5-2012

ICT Support for Knowledge Management in Primary Healthcare: a Case Study of Partnership for Reviving Routine Immunization in Northern Nigeria (PRRINN)

Gbola Olasina
University of Ilorin, Nigeria, olasina.g@unilorin.edu.ng

ICT Support for Knowledge Management in Primary Healthcare: a Case Study of Partnership for Reviving Routine Immunization in Northern Nigeria (PRRINN)

Gbola Olasina
Department of Library and Information Science
Faculty of Communication and Information Sciences
University of Ilorin, Nigeria

Introduction

From observation, very few organizations in Nigeria have Knowledge Management (KM) portfolios and one of such is KPMG that recruits staff regularly to fill knowledge management positions and have primary responsibilities to manage, develop, coordinate, maintain and disseminate KPMG's knowledge management processes and resources amongst several other responsibilities played by personnel employed in the KM section

However, outside Nigeria, there have been plenty of knowledge management (KM) projects that come and go. Many of which have had success stories and organizations including those in primary health care are still leveraging benefits from their KM systems. However, from review of extant literature, it is fair to say that a considerable proportion of KM projects/initiatives have not been so successful. In retrospect, many of the KM projects that commenced in the past were primarily driven by the adoption of technologies. Technologies include tools such as search engines, retrieval and classification tools, e-collaboration tools, portals and content management systems. One of the lessons learnt from these failures is that technology alone should not be the primary driver for any KM projects/initiatives and that an appropriate balance of technology, process, people and content is instrumental to the continued success of any KM deployment. Technology, however, can act as a catalyst for the introduction and initial buy-in of a KM programme but, in order to be successful, this accelerated adoption has to be aligned with a defined KM strategy and supported by a change programme. On the technologies for supporting KM, as mentioned above, during the 1990s, these technologies tend to be discrete, distinct from each other and not aligned with defined business processes. When implemented, a user may have to operate separate systems in order to accomplish his/her task (e.g. location of a firm's procedures/methodologies, discussion with colleagues and sharing material with them).

Although efforts at managing knowledge certainly preceded the computer, it has been computer-based technology that has ushered in the modern era of knowledge management. In the last few decades, and especially in the last decade, there has been as much progress in understanding knowledge management and advancing its practice as occurred in the many preceding centuries that dealt with traditional, conventional, non-technologically-supported knowledge management. Much of this progress has been either stimulated by or enabled by advances in computing technology.

The role of technologies in KM has always been a debatable topic whether in health care, education, academia or industry. Holsapple (2005) finds that the general perception is that technology was a driver in many of the KM projects in the late 1990s but nowadays organizations are treating the process and people aspects as critical success factors in any KM initiatives. Holsapple argued that both the inclusive and exclusive perspectives of separating knowledge from information completely ignored or under-estimated the contributions of CBT to KM. He further proposed a third perspective that is to subdivide the representation and processing of various types of knowledge by a computer system. Through this new perspective, which is further substantiated by observations with several renowned e-business/commerce systems, one can gain a stronger appreciation of how CBT can add value to KM. Information technology can accomplish a lot more than mere storing and retrieving data (Holsapple, 2005).

From observation KM as a field of study and practice is here to stay (Ajiferuke, 2003). Yet, it is still in a formative stage, marked by differences in terminologies, emphases, and boundaries. This paper focuses on one of those boundaries: the relationship between knowledge management (KM) and computer-based technology. It advocates a perspective of the boundary that neither excludes technology, nor identifies with it. This is an inclusive perspective based on a conception of knowledge that recognizes multiple knowledge types (descriptive, procedural, reasoning), multiple gradations of knowledge, and diverse processors of diverse knowledge representations. Views on the relationship between KM and computer-based technology are wide-ranging. Some say that there is little or no relationship. Some contend that any such relationship is largely incidental (Alavi and Leidner, 2001). In contrast, others tend to use the terms information and knowledge interchangeably, seeing information technologies and systems as being at the core of knowledge management.

