Context-Aware Framework of Knowledge Management: Cultural and Infrastructural Considerations

Adekunle Okunoye

University of Turku and TUCS, Finland

adeokun@it.utu.fi

Abstract: Multiple case studies in India, The Gambia, and Nigeria are the background for an empirically grounded framework of knowledge management (KM). Cultural diversity and gaps in the provision of infrastructure make managing knowledge challenging but necessary in developing countries. These environmental factors interact with organisational variables and technology to enable or constrain knowledge management processes in the creation and protection of knowledge resources. The framework can help organisations to prepare their KM projects, to reveal problems during the project, and to assess its outcomes.

Key words: Knowledge management, framework, culture, infrastructure, organisational variables, developing countries, knowledge resources, knowledge processes

1. INTRODUCTION

Knowledge management (KM) frameworks tell us of the foci for consideration in KM efforts (Earl 2001). These frameworks can help organisations to approach KM methodically and consciously. They can help to identify a specific approach to KM, to define goals and strategies, to understand the various KM initiatives, and then to choose the best ones in the particular circumstances (Maier and Remus 2001; Earl 2001). There have been several frameworks to guide KM efforts in organisations. However, these frameworks do not address KM across the full spectrum of organisational needs (Calaberese 2000), but each of them addresses certain KM elements. There is need for a comprehensive KM framework.

The three recent reviews (Holsapple and Joshi 1999; Lai and Chu, 2000 and Rubestein-Montano et al. 2001) discuss the components and assumptions in the existing frameworks. There appears to be a consensus on the need for a more generalized framework, and, consequently, these authors also outline recommendations for what should be included in it. All agree that the basic components should be knowledge resources, KM processes and influences. Even though the existing and the suggested frameworks recognise varying organisational contexts, they generally appear to ignore the differences in the operating environmental contexts. This is similar to the pattern in IS literature, where very few studies address global diversity (Walsham 2001; Avgerou 2002).

The importance of the local operating environmental context has already received some attention in information systems research and practice (Simon 2001; INDELEHA Project, 1999). In KM, however, there is a basic need for consideration of the environmental context and how it could influence other issues involved. The framework describe here is designed to address that need, by focusing on the local cultural and infrastructural factors that could interact with organisational factors and information technology and the resultant effect on knowledge processes and resources. Considering the context in which KM frameworks are designed and their designers, it can be argued that some basic assumptions (to be discussed later) about the KM processes and influences have been inscribed into these frameworks (Akrich 2000). An attempt to describe and apply the framework in another context might be conflicting. Hence, a context-aware framework, with specific consideration for the operating environmental factors and for the organisational factors that are closely related to the environment, would meet the requirements for a universally applicable KM framework.

2. THE MAKING OF THE FRAMEWORK

2.1. The Study

Most of the studies that form the basis of the existing frameworks have been carried out in organisations in Western industrialised countries where there can be similarities in some of the assumptions about the components of the framework. To add a new perspective, we conducted our study in developing countries. These countries afford us opportunity to see the differences in culture and infrastructure provision at the local level.

An empirical study was conducted into KM in six research organisations in Nigeria and The Gambia (Okunoye and Karsten 2001) and two research organisations in India (Okunoye et al 2002). Nigeria is representative of

countries in sub-Saharan Africa (SSA) due to its large population and huge natural resources. There are many multinational companies with importation and imposition of western management styles. The Gambia presents a contrast to Nigeria as one of the smallest countries in SSA but with a reliable infrastructure. Having lived in these two countries, I anticipated the data to show some cultural differences. India is representative of countries in South Asia, by population, culture and business environment. India is a major site for offshore software production (Lateef 1997) and the influences of this were anticipated to show both in the environmental context and in the organisational variables. The methodology used was a multiple case study (Yin 1994). The analysis of the data was carried out on the organisational level (Korpela et al, 2001). Both quantitative and qualitative data was collected using questionnaires, interviews, non-participant observation, and reviews of historical documents (Okunoye and Karsten 2001).

