

## **Organisational structure and knowledge sharing in public research institutes: experiences from a developing country**

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### **Abstract**

Knowledge is one of the most important strategic resources of the 21<sup>st</sup> century and has received considerable attention in management literature. Previous research has strongly established the role of knowledge sharing in improvement of the quality of service delivery in organisations. Public research institutes being knowledge intensive organisations have an important role to play as the country seeks to transform from an agrarian economy to a Knowledge economy by year 2030. Despite the fact that these organisations have created substantial knowledge over the years, little has been shared with their stakeholders. This study investigated the effect of organisational structure on knowledge sharing among public research institutes in Kenya. The determinants under study were; adherence to organisational regulations, ease of access to information within the organisation, approvals of every action, competence based promotions and top management support. The study employed exploratory survey research design to investigate each of the identified determinants. The study targeted four out of six public research institutes and collected data from managers of research programmes and projects. A census of all the fifty one (51) managers was undertaken with a response rate of 72.5% which was considered adequate for the investigation. Primary data was collected using structured closed ended questionnaires which were delivered to the respondents and picked after completion. To analyse the data, descriptive and inferential statistics were employed. Pearson's Product Moment Correlation was used to determine the relationships among variables while the multiple regression analysis was used to determine the predictive power of the model. The investigation revealed a strong positive relationship between access to information and organisational structure (0.736) with a p-value of 0.023, significant at  $p=0.05$ . The other three independent variables namely regulations and procedures, approvals, competence recognition and top management support were insignificant ( $p>0.05$ ). Overall organisational structure determinants studied contributed 46.7% to knowledge sharing in these organisations suggesting that other factors are responsible for knowledge sharing. Of the four, only access to information was found to be a significant organisational structure determinant contributor at 73.6% to knowledge sharing while the rest were insignificant. The study recommends that public research institutes should put in place appropriate organisational structure and policies to enhance access of information to all.

**Key words:** organisational structure, knowledge sharing, research institutes, developing country, Kenya

### **1. Introduction**

Knowledge and innovation are important in the development of society. Leading economists and business theorists have pointed to knowledge as the ultimate competitive advantage for the modern organisations (Maen and Basher, 2007). The creation, management and sharing of

knowledge are today a top agenda for most organisations. This has been attributed to the perceived benefits of knowledge management that include cost reduction, creativity and innovation, efficiency, quality performance, staff competencies, and reputation (Wai, Chai, & Songip, 2010).

Organisational knowledge management strategy is influenced by the creation of knowledge assets and knowledge transfer. The contrast between government and corporations is that the government seeks to transfer research knowledge from public agencies to everybody, whereas the corporation seeks to protect the knowledge with the exception of carefully selected recipients (Kremic, 2003). A knowledge organisation focuses on developing interpersonal, structural, and network relationships in order to achieve effective knowledge sharing and to further generate new knowledge or capabilities for organisational competitiveness and success (Yang and Chen, 2007).

The government of Kenya established public research institutes to undertake research and development in specified fields. Kenya Industrial Research and Development Institute (KIRDI), Kenya Medical Research Institute (KEMRI), Kenya Forestry Research Institute (KEFRI), Kenya Marine and Fisheries Research Institute (KEMFRI), and Kenya Agricultural Research Institute (KARI) were established under the Science and Technology Act (GoK, 1980) while Kenya Institute for Public Policy Research and Analysis (KIPPRA) currently operates under the KIPPRA Act No. 15 of 2006. KIRDI has a mandate to undertake research and development in industrial and allied technologies while KEMRI is responsible for carrying out health research. KEFRI was established in 1986 through an amendment of the Science and Technology Act (Chapter 250) to carry out research in forestry and allied natural resources. KMFRI was established to conduct aquatic research covering all the Kenyan waters and the corresponding riparian areas while KARI has a mandate to undertake research and development in agriculture within the country. The Kenya Institute for Public Policy Research and Analysis (KIPPRA) was established in 1997 to provide objective public policy advice to the Government of Kenya, and other stakeholders, in order to

contribute to the achievement of national development goals.

