



Performance management practices, information and communication technology (ICT) adoption and managed performance

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Abstract

Purpose – The purpose of this paper is to demonstrate the need for managers of public universities to pay attention to performance management practices and information communication technology (ICT) adoption in order to achieve successful managed performance.

Design/methodology/approach – Using a disproportionate stratified purposive approach, a sample of 900 employees was drawn from four public universities in Uganda.

Findings – The results revealed that performance management practices that are vested in agency relations and goal setting with ICT adoption are necessary in the achievement of managed performance in public universities.

Practical implications – Building a positive employer-employee relationship and involving employees in setting goals and targets is crucial for successful management of organisations. ICT adoption will further facilitate service quality, service delivery and cost reduction.

Originality/value – This paper calls for a new approach to managing employees in public universities in developing countries and Uganda in particular.

Keywords Performance management, Universities, Uganda

Paper type Research paper

Introduction

According to Armstrong (2000), performance management is a means of getting better results from the whole organisation or teams or individuals within it, by understanding and managing performance within an agreed framework of planned goals, standards and competence requirements. Performance management could be validated and tested in an emerging country's context of growth and development for a developing country like Uganda. Uganda's context of growth and development could be more dynamic and completely different from a developed country's context. For this study the context was in terms of public universities in Uganda. Public Universities of Uganda are facing challenges such as reduced funding from the government, restructuring, downsizing and reengineering amidst ever increasing demand for University education and stakeholders demanding for quality services, service delivery and cost reduction.

In such a hyper changing educational environment, there is need for developing countries and public universities of Uganda in particular to adopt information and



communication technology (ICT) to meet stakeholder needs. According to Nomdo (2004), the use of ICT in educational settings has become an important area of enquiry. Tusubira *et al.* (2009) asserted that ICT is not merely technology but about people networks at the intellectual, functional and operational level to: support student-centred learning generating twenty-first century human resource; enhance effective and efficient student and staff research both locally and internationally through collaboration; facilitate academic and administrative management processes; and also enable cheap, efficient timely communication.

Consequently, public universities in Uganda have to find money and invest in the use of ICT for learning, teaching and research (Kasozi, 2005). However, ICT being completely new in Uganda is posing a serious challenge to users and providers of services in public universities. Most importantly, universities cannot afford the costs of acquiring and updating of software and hardware, developing infrastructure and ensure regular maintenance of ICT equipment. Also, inability to attract and retain competent ICT staff in addition to other institutional factors such as organisational politics hinders human resource development. Human resource is crucial for successful performance of these universities. Public universities still have to outsource for ICT expertise in certain areas of operations. This further undermines the adoption of ICT in public universities of Uganda and impacts on the growth and development of the country. This study was set to establish whether performance management practices vested in agency (Jensen and Meckling, 1976) and goal-setting (Locke, 1968; Locke and Latham, 1990) theories with adoption of ICT explained successful attainment of managed performance in public universities of Uganda (see Figure 1). The conceptual framework (see Figure 1) proceeds with a review of the literature. This is followed by research methodology, results, discussion and conclusions in this order.

Performance management practices, ICT adoption and managed performance

Performance management is about directing and supporting employees to work as effectively and efficiently as possible in line with the needs of the organisation (Walters, 1995). This requires adoption of information and communication technology

