Knowledge Management Among Engineering Firms In Oyo State, South-Western Nigeria

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ABSTRACT

Increasingly dynamic pace of technological advancement and cut-throat rivalry is a major attribute of businesses in the 21st century. An organization's survival is often predicated upon its exclusive knowledge base, it is a framework upon which a competitive advantage is based. There is a dearth of research on the effect of knowledge loss on engineering organizations in Nigeria. Furthermore, the type of knowledge used among different organizational sectors in Nigeria remains unknown. This study investigated knowledge loss in engineering firms in Oyo State, ease of access was obtained from the Nigerian Business Directory classification of organizations. Stratified random sampling technique was used in collecting survey data from 35 respondents using a structured questionnaire. The method of data analysis was descriptive statistics. Simple linear regression was also used to test relationship between variables. Hypotheses were tested at 0.05 level of significance. Organizational culture and organizational knowledge codification had significant influence on knowledge loss. The outcome of this study provides a framework for policy makers and business owners on how best to ensure knowledge retention within the confines of a particular environment.

Keywords: Knowledge management, engineering, sharing, codification, organization

1. INTRODUCTION

 "A firm's competitive advantage depends more than anything on its knowledge: on what it knows- how it uses what it knows – and how fast it can know something new." – HR Magazine 2009.

Business market places are increasingly competitive, the rate of innovation is rising. For most organizations, the time of rapid technological change is also the time of relentless tussle for maintaining a competitive advantage. It is apparent that knowledge is increasingly becoming the most essential factor of production, next to labour, land and capital. Technological advancement in the business world has created the emergence of knowledge based economies where emphasis is laid more on human capital development. The 21st century is information based and the need for life-long learning is an inescapable reality. Consequently, organizations no longer compete solely on the basis of financial capital and strength, rather knowledge is the new competitive advantage in business, Omotayo (2015) and invariably, Knowledge is the new currency organizations trade with.

In practice, knowledge management often encompasses identifying and mapping intellectual assets within the organization, generating new knowledge for competitive advantage within the organization, making vast amounts of corporate information accessible, sharing of best practices, and technology that enables all of the above. It is the process through which organizations generate value from their intellectual and knowledge-based assets and also the practice of harnessing and exploiting intellectual capital to gain competitive advantage and customer commitment through efficiency, innovation and faster and more effective decision-making.

Organizations usually do not have all the period to themselves to make decisions, time is of essence and though they have an overload of information, not all of such knowledge prove useful. Each must be carefully analyzed to decide it's qualification as a knowledge asset. Generally, knowledge based assets fall into one of two categories: explicit such as patents, trademarks, business plans, customer lists, marketing list or tacit which is the most common type of knowledge resident in the mind of an individual but also a form of knowledge that is difficult to articulate. Knowledge is the most important asset an organization possess to create value and stay competitive. Human capital has been discovered to be the greatest asset of any organization. Hislop (2013) noted that the ability to create knowledge and generate a competitive advantage is now essential for any organization that wishes to remain sustainable within its marketplace.

1.1 Problem Statement

The need to create and retain knowledge in organization is the heart of the organization in totality as knowledge often acquired at a great expense can be lost upon employee exit, retirement, retrenchment or transfer. Over time, researchers have argued that knowledge is now the organization's most valuable resource (Grant, 1996; Zack, 1999) but employees with valuable knowledge (human capital) may take this with them when they leave, the knowledge may be unique or difficult to imitate, making replacement difficult. Moreover, employee turnover rates are increasing and most often, employees are not replaced. This suggests a reduction in the organization's overall knowledge, because the stock of knowledge resources is not replenished. Furthermore, the average age of the workforce is increasing. Over the next 18 years, a baby boomer will reach retirement age every 18 seconds (Beazley et al., 2002). This means that organizations are increasingly at risk of losing valuable human capital.

No doubt, Individuals are the custodian of organizational knowledge. However, with humans come a number of key factors. Individuals may get fired, retrenched, fall critically ill or at most die and because knowledge creation is purely a human process, organizations must find a means of storing and retrieving such knowledge. Although most new employees bring useful specialist experience with them, few organizations tap this rich reservoir of information, most organizations still repeatedly find these a daunting task and the impact of effectively harnessing these potential remains widely unknown. The type of knowledge needed for survival by engineering organizations in an information overloaded age presents a gap. Furthermore, there is a dearth of research at organizational level on critical success factors needed by engineering organizations, these sector is key to the much desired rapid industrialization of the nation's economy.