The discussion in this paper summarises and concludes the earlier reports of the studies. The results show differences to earlier assumptions on the influence of KM, especially when the local operating environment context is considered (Okunoye and Karsten 2002a). Our study showed how the availability and use of information and communication technologies could support KM processes (Okunoye and Karsten 2002b) and how especially the Internet appears to provide a gateway to the international research community (Okunoye and Karsten 2003). This would suggest raising IT to be a major component in a comprehensive KM framework. These findings also indicated some issues about leadership, structure, and culture that are contextual to each organisation and the environment in which they operate. A conclusion of our study is that a KM framework needs to have contextual relevance for organisations in diverse social-cultural environments (Okunoye 2002a). It should align information technology, people, structure, knowledge processes and socio-cultural and organisational influences to make KM sustainable. In this paper, I synthesize all the insights from our studies, to build a context-aware framework, with an explanation of its components. The framework is called KAFRA (an abbreviation of Kontext Aware FRAmework).

In building KAFRA, also well-known concepts and theories in organisation studies were used to support the arguments. Leavitt (1965) calls for interdependence of organisational variables for effective organisational change and Scott (1998) asserts that environment and organisation are inseparable. Powell and DiMaggio in their institutionalist perspective (1991) support the argument on the need to consider the operating environment in a KM framework. Following Pettigrew's contextualist approach (1987), for a study on change to contribute towards a robust theory (framework) that can guide practice, it must examine change as a process and in a historical and contextual manner. Hofstede's (1997) cultural model and Galbraith's (1977)

conceptualisations of organisational variables are also brought in to strengthen the arguments for the KAFRA framework. With evidence of the influence of local diversity in an organisation's environment, we discuss cultural and infrastructure diversity and their influences on KM. The diversity in our study organisations—which include national and international organisations in different research fields—formed the basis of evidence on contextual issues in organisational variables and information technology. Each of the components is discussed next in detail with some specific examples.

2.2. Environmental factors

Environmental factors include those factors outside the organisation, in its environment, that directly influence its activities. Holsapple and Joshi (2000) include governmental, economic, political, social, and educational factors (GEPSE) here. There are also other factors such as *culture* and *national infrastructure.* The operating environment varies from organisation to organisation, between countries, and also from one site to another within a country. Yet many frameworks that guide organisational strategies and development assume a homogeneous environment and thus exclude it in their design.

2.2.1. Infrastructural issues

The national infrastructure can be said to include education, banking and cooperatives, transport and communication systems. There has been claim that these infrastructures could influence the organisational IT infrastructure (Weill and Vitale 2002). The infrastructural issues are derivatives of several other environmental factors and this discussion cuts across many other issues. The infrastructural capability of a country is likely to influence the kind of technology the organisation could deploy. It could also determine the extent of the application and sustainability of this technology. Most of the technological problems associated with environmental factors are beyond the control of single organisations. There are considerable differences in the IT infrastructures globally between countries, e.g. between western and developing countries (The World Bank Group 2002). The differences within developing countries are also wide, as is illustrated in Table 1.

Specifically, in our study and as evidenced in literature and available statistics (Odedra et al. 1993, World Bank Group 2002), the problem with the IT infrastructure is more pronounced in SSA than in India where the government has invested heavily in it. Most of the problems in the SSA can be attributed to the government's lack of preparedness to commit sufficient

resources to develop the national infrastructure, which could as a consequence improve the organisational infrastructures.

ICT infrastructure, computers and the Internet	Nigeria	The Gambia	India	USA
Telephone mainlines/1000 people	4	26	32	700
Mobile phones/1000 people	0	4	4	398
Personal computers/1000 people	6.6	11.5	4.5	585.2
Internet users (‘000)	200	4	5,000	95,354
Internet speed and access[1]	2.5/7		3.6/7	6.6
Internet effect on business[1]	3.3/7		3.2/7	5.0

Table 1. Infrastructural differences between Nigeria, The Gambia, India and USA (The World Bank Group 2002).

For example, in Nigeria, individual cost is associated with Internet use in the national research organisations we studied, but not in India and The Gambia. Also, the Indian government’s long-term investment in the social infrastructure has provided a large pool of qualified IT practitioners (Tessler and Barr 1997). This has a high impact on the kinds of technology they are able to use in the organisations. They have been able to design the required KM applications and to provide adequate support, sometimes at a cheaper cost when compared to Nigeria and The Gambia. This was unlike in SSA where getting qualified IT support and management personnel continue to be a big problem (Odedra et al. 1993). These examples show the kind of influence the infrastructure provision in a particular environmental context can exert on the information technology that can be deployed within an organisation. It also shows the effect on usage: where individuals are responsible for the cost of using technology, it is likely to be used less. Thus, a framework that could be applicable in this context should provide for the assessment of infrastructural provision in the environment where the organisation operates.