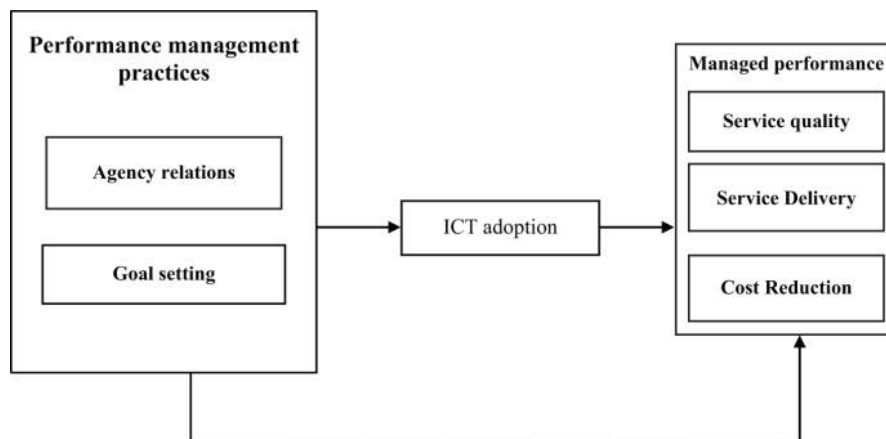


Figure 1.
The interrelationships among the study variables

(see Figure 1). In this study, public universities of Uganda have to recruit competent employees and continually ensure human resource development as new technologies are adopted for delivery of fast and cost effective quality services. According to Tusbira *et al.* (2009) these universities still face challenges of incorporating email and Internet/intranet services. Further, management, control and maintenance of ICT resources owned by the units responsible for the main systems and databases are either lacking or not networked.

Such resources include centrally located servers (for databases and software) for the Academic Records Information System, the Library Information System, the Finance Information System and the Human Resource Information system.

Basing on the agency theory perspective as an aspect of performance management practice, Karake (1995) argued that using information technology as a means of control; managers could protect their own interests as well as those interests of the stockholders to successfully manage performance. Control is the purpose of agency and the basis for agency theory, and organisational control is one of the most fundamental and most important areas of management activities. Control means ensuring that the principal's actions and work are performed by some people, and information and communication technology strengthens managers' ability to control by communicating information rapidly across distances and utilizing computational routines (Karake, 1995). For instance, Lewis *et al.* (2005) found that while the introduction of networked ICTs into the organisational setting is meant to empower workers, it also increases the ability for organisations to exercise centralised control and surveillance (DiMaggio *et al.*, 2001). Karake (1995) also found and confirmed that large companies with a larger number of outside directors on the board use the advantage of information technology as a mechanism of monitoring managers. This reduces agency costs that arise from the problem of separation of ownership (risk bearing) and control (management) in an organisation.

Furthermore, Brynjolfsson and Mendelson (1993) established that ICT utilisation has had a significant impact on changes occurring in society, the economy and organisations in particular. Organisations are social entities that thrive on good working relationship between the employers and employees.

Agency relationships, the focus of this study are derived from the agency theory perspective that exist when one party (the principal) depends on the actions of another (the agent) to achieve the aims of the firm (Jensen and Meckling, 1976). In such a relationship, the doer is known as the agent, whereas the affected party is called the principal. There is reason to believe that the agent will not always act in the best interest of the principal given that the agent is a utility maximizer who is granted decision making authority and that there are asymmetric levels of information between the two parties (Berle and Means, 1932). Also, under the agency perspective, the owners put up the capital necessary to fund the organisation. In return, they receive the residual claims, or profits, that remain after all other claimants are paid. However, in public universities, there are no residual claims to be paid out and no owners expecting to earn a profit. Within these universities, any conceivable agency relationship between employers and employees is clouded (Olson, 2000). Furthermore, without residual claims or stock, there is no need for management to worry about the organisation being bought or sold in the marketplace. These conditions suggest that managers in public universities have increased opportunity to pursue self-interest (Dyl *et al.*, 1996). This

opportunity is clearly established in Mamdani (2007) who demonstrated how the central administration in one of the public universities under study lost control of its finances to the deans and directors of faculties.

These deans and directors were able to pay themselves increments in top up allowances without the authorization of the central administration. Such a situation has particular implications for attainment of managed performance in public universities and how to report on that performance (Myners, 1998).

Wolf's (1999) study of the service sector in Uganda, Kenya and Tanzania found that higher levels of computerization, that is, the office, computing and accounting equipment made available to employees have led to lower productivity. This finding could be explained by the high reliance of the service sector on the quality of the labour input (Aickelin *et al.*, 2008). For public universities of Uganda do not pay open market rate salaries and wages to compete with private sector in attracting and retaining competent employees, a problem that remains unresolved.

Rheingold (1993) argued that ICT adoption in performance management is used to facilitate human systems to form webs of personal relationships in cyberspace as well as increase information circulation to enable employees achieve managed performance. For instance, studies on marketing and innovation (Vilaseca-Requena *et al.*, 2007) showed that ICT use not only enables the development of co-operative relationships with agents of the environment, it also allows agents' full integration in the processes of innovation by the formation of flexible working groups with a high degree of communication between its members. This is crucial for quality, service and cost consideration and attainment of managed performance. For instance, using ICTs, Dell virtually integrated their complete value chain with customers, distributors and suppliers. Dell is therefore in a position to reap a lot of production efficiency such as improving speed and flexibility in the global IT industry (Joan, 1998). This underlies the European Commission Report on ICT (European Commission, 2008) that our innovation performance is crucially dependent on strengthening investment in and the use of new technologies, particularly ICTs, by both the private and public sectors with information and communication technology providing the backbone for the knowledge economy. From the reviewed literature, it was hypothesised that:

H1. Performance management practices have a positive relationship with information and communication technology adoption.

