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AUTHORS

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Knowledge management in Technological Innovation: Correlate of Job Performance of Non-teaching Staff at the Federal Polytechnic, Ilaro, Nigeria

By
Charlotte Bose Iro-Idoro, PhD
And
Tajudeen, Adisa Jimoh
Department of Office Technology and Management
The Federal Polytechnic, Ilaro, Nigeria.

Abstract

This study examined the need for knowledge management in technological innovation in facilitating the job performance of non-teaching staff in Nigerian Polytechnics. It investigated the importance of two components of knowledge management - transfer and application of knowledge in technological innovation and how these enhance efficiency and effectiveness of non-teaching staff in Federal Polytechnic, Ilaro. The study adopted the survey design with the use of questionnaire. The population comprised senior non-teaching staff of the Federal Polytechnic, Ilaro Ogun State out of which 100 were randomly selected as sample. Data collected were analysed with frequency counts and percentage while the hypotheses were tested at 0.05 level of significance using regression analysis. It was found that components of knowledge management examined were positively correlated with the efficiency and effectiveness of the non-teaching staff and that good knowledge management practice in technological innovation will enhance the job performance of this category of staff. The authors recommend, among others, that the institution under study and other learning organisations should expand their knowledge management practices in new innovation about work methods, procedures and tools with a view to enhancing the performance of non-teaching staff especially in serve quality and delivery.

Keywords: Knowledge Management, Technological Innovation, Job Performance, Non-teaching staff.

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Background to the Study

In today's era of knowledge society and knowledge economy, institutions of higher learning play major roles in creating and disseminating knowledge within their organisations and to the wider society. Traditionally, institutions of higher learning have been sites of knowledge production, storage, dissemination and authorisation. Consequently, knowledge management is a key issue in institutions of higher learning due to changes in the knowledge culture.

In discharging their core responsibilities of research and learning, higher educational institutions take considerable interest in knowledge management and are changing their role to respond to the dictates of a knowledge-based society, increased external pressure, and taking advantage of the emerging Information and Communication Technologies (ICTs) to manage and share knowledge.

Polytechnics, like other institutions of higher learning need good mechanism and culture to retain, develop, organise, and utilise their capabilities in order to remain at the forefront and have an edge over competitors. Knowledge and the management of knowledge are regarded as important features for these and organisational survival (Omotayo, 2015).

Many people simply do not think in terms of managing knowledge, but they all do it. The average person is a personal store of knowledge with training, experiences, and informal networks of friends and colleagues, whom they seek out when they want to solve a problem or explore an opportunity. Essentially, people get things done and succeed by knowing an answer or knowing someone who does (Laal, 2010).

Knowledge Management (KM) is a process where organizations have formulated ways in the attempt to recognize and archive knowledge assets within the organization that are derived from the employees of various departments or faculties and in some cases, even from other organizations that share the similar area of interests or specialization (Firestone, 2001). It is also viewed as the process of transforming information and intellectual assets into persisting value. It connects people with the knowledge that they need to take

action, when they need it (Kidwell, Vander, and Johnson, 2000). It is specifically concerned with making the right knowledge available to the right processor such as human or computer, at the right time in the right presentations and at the right cost (Aranganathan & Lakshmi, 2010).

Proponents of a knowledge-based approach to organisational performance argue that the primary purpose of a firm is to create and apply knowledge **(Cania and Korsita, 2015)**. With this approach, organizations consider knowledge as a strategic lever for the competitive advantage and their success seems to depend increasingly on the ability to assess, manage and develop their own knowledge as well as to acquire new knowledge (Davenport and Prusak, 1998).

Knowledge, according to Davenport and Prusak (1998), is a fluid mix of framed experience, values, contextual information, expert insight and grounded intuition that provides an environment and framework for evaluating and incorporating new experiences and information. It originates and is applied in the mind of knower. Fassehi (2013) therefore sees knowledge management as a systematic and organised attempt, and a bundle of principles, models, approaches, techniques, and tools that allows businesses to develop and exploit knowledge.

Davenport and Prusak (1998) identified the following five processes as constituting knowledge management:

- Understanding knowledge requirements; searching for knowledge from different sources; finding existing knowledge; and fusing it;
- Creating new knowledge;-
  Integrating knowledge created externally;
- Applying existing knowledge; and
- Re-using knowledge. In their submission, Gamble and Blackwell (2001) posited that knowledge management practices rests on four fundamental elements which are knowledge creation, Knowledge acquisition (both internally and externally), knowledge sharing or transfer and knowledge use and reuse. However, this study examines three of the elements or component factors of knowledge management acquisition, transfer and application in relation to technology innovations.