2.2.2. Cultural issues

Several authors have demonstrated how national culture influences management practices. For example, Schneider and Barsoux (1997) relate culture with each of the organisational variables that have been identified as having a great influence on KM (APQC 1996). Weisinger and Trauth (2002) have argued that cultural understanding is locally situated and

[1] Ratings from 1 to 7; 7 is highest/best

negotiated by actors within a specific context. In information systems research, national culture has been noted to influence, among others, IT utilization (Deans at al., 1991), IT diffusion (Straub 1994), and technology acceptance (Straub et al. 1997, Anandarajan et al 2000). Earlier KM frameworks recognize different organisational cultures but they are often silent on the effect of different national cultures.

The best-known and most widely used cultural model was developed by Hofstede (1997). He included four dimensions of national culture: power distance, uncertainty avoidance, individualism-collectivism, and masculinity-femininity. He then added a fifth dimension: long- versus short-term orientation based on a study carried out in Asian countries. The model helps bring out issues related to cultural differences and it provides some universal measures with which to analyze them. According to Walsham (2001), however, such measures are too general and cannot be used to explain some cultural differences. Considering the fact that people's behaviour is likely to be culturally influenced and that people play a major role in KM, it is important that a framework to guide an organisation also should consider these cultural differences.

According to Hofstede, countries in West Africa differ culturally from USA especially in the power distance and individualism-collectivism dimensions. This study and my earlier experiences[2], however, tell of major differences within and between the countries in West Africa. In western Nigeria, where three of the study organisations are located, every village has a well-defined hierarchy and family structure. It is a societal norm to treat senior members with absolute respect and obedience. Their views and opinions are often accepted and their judgements are not to be publicly questioned. Contrary behaviour (even when not necessarily wrong) by any member of the community can be interpreted as disloyalty and attract punishment. In the Nigerian national research organisations, it was very easy to recognize the leaders and people in position of power. Without careful attention to this, implementing a framework that assumes that everyone has freedom of expression and equal rights could likely yield another outcome in these settings. There is a gap between the leaders and their subordinates. In northern Nigeria, however, the scenario is different even though it is within the same country. The hierarchy is less pronounced and the social stratification is somewhat blurred. The Gambia exhibits similar characteristics to northern Nigeria.

When the above example is interpreted with Hofstede's dimension of power distance, it would be higher in western Nigeria when compared to northern Nigeria and The Gambia. This is contrary to Hofstede's

[2] I am Nigerian by birth and have lived and worked in The Gambia for four years.

classification of West Africa into one category. Our argument here is that each organisation should be studied in its own cultural context and thorough knowledge of this should influence the application of the KM framework.

2.3. Organisational variables

The organisational variables as a necessary concern are recognized in several studies and frameworks (Holsapple and Joshi, 2000, APQC 1996), also our study included (Okunoye and Karsten 2002a). To succinctly describe all organisation issues that could influence KM, the conceptual framework (Figure 1) developed by Galbraith (1977) is adopted and modified by adding organisational culture which is another important component in organisational design (Schein 1985). Task, structure, information and decision processes, reward systems, and people are included in the framework. These variables need to be aligned for optimal results (Leavitt 1965; Galbraith 1977).