Arnal *et al.* (2001) found that the improved flow of information between managers and workers, as a consequence of ICT adoption, has enabled innovative practices such as decentralisation of decision making and teamwork adoption.

Clarke and Clegg (2000) added that information and communication technology has facilitated the globalization of production and is transforming concepts of time and space. Furthermore, ICT technology is well targeted and deployed in order to achieve strategic goals (Zahra *et al.*, 2006). For instance, Busi and Bititci (2006) found that ICT has increased the amount of information available to individuals and their ability to share such information far beyond everybody's expectations. Rheingold (1993) established that increased use of ICT in organisations has led to improved efficiency and effectiveness. This means that ICT adoption is imperative for a nation's growth and development. This study sought to establish that ICT adoption as one of the set goals for public universities of Uganda facilitated performance management practices

to achieve managed performance. From the reviewed literature, it was hypothesised that:

H2. Information and communication technology has a positive relationship with managed performance.

Managers of organisations and those of public universities in Uganda in particular have to continuously scan the environment, be innovative, set and implement their goals appropriately in order to successfully manage performance.

The goal-setting idea that underlies much of motivation theory (Locke, 1978) pervades the recent practice in performance management (Punnett *et al.*, 2007). Miner (2003) conducted an evaluation basing on assessment of organisational behaviour (OB) scholars and rated goal setting theory first in importance among 73 management theories despite its longevity. According to Locke and Latham (2002), goals are outcomes to attain standards for judging one's accomplishments. Locke and Latham (2005) cited in Smith and Hitt (2005, pp. 128-47) found that people are more satisfied when they attain their goals or make meaningful progress towards them than when they fail, make little or no progress. Also, Frese (2005) cited in Smith and Hitt (2005, p. 102) found that proactive goal setting maximizes the positive effect of goals by developing specific, time-bound, and challenging goals to which participants feel committed. In view of the goal setting theory, Vecchio and Appelbaum (1995) established that improved performance is achieved where managers and employees have agreed on performance goals and expectations (Heskett *et al.*, 1994) coupled with good information flow facilitated by ICT. In addition, Boonstra and Vink (1996) found that information and communication technology (ICT) is a useful tool or system for controlling regulation of the workflow, improving flexibility, service, quality and innovation capacity of an organisation. Furthermore, Gonzalez (2008) found that ICT as a support tool offers the means for improving effectiveness and efficiency in goal setting for coordinating business networks.

According to De Waal (2003), better understanding and implementation of performance management practices requires examining the influence of information and communication technology, particularly on availability and utilisation of ICT such as computers, intranet, fax, and telephones in order to manage performance.

Furthermore, London *et al.* (1997) found that 360-degree feedback with clear information and communication in setting goals facilitated efficiency and effectiveness of work performance. Thomas (1996) had also earlier established that 360-degree feedback coupled with the validity of goal setting as a management approach improved performance. Verbeeten (2008) also found that the definition of clear and measurable goals is positively associated with quantity and quality performance and that the use of incentives is positively associated with quantity performance yet not related to quality performance. An empirical finding (Pollit, 2006) further showed that quantitative performance measures tend to ignore the quality aspect of service delivery since qualitative performance is much more difficult to measure. Verbeeten (2008) further established that the effects of performance management practices in public sector organisations are affected by institutional factors with the results suggesting that the behavioral effects of performance management practices are as important as the economic effects in public sector organisations. According to Latham (2001), there

is need to investigate goal setting procedures and generalization, in the achievement of managed performance (Mitchell, 1997) and that empirical evidence on performance management practices in the public sector is inconclusive (Verbeeten, 2008). This study was set to investigate and explain the need for performance management practices with ICT adoption in public universities of Uganda.

From the literature discussed a hypothesis was predicted that:

H3. Performance management practices have a positive relationship with managed performance.

