability (George & Mallery, 2003; Gliem & Gliem, 2003; Nunally, 1978). In addition, the collected data was purified to provide meaningful and reliable results during analysis through data screening. Congruent with Glas & Pimental (2008), we ignored the few cases identified during analysis since only two instances of missing values were detected. Furthermore, normality tests were used to establish the distribution of data with the help of probability plots as recommended by (Mooi & Sarstedt, 2011).

Tests for Multi-collinearity was done through SmartPLS. On the other hand, designed for SmartPLS, CMB via a full collinearity estimation method is noticed (Kock, 2015). Kock (2015) and Ringle *et al.*, (2015) indicate that the VIF values ought to be five and lower than the threshold for acceptability of collinearity points. This was achieved.

Also, the mediation assessment was accomplished by Jose (2008) MedGraph program to examine the extent of organizational culture influence on the association between information technology competence and IT governance effectiveness. Mediation can either be in the form of full-mediation or partial mediation (Baron & Kenny, 1986).

Sample Characteristics Results

Results indicate that 53.6% of respondents are male and 46.4% female. The result shows most decision-makers in IT-related matters in the universities are male. The statistical analysis further suggests that 13.4% of the respondents have the undergraduate requirement, 34% have a postgraduate degree, 21.6% have postgraduate diplomas then 30.9% have Ph.D. Most of the top academic leaders are at least at the rank of senior lecturer since they possess a Ph.D. holder in public university in Uganda. Therefore, it is not a coincidence that 30.9% of the respondents are Ph.D. holders.

Mediation Results

Hypothesis 2 is about organizational culture mediating the relationship between IT competence and IT governance effectiveness. Mediation tests were done following the guideline of Barron and Kenny (1986) presented in four steps and executed as follows to determine whether the study was compliant with the conditions.

Correlation Analysis

Correlation analysis was used to establish the existence of relationships between IT competence, organization culture, and IT governance effectiveness. These results in Table 1. Below display positive and significant relationship midst of IT competence and IT governance effectiveness ($r=0.582^{**}$). It also illustrates a significant and positive relationship between IT competence and organizational culture ($r=0.624^{**}$). The results also reveal a significant positive correlation between organizational culture and IT governance effectiveness ($r=0.699^{**}$). The results imply that IT competence and culture are highly associated with IT governance outcomes in public universities.

Table 1. Correlation results

		ITC	OC	ITGE
IT Competence	Pearson Correlation	1		
Organization Culture	Pearson Correlation	0.624**	1	
IT Governance Effectiveness	Pearson Correlation	0.582**	0.699**	1

** . Significant at 0.01 level (2-tailed).

Regression Analysis

Regression analysis was done to determine the predicting power of the independent variables on the mediator and outcome variable. Tables 2. and 3. below present the regression of IT governance effectiveness on organization culture and IT competence and organization culture on IT competence, respectively. While Table 4. shows the summary model, as indicated below.

Regressing Organization Culture on IT Competence

Table 2. Organization Culture and IT Competence

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations		
		B	Std. Error	Beta			Zero-order	Partial	Part
1	(Constant)	2.914	.175		16.616	.000			
	IT Competence	.405	.052	.624	7.778	.000	.624	.624	.624

a. Dependent Variable: Organizational Culture

Regressing IT Governance Effectiveness on Organizational Culture and IT Competence

Table 3. ITG Effectiveness on Organization Culture & IT Competence

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	Correlations		
		B	Std Error	Beta			Zero-order	Partial	Part
1	(Constant)	1.819	0.214		8.506	.000			
	Organizational Culture	0.382	0.063	0.550	6.041	.000	.699	.529	.430
	IT Competence	0.108	0.041	0.239	2.627	.010	.582	.261	.187

a. Dependent Variable: IT Governance Effectiveness

Table 4. Model Summary

Model	R	R ²	Adjusted R ²	Estimate Std Error
1	.724 ^a	.524	.514	.23649

a. Predictors: (Constant), IT Competence, Organization Culture

Results in the above tables show that IT competence predicts 23.9% of IT governance effectiveness (Beta=.239, P=.010) while organization culture predicts 55% of IT governance effectiveness (Beta=.550, P=.000) (r=.624**). The total predicting power of IT competence and organization culture on IT governance effectiveness 52.4% (R²=.524). Thus the Tables show the mediation conditions (Kenny and Baron, 1986). First, the effect to be mediated exist (B = 0.108, p < 0.05). Second, there is a significant relationship between IT competence and mediator (B = 0.382, p < 0.01). Thirdly, the coefficient of the mediator (organization culture) is significant in Table 2 (B = 405, p < 0.01), with both IT competence and organization culture as

predictors. And lastly, the absolute influence of IT competence on IT governance effectiveness is less in the third regression (standardized $\beta = 0.239$) than in second regression (standardized $\beta = 0.624$)

Given that all the three relationships are significant, the findings are suitable for testing of mediation using a Medgraph by Jose (2013). These statistics were input in a program that graphically depicts mediation between variables (Jose, 2013). Figure 1. below presents Medgraph.