Organisational structure refers to the formalised arrangement of interaction between and responsibility for the tasks, people, and resources in an organisation. It is most often seen as a pyramidal chart, with positions or titles and roles in a cascading fashion (Pearce II & Robinson, 2011). Structures incorporate a network of roles and relationships and are there to help in the process of ensuring that collective effort is explicitly organised to achieve specified ends. The structure indicates who is accountable for directing, coordinating and carrying out these activities while defining management hierarchies (Armstrong, 2009).

There are basically five types of organisational structure, and these are simple, functional, divisional, matrix and product organisational structures. A simple organisational structure is one in which there is an owner and a few employees and where the arrangement of tasks, responsibilities, and communication is highly informal and is accomplished through direct supervision (Pearce II and Robinson, 2011). A functional organisational structure is one in which the tasks, people, and technologies necessary to do the work of a business are divided into separate groups (such as marketing, operations, finance) with formal procedures for coordinating and integrating their activities to provide the business's products and services. A divisional structure is one that has a set of relatively autonomous, or divisions, governed by a central corporate office but where each operating division has its own functional specialists who provide products or services different from those of other divisions. A matrix organisation is a structure in which functional and staff personnel are assigned to both a basic functional area and to a project or product manager (Armstrong, 2009; Cole, 2004; Pearce II and Robinson, 2011). A product organisation structure is one that assigns

functional managers and specialists to a new product, process or project team that is empowered to make decisions about their product (Cole, 2004; Pearce II and Robinson, 2011).

Organisational structure together with policies and procedures within the organisation has been shown to influence of communication flows which has a direct bearing on knowledge sharing. Document confidentiality status is likely to negatively affect the extent of knowledge sharing because certain items and information are restricted to certain levels of employees restricts information flow and so does the establishment of permitted communication channels within the organisation (Syed-Ikhsan & Rowland, 2004, Jacobson, Butterill & Goering, 2004). Free communication flows between all project participants, and proper documentation, procedures and regulations can help create and share knowledge. On the other hand, existence of more hierarchies and restrictions on access to knowledge in an organisation will most likely affect knowledge transfer (Gopalakrishnan & Santoro, 2004). Top management support was found to be effective for employee willingness to both donate and collect knowledge with colleagues but organisation rewards was not when studying knowledge sharing and firm innovation capability of several organisations (Lin, 2007). Reward, compensation, promotion, and prizes are among the incentive schemes which can encourage individuals to contribute their professional knowledge to the organisation (Yang & Chen, 2007).

It has been suggested that organisations should create opportunities for employee interactions to occur and employee's rank, position in the organisational hierarchy, and seniority should be de-emphasised to facilitate knowledge sharing (Wang & Noe, 2010). Three variables that have been previously used to study the organisational structure dimension are centralisation,

formalisation and performance-based reward system (Kim & Lee, 2006). However, having clearly established objectives, both at the individual and corporate level, guides what knowledge is shared and created toward achieving organizational goals (Magnier-Watanabe *et. al.*, 2011).

Research institutes in Kenya play critical repository role of critical knowledge generated over the years both by local and external scientists or collaborative research work. Yet this knowledge is rarely shared with other research institutes in the country or even within the organisation's departments. This practice inhibits dissemination of research findings and may lead to duplication of research studies and wastage of resources. This study therefore sought to establish the influence of Organisational structure on knowledge sharing in public research institutes in Kenya, a developing country.

## **2. Methodology**

The study employed a descriptive survey research design to investigate each of organisational factors that affect knowledge sharing in public research institutes. An explanatory study goes beyond description and attempts to explain the reasons for the phenomenon that the descriptive study only observed (Cooper and Schindler, 2008). The target population was managers of research programmes and knowledge management and related activities in four public research institutes in Kenya. A census of the managers in charge of research programmes and other knowledge management related functions was carried out. This is because of the relatively low number of institutions and target respondents. The total number of research programmes and knowledge management related programmes was 51.

Primary data was collected using structured closed ended Likert-type questionnaires which was delivered to the respondents and picked after completion.

The questionnaire was made up of two sections. Section one was used to collect information on the respondent's profile. Section two was used to collect information on the on knowledge sharing measures, and items of organisational structure, organisational culture, information technology and organisational resources. The questionnaire was pretested among selected respondent's who were encouraged to critique the instrument. Appropriate amendments were then undertaken before the questionnaire is presented to the population.