This study considers the role of technology in knowledge management. In so doing, it takes a position that there is neither a barrier that differentiates information from knowledge, nor can the terms knowledge and information be used interchangeably. Building on this, it finds that technology is essential to an understanding and application of modern knowledge management. Furthermore, it concludes that knowledge management forms the rationale and intellectual basis for studying computer-based technology and systems. Exploration of how technology can complement and mesh with human knowledge handling is where researchers have added and can continue to add value to the knowledge management movement. This paper considers several examples of ICT tools that have been integrated to knowledge handing. It also identifies and discusses several areas where ICT research has a potential to make further contributions to the KM field. The purpose of this study is to contribute to literature on KM from a perspective from Nigeria and growth of this concept in a developing country. From observation there is nothing in literature on use of ICT to support KM or even KM in Nigeria.

Outside Nigeria, over the last ten years or so, there have been two significant changes in landscape of KM technologies. First, due to advancements in open standards, these technologies have become far more interoperable and less platform dependent. As a consequence, many of these technologies are now componentized and can be embedded seamlessly into other enterprise applications. For example, a search engine can be incorporated as part of an e-

collaboration suite and a portal usually provides a document management component. The second change is the bundling of the market offerings by the vendors of commercial KM technologies. KM solutions in the marketplace today are likely to be a collection of complementary technologies that aim at execution of a specific process (e.g. collaborative product development), a solution (e.g. problem resolution and service support by a contact center) or a particular industry (e.g. wealth management portal in financial services).

Study Background at PRRINN

In Nigeria, a vast country of over 120 million people, PRRINN is working as part of a consortium of international organizations to improve immunization in four of the poorest states of the country namely - Jigawa, Yobe, Katsina and Zamfara – all of which have very little immunization coverage. The UK Department for International Development (DFID) in Nigeria is supporting the Programme for Reviving Routine Immunization in Northern Nigeria (PRRINN) Consortium to implement a £20m project in four States of Northern Nigeria. It is anticipated that by the end of the project state and local government authorities would have significantly improved the coverage of child immunization. This will be achieved through building the state's capacity to plan, implement and monitor routine immunization activities, and by increasing access and uptake of immunization at community level. In this way ownership of immunization activities will be transferred from external agencies to the local communities. (http://www.transaid.org)

PRRINN has some international partners of which this paper has to make mention of, such as Health Partners International, Save the Children, Grid Consulting and PATH and Transaid and the latter was asked to become involved in the Partnership for Reviving Routine Immunization in Northern Nigeria (PRRINN). In this project, the cold chain and related transportation is absolutely vital for making vaccines more readily available and improving immunization coverage in the target areas. Transaid was therefore tasked to undertake an assessment on the supply side to analyze the current transport situation and existing resources in each state, and how they can be best utilized to help achieve the aims of the project. The initial assessment which was carried out in 2007 revealed that the four state ministries of health are very poorly resourced, and much of facilities non-functional (http://www.transaid.org). The PRRINN programme will increase the vaccination rates through emphasizing the need for capacity building among stakeholders at different levels, with work being undertaken with Ministry of Health employees at all levels, and work with the communities. PRRINN is presently working with the federal government of Nigeria to promote the development of appropriate policies that will harmonize the intervention of different agencies supporting immunization and clarify the resources available for the programme.

PRRINN'S Activities and Highlights

Operational research provides PRRINN with evidence for strategic planning, capacity building, and operations management of routine immunization. Activities include a detailed baseline systems assessment, a catchment area mapping process, operations research into acquisition of routine immunization supplies and their distribution, assessment of national epidemiology technical capacity, and associated training, a cost-effectiveness analysis of routine immunization, and a 100% audit of cold chain equipment in the programme states and LGAs. One of the goals of PRRINN in community mobilization/social development is to increase community participation in demand and supply side of routine immunization services. It draws on its experience from two other Nigerian projects, COMPASS and PATHS, to strengthen the evidence base on immunization demand, maximize community participation in the design, deliver and review of routine immunization services and create an enabling policy environment for demand creation and engagement efforts. By the end of the programme it is expected that 60% of the

infants under one year old will have been fully immunized and 70% of women aged 15-49 will have had the appropriate tetanus toxoid doses (http://www.transaid.org).