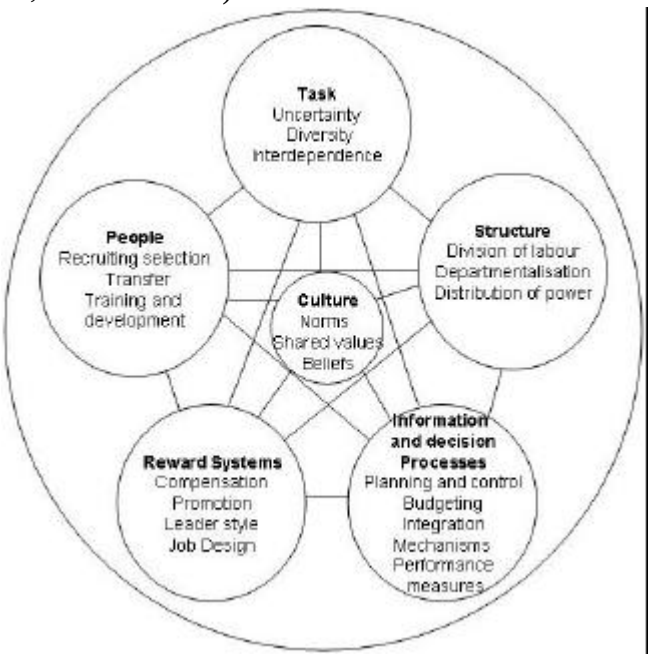

Figure 1. Organisational Variables (adapted from Galbraith 1977)

Organisational structure is the distribution of power and the shape of the organisational form. People have competence, nature and attitudes. Information and decision processes include especially the availability and accessibility of information. The reward systems tell how the organisation compensates its members for effective performance. The organisational culture includes the shared values, beliefs, norms, expectations and

assumptions that bind people and systems. The organisational culture is particularly important in KM because it gives the people a basis for stability, control and direction and helps them to adapt and integrate other variables and technology with the operating environmental factors. Organisational changes could depend on how well the interrelationship of these variables can support an organisation's core activities, considering the available information technology (Markus and Robey 1988) and the influence of environmental factors.

These organisational variables and the KM processes are mutually dependent (APQC 1996). For the success of a KM project, Davenport and Prusak (1998) include many of the organisational variables as important factors. Due to several factors such as strategic alliance, internationalisation of firms and services, technology transfer, globalisation, and recent advances in ICT, the western management style and forms of organisation have a great influence across the world. The success of multinational corporations and consulting firms add to the assumptions about the universality of management strategies, including knowledge management. Nevertheless, while the basic principles might be the same, the assumptions are not. This is next illustrated with examples.

The people working in an organisation are directly influenced by their own identity (Walsham 2001), which could be influenced by societal norms and values and controlled by social, economic, and educational factors. For example, while training and learning without any formal certification could be acceptable for employees in western industrialized countries, we found that employees in SSA would normally like to have a certificate for their training. The reason is the importance attached to a certificate as evidence of knowledge, and the prospect of getting a well-paid job, based on the extent of certified training. Similarly, knowledge as a source of power has a different meaning to western employees and their developing countries counterparts, where, due to high unemployment rate, lack of social security and benefits, and with only few well-paid jobs, everyone likes to protect their source of competitiveness and thus they view sharing knowledge as giving away their power.

The basic concept of knowledge varies from one culture to another. In each of the countries in our study, there is a long tradition of recognizing some people as a repository of knowledge: for example, the griot in the Gambia, the babalawo in Yorubaland and the guru in India. Even though not pronounced in research organisations (as it is basically overridden by the professional culture), attention needs to be paid to differences in the peoples' notion of knowledge and the effect of this on organisations. One scientist in a national organisation explained how ascription is being used to rate people's contributions instead of achievement, that is, people are judged by who they are and not necessarily by what they do.

As research organisations, our case organisations shared many similar cultural features and the scientists also have a similar professional culture. Yet, there are notable differences in the organisational culture of national versus international organisations. While international organisations exhibit combinations of cultures (Weisinger and Trauth 2002), which include corporate culture, industrial culture, professional culture and some national culture of the local environment, the national organisations are greatly influenced by the regional culture (e.g. western versus northern Nigeria). Also, the diversity in workforce of international organisations reduces the effect of the interaction of national or societal culture with organisational culture when compared to national organisations. The organisational structure is closely related to the societal structure and the style of leadership could be influenced by the orientation of the people (Korpela 1996). Following the leadership pattern in western Nigeria, we also observe that superiors are often inaccessible and the power holders are entitled to privileges in organisation. The hierarchical settings in the community are also reflected in the organisation. This is in contrast to organisations in The Gambia. This has implications for KM, as the organisational structure could affect knowledge sharing and communication (Davenport and Prusak 1998)

Taken together, each of these has implications for KM efforts in organisations. In KM research and practice, it has always been suggested that particular attention be paid to organisational variables, (often called enablers or influences) without which the success of KM cannot be guaranteed. With evidence that the assumptions about these variables are contextual, I contend here that any framework to support KM needs to consider each variable in the context of each organisation, with due consideration also for the interaction with the operating environment.