This study identifies whether the knowledge loss caused by the exit of valuable employees affects the organization and its surviving employees, and if so, how. This study attempts to determine the influence of knowledge management on performance of engineering organizations. It aims to contribute to existing body of literature on knowledge management by proposing a knowledge management framework that can be adopted for use by various organizations and also present findings that serve as a guide for policy makers in making informed decisions on knowledge management organization best practices.

1.2 Research Objectives.
1. To determine the type of knowledge needed by engineering organizations in Oyo state.
2. To determine the influence of knowledge transfer on organizational performance.
3. To determine the influence of knowledge management processes (codification and sharing) on organizational performance.

1.3 Research Questions
1. What type of knowledge do engineering organizations acquire?
2. How is knowledge transferred in engineering organizations?
3. How do engineering organizations codify knowledge?

1.4 Research Hypotheses
1. Knowledge codification will not have any significant influence on organizational performance.
2. Knowledge sharing will not have any significant influence on organizational performance.

1.5 Justification of the Study
The study proposes a knowledge loss framework that can be adopted for implementation by various firms as a means of minimizing the loss of organizational knowledge. Second, the findings from this study could serve as a guide for policy makers in formulating informed policies that promote knowledge retention within organizations.

1.6 Scope of Study
This study focuses on registered engineering firms within five selected local government areas in Ibadan, Oyo state. Ibadan is the third largest city in Africa with a thriving and teeming population. These local governments are densely populated with various industries ranging from small start-ups to large corporations**.**

2. REVIEW OF LITERATURE

2.1 Knowledge and Knowledge Management

Knowledge often times can be defined as a justified personal belief. Oyelusi (2014) defines knowledge as the collective understanding plus the ability to transform this understanding into actions (skills), which yields performance being dependent of the situation in which it is learned and used.

Knowledge is one of the most imperative asset for an organization to create values and by extension, a sustainable competitive lead, it is an intangible resource, we sense its value only when we use and apply it to create a business value (Asseffa, 2010). Knowledge can be distinguished in two different types. Nonaka (1994); Nonaka and Takeuchi (1995) describe knowledge as existing in two dimensions – tacit and explicit knowledge. In essence, knowledge is most commonly categorised as either explicit (coded) or tacit (that which is in people's heads). Tacit knowledge is the personal and contextspecific knowledge of a person that resides in the human mind, behaviour, and perception (Duffy 2000).

It evolves from people's interactions and requires skill and practice. Tacit knowledge is highly personal (held within the holder), subjective, difficult to formalize, articulate and communicate fully, experience based, contextualized, job specific, transferred through conversation or narrative, not captured by formal education or training and may even be subconscious but capable of becoming explicit knowledge (Nonaka and Takeuchi, 1995, Hislop, 2013). It is the type of knowledge that is used mostly by organisational members in the performance of duties. Tacit knowledge is hard to verbalise because it is expressed through action based skills and cannot be reduced to rules and recipes. It is deeply rooted in action, procedures, commitment, ideals, values and it can only be indirectly accessed.

In practice, knowledge management often encompasses identifying and mapping intellectual assets within the organization, generating new knowledge for competitive advantage within the organization, making vast amounts of corporate information accessible, sharing of best practices, and technology that enables all of the above. It remains a relatively new practice in several industries and each industry has its own key knowledge asset.

2.2 Knowledge Management Processes

KM is viewed as a process, where many activities are formed to carry out key elements of an organisation's KM strategy and operations. Not every information is valuable and the task of determining which knowledge to retain or discard ultimately resides with an organization, this however is no little task particularly for organizations within developing economies such as Nigeria. Knowledge management is a cross-disciplinary domain that involves the planning, organizing, motivating, and controlling of people, processes and systems in the organization to ensure that its knowledge-related assets are improved and effectively employed. Knowledge management processes and activities capable of influencing knowledge loss in organizations abound. Several authors have shared their perspectives on the processes that encompass organizational knowledge management, one of the earliest studies is that of Tiwana (2000), he identified three knowledge management activities as knowledge acquisition, knowledge sharing and knowledge utilization.Knowledge management however primarily focuses on tacit knowledge commonly resident in an organization. Over the years, employees learn from continuously doing an organizations work, this form of knowledge differs from book knowledge and often cannot be articulated.

Similarly, the processes of KM involve knowledge acquisition, creation, refinement, storage, transfer, sharing, and utilization and organizations that do not implement effective KM strategies may face some difficulties. Although individuals can perform each of the KM processes independently, KM is largely an organizational activity that focuses on what managers can do to enable its goals to be achieved, how they can motivate individuals to participate in achieving them and how they can create social processes that will facilitate KM success. *Knowledge sharing* is an essential mechanism capable of turning individual knowledge into group organizational knowledge. This assertion is strongly supported by previous studies which summarily opine that sharing of knowledge represents the core of knowledge management and that the organizations that shares knowledge among its management and staff grows stronger and becomes more competitive.