Objectives of the Study

The general objective is to identify knowledge management systems at PRRINN, highlight the ICT tools found at the case study that support KM in that organization and take a look into PRRINN's future needs (ICT support for KM).

Literature Review

There is a dearth of literature from Nigeria on KM. The literature review will center on technology and on knowledge management systems, again without wishing to imply that this is in anyway the most important aspect of KM. By aiming to relax cognitive, temporal, economic, or competitive pressures on decision makers, these systems give decision makers greater opportunity to exercise and exploit their own idiosyncratic KM capabilities (Holsapple and Whinston, 1996). Decision-making has long been recognized as a knowledge-intensive task. Knowledge comprises its raw materials, work-in-process, byproducts, and finished good. It involves processing representations of descriptive, procedural, and/or reasoning knowledge in order to help produce knowledge about what to do (Bonczek et al., 1981; Holsapple, 1995). In the case of artificially intelligent decision support systems (e.g. expert systems), the emphasis is on representing and processing reasoning knowledge. In the case of solver-oriented decision support systems (e.g. online analytical processing systems), the emphasis is on the representation and processing of procedural knowledge.

Edwards, et al (2005) identified different types of ICT support for knowledge management to include (AI-based conventional) case-based reasoning, computer-supported cooperative work, expert systems, genetic algorithms, intelligent agents, knowledge-based systems, multi-agent systems, neural networks, "push" technology. Conventional ones include bulletin boards, data mining, databases, data warehousing, decision support systems, discussion forums, document management, electronic publishing, email, executive information systems, groupware, information retrieval, intranets, multi-media/hypermedia, natural language processing, facebook/people finder/"yellow pages", search engines, workflow management.

Davenport and Prusak (1998) describe KM as involving organizational, human and technical issues, with the advice that the technical should be treated as least important of the three. Dieng et al. (1999) add financial, economic and legal issues to this list. Many authors have written about the use of various types of software in knowledge management, including Junnarkar and Brown (1997), Offsey (1997), Liebowitz (1998), Borghoff and Pareschi (1998), Dieng et al. (1999), Alavi and Leidner (1999), Hendriks and Vriens (1999), Earl (2001) and Alavi and Leidner (2001). Since the early days of knowledge management there has been a particular stream of thinking that stresses the use of knowledge-based systems software in knowledge management. Strapko (1990) was discussing this point even before the term knowledge management came into common use, while Liebowitz has been one of its main proponents, arguing that expert systems have a crucial role in institutional memory, because of their ability to capture business rules. Becerra-Fernandez (2000) gives a different kind of example, a people-finder system. It is clear that expert or knowledge-based systems software and artificial intelligence (AI) software more generally, does have a role to play in supporting knowledge management, but in addition, so does more conventional software.

Anand et al (1998) differentiate between knowledge that is included in information technology and soft knowledge that is shared among organizational members and it substantially contributes to transfer and storage of information within computers.

Moreover, the authors find that soft knowledge is the most important in the use and understanding of any type of information technology, because it refers to beliefs, intuition and judgmental abilities of staff. O'Sullivan (2007) discusses the communications strategy for the KM system deployment, their codification in the internal communications plan. This plan associates different communications strategies with different phases of the deployment to ensure that the correct information is disseminated to knowledge workers through out the process of systems implementation. The same paper goes ahead to give what it termed the media selection process as: (1) Face to face communication. (2) KM system demonstrations/presentations. (3) Support media (print materials, marketing collaterals, conversational support technologies) see table below. (4) Conversational support technologies: Conversational support technologies have the benefit of providing information to targeted audiences while also providing an inbuilt capability for feedback and discussion on that message. The same study lists conversational support technologies to include; help communities, discussion forums, weblog (blog) and wikis.

Alavi and Leidner (1999) and Zyngier (2001), and Edwards et al. (2003), reveal a lot about surveys on use of KM systems. The focus of the paper is on which of these ICTs support KM in organizations in general with particular reference to such organizations in the developing countries and in this case PRRINN. This is done by classifying PRRINN's alongside (Edwards et al., 2003), the organization's preferred knowledge management solutions into three types: (1) Technology. (2) People. (3) Process-based. Holsapple (2005) neither dismisses technology nor identifies with it. From this perspective, the paper develops the contention that modern KM has been tremendously enriched by advances in computer-based technology (CBT), discussing several specific examples. Moreover, that paper concludes that CBT needs to be grounded in a clear, deep consideration of knowledge management.