2.4. Information Technology

Information technology (IT) can support the processes for knowledge creation, sharing, application and storage (Alavi and Leidner 2001). It can also enhance the interaction of individual, group, organisational, and inter-organisational knowledge (Nonaka and Takeuchi 1995, Hedlund 1994). Information technology availability and use varies even within countries and between organisations. When there is little funding to an organisation, there are fewer computers and software applications for use, with less access time to the Internet and other IT services.

In contemporary organisations, IT is not only considered to support other organisational processes but as a source of competitive advantage and even organisational core capability. IT enables changes in the organisational structure and supports communication within and between organisations. IT can make the information and decision making processes easier. There is

hardly any aspect of organisations that IT has not affected, including the way people think and carry out their work processes (Lau et al. 2001).

According to Orlikowski and Barley (2001), the transformation in the nature of work and organizing cannot be totally understood without considering both the technological changes and the institutional (specifically environmental) context that are reshaping economic and organisational activities. This clearly explains the interrelationship of the environment, organisational variable and technology. They argue that collaboration between organisational issues and information technology could increase the understanding of changes taking place in the organisation. In our study, we found out that organisations with high IT capability were able to support knowledge processes better in spite of some notable exceptions. The application of technology also depends on the people and the support of the management, which are also organisational issues.

Many technologies can support KM processes. However, these technologies require a basic IT infrastructure, such as local area networking and Internet connectivity, to function optimally. There is also need for basic hardware and software. The provision of these IT infrastructures varies between organisations (Broadbent et al. 1999) and its use depends on the context of each organisation. Also in our study, we found differences in level of IT capability between national and international organisations, which we attribute to differences in level of funding, and other factors (Okunoye 2002b). There were also differences in expertise to support these technologies. Although IT skill shortage is a global phenomenon, its extent varies between countries. Thus, it is important that a framework to support KM efforts in an organisation recognises these different levels of IT availability and use and that it supports the organisation in making a right decision of which technology is most appropriate in their circumstances.

2.5. Knowledge Management Processes

Knowledge management processes are socially enacted activities that support individual and collective knowledge and interaction (Alavi and Leidner 2001). These activities vary depending on which of the knowledge resources that the organisation aims at improving. It is these activities that must be supported by the influences discussed earlier. Since each organisation has a different focus, KM processes take place also in a different context. These processes can be summarized as knowledge creation, knowledge storage/retrieval, knowledge transfer, and knowledge application. Thus the organisation should consciously choose which of these activities they intend to support in order to choose appropriate organisational variables and technology to enable them. For example, research organisations in SSA are particularly interested in knowledge creation and

transfer and they found Internet a technology to support this process (Okunoye and Karsten 2003). One of our case organisations in India focuses on knowledge sharing among the scientists and the rural community and they also are using a global intranet (ICRISAT 2001).

2.6. Knowledge resources

The main targets of the KM processes are the knowledge resources. Holsapple and Joshi (2001) present a comprehensive framework of organisational knowledge resources where they consider employee knowledge, knowledge embedded in physical, human capital, organisational capital, customer capital, external structures, internal structures, employee competencies. Knowledge resources also include intellectual capital (Stewart 1998). The main advantage of KM lies in these resources (Lai and Chu 2000). The benefit and strategic importance of KM is in the ability of an organisation to correctly identify which knowledge resources they can improve to gain sustainable competitive advantage. This is a reason for the popularity of KM as the process of identifying the resources and subsequent selection of processes are never the same. In addition, organisational variables and technology need to support these processes with varying complexity and with different levels of influence by the operating environment.

3. CONTEXT AWARE FRAMEWORK OF KM

In this context-aware KM framework, KM is seen as an effort to properly put all the organisational variables into best use with the support of relevant information technology to facilitate the knowledge processes with the main goals of organisational productivity, responsiveness, innovation, and competency through the creation and protection of knowledge resources.

This framework (Figure 2) differs from those presented earlier in that it considers the relationships between and interdependency of all components with particular attention to the environmental context. This framework enables organisations to pay attention to the local context and how this affects the assumptions about each component. The method and research approach used to arrive at the assumption about the components also ensure that the projected users are the actual users and the gap between the world inscribed in it and the world that will be described by its displacement can be expected to be narrowed, if not eliminated.