The questionnaires were checked for completeness. After which they were coded using the Statistical Package for Social Scientists (SPSS). Quantitative data analysis techniques were used. Descriptive statistics such as mean, standard deviation, percentages and frequencies was used to explain the variable statistics. The inferential test statistics that was used is Pearson's Product Moment Correlation and general linear regression. Pearson Product-Moment Correlation is one of the measures of correlation between variables which quantifies the strength as well as direction of such relationship. It is usually denoted by Greek letter  $\rho$ . The linear regression was used to model the relationship between two variables by fitting a linear equation to observed data and hypothesis testing (Cooper and Schindler, 2008). The SPSS software was used to quantitatively analyse the data to generate percentages and frequency tables.

Correlation analysis was used to establish relationships between variables. Multiple regressions were used to estimate the predictive effects of independent variables on knowledge sharing. Knowledge sharing is a function of specific determinants (X) formulated in the following equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6$$

Where

Y – Organisation Structure

$\beta$  – Regression coefficient, where  $\beta_0$  is the intercept

$X_1$  – Regulations and Procedures

$X_2$  – Ease of Access to Information from other units

$X_3$  – Approval of each action

$X_4$  – Competence based promotions

$X_5$  – Top management support

The study was based on self-report data incurring the possibility of respondent bias which includes social desirability effect. To counter this, respondents were guaranteed confidentiality of the data obtained and presented a letter from the university indicating that the data and information obtained will be for academic purpose only. The respondent's profile considered for the study included designation, number of years they had served in the organisation, gender, age and highest academic qualification attained. A total of 37 completed questionnaires out of the 51 questionnaires were obtained from the respondents for the study. This represented 72.5 % response rate which the study considered adequate for the analysis. The survey was undertaken between 15<sup>th</sup> August and 6<sup>th</sup> September, 2011.

The respondents were to indicate their designations after which their level of management was deduced based on the organisational structure. Those directly reporting to the managing director/ chief executive officer were classified as 'senior managers' while those that were in charge of sections or relatively units and fewer personnel within the organisation were classified as 'Supervisors'. Heads of programmes, divisions or departments within the organisations are classified as 'Managers'.

### 3. Findings/Results

#### Descriptive statistics on Organisational Structure and Knowledge Sharing

Constructs	Minimum	Maximum	Mean	Standard Deviation
Tasks are undertaken according to laid down organisational regulations and procedures	2	5	3.51	1.017
Easy to access information, documents, publications held by other divisions or departments within the institute	1	5	3.32	1.029
Each action does not requires approval by the supervisor	1	5	2.84	1.191
Employee promotions are based on competencies and performance	1	5	2.68	1.082
Top management supports	1	5	3.16	.928

From the results, the respondents were, to some extent, of the view that Tasks are undertaken according to laid down organisational regulations and procedures (3.51 out of a possible 5). This was expected since the organisations are public bodies that were established to undertake a particular function and hence adopted a functional organisational structure that operated through departmentalisation of the organisation. The respondents were neutral as regards to access to information held by other divisions (3.32) and each action not requiring approval by the supervisor (2.84). However, since the respondents are managers it would be expected that they should be in a position to make decisions without having to seek approvals as this would negatively affect knowledge sharing. Similarly, access to information should be easy for those in these responsible positions. This may be because given their positions as managers they may sometimes have access to data and information from other divisions.

#### **Correlation and Regression Analysis**

Correlation analysis was used to establish relationships between variables and multiple regression analysis was used to

estimate the predictive effects of organisational determinants on knowledge sharing.

Pearson's product moment correlation analysis was used to infer the relationship among variables. This method was chosen because of the measurement scale used in the questionnaire. From the survey results, the correlation coefficient,  $r \neq 0$  thus the independent variables ( $X_i$ ) are related to the dependent variable ( $Y$ ). The probable reason for this is that the independent variables under study affect communication within organisations. It is clear in the results that all the variables are positively correlated to each other. Organisational structure and access to internal information have a strong correlation (0.674,  $p < 0.01$ ) followed by the correlation between organisational structure and adherence to organisational regulations (0.621). The correlation between the organisational structure and competence recognition was moderately strong at 0.521. The other correlations between independent variables were varied (0.1-0.6). A detailed correlation of the variables is presented in table 1.