The study by Holsapple (2005) is worth a mention in what he termed boundary perspectives and the exclusive perspectives, as background for exploring the KM-CBT boundary, consider two contrasting perspectives: exclusion and identification. The exclusive perspective sees knowledge management as being a strictly human and social phenomenon. It sees the representation and usage of knowledge as being exclusively a human endeavor. In sharp contrast, the identification perspective views knowledge management as mainly a re-naming of computer-based technology's various monikers and variants such as data processing (DP) systems, information systems (IS), information technology (IT), enterprise resource planning (ERP) systems, intranet systems, data warehousing, and so forth. The exclusive perspective in KM conference presentations, articles, and websites, it is not uncommon to encounter the perspective that knowledge management has little or nothing to do with technology. In this perspective, knowledge management is about human relationships, interpretations, processes, resources, and culture. However, according to Wilson (2002), CBT is nothing more than an enabler to facilitate the practice of KM. Curiously, by their very natures, "enabling" and "facilitating" are hardly incidental; they are at least important, if not crucial. So, from the exclusive perspective, there is a well-defined boundary between KM and computer-based technology, in the sense that KM has little or nothing to do with technology and CBT is only concerned with information or data, but never with knowledge.

However, the exclusive perspective's mainstream is ably represented by Galliers and Newell (2003) who eschew IT-enabled knowledge management, both in theory and in practice. They argue that the information technology research community has little to contribute to the development of the KM movement. In defining away any role for technology in KM, the exclusive perspective labels the storage, generation, application, and distribution activities of computers as data management or information management, while reserving the KM term for activities performed by humans (information becomes "knowledge" when it is processed in a human mind). Such labeling ignores other important and long-recognized abilities

of CBT: storing, generating, applying, and distributing procedures and logic, as well as state descriptions such as data/information (Bonczek et al., 1981).

According to Lamporoulis (2007) technology is found to be an essential artifact that enhances in all cases the creation of knowledge that transforms into innovations. Prieto, Revila and Rodriguez (2007) in an empirical study of IT as KM enabler in product development show that there are statistical differences in terms of knowledge exploitation showing advantages in a combination of two IT dimensions to product development. Many studies show that technology enhances the efforts of the staff. Initially, it is pointed out in Lamporoulis (2007) that the conclusion derived from the data that technology enhances the efforts of the employees to create knowledge that leads to innovation. In his conclusion after surveying some organizations discovered that, for the case of the surveyed organization, emphasized the fact that most staff see technology in a positive way which can benefit them in the process of productizing knowledge. From this approach, which relates to culture of the case organization, the creative staff understand technology as an added help that can complement their own efforts in the construction of innovations. Technology increases the speed and the efficiency of the work. From the research data is revealed that, "technology makes quicker and easier the retrieval of knowledge".

From findings of Lamporoulis (2007), employees consider technology useful because it makes quicker and easier the retrieval of knowledge. This is crucial point for the creative staff since they find the amount of work to continuously increase along with the demands of the customers for high quality of work. Therefore, technology, due to its speed and capabilities that it offers to the user, tends to occupy more and more of the time and the intellectual skills of employees within the case study organization. Technology is a tool for staff to visualize an idea. The results of the research underline that technology is used as a tool which allows the visualization of an idea, and employees tend to use it after having in their minds a very good idea of what they want to achieve. Technology is used for developing and searching for new ideas (Lamporoulis, 2007). Following the previous findings, an important conclusion that derives from the data is that technology is used for developing and searching for ideas and not as the main way of perceiving a new idea.