2.3 Organizational Knowledge

What happens when an employee leaves an organization? Traditionally, human resource management particularly in Nigeria address this issue by simply recruiting new employees or training existing employees as replacements. Individuals make up an organization. Employee exit is a cumulative effect of several factors. Early days of the industrial revolution witnessed organizations with improved efficiency, effectiveness and greater competitive edge through the automation of manual labor and reduction in redundancy. Now in the age of *Knowledge workers,* many organizations have gone through considerable reformation to reduce redundant workers and jobs. Every now and then these efforts lead to the ideas of business process engineering. Downsizing, though a global phenomenon is at the moment a re-occurring decimal among Nigerian organizations resulting in major loses, sometimes irreplaceable, of core knowledge assets as employees walked out the door with their knowledge. The outcome of such knowledge dissipation are diminutive innovation, teamwork and throughput.

Organizational Knowledge is the ability of a company as a whole to create new knowledge, disseminate it throughout the organization, and embody it in products, services and systems. Ultimately, the quality of an organization's knowledge is a major determinant of its competitive advantage. Organizational assets related to knowledge often include knowledge in the form of printed documents such as patents and manuals, knowledge stored in electronic repositories such as a "best-practices" database, employees' knowledge about best job practices, knowledge held by teams working on focused problems and knowledge that is embedded in products, processes and relationships.

3. METHODOLOGY

3.1. Location and Population of the Study
The purpose of this study is to determine the impact of knowledge management on organizational performance among engineering firms in Ibadan, Oyo State. Ibadan as the capital of Oyo State is the fourth largest city in Nigeria by population after Lagos, Kano, and Port Harcourt .Ibadan is also largest in geographical area. At independence, Ibadan was the largest and the most populous city in Nigeria and the third in Africa after Cairo and Johannesburg. It has an estimated population of 2,550,593 according to 2006 census results (National Bureau of Statistics, Nigeria 2006). The population of central Ibadan, also known as Ibadan metropolis which includes five LGAs, is 1, 338, 659. Over the years, Ibadan has grown in importance and has served as the administrative center for the whole region of southern Nigeria (1946-1960) and as the capital of the western region (1960-1962). Ibadan has been the capital of Oyo State since 1991 and is also still the largest city in Nigeria.

3.2 Sampling Procedure
Purposive sampling technique was used in selecting the local government areas considered for the study. Furthermore, a simple random sampling procedure was employed to ensure that each engineering firm had an equal chance at selection. Ease of access was navigated through professional association of engineering firms within the state. Engineering firms belong to associations such as MAN (Manufacturers Association of Nigeria) and state chapters of commerce and industry. A list of engineering firms within Ibadan, Oyo state was compiled from the Nigeria business directory classification of companies (2009) consisting of 200 names. 100 names were randomly selected representing half of the total population. A structured questionnaire was used in eliciting data from 100 respondents out of which a total of eighty eight (87) copies of the questionnaire were retrieved and used for the analysis. Data collected were analyzed using descriptive statistics (frequencies and percentages) and simple linear regression.

4. PRESENTATION OF RESULTS AND DISCUSSION

4.1. Demographic Profiles of engineering Organizations
The frequency distributions of the demographic profiles of engineering organizations are displayed in table 4.1 below:
Table 4.1 Organizational Profile of the Respondents

How long has your organization been in existence?	Frequency	Percentage (%)
Below 5 years	22	25.2
5-10 years	11	12.6
11-20 years	24	27.5
Above 20 years	30	34.4
What is your organization's staff strength?		
Below 20	28	32.1
21-50	32	36.7
51-100	17	19.5
Above 100	10	11.5
Department		
Finance	14	16.0
HR	11	12.6
Admin	25	28.7
Supply & Logistics	0	0
Information Technology	31	35.6
Others	**6**	**6.89**
What is the scope of your organization's operations?		
National	41	47.1
International	19	21.8
National and International	27	31.0

4.1.2 Research Questions
Research Question One: How is Knowledge transferred within engineering organizations?
Table 4.3: Frequency Distribution for Knowledge Transfer in Organization