**Table 1 Pear son Correlation of Study Variables**

Correlations						
	Organisational Structure	Adherence to organisational regulations	Access to internal information	Approvals of every action	Competence Recognition	Top management support
Organisational Structure	1					
Regulations and procedures	.621**	1				
Access to information	.674**	.580**	1			
Approvals	-.168	-.250	-.251	1		
Competence Recognition	.521**	.585**	.571**	.131	1	
Top management support	.446**	.380*	.525**	.175	.635**	1

\*\* . Correlation is significant at the 0.01 level (2 -tailed).

\* . Correlation is significant at the 0.05 level (2 -tailed).

**Table 2 Regression Coefficients <sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.807	.716		1.127	.268
	Regulations and procedures X <sub>1</sub>	.329	.173	.322	1.902	.067
	Access to information X <sub>2</sub>	.428	.178	.424	2.401	.023
	Approvals X <sub>3</sub>	.001	.126	.001	.006	.995
	Competence recognition X <sub>4</sub>	.043	.183	.045	.236	.815
	Top management support X <sub>5</sub>	.080	.188	.072	.425	.673

a. Dependent Variable: Organisational Structure

**Regression analysis**

Correlation analysis was used to establish relationships between variables. Multiple regressions were used to estimate the predictive effects of independent variables on knowledge sharing. Knowledge sharing is a function of specific determinants (X) formulated in the following equation:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$$

Where

Y – Organisation Structure

$\beta$  – Regression coefficient, where  $\beta_0$  is the intercept

X<sub>1</sub> – Regulations and Procedures

X<sub>2</sub> – Access to information

X<sub>3</sub> – Approvals

X<sub>4</sub> – Competence based promotions

X<sub>5</sub> – Top management support

A multivariate regression model was applied to determine the relative importance of each of the four independent variables with respect to organisational structure and knowledge sharing. The regression model was as follows:  $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5$   
Using the values of the coefficients ( $\beta$ ) from regression coefficient table, the established multiple linear regression equation takes the form of:

$$Y = 0.807 + 0.322X_1 + 0.424X_2 + 0.001X_3 + 0.045X_4 + 0.072X_5$$

Where:

Y - Organisation Structure

Constant = 0.807, when the value of independent variables are zero, organisational structure would take the value 0.807.

$X_1 = 0.322$ ; one unit increases in Organisational regulations and procedures results in 0.322 units increase in organisational structure

$X_2 = 0.424$ ; one unit increases in access to information results in 0.424 units increase in organisational structure

$X_3 = 0.001$ ; one unit increase in approvals results in 0.001 units increase in organisational structure

$X_4 = 0.045$ ; one unit increase in competence recognition results in 0.045

increase in organisational structure

$X_5 = 0.072$ ; one unit increase in top management support results in 0.072 increase in organisational structure

Ranking the predictor variables in terms of their individual influence on organisational structure table 2 shows the relative importance of each of the predictions. The results of this study show that the coefficient of access to internal information is statistically significant ( $p < 0.05$ ) at 95% confidence limit while the other predictors are not statistically significant. This is because they all have their p values greater than 0.05 with adherence to regulations and procedures ( $p 0.067$ ), approvals ( $p 0.995$ ), competence based promotions ( $p 0.815$ ) and top management support ( $p 0.673$ ).

**Table 2 Model Summary**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.736 <sup>a</sup>	.541	.467	.758

a. Predictors: (Constant), Top management support, Approval s, Regulations and procedures, Access to information, Competence recognition

The results as shown in table 2 indicates that the coefficient of regression,  $R=0.736$  shows a strong positive linear relationship between independent variables and the dependent variable. The coefficient of determination  $R^2=0.541$  shows the predictive power of the model and in this case 54.1% of variations in organizational structure performance in public research

institutes is explained by the independent variables. The adjusted coefficient of determination  $R^2$  shows the predictive power when adjusted for degrees of freedom and sample size. In this case, after the adjustments 46.7% of the variations in organizational structure in public research institutes are explained by independent variables.