Knowledge Management Models

A review of knowledge management models by Haslinda and Sarinah (2009) show there are several knowledge management models but that of Stankosky and Baldanza's (2001) knowledge management framework will guide this study. This is because their framework addresses enabling factors such as learning, culture, leadership, organization and technology, all elements that are very relevant to the scope of this study. The construct of the model on technology will be used to test the role of KM in the case study, PRRINN. This framework presents that knowledge management encompasses a wide range of disciplines that include cognitive science, communication, individual and organizational behavior, psychology, finance, economics, human resource, management, strategic planning, system thinking, process reengineering, system engineering, computer technologies, software and library science. Stankosky and Baldanza's framework states that technology infrastructure should promote the efficient and effective capture of both tacit and explicit knowledge. It posits that it should also support knowledge sharing in the entire organization. Communication, electronic mail, intranet, internet, data warehousing and decision support systems are some of the key elements. The model proposes learning communities, virtual teams, communication and a culture of trust can be identified as some of the key elements .In addition, the constructs in the framework such as leadership, organization structure, technology infrastructure and learning will be drawn upon in the research design and research instrument.

Knowledge Management in Nigeria

Ajaikaiye and Olusola (2003) observed that the knowledge system of any progressive society performs a pivotal function in its development. However, they note that "in spite of this recognition, the attention given to Nigeria's knowledge system has been weak and unstable, and has therefore affected its effectiveness and utilization." Therefore, the challenge is for institutions and countries to determine and develop
organizational practices, principles, guidelines, and approaches on how knowledge can be created, harnessed, shared, tracked, and distributed among government agencies, research communities, and the
public (Riley, 2003).

Nwafor and Salau (2010) reported that Nigeria needs to establish a knowledge management system that considers the multidimensional perspective of poverty and agriculture. Two of these multi-dimensional areas are gender and the environment. The key government ministries most directly in charge of issues related to the interactions of gender, the environment, agriculture and poverty are the Federal Ministry of Agriculture and Water Resources (FMAWR), the Federal Ministry of Environment, and the Federal Ministry of Women Affairs and Social Development (FMWA&SD). Their study examines aspects of knowledge management in general in these three ministries and also examines the national capacity to carry out comprehensive agriculture sector modeling in particular. The study was a first step in assessing the existing knowledge management system in Nigeria with respect to the achievement of agriculture-led growth and poverty reduction. To strategically situate future analysis of knowledge management, the study took an inventory of the national objectives related to agriculture-led growth and poverty reduction, which take into consideration gender issues as well as environmental sustainability. Relevant lessons that are systematically incorporated into existing and ongoing activities and future plans were also included in the inventory. The report then examines knowledge management in the three ministries and the capacity to carry out a comprehensive agriculture sector economic research model. The paper discusses the national development targets and research results from existing literature.

From available literature on KM in the context of Nigeria, KM in non-existent in most organizations and there may be need for further studies on why this is the case.

Methodology

In this case study a mixed methods approach was utilized. Instruments used were a questionnaire with 3 sections on a 3-point scale (Agree, Undecided, Disagree) and interview conducted over the phone, IM (instant messaging) and by email. The data collection spanned a period of three weeks. Data was collected in January 2008. The items in the questionnaire were adapted from previous related studies mostly from the KM model by Stankosky and Baldanza's (2001). The questionnaire items sought to: identify ICT tools that support KM; seek for enabling factors to use of ICT to support KM; evaluate ICT support for KM in terms of knowledge sharing; etc and identify barriers to KM, at the case study, PRINN. The respondents were the KM officer and 2 other staff with ICT related schedules at PRINN.

Discussion of findings of technology use in KM at PRRINN

It is important to underline the essential shared belief between staff in primarily using and developing their own minds rather than constantly based on technology (computers, CD-ROM, telephone, specializing software for design) for the production of a project. Therefore, PRRINN considers as its most important capital to be the people, as shown in the results of the interview, who the expansion of

their abilities is a vital issue in order to satisfy the demands of the clients. Technology contributes in the experimentation of staff. Further, technology contributes to employees so as to help them to experiment by trial and error. Technology is involved in the experimentation of the staff case organization. However, it occurs for a purpose, that staff will enrich their present knowledge searching for new routes of knowledge that use of ICT offers to them. Technology does not substitute the face-to-face interaction of staff. The interviews show that information sharing within PRRINN is hugely encouraged through face to face contact than any other means. For the staff of the case study PRRINN, the best way to store and retrieve knowledge is through the human interaction and the utilization of human mind. This is because through their personal contact, employees transfer their experience, intuition and knowledge from one person to another, while explaining insights and solutions that are applied to different projects in the past.