According to Nwaiwu & Imafidon (2017), *knowledge acquisition* encompasses the development and creation of knowledge. It entails the ability to conceive ideas and solve problems. Knowledge acquisition is clearly the most important aspect of knowledge management, because it is concerned with the development of

skills, new technology, better ideas and more efficient processes. *Knowledge transfer* is sometimes taken to be synonymous with knowledge sharing, (Iro-Idoro & Jimoh, 2018). Knowledge transfer means the distribution of knowledge from individual to individual and from team to team, within an institution. Individuals transfer knowledge to their counterparts by means of exchanging ideas, thoughts, beliefs, knowledge and experiences with them while contributing to task execution in teamwork, or informally, through conversations with them. The transfer of knowledge at individual level occurs when an individual is willing to assist, as well as to learn from, others in the development of new skills and competencies. *Knowledge application*, according to King, Chung and Haney (2008) in Nwaiwu and Imafidon (2017), is accomplished in various different ways, including elaboration, thoroughness (facilitation), innovativeness and collaborative problem-solving. Knowledge can also be applied in the development of new products, research and development, and in the improvement of processes and procedures.

There are two kinds of knowledge. One is explicit knowledge, which can be expressed in words and numbers and shared in the form of data, scientific formulae, product specifications, manuals, universal principles, and so forth. This kind of knowledge can be readily transmitted across individuals formally and systematically. Tacit knowledge is highly personal and hard to formalize, making it difficult to communicate or share with others. Subjective insights, intuitions and hunches fall into this category of knowledge. Furthermore, tacit knowledge is deeply rooted in an individual's action and experience, as well as in the ideals, values or emotions an individual embraces (Laal, 2010).

Twenty-first century learning organisation is characterized by different forms of technological innovation and organisations depend heavily on knowledge acquisition and application in technological development. According to Lu, Wang and Mao (2007), technological innovations are complex organisational activities and to date no widely accepted management method has been designed for managing knowledge in this regard, yet knowledge management in technology innovations is become an increasingly important source of added value for organisations.

According to Tidd, Bessant, & Pavitt (2001), innovation consists of two dimensions, namely, *change* and *degree*. The first dimension is particularly on technological change. The technological change can take two forms: changes in the product or services, which an organisation offers, and changes in the way these products or services are created and delivered. Second dimension of change is the degree of novelty involved. There are various degrees of novelty,

running from minor, incremental improvements right through to radical changes, which transform attitudes. Technology is conceived as designs for instrumental action that reduce uncertainty in the cause effect relationships involved in achieving a desired outcome.

Technologies generally consist of two components a hardware aspect, consisting of the tool that is the material embodiment of the technology and a software aspect, comprising the information base required to use the tool (Lu, Wang & Mao, 2007). Hence, capabilities in the use of technology is a set of functional abilities, reflected in firm performance using various technological activities and whose ultimate purpose is firm-level value management. Yam et al (2004) argue that successful technological innovation depends not only on technological capability, but also on other critical learning activities like knowledge management.

The foregoing suggest that technological know-how constitutes the competitive advantage of many modern organisations and most firms wish to maintain control over how their know-how is used, and they can efficiently control and manage their technology via an excellent knowledge management system.

Polytechnics like other organisation in the education sector have different occupational groups. Academic organizations of higher education comprises and serve a great number of individuals from diverse backgrounds and roles and are constantly faced with the various demands for change to either acknowledge and embrace new learning and knowledge diffusion approaches, take advantage of technological development or re-orient members of the institution on service practices. While the academic personnel in polytechnics are involved in core responsibilities of learning and research, the non-academic groups perform administrative and support function and play important roles in ensuring that institutional values, behaviours and considerations capable of achieving the goals and objectives for facilitating effective learning and research. As a result, individuals saddled with various responsibilities struggle seriously to activate, use and connect their knowledge in the complex, diverse and unpredictable situations in attempts to engender behavioural shift necessary for desired change (Iro-Idoro & Jimoh, 2018).

Managing Knowledge in higher education implies not only the ability to retain, in the institution, more efficient and effective workers, but also requires that senior management understands the organisation's needs with a clear vision for its future, a grasp of the range of technologies available for use or that may be needed by the staff, managing the available knowledge and applying same to the institution's activities and experience (Bergerson, 2003).