Research methodology

Procedure

The study is based on survey data collected from employees in public universities in Uganda. According to Cooper and Schindler (2003), surveys allow contact with otherwise inaccessible respondents at relatively low costs. A disproportionate stratified purposive sampling approach was adopted. The questionnaires were distributed and collected by the researcher (see Table I).

Questionnaires were purposively distributed to a selected group of employees identified with the help of administrative officers from the senior-, middle-, and lower levels of management in administration. In selecting employees for participation, effort was made to include people from different hierarchical levels. The selected participants largely consisted of administrative employees and academic staff. A number of call backs to the respondents were made to ensure maximum retrieval of the questionnaires.

To minimize sampling errors, Krejcie and Morgan (1970) produced a table for determining sample size for any population of a defined (finite) size based on this confidence level that does not necessitate any computations to be carried out. Krejcie and Morgan (1970) stated that, using this table, as the population increases the sample size increases at a diminishing rate (plateau) and remains, eventually constant at slightly more than 380 cases. There is little to be gained to warrant the expense and the time limit to sample beyond 380 cases. Alreck and Settle (1995) provided similar evidence. However, Ntoumanis (2001) recommended a ratio of participants to independent variables for a multiple regression to be at least 5:1 and Field (2005) recommended a sample size of at least 200 participants for up to 20 predictors in order to obtain a medium effect. This study met all the conditions with a total of 474 questionnaires returned of which 447 were usable (50 per cent response rate).

Name of university	Age of university	Number of employees	Sample selected	Returned questionnaires
Kyambogo University	6	1,027	300	250
Makerere University	87	2,911	400	134
Mbarara University	20	686	100	40
Gulu University	7	166	100	50
Total		4,774	900	474

Table I.
Study population and sample size

Measures

This was a cross-sectional survey design using a quantitative approach to data collection and analysis. All the constructs were measured using a four-point Likert scale on a scale of (“1 = strongly disagree” to “4 = strongly agree”). The scale is practical and interesting, does not have a midpoint and in that sense forces a choice (Worthen *et al.*, 1999). The four point Likert scale was adopted in anticipation of respondents’ likelihood to score the midpoint. J.C. Munene (Personal communication, July 30, 2008) claimed that this was a common problem in Uganda.

Variable(s) of performance management practices included the agency relations and goal setting. Agency relations were measured using seven items adopted from an instrument developed by Martinez and Kennerley (2005).

For instance, each respondent was asked to indicate his/her opinions for items with an example: “Managers focus their attention on key objectives set by shareholders and regulators”.

Goal setting was measured using 11 items adopted from an instrument developed by Van de Walle (1997). An example of the item being: “I often prepare a work plan for effective performance”.

Information, communication and technology (ICT) adoption characteristics were measured using 20 items adopted from an instrument developed by Worrall (2005). For instance, a respondent was asked to indicate whether “ICT support staffs have a high level of technical competence”.

The variable managed performance that includes quality service, service delivery and cost reduction was measured. Quality service was measured using adopted items from an instrument developed by Hui *et al.* (2003) using 11 items. A respondent was asked to indicate his/her opinion on an item such as: “Employees in this institution have the knowledge to answer the stakeholders’ questions”.

Cost-reduction was measured using three adopted items from an instrument developed by Huang (2001). For instance, a respondent was asked to indicate whether: “Performance is monitored by a control system”.

Service delivery was measured using 11 adopted items from the instrument developed by Parasuraman *et al.* (1988), such as: “I perform the service right the first time”.

Control variables such as sex, marital status, age of respondent, university age, educational level, tenure and previous work experience were included in the analyses (Herrmann and Datta, 2005). University age showed significant results and so was included in further data analysis.

Data management and analysis

Missing values (maximum 2.5 per cent) were replaced using the series means approach in a statistical software package for social scientists (SPSS version 16). With the variance inflation factor at 1.00 and tolerance statistics all well above 0.90, indicated that there was no collinearity within the data showing that the items were distinct for the constructs under measurement (Field, 2005).

Factor analysis was conducted to indicate the extent to which items measure the distinct variables to establish the discriminant validity (Straub, 1989). Field (2005) citing Tabachnick and Fidell (2001) suggested that it is comforting to have at least 300 cases for factor analysis, which this study satisfied. All items that were cross loading

on other components with values exceeding 0.5 were not included in the analysis together with those values had values less than 0.5. McCarthy and Garavan (2007) argued that factor analysis is recognized as “a powerful and indispensable method of construct validation” that “is at the heart of the measurement of psychological constructs”, a major reason for having conducting a factor loading in this study. The zero-order Pearson correlation coefficient was used to examine the relationships between the study variables. Hierarchical regression analysis (HTA) examined the mediation and prediction power of the study variables.