Although the methodology had included several personal and informal interviews with the knowledge officer and other staff at PRRINN covered many aspects of knowledge management in the organization. During the interview there was concentration on knowledge management systems and the role of information technology, but discussion of other issues were discussed. There were two types of information technology (e-mail and knowledge-based systems) mentioned during the identification of processes that were relevant to current KM, neither was pursued in the subsequent detailed interviews. Current uses of information technology for KM were identified as including the Internet (for searching), email, bulletin boards and shared files. There was also the identification that PRRINN had knowledge stored in databases. There was also the discussion of ideas related to IT, but more centred on their internal communication. There was the discussion on the fact that increasing number of staff wished to see more and better integrated databases, that is, shared databases as opposed to stand alone databases. The interview indicated that PRRINN is aware of the under-listed KM tools and intends to use them in the future (marked F below). The presently available tools (marked yes below) are used for administration, communication and knowledge sharing amongst staff and with partnering organizations. Staffs were asked if they perceived any organizational knowledge management initiative/principle and all respondents indicated 'no'. The last questionnaire item was whether KM could not exist without use of ICT tools and all respondents indicated 'no'.

Table: ICT support for KM at PRRINN- current facilities (marked yes) and suggested in future (marked F)

Available KM tools/Principles/Perception of KM

Email	Internet/Web	Intranet/Portal	Extranet	Shared Databases/file servers	Data warehouse
Yes	Yes	No	Yes	Yes	Yes

Bulletin boards	Accounting system	Their own website	MIS	Payroll system
	Yes	No	No	Yes

Blogs	Groupware	Data mining	Discussion forum	Wikis	KM Principles/Initiatives	No KM without technology?

No	No	No	No	No	No		No

Conclusion

Finding the way to make best use of generally available software such as intranets, email, portal technology and website for KM is perhaps the biggest single challenge for PRRINN and most likely other organizations in Nigeria. As PRRINN's suggested future KM technologies table 1 (above) suggests, there is awareness of these technologies but there is the issue of human challenges that this study cannot address. The success of the deployment of knowledge management systems is enhanced by the active management of communication between the KM system project team and stakeholders of the system, whether knowledge workers or not is essential to the smooth operation of the system during the deployment of the technologies. There are also issues of trust within the organization.

Once again, this paper underlines the importance of KM tools to support and enhance decision making in PRRINN at the process level. PRRINN and other organizations in Nigeria should consider use of tools such as discussion forums (also called discussion boards or bulletin boards) which from reviewed literature have been one of the earliest technologies for collaboration and knowledge sharing (Wagner and Bolloju, 2005). Highly interactive forums support ongoing collaborative discussions among producers (the KM deployment team) and the target audience as one group, continually responding to and building upon each individual's addition to the discussion (Zack, 1999). Because of the ability to share knowledge through these discussion boards – both from audience to deployment team and deployment team to audience, they provide a valuable solution to providing real time communication with targeted audience members that may not be co-located. The challenge of lack of IT infrastructure in rural Nigeria (target population of PRRINN) is fast changing as most urban cities in Nigeria presently have internet access and situations in rural areas changing with the emergence of GSM and mobile internet access and other initiatives of the federal government of Nigeria. However, there most certainly is more to KM than technology.

References

Ajiferuke, I. (2003). Role of Information Professionals in Knowledge Management Programs: Empirical Evidence from Canada. *Informing Science Journal* (6): 8-13.

Alavi, M., & Leidner, D. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly* (25:1): 107-36.

Alavi, M., & Leidner, D.E. (1999). Knowledge management systems: issues, challenges and benefits. *Communications of the Association for Information Systems* (1:7): 1-37.

Alavi, M., & Leidner, D.E. (2001). Review: Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly* (25:1): 107-36.

Al-Busaidi, K.A., & Olfman, L. (2005). An investigation of the determinants of knowledge management system success in Omani organizations. *Journal of Global Information Technology Management* (8:3): 6-22.