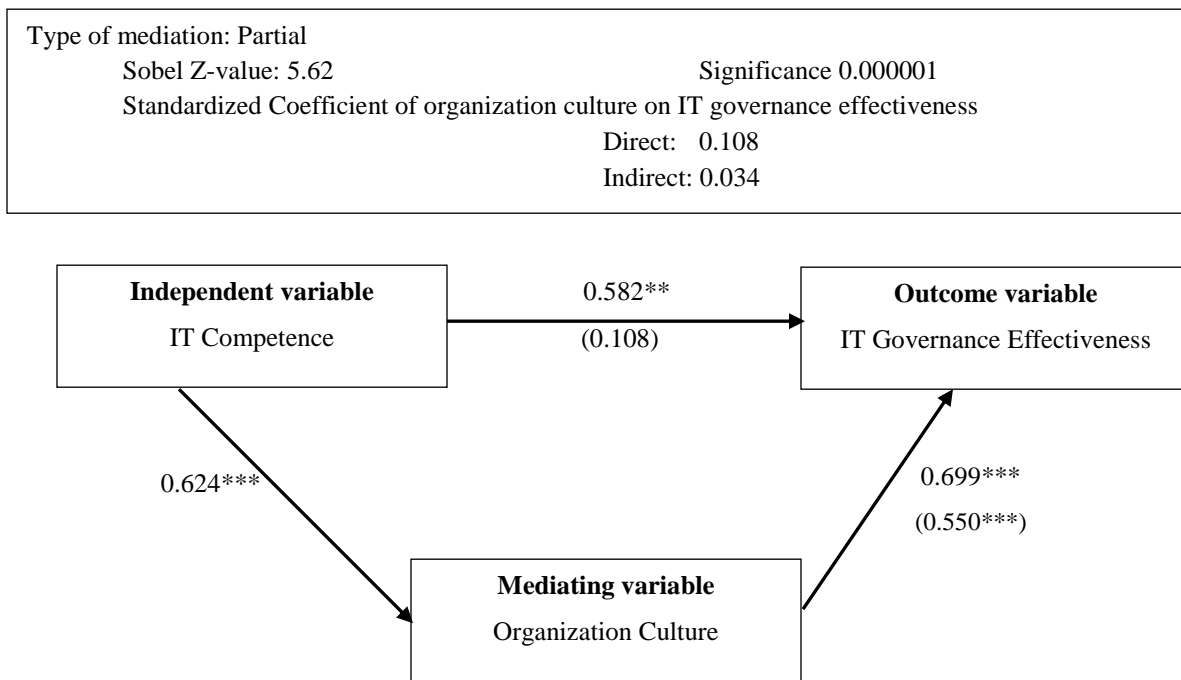


Figure 1. A Medgraph showing OC mediating ITC and ITGE

Results in the Medgraph above show that organization culture partially mediates IT competence and IT governance effectiveness relationship (Sobel z value = 5.620039, $P = <0.000001$. Mediation is significant at 95% Symmetrical Confidence interval, lower bound 0.25699, and higher bound 0.53223. Thus, Sobel z-value of 5.6 with a p-value of 0.000001 and the beta weight for the basic relationship between IT competence and IT governance effectiveness ($r = 0.108$, $p < 0.05$) were revealed. First, the results indicate that since the Sobel z-value is large with a p-value that is less than 0.05, it is an indicator of significant mediation of organization culture in the relationship between IT competence and IT governance effectiveness existed. In fulfillment of Jose (2008) in the third regression model (Table 3), it actually shows that the association between the predictor variable (IT competence) and the criterion variable (IT governance effectiveness) has been significantly reduced (that is from 0.582 to 0.108) by the inclusion of the mediating variable (organization culture). Secondly, there is partial mediation due to correlation reduction to a significant level between the independent variable and criterion variable from 0.582** to 0.108.

Further, the direct path explains a 3.4% variance in the dependent variable, while the indirect effect explains a 16.8% variance in the dependent variable. This finding indicates that hypothesis H2, which states that organization culture mediates staff IT competence and IT governance effectiveness relationship, was supported. Thus, organizational culture causes IT governance effectiveness.