Multiple regression analysis was used to examine the moderating effect and predictive powers of the study variables. Analysis of variance (ANOVA) was used to examine differences between groups for demographic factors and study variables. Using weighted least squares, mean values, and variances of each university on study variables were obtained. Path analysis was conducted to examine the total effect of the mediation variables on predictor variables and the Sobel's (1982) test was used to confirm mediation. All main variables exceeded the minimum reliability coefficient of 0.70 using the Cronbach Alpha.

Findings

The findings showed that of the respondents: 62 per cent were male; 38 per cent were female; 64 per cent had ages below 40 years and 36 per cent above; 66.2 per cent were married; 29.5 per cent were single; 2.2 per cent separated; 0.7 per cent divorced and 1.3 per cent widowed; 45 per cent had a second degree and above; 5.6 per cent had certificates; 13.4 per cent had diplomas; 35.6 per cent had a first degree; 36 per cent had worked in the universities for more than ten years and 64 per cent less; and 74 per cent had worked elsewhere before joining university service whereas 26 per cent had no working experience on joining university employment. The results revealed that the respondents scored high on goal setting ($M = 2.80$, $SD = 0.45$), ICT adoption ($M = 2.73$, $SD = 0.49$) and managed performance ($M = 2.69$, $SD = 0.52$) and low on agency relations ($M = 2.30$, $SD = 0.60$).

The results in Table II reveal that the dimensions that tested the agency relations in the model account for 41 percent.

Dimensions	Agency relations
The performance of university top leaders is regularly monitored	0.68
The compensation of university top leaders is according to their performance	0.60
Policies and procedures of the institution are clearly defined	0.68
The review of the of decisions taken by the university top leaders is done formally by committees or higher management	0.69
University top leaders' performance is regularly reported to all stakeholders	0.69
The reviews of the decisions taken by the university top leaders is comprehensively conducted	0.75
<i>Eigen values</i>	2.87
<i>Percent total variance</i>	40.96
<i>Cumulative percentage</i>	40.96

Note: One component had a loading less than 0.5 and was extracted

Table II.
Rotated component
matrix: agency relations

Dimensions	Indices		
	1 Performance attainment	2 Empowerment	3 Participation
I prefer to work on projects where I can prove my ability to others	0.84		
I enjoy work when others are aware of how well I am doing	0.79		
I prefer to work under conditions that require a high level of ability and talent	0.76		
I am willing to select a challenging work assignment	0.74		
In this institution employees set themselves challenging but achievable goals		0.83	
In this institution employees are committed to their goals		0.69	
In this institution employees believe in their own ability		0.67	
In this institution employees always receive feedback		0.57	
In this institution employees define goals for their own teams			0.77
In this institution employees praise themselves when they do well			0.66
In this institution employees are encouraged to set their own task goals			0.75
<i>Eigen values</i>	2.57	2.09	1.69
<i>Percentage total variance</i>	23.35	18.96	15.38
<i>Cumulative percentage</i>	23.35	42.31	57.70

Table III.
Rotated component
matrix: goal setting

The results in Table III reveal that 58 per cent of variance in goal setting is due to performance, empowerment and participation of which 23 per cent is due to performance attainment, 19 per cent is due to empowerment, and 15 per cent is due to participation.

The results in Table IV reveal that 58 per cent of variance in information and communication technology is due to collaboration, capacity building, information and communication technology (ICT) utilisation and technical competence, of which 25 per cent is due to collaboration, 18 per cent is due to technological accumulation, 8 per cent is due to ICT utilisation and 7 per cent is due to technical competence.

The results in Table V reveal that 57 per cent of variance in managed performance is due to service quality, service delivery and cost reduction, of which 30 per cent is due to service quality, 20 due to service delivery, and 7 per cent due to cost reduction.