Becerra-Fernandez, I. (2000). The role of artificial intelligence technologies in the implementation of people-finder knowledge management systems, *Knowledge Based Systems* (13:5): 315-20.

Borghoff, U., & Pareschi, R. (1998). *Information technology for knowledge*

management, New York, NY: Springer.

Bush, A.A., & Tiwana, A. (2005). Designing strictly knowledge networks. *Communications of the ACM* (48:5): 67-71.

Clarke, E., &Ramsay, W. (1990). Problem of retention in tertiary education. *Education Research and Prospective, University of West Australia* (17:2): 47-59.

Cooper, W.H., Gallupe, R.B., Pollard, S., & Cadsby, J. (1998). Some liberating effects of anonymous electronic brainstorming. *Small Group Research* (29:2): 147-78.

Damodaran, L., & Olphert, W. (2000). Barriers and facilitators to the use of knowledge management systems. *Behaviour and Information Technology* (19:6): 405-13.

Davenport, T., & Prusak, L. (1998). *Working knowledge*. Boston, MA: Harvard Business School Press.

Davenport, T.H., & Glaser, J. (2002). Just-in-time delivery comes to knowledge management. *Harvard Business Review* (80:7): 5-9.

Davenport, T.H., & Prusak, L. (1998). *Working knowledge: How organizations manage what they know*. Boston, MA: Harvard Business School Press.

Dieng, R., Corby, O., Giboin, A., & Ribiere, M. (1999). Methods and tools for corporate knowledge management. *International Journal of Human-Computer Studies* (51): 567-98.

Earl, R.C., Galup, S. D., & Dattero, R. (2007). The transformations in the five-tier knowledge management transformation matrix. *Journal of Knowledge Management Practice* (8:1)

Edwards, J. S., Shaw, D., & Collier, P.M. (2005). Knowledge management systems: Finding a way with technology. *Journal of Knowledge Management* (9:1): 113-125

Eppler, M.J., Siefried, P.M., & Ropnack, A. (1999). Improving knowledge-intensive processes through enterprise knowledge medium. *SIGCPR '99*: 222-30.

Geets, G.L., & Kim, M. (2005). Blogging 101 for CPAs. *The CPA Journal* (75:7): 12-13.

Haslinda, A., & Sarinah, A. (2009). A review of knowledge management models. *The Journal of International Social Research* (2:9)

Holsapple, C. W (2005). The inseparability of modern knowledge management and computer-based technology. *Journal of Knowledge Management* (9:1): 42-52

http://www.getnaijajob.blogspot.com

http://www.transaid.org/projects/nigeria,-programme-for-reviving-routine-immunization-in-four-northern-states,-2007-%E2%80%93-2011

Jones, P. (2005). Strategies and technologies of sharing in contributor-run archives. *Library Trends* (53:4): 651-62.

Lamproulis, D. (2007). Cultural space and technology enhance the knowledge process. *Journal of Knowledge Management* (11:4): 30-44

Lewis, B. (2002). On demand KM: A two-tier architecture, *IT Professional* (4:1): 27-33.

Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis*. London: Sage.

Morey, D. (2001). High-speed knowledge management: Integrating operations

theory and knowledge management for rapid results. *Journal of Knowledge Management* (5:4): 322-8.

Nakpodia, E.D. (2006). Educational administration: A new approach. Warri-Nigeria: Jonakase Publishing Ltd.

Nonaka, I., & Konno, N. (1988). The concept of "ba": Building a foundation for knowledge creation. *California Management Review* (40:3): 40-54.

Nonaka, I., & Takeuchi, N. (1995). The knowledge-creating company. New York, NY: Oxford University Press.

Nonaka, I., Toyama, R., & Konnao, N. (2000). SECI, Ba, and leadership: A unified model of dynamic knowledge creation. *The Academy of Management Review* (23:2): 242-66.

Nwafor, M., & Salau, S. (2010). *Knowledge management and development targets in Nigeria*. International Food Policy Research Institute (IFPRI). Available: http://www.application/pdf_icon_nnspreports2.pdf

O'Dell, C., & Grayson, C.J. (1998). If only we knew what we know: Identification and transfer of internal best practices. *California Management Review* (40:3): 154-74.