Knowledge management in the different of job responsibilities and duties of non-academic staff does not necessarily encompass managing all the knowledge, but rather knowledge that is the most important to the performance of the job incumbent and ensuring that people have the right knowledge they need, in the right place, and at the right time. However, the paradigm shift to the use of technology in almost all facets of institutional activities demands deliberate and planned efforts in managing knowledge in technological innovations.

This study considered the five main factors in the models of Dahiya, Gupta, and Jain (2012). These are knowledge creation, acquisition, sharing, storage, and application/implementation. It however, examines two of these factors - knowledge transfer and knowledge application in relation to technology innovations and how these could facilitate efficiency and effectiveness of non-teaching personnel of the Federal Polytechnic, Ilaro.

Statement of the Problem

In institutions of higher learning, Polytechnics inclusive, knowledge created during academic and administrative processes, in the form of documents and procedures, may become tacit knowledge in form of experiences, judgement, views and perceptions that reside within individuals. Among the non-academics, knowledge is created at various levels and in different forms: administrative processes supporting teaching, examinations, evaluation and also in admissions, counselling, training, placement, research and consultancy.

As higher education demands the use of innovative and more effective ways offered by technological innovations, to deliver course content and quality services and to connect more broadly with students, decision makers and management of institutions are increasingly turning to a variety of technology-based options to engender quality service and efficient performance of duties by all concerned. The non-academic personnel form prominent occupational groups within the Polytechnic system, and always play central roles in the higher education administration. The particularity of the non-academic personnel stems from the fact that they operate at the interface of all organisational functions in the life of an higher institution - between academic and administrative works, between governance and administration, management and leadership of institution, and between senior Executive Team and lower echelons of institution's work, and they perform hybrid of functions across these different domains. The increasing technological innovations serve as in important mechanism through which efficiency and effectiveness can be

achieved. Hence it is important to examine the place of transfer of acquired knowledge in technology innovations and its application in the discharge of duties by non-academic personnel and the effects on the efficiency and effectiveness of their job performance with special reference to the Federal Polytechnic, Ilaro.

Objectives of the Study

The purpose of this study was to examine the need for knowledge management in technological innovation in facilitating the job performance of non-teaching staff in Nigerian Polytechnics. The study specifically aimed at investigating the importance two components of knowledge management practices *transfer* and *application* of knowledge in technological innovations and how these enhance efficiency and effectiveness of non-teaching staff in Federal Polytechnic, Ilaro.

Research Questions

1. How does transfer of knowledge in technological innovation facilitate service delivery among non-teaching staff of Federal Polytechnic, Ilaro?
2. To what extent will application of knowledge in technological innovations translate to higher job performance among non-academic staff of the Federal Polytechnic, Ilaro?

Hypotheses

Ho_1: Transfer of knowledge in technological innovations will not engender any positive impact on rate of service delivery among non-academic personnel of the Federal Polytechnic, Ilaro.

Ho_2: Application of knowledge in technological innovations will not have any significant impact on the performance of non-academic personnel of the Federal Polytechnic, Ilaro.

Methodology

This study was an exploratory research and it adopted the survey approach to examine the variables studied. The study was carried out at the Federal Polytechnic, Ilaro. The population comprised senior non-academic personnel of the Institution. Simple random sampling was employed and a total of 100 senior non-academic staff of the Institution were selected to form the sample. Questionnaire was the main instrument of data collection. The instrument tagged Knowledge Management in Technological Innovation Questionnaire.

The instrument was adapted from the Knowledge Management scale of Cho (2010) and Employee's Performance and Productivity scales of Teseema & Soeters (2006). 97 of the administered questionnaires were completed, returned and used for data analysis.

Results and Discussions

Hypothesis 1: Transfer of knowledge management in technology innovations will not engender any positive impact on the performance of non-academic personnel of the Federal Polytechnic, Ilaro.

Table 1: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.776[a]	.603	.601	2.218

Table 1 above shows the relationship between transfer of knowledge in technological innovation and rate of service delivery of non-academic staff of the Federal Polytechnic Ilaro. The correlation coefficient of 0.776 shows that there is a strong positive relationship between the variables with coefficient of determination of 0.603 signifying that about 60.3% of the variation in service delivery will be attributed to adequate knowledge transfer. The adjusted R-square is 0.601 and the standard error of the estimate is 2.218.