Results

A number of statistical tests such as zero-order correlations and regression analysis were carried out to establish the nature of relationships that exist among the dependent and independent variables. In the process of doing so, a number of significant relationships were found. Those relationships uncovered the support and shed more

Dimensions	Indices			
	1 Collaboration	2 Capacity building	3 ICT utilisation	4 Technical competence
ICT support staff are easy to contact when they are needed by the user	0.78			
ICT staff respond quickly to remedy users' problems	0.75			
Good communication exists between those who support and those who use ICT	0.75			
There is high level participation in the planning of new systems and developments	0.68			
ICT support staff understand the users' business	0.67			
Proper training is provided to increase the ICT knowledge and skills base of the users	0.64			
In this institution users of ICT have a good working relationship with other employees	0.51			
The software is up to date		0.88		
The hardware is up to date		0.82		
Senior it management has visionary leadership in the exploitation of technology		0.63		
ICT professionals upgrade themselves continuously to avoid decay		0.57		
There is short lead time for the development of new information systems			0.78	
There is a low downtime in this institution			0.59	
ICT staff should have high level of technical competence				0.83
<i>Eigen values</i>	<i>5.04</i>	<i>3.55</i>	<i>1.52</i>	<i>1.42</i>
<i>Percentage total variance</i>	<i>25.20</i>	<i>17.77</i>	<i>7.61</i>	<i>7.12</i>
<i>Cumulative percentage</i>	<i>25.20</i>	<i>42.96</i>	<i>50.57</i>	<i>57.69</i>

Table IV.
Rotated component
matrix: information and
communication
technology

light on the antecedents of achieving managed performance at public universities. The correlation analyses unearth and describe the strength and direction of the linear relationship between the study variables.

Zero-order correlations shown in Table VI to interpret their size, Cohen *et al.* (2003) criteria was used that for small ($r > 0.10$), medium ($r > 0.30$), and large ($r > 0.50$) effect size.

H1. *Performance management practices have a positive relationship with information and communication technology adoption.*

The Pearson zero-order correlation results in Table VI showed that performance management practices had a positive significant relationship with ICT adoption

Dimensions	Indices		
	1 Service quality	2 Service delivery	3 Cost reduction
The physical facilities at this institution are visually appealing	0.79		
This institution has modern looking equipment	0.77		
This institution's departments provide their services at the time they promise to do so	0.74		
This institution's departments perform the service right first time	0.72		
This institution's departments insist on error-free records	0.72		
When this institution's staff promises to do something by a certain time, they do so	0.71		
Employees at this institution tell stakeholders exactly when services will be performed	0.68		
Employees in this institution's departments give prompt services to stakeholders	0.66		
When a stakeholder has a problem this institution's staff show a sincere interest in having it solved	0.65		
Employees at this institution appear professionally dressed	0.64		
This institution gives stakeholders individual attention		0.71	
Employees in this institution's departments understand the needs of their stakeholders		0.69	
This institution's departments have the stakeholders' best interests at heart		0.65	
Employees in this institution's departments have the knowledge to answer the stake holder's questions		0.60	
This institution has operating hours convenient to all their stakeholders		0.60	
Employees in this institution's departments are never too busy to respond to stakeholders' requests		0.59	
At this institution competitive power is maintained by cutting costs			0.83
At this institution performance is monitored by a cost control system			0.69
At this institution changes are set lower than those of our competitors			0.65
<i>Eigen values</i>	7.48	4.91	1.84
<i>Percentage total variance</i>	29.91	19.64	7.35
<i>Cumulative percentage</i>	29.91	49.54	56.89

Table V.
Rotated component matrix for managed performance

	Cronbach								
	alpha	M	SD	(1)	(2)	(3)	(4)	(5)	(6)
University age				1.00					
Agency relations	0.81	2.30	0.60	0.14**	1.00				
Goal setting	0.84	2.80	0.45	0.13**	0.18**	1.00			
Performance management	0.93	2.51	0.52	0.03	0.52**	0.28**	1.00		
ICT adoption.	0.91	2.73	0.49	0.18**	0.19**	0.10*	0.21**	1.00	
Managed performance	0.97	2.69	0.52	-0.08*	0.17**	0.09*	0.24**	0.20**	1.00

Notes: * $p < 0.05$; ** $p < 0.01$; $n = 447$

Table VI.
Zero order correlations: demographic factors, agency relations, goal setting and managed performance