O'Sullivan, K.J. (2007). Creating and executing an internal communications plan for knowledge management systems deployments. *Journal of Knowledge Management* (11:2): 102-108

Orlikowski, W.J. (1992). The duality of technology: Rethinking the concept of technology in organizations. *Organization Science* (3:3): 398-427.

Peters, J.T., & Waterman, H.R. (1982). *In search of excellence: Lessons from America's best-run companies.* New York, NY: Harper & Row.

Pettigrew, A.M. (1979). On studying organizational cultures. *Administrative Science Quarterly* (24:4): 570-81.

Pfeffer, J., & Sutton, I.R. (1999). *The knowing-doing gap.* Boston, MA: Harvard Business School Press.

Quinn, B.J., Anderson, P., & Finkelstein, S. (1996).Making the most of the best. *Harvard Business Review*, 32, 71-80.

Quinn, B.J., Baruch, J.J., & Zien, K.A. (1996). Software-based innovation, *Sloan Management Review* (37:4): 11-24.

Rafaeli, A., & Yavetz, V. (2004). Emotion as a connection of physical artifacts and organizations. *Organization Science* (15:6): 671-86.

Revilla, E., Rodríguez-Prado, B., & Prieto, I. (2009). Information technology as knowledge management enabler in product development: Empirical evidence. *European Journal of Innovation Management* 12(3): 346-363.

Schein, E.H. (1992). *Organizational culture and leadership.* 2nd ed. San Francisco, CA: Jossey-Bass.

Schon, D.A. (1987). *Educating the reflective practitioner*. San Francisco: Jossey-Bass.

Seely, C.P. (2002). Igniting knowledge in your business processes. *KM Review* (5:4): 12-15.

Shankar, R., Singh, M.D., Gupta, A., & Narain, R. (2003). Strategic planning for knowledge management implementation. *Work Study* (52:4): 190-200.

Snowden, D. (2002). Just-in-time knowledge management: Part 1. *KM Review* (5:5): 14-17.

Snowden, D. (2003). The knowledge you need, right when you need it. *KM Review* (5:6): 24-7.

Stankosky, M., & Baldanza, C. (2001). *A systems approach to engineering a KM system*. Unpublished manuscript

Storey, J., & Barrett, E. (2000). Knowledge management initiatives: Learning from failure. *Journal of Knowledge Management* (4:2): 145-56.

Thomas, J.C., Kellogg, W.A., & Erickson, T. (2001). The knowledge management puzzle: Human and social factors in knowledge management. *IBM Systems Journal* (40:4): 863-84.

Trice, H.M., & Beyer, J.M. (1984). Studying organizational cultures through rites and ceremonies. *The Academy of Management Review* (9:4): 653-69.

Tsui, E. (2005). The role of it in KM: Where are we now and where are we heading? *Journal of Knowledge Management* (9:1): 3-6

Tsui, E. (2002). Technologies for personal and peer-to-peer knowledge management, CSC Leading Edge Forum Technology Grant Report, May. Available: http://www.csc.com/aboutus/lef/mds67_off/index.shtml

Ulrich, W.L. (1984). HRM and culture: History, ritual, and myth. *Human Resource Management* (23:2): 117-28.

Vouros, G.A. (2003). Technological issues towards knowledge-powered organizations, *Journal of Knowledge Management* (4:2): 114-27.

Wagner, C., & Bolloju, N. (2005). Supporting knowledge management in organizations with conversational technologies: discussion forums, weblogs and wikis. *Journal of Database Management* (16:2): 1-8.

Walsham, G. (2001). Knowledge management: The benefits and limitations of computer systems. *European Journal of Management* (19:6): 599-608.

Weick, E.K. (1995). What theory is not, theorizing is. *Administrative Science Quarterly*, 40, 385-90.

WikkiTikkiTavi (2005). What is a WIKI, available at: http://tavi.sourceforge.net/WhatIsAWiki

www.healthpartners-int.co.uk/our_projects/prrinn.html

Zack, M.H. (1999). Managing codified knowledge. *Sloan Management Review* (40:4): 45-58.