	Knowledge Transfer (Technology)		INTERNET	INTRANET	EMAIL	VIDEO CONFERENCING
1	These technologies are effective within our organization	Yes	80(91.9%)	81(93.1%)	81(93.1%)	16(18.3%)
		No	7(8.0%)	6(6.8%)	6(6.8%)	71(81.6%)
2	All employees can make use of these available technologies within our organization	Yes	59(67.8%)	32(36.7%)	60(68.9%)	11(12.6%)
		No	28(32.1%)	55(63.2%)	27(31.0%)	76(87.4%)
3	We use the following to retrieve, share and disseminate knowledge	Yes	55(63.2)	12(13.7%)	5(5.7%)	1(1.1%)
		No	32(36.7%)	65(74.7%)	82(94.3%)	86(98.8%)
4	We use the following to transfer knowledge with our other branches	Yes	66(75.85)	15(17.2%)	8(9.1%)	1(1.1%)
		No	21(24.1%)	72(82.7%)	79(90.8%)	86(98.8%)
5	Employees have access to the following technologies at all times	Yes	73(83.9%)	66(75.8%)	72(82.7%)	2(2.3%)
		No	14(16.1)	21(24.1%)	15(17.2%)	85(97.7%)

Research Question Two: How is knowledge shared within engineering organizations?

	Knowledge Sharing (Organizational Culture)	D	U	A
	We encourage knowledge sharing in our organization through (1-3):			
1.	Top to Bottom ie Superior to surbodinate	2(2.6%)	12(13.7%)	73(83.9%)
2.	Upward with superiors (e.g. cleaners sharing with the Director)	16(18.4%)	10(11.4%)	61(70.1%)
3.	Horizontally with colleagues	16(18.3%)	2(2.2%)	69(79.3%)
4.	Our beliefs, values and norms encourage intra-organizational knowledge sharing	10(11.4%)	17(19.5%)	60(68.9%)
5.	Experienced employees hoard their knowledge	50(57.5%)	12(13.8%)	25(28.7%)
6.	There is a culture of secrecy within our organization	37(42.5%)	8(9.1%)	42(48.3%)
7.	We encourage mentoring relationships for new employees	17(19.5%)	23(26.4%)	47(54.0%)

Research Question Three: How is knowledge codified within engineering organizations?
Table 4.4: Frequency Distribution for Knowledge Codification within Organizations

	Knowledge Codification (Knowledge identification and capture)	D	U	A
	Knowledge is identified in your organization through:			
1.	The skills and experiences of each employee	12(13.7%)	6(6.8%	69(79.3%)
2.	The assignment of specific tasks to each department	5(5.74%)	13(14.9%)	69(79.3%)
	We capture knowledge through:			
3.	Documenting work processes and projects done	15(17.2%)	35(40.2%)	37(42.5%)
4.	Eliciting the experiences of our employees	20(22.9%)	10(11.5%)	57(65.5%)
5.	The regular presentation of project reports	32(36.7%)	35(40.2%)	20(22.9%)
	Knowledge Codification (Knowledge map)			
6.	Knowledge resources are ordered in an accessible and easy to use manner	40(45.9%)	25(28.7%)	22(25.3)
7.	We make use of an organizational chart to describe the expertise of each employee	65(74.7%)	10(11.5%)	12(13.7%)
8.	We organize knowledge in an order of importance	19(21.8%)	11(12.6%)	57(65.5%)
9.	We only make use of employees at the strategic level to resolve complex problems	31(35.6%)	12(13.7%)	44(50.5%)

4.1.3 Research Hypothesis

Knowledge codification will not have any significant influence on organizational performance

Table 4.5. Regression Analysis Between Knowledge Codification and Organizational Performance

	Unstandardized Coefficients		Standardized Coefficients	T	p-value
	B	Std. Error	Beta		
(Constant)	33.597	1.799		18.671	.000
Knowledge Codification	.178	.069	.306	2.594	.011

Table 4.7 showed that there was a significant relationship between knowledge codification and knowledge loss (r= 18.67; p<0.05). This implied that, knowledge codification is a significant predictor of knowledge loss in an IT organization. Therefore, the null hypothesis was rejected while the alternate hypothesis is not rejected.

Knowledge sharing will not have any significant influence on organizational performance.

Table 4.6 Regression Analysis Between Knowledge Sharing and Organizational Performance

	Unstandardized Coefficients		Standardized Coefficients	t	p-value
	B	Std. Error	Beta		
(Constant)	34.347	1.106		31.043	.000
Knowledge Sharing	.234	.066	.397	3.566	.001

Results from table 4.6 showed that there is a significant relationship (r = 0.397) between knowledge sharing and knowledge loss (p<0.05). This implied that, knowledge sharing is a major factor and predictor of performance in an engineering organization. Thus, the null hypothesis was rejected implying that there is a relationship between knowledge sharing and knowledge loss.