**Table3 ANOVA<sup>b</sup>**

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	21.005	5	4.201	7.314	.000 <sup>a</sup>
Residual	17.805	31	.574		
Total	38.811	36			

a. Predictors: (Constant), Top management support, Approval s, Regulations and procedures, Access to information, Competence recognition

b. Dependent Variable: Knowledge sharing

ANOVA findings as explained by P- value of 0.000 which is less than 0.05 (significance level of 5%) confirms the existence of correlation between independent and dependent variables. The model shows the model fitness i.e. how well

the variables fit the regression model. From the results, the F-ratio of 7.314 and the significance of 0.000 shows there is not much difference in means between dependent and independent variables. The sum of squares gives the model fit and hence the variables fit the regression model.

#### **4. Discussion**

What determines an effective knowledge sharing within and outside an organization? Scholars have examined this question from different viewpoints, focusing on the problem of transferring tacit and complex knowledge across organization subunits (Kalerwa, 2011; Zander & Kogut, 1995), the nature of informal relationships between two parties to a transfer (Gupta & Govindarajan, 2000; Reagans & McEvily, 2003;), and the problem of searching for knowledge (Ancona & Caldwell, 1992). This growing body of literature has shed much light on the various problems underlying knowledge transfer in and within organizations.

The main hypothesis in this study postulated that the structure of the organisation has no significant effect on knowledge sharing in public research institutes. The study results showed that there existed a positive relationship between organisational structure and knowledge sharing that was statistically significant ( $\beta=0.712$ ,  $p<0.001$ ). These observations are consistent with previous studies on knowledge sharing in public sector organisations which suggested that found the most appropriate organization design consists of coordination that is not solely based on formal systems but also more on lateral coordination (Willem & Buelens, 2007). It has also been argued that knowledge sharing prospers with structures that support ease of information flow with fewer boundaries between divisions (Syed-Ikhsan & Rowland, 2004).

The results of this study affirms the crucial role played by the structure of organizations in knowledge sharing. Since organizations are headed by chief executives, it can therefore be argued that the role of the organizational head is crucial in propelling knowledge sharing within or outside the organizations. Furthermore, the organization structure should be networked to provide opportunities for employees to interact and communicate with others, and

support knowledge- related actions. (Kerka,1995). This is important because Knowledge Management defines a systematic, explicit and deliberated building processes required to manage knowledge, the purpose of which is to maximize an enterprise's knowledge-related effectiveness and create values (Bixler, &Stankosky, 2005).

Cross, Parker, Prusak, & Borgatti (2001) proposed mapping knowledge flows across the various boundaries in an organization to yield critical insights into where management should target efforts to promote collaboration in knowledge sharing. Some relational qualities were found to promote effective knowledge sharing. Knowing what someone else knows (knowledge) is a precursor to seeking out a specific person when faced with a problem for which a solution is needed. However, knowing to whom to turn is only useful if one can gain access to that person in a timely manner. Access is influenced by the closeness of one's relationship as well as physical proximity, organizational design and use of collaborative technology. Once access is made available, knowledge can only be shared if the expert understands the problem as experienced by the person seeking assistance (engagement). At this point, the expert can shape his or her knowledge to help solve the problem at hand. Finally, the safety of the person seeking knowledge is of utmost concern. Being able to admit a lack of knowledge and seek out assistance results in creativity and learning. Cross et al. (2001) found it particularly important to identify points of knowledge creation and sharing that held strategic relevance. Example domains that might yield this sort of benefit included: senior management networks, collaborative initiatives, joint ventures and alliances and communities of practice. Again, it can be observed here that senior management networks plays a critical role in knowledge sharing.

#### **5. Conclusions**

Public research institutes in Kenya are



expected to play a crucial Science Technology and Innovation (ST&I) role as the country strives to transform to a knowledge based economy by year 2030. This study aimed to investigate the influence of organisational structure on knowledge sharing within and among public research institutes in Kenya. The determinants under study were adherence to organisational regulations, ease of access to information within the organisation, approvals of every action, competence based promotions and top management support to knowledge sharing. The study found that access to and sharing of

information is significantly influenced by organisational structure.

## **6. Recommendation**

Based on the findings of this study, it is recommended that organisations should develop organisational policies that are supportive to knowledge sharing within and among research institutes in Kenya for faster realisation of Vision 2030.

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