Steps	Variable	Constant	B -stand.	β -unstand.	p -val.	t	Stand. error.	R^2	ΔR^2	F	Tol.	VIF
1	Dependent = ICT adoption Independent variable = performance management practices	2.25	0.21*	0.19*	0.00	4.10*	0.04	0.04	0.04	16.77*	1.00	1.00
2	Dependent variable = managed performance Independent variable = performance management practices	2.09	0.24*	0.24*	0.00	5.14*	0.05	0.06	0.06	49.52*	1.00	1.00
3	Dependent variable = Managed performance Independent variable = ICT adoption Independent variable = performance management practices	1.70	0.16* 0.20*	0.17* 0.20*	0.00 0.00	3.48* 4.38*	0.05 0.05	0.08 0.08	0.08	19.60* 19.60*	0.96 0.96	1.04 1.04
4	Dependent = managed performance Independent variable = ICT adoption	2.09	0.20*	0.22*	0.00	4.38	0.05	0.04	0.04	19.19*	1.00	1.00

Notes: * $p < 0.01$; $n = 447$

Table VII.
Multiple regression analysis of the major constructs

($r = 0.21, p = 0.00$). The regression analysis in Table VII also indicated that 4 per cent of variance in ICT adoption is attributable to performance management practices, $R^2 = 0.04, [F(1, 445) = 16.77, p = 0.00]$. This supports *H1*.

H2. Information and communication technology adoption has a positive relationship with managed performance.

According to the Pearson zero-order correlation results in Table VI, ICT adoption had a positive significant relationship with managed performance ($r = 0.20, p = 0.00$).

The regression analysis results in Table VII also revealed that 4 per cent of variance in managed performance could be explained by ICT adoption, $R^2 = 0.04, [F(1, 445) = 19.19, p = 0.00]$. This supported *H2*.

H3. Performance managed practices have a positive relationship with managed performance.

The Pearson zero-order correlations in Table VI, revealed a positive significant relationship between performance management practices with managed performance ($r = 0.24, p = 0.00$). The regression analysis results in Table VII also indicated that 6 per cent of the variance in managed performance was attributable to performance management practices, $R^2 = 0.06, [F(1, 445) = 49.52, p = 0.00]$. This supported the suggested *H3* that there is a positive relationship between performance management practices and managed performance.

The hierarchical multiple regression analysis (see Table VIII) was carried to further explore the true nature of the relationships basing on the stated hypotheses. In so doing, there was hope that better prediction of the factors that influence the achievement of successful managed performance would be obtained. In the first model, the university age that was controlled for accounted for 1.0 per cent of variance in managed performance.

In the second model, adding the second block of performance management practice variables (agency relations and goal setting) resulted in 4.4 per cent of variance in managed performance with 3.8 of variance accounted for by components of performance management practices, $F(3, 443) = 6.825, p = 0.00$.

Predictor variable	Model 1 β	Model 2 β	Model 3 β
Constant	2.745**	2.188**	1.729**
University age	-0.03	-0.046*	-0.058**
Agency relations		0.151**	0.124**
Goal setting		0.082	0.070
ICT adoption			0.211**
R^2	0.006	0.044	0.080
R^2 (adj.)	0.004	0.038	0.072
ΔR^2	0.006	0.036	0.036
F	$F(1,445) = 2.873$	$F(3, 443) = 6.825^{**}$	$F(4,442) = 9.657^{**}$
ΔF	2.873	8.748**	17.401**

Notes: * $p < 0.05$; ** $p < 0.01$; $n = 447$

Table VIII.
Hierarchical regression analysis (dependent variable: managed performance)

The third and overall model indicated that entering information and communication technology adoption, $F(4, 442) = 9.657, p = 0.00$, provided the best model fit contributing 3.6 per cent to the total predictive power of 8.0 per cent of variance in managed performance. The findings supported the hypothesis (*H1* and *H2*).

Also, information and communication technology (ICT) adoption was found to have predictive qualities ($\beta = 0.17, p = 0.00$) using Baron and Kenny's (1986) approach in Table VII to establish mediation. This result compared to the zero-order coefficient ($r = 0.20, p = 0.00$) suggested a partial mediation influence of ICT adoption on performance management practices and managed performance.

The path analysis results showed that for: performance management practices, ICT adoption and managed performance path, the total effect was 0.280, Sobel test confirmed the partial mediation ($t = 3.12, p = 0.00$); Agency relations, ICT adoption and managed performance path, the total effect was 0.182, Sobel test confirmed the partial mediation ($t = 2.964, p = 0.00$); and goal setting, ICT adoption and managed performance path, the total effect was 0.131, Sobel test confirmed the partial mediation ($t = 2.330, p = 0.01$).