5. DISCUSSION OF FINDINGS

Many forms of knowledge exist. They typically include human (what individuals know or know how to do which are manifested as skills or expertise), social (which exists between individuals or within groups), cultural (which reflects a collective understanding of how things are done within an organization) and structural knowledge (which is embedded in an organization's systems, processes, tools and routines). Engineering organizations require Structural knowledge. This form of knowledge is assumed to exist independently of what humans know as it is explicit in nature and rule based and therefore, clearly an organizational resource. Results from the study revealed that engineering organizations within the state have a long history of existence. Most of the organizations operating within the state have been in operation for more than 20years as indicated by 34.4% response rate. This perhaps is a pointer to the myriad of challenges still experienced by businesses and business owners in Nigeria and that Long years of existence over time has failed to transform economic fortunes of their host communities and the country as a whole as Nigerian organizations after sometime often struggle not to go under. Accordingly, a recent study by Fatai (2013) asserted that problems and challenges of organizations in Nigeria are consequently tied to certain economic variables that generally characterize the nation's economy. Also, 27.5% admitted to having been in existence for 11-20years.

Engineering organizations within the state reported having a staff strength of 36.7% while 32.1% had a staff strength below 20. This percentage is considered low and a reflection of the poor state of engineering activities within the country, currently, Nigeria is a predominantly consuming nation with large dependence on foreign exports. Though data elicitation was not tied to specific units within the organizations, the information technology unit recorded a greater percentage response of 35.6% (31%) closely followed by the administrative units with 28.7% (25). The scope of operation of most engineering firms in Nigeria leaves much to be desired. Majority of these organizations, 41% (47.1) still operate within the shores of the country. This might not be unconnected to the fact that Nigerian business organizations are beleaguered with many overwhelming but surmountable socio-economic challenges. Knowledge transfer essentially involves a formalized function of developing specific strategies to encourage knowledge exchange (Davenport and Prusak, 1998:89 in Kakabadse, 2001). Results indicated that majority of engineering firms employ the internet effectively as a key knowledge transfer tool for employee use, knowledge retrieval, knowledge transfer and regular access as indicated by 80(91.9%). 59(63.8%), 55(63.2%), 66(75.8%) and 73(83.9%) respectively. The high proportion of internet use among engineering firms might not be unconnected with the current high influx of telecommunication service providers into the country's business terrain in recent times. Other forms of technology such as intranet and email also showed high response rate in terms of use and availability.

A key determinant of organizational success is inherent in it's information sharing culture. 73(83.9%) of respondents agreed that knowledge is shared from top to bottom while 61(70.1%) concurred to a more flexible pattern of knowledge sharing originating from surbodinates to superiors. Knowledge sharing among colleagues recorded a high response rate of 69(70.3%), this agrees with the response to beliefs and norms within the organization as indicated by 60(68.9%). Organizational culture adopted by engineering firms promote knowledge sharing and accordingly, a comparatively low number agreed to hoarding of knowledge by experienced employees. 42(48.3%) were of the opinion that a culture of secrecy existed within their organizations, this may be equivalent to trade secrets peculiar to any organization which ensures their continual survival within the business terrain. 47 (54%) also agreed to a culture of mentoring new employees.

Organizations need to capture the knowledge they have i.e codify it in a re-usable manner, share it and use it to some commercial benefit. Knowledge codification varies within organizations. Skills and experience of each employee, assignment of specific tasks had a high response rate as 69(79.3%) agreed to various ways of identifying knowledge. 37(42.5%), 57(65.5%) agreed to documentation of work processes as well as elicitation of employee experience respectively as ways of knowledge capture n their organization. Furthermore, 22(25.3%), 12(13.7%), 57(65.5%) and 44(50.5%) respectively agreed to the use of knowledge map in various ways to codify knowledge.

6. CONCLUSION

In this paper, knowledge management among engineering firms have been studied. Various ways by which engineering organizations acquire, transfer and codify knowledge have also been discussed. The many years of existence for most of the engineering. firms have not translated into growth and development for the sector and for the nation at large. Results suggests that knowledge management practices is still at its infancy stage in most engineering firms. This might not be unconnected to the abysmally low engineering versatility within the Nigerian state.

7. RECOMMENDATION

The outcome of this study offers new promising fields of future research. Engineering firms represent an integral part of any nations per capital strength hence the need for concerted efforts towards reviving the nearly comatose practice among firms operating in Nigeria.

Based on the aforementioned, the following recommendations are made:
1. A proper documentation of all projects embarked upon is of uttermost importance.
2. A culture of mentoring new employees such as practiced by giant corporations and big multi-nationals will go a long way in ensuring the continuous survival of engineering firms within the shores of Nigeria.

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