Table 2: ANOVA[a]

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	1789.325	1	1789.325	212.232	.000[b]
	Residual	1180.365	96	8.431		
	Total	2969.690	97			

From the ANOVA table, the result shows the mean square regression and residual of 1789.325 and 8.431 respectively with F-value 212.232 and the significant value of 0.000 (which is less than 0.05), showing that the test is significant and hence, the model is adequate in relating the two variables under consideration (that is, knowledge transfer and service delivery).

Table 3: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	2.406	.647		3.720	.000
	KTTI	.539	.028	.776	19.074	.000

Table above shows the contribution of knowledge transfer in technology innovation to Service Delivery of the non-academic staff. The model is: *SD = 2.406 + 0.539SKTTI;* where, SD stands for Service Delivery and KTTI stands for knowledge transfer in technology innovations.

The result indicates that for every unit increase in knowledge transfer among the non-academics, there will be about 0.539 unit increase in their service delivery. The test is significant with the p-value of 0.000 and the t-value is 19.074. Hence, we can conclude by accepting the alternative hypothesis that transfer of knowledge in technology innovations will engender significant positive impact on the service delivery of non-academic personnel of the Federal Polytechnic, Ilaro.

HYPOTHESIS II: Application of knowledge in technological innovations will not have any significant impact on the performance of non-academic personnel of the Federal Polytechnic, Ilaro.

Table 4: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.930[a]	.866	.865	1.678

In Table 4, there exists strong positive relationship between application of knowledge in technological innovation and job performance of non-academic staff of the Federal Polytechnic Ilaro with correlation coefficient of 0.930 and coefficient of determination of 0.866 signifying that about 86.6% variation in job performance may be attributed to application of shared knowledge in technology innovation. The adjusted R-square is 0.865 and the standard error of the estimate is 1.678.

Table 5: ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4354.235	1	4354.235	901.684	.000[b]
	Residual	676.162	96	4.829		
	Total	5030.397	97			

The ANOVA table above (Table 5) shows mean square regression and residual of 4354.235 and 4.829 respectively with F-value 901.684 and the significant value of 0.000 (which is less than 0.05), showing that the test is significant and hence, the model is adequate in relating the two variables under consideration (that is, knowledge application and job performance). Therefore the model can be specified.

Table 6: Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig
		B	Std. Error	Beta		
1	(Constant)	1.061	.383		2.767	.006
	KTTI	1.233	.031	.930	39.313	.000

Table 6 shows the contribution of information communication technology to the service delivery of the academic staff of the Federal Polytechnic Ilaro. The model is: JP = *1.061 + 1.233KATI; Where,* JP stands for job performance and KATI stand for Knowledge application in technological innovation.

From the model above, it is observed that for every unit increase in the knowledge application in technological innovation, there is likely to lead to 1.233 unit increase in the job performance of the non-academic staff. The test is significant with the p-value of 0.000 and the t-value is 39.313. Hence, a conclusion can be drawn by accepting the alternative hypothesis that application of knowledge in technological innovations will have significant impact on the performance of non-academic personnel of the Federal Polytechnic, Ilaro.

Conclusion

Technological innovation has become a very effective means for the performance in higher educational institutions and the sharing and use of knowledge in technology innovation is useful not only for the exploitation of internal resources to use new technologies, but in all facets of institutional activities.

Knowledge is a very valuable asset for an organization that provides a sound base for driving innovation, promoting research and development and facilitating effective teaching and learning. Management of knowledge in technology innovation is necessary to address the challenges of higher education in reaping the fruits of technology innovations. Non-academic personnel of higher educational institutions get knowledge in technology innovations from different sources in relations to their schedule of duties but do not see sharing of knowledge acquired as an important way of facilitating group or team performance within their organisation. Effective transfer or sharing of acquired knowledge in technological innovations and the application or use of same enhance rate of service delivery and the overall effectiveness and efficiency of non-academic staff in performing their administrative and support roles.

Recommendations

The researchers recommend the following:

- Management of institutions of higher learning should have established knowledge management culture and infrastructure to ensure effective promotion of knowledge management practices among staff.
- The Federal Polytechnic, Ilaro and other higher institutions of learning should expand their knowledge management practices to new innovation about work methods, procedures and tools in order to enhance the performance of non-teaching staff.
- To facilitate effective service quality and delivery, more investment should be directed towards knowledge management practices among members of staff and in training of staff to embrace new development and innovations in technology.
- There should be paradigm shift from being adaptive to become learning organizations, striving to reach the status of world class organizations through technological support and continuous improvement in processes and procedures.

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