Discussions and conclusions

The aim of this study was to demonstrate the need for managers of public universities to pay attention to performance management practices, information and communication technology in order to achieve successful managed performance. Three hypotheses were derived from the literature review, tested and confirmed.

H1 stated that performance management practices that were vested in the agency and goal setting theories have a positive relationship with information and communication technology adoption was tested and confirmed. In support of the finding, Pedro (2001) argued that the parameters of investment in ICTs must be gradually changed because teachers' computers are now both research and teaching tools, and as such essential tools to be financed.

Also, previous studies show that information and communication technology adoption require concerted efforts of the managers from the strategic decisions they make in aligning the business strategy and human resources by instilling pride in employees and acting as role models in bringing about organisational behaviour (Ulrich *et al.*, 2007). This means that managers of public universities have to ensure result-oriented relationships with employees by investing in ICT technology. Total commitment to ICT development, implementation and sustainability by top management of public universities is an imperative in order to meet the dynamic environmental educational demands. Development partners, alumni, students and other stakeholders could be involved in all activities of university, for instance, in curriculum design through use of ICT.

H2 stated that information and communication technology has a positive relationship with managed performance. This was tested and confirmed. The findings were supported by Lewis *et al.* (2005) who established the importance of information and communication technology (ICT) on both organisational and teaching and learning issues in five Australian Universities. Tusubira *et al.* (2009) asserted that e-learning is the entire learning that public universities should undertake. Brennan *et al.* (1999) argued that any university that teaches using technology has to recreate itself continually. According to Attaran and Attaran (2002) with use of ICT technology

public universities should be capable of: information retrieval and utilisation; communication and data transmission; distribution of services, particularly the badly needed outreach programmes in Uganda; and other institutional transactions. However, there is need for an increased bandwidth, which is still problematic in developing countries and Uganda in particular.

H3 stated that performance management practices have a positive relationship with managed performance. In support of these findings, Thornhill and Saunders (1996) argued that high quality provisions and the need to reduce unit costs yet improve productivity in higher education is a must. Yet, public universities were still striving to come up with a unit cost per student agreeable to all stakeholders without endangering university education access and quality of services (Kasozi, 2005). According to Varcoe, 1995 cited in Amaratunga and Baldry (2000), operating costs keep going up and the user expectations increasing in educational settings. Tsubira *et al.* (2009) cited the case of Makerere University where the ratio of academic and research staff to administrative and support staff highly exceeded that of other countries. This increased staff in an efficient environment reduced productivity and efficiency, calling for even more staff (Tsubira *et al.*, 2009). Such inefficiencies existed in older universities, which were also larger in size. The results support Verbeeten's (2008) findings that large organisations appear to have more difficulty in defining clear and measurable goals and are less likely to use incentives and have lower quality performance. In this study, young universities had better agency relations and generally managed performance better than the older ones. The knowledge contribution of this study is that the theories agency and goal setting converge into performance management practices to explain and provide information on how to attain managed performance (quality services, service delivery and cost reduction).

However, all public universities involved employees in goal setting as established from the strategic plans but the theory had a weak prediction of performance. This required universities to have competent, committed and motivated workforce using a number of human resource and quality initiatives (Thornhill and Saunders, 1996), which most these public universities lacked. Consequently, student demonstrations against poor quality services were common phenomena at public university campuses (Businge, 2009). Other findings included establishment of a mediation effect of Information and communication technology adoption on performance management practices and managed performance.

Limitations and future research

This was a cross-sectional survey using quantitative approach, by its nature precludes cause-effect relationships being uncovered (Schauffeli *et al.*, 2008). The study relied on self-report measures, so common method biases could affect the magnitudes of bivariate correlations between the variables. There is need for complementary longitudinal studies as an intervention. Attempts to minimize common method biases included collecting data from the different strata of each public university, which geographically in different parts of Uganda and the questionnaires were distributed and collected at different times. Furthermore, this study dwelled on quantitative approach, failing to tap salient issues from the respondents. Using different methodological approaches (Kozlowski and Klein, 2000), particularly blending both qualitative and quantitative approaches for more enriching results is necessary.

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