Discussion and Conclusion

This research examined and also verified the mediating outcome of organization culture in the relationship between IT competence and ITG effectiveness in the Uganda public universities. The study essence was to test or verify precise underlying theories around time-ordered associations between variables and the specific mechanism or conduit through which a relationship arises. Accordingly, as shown in the previous section, results indicate evidence of the sure drivers of ITG

effectiveness in their causal or underlying chain relationships. Therefore, since it was a partial mediation, the conclusions indicate that organizational culture partly mediates the relationship or association between IT competence and ITG effectiveness. In concrete terms, it reveals that the whole effect on ITG effectiveness doesn't merely go over the focal predictor variable (IT competence) but also organization culture. This implies that the linkage flanked by IT competence and ITG effectiveness is weakened by means of the existence of organization culture in the model. The abovementioned confirms that the occurrence or existence of organization culture partly acts as a pathway or conduit in the IT competence and ITG effectiveness relationship in the Ugandan public universities. Thus, IT competence and organizational culture are factual drivers of ITG effectiveness in Uganda's public universities.

Prior studies have recognized the mediating role of IT governance structure and organizational enactment on performance (Weill & Ross, 2004). Previous studies have also measured the consequence of IT governance on enactment performance (Pereira *et al.*, 2014)). These studies provided evidence of partial mediation in the relationships on IT governance performance. Consequently, better decisions made due to an effective IT governance structure. Pereira *et al.* (2014) affirm that to manage an assortment of available technologies, the involvement of management in IT is critical to support choices related to IT activities and resources. These IT activities and resources firmly aligned with an organization's long-term decisions.

On the other hand, Feeny & Wilcocks (1998) defined IT competence to include diverse talents, expertise, and processes that enable organizations to deploy IT products and services to improve innovations. IT competence also includes various assets, understanding, and relationships that allow IT organizations to all resources (Feeny & Wilcocks, 1998). Bharadwaj (2000) recognizes IT competence as an organizations' capability to marshal and deploy IT resources alongside others to achieve organizational strategies. IT adeptness and proficiency for non-IT top management support and assurance are necessary to support strategic ITG performance and effectiveness initiatives (Subirana, 2004; Valentine & Stewart, 2013).

In this case, the belief that originates from organization culture enables university stakeholders and management to follow the communal and collective goals by a team working and sharing of knowledge. Actually, this synergetic occurrence is what partly supports the university management to achieve ITG effectiveness in the Uganda public universities. Thus, the factual drivers of ITG effectiveness in the Ugandan public universities are IT competence and organization culture. However, organizational culture exhibits a partial form of mediation in the relation between IT competence and ITG effectiveness. Hence, a definite mechanism or path a relationship occurs between IT competence and ITG effectiveness is direct, though organization culture partially mediates the relationship.

Research Implications

Before the study, little was known about IT governance effectiveness understanding in Ugandan public universities. Therefore, through this understanding, the results can help identify areas for strategic focus to assess IT governance effectiveness as a technology-driven initiative to support and appropriately implement IT-related undertakings in universities.

Research implications are also identified for stakeholder attention. Although IT competence is greatly stressed as a means of encouraging ITG effectiveness outcomes, senior management and the executives alike should recognize that it can't be absolutely divorced from organizational culture. Organizational culture is related to the way IT adds to the accomplishment of institutional management tasks, given the level of staff IT competence. Thus, culture is also found as an essential variable in technology acceptance and usage since it requires university effectiveness in sharing IT experience and imparting skills to their members. According to Cameron and Quinn (2011), educational effectiveness is an outcome of the same culture by way of the organization's dream, ideals, beliefs, and the overall organization's strategic approach.

IT competence is related to how IT adds in the direction of the accomplishment of the group given specific organizational culture. Prior studies such as Straub *et al.* (1997) and Choe (2004) confirm culture as an essential variable in consideration of technology acceptance and usage. Kwantes and Boglarsky (2007) also agree that the culture at a university level requires internal effectiveness associated with IT competence such, as IT knowledge, IT skills, and IT abilities. Therefore university culture and individual capabilities and skills in the university can lead to organizational goal achievement (Gregory *et al.*, 2009). Henceforth, IT governance effectiveness, and more so effective utilization of IT resources can be strengthened and improved by enhancing the IT knowledge and skills of top decision-makers with culture embedded, in the public universities.

Study Limitations

The empirical investigation in this research depends profoundly on public universities. Correspondingly, the results from this study ought to be applied in general context with cautiousness once likening with private universities raising the issue and challenges of generalization of results. Suitability of longitudinal data to IT governance effectiveness research should be considered in the future. Moreover, the studies should be done in other emerging countries to cater to different national cultures.

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