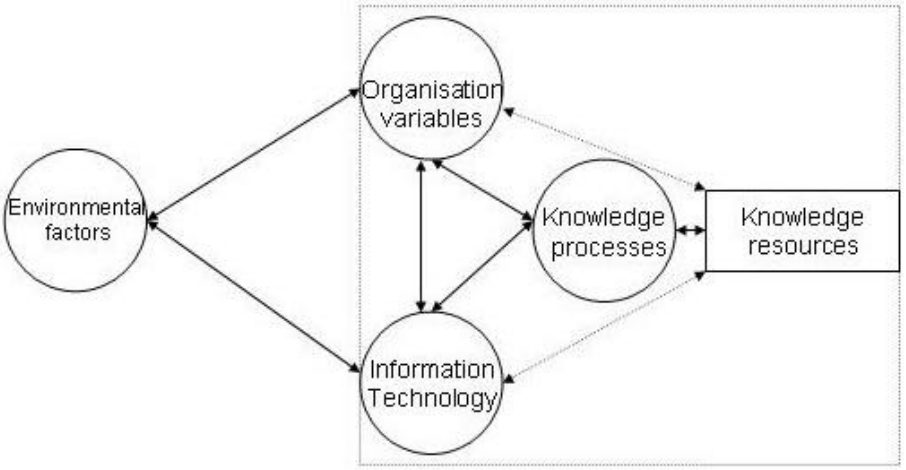

Figure 2. Context -aware framework of knowledge management

As explained earlier, all the organisation-related influences that could enable or constrain KM can be put together as *organisational variables. Information technology* is a separate component due to its strategic importance in supporting *the knowledge processes* of knowledge creation, storage, sharing and application. All these are directly affected by the *environmental factors* (e.g. culture and infrastructure in our discussion) where the organisation operates. The organisational variables and information technology can influence each another and they are both enablers of knowledge processes. On the other hand, the kind of knowledge to be created could determine which kind of information technology to be used and which variables in the organisation need to be adjusted. Effective handling of knowledge processes yields the main aim of the KM, which is improving the *knowledge resources* in which the competitive advantage and all other benefits of KM lie. Also, knowledge resources could effectively affect knowledge processes.

The double arrow that joins the organisational variables and the technology to the operating environment shows the interdependency between the organisation and the environment, ensuring that KM processes are consistent with the external environment in which the organisation operates and that those activities meant to improve knowledge resources are undertaken in a coordinated manner. Each component is linked to the others in a cyclic manner, which indicates the continuous dependency and influence between them. There is also a possibility of direct interaction between knowledge resources and organisational variables and also with information technology, even though not explicitly explained in this framework.

4. CONCLUSIONS

The KM framework presented here could be applied by anyone in any organisation. The framework agrees with the recommendations of Leavitt (1965) that call for interdependence of the variables and with Scott (1998) in acknowledging that organisations and their environment affect each other. The consideration for environmental factors agrees with the institutionalist perspective of organisational challenges (Powell and DiMaggio, 1991). The emphasis on the importance of context within which the framework will be applied can be fully explained by Pettigrew's contextualist approach (1987).

The application of this framework requires thorough understanding of the issues related to each component, that is, pre-knowledge of organisational variables and an ability to handle problematic areas are required. Knowledge of the technology and which knowledge processes it can support are also essential for the successful application of the framework. The organisation also needs to know the knowledge resources they are interested to improve for competitive advantage and which knowledge processes could best support this. The framework also requires cultural knowledge of the environment and what kind of infrastructure is available in reality. The GEPSE factors are often common knowledge but statistics sometimes do not reveal many qualitative details; input of a local person is again required.

The framework could ensure that KM is approached with consideration to the environment in which the organisation operates and that these activities are carried out in a well-guided manner. This framework shows the need for a multidisciplinary team for a KM project. In a multinational organisation, a multicultural team is also required. The problems associated with inscription of the outsiders' beliefs, perception, and norms are addressed in the framework. Also, the expected users are the actual users and the displacement that the latter could cause is already built into the framework. For KM practice, this paper contributes to understanding the cultural and infrastructural interaction with organisational variables and technology, an issue which has been attempted to address in KM. It also forms a basis for the composition of a KM team and means of control and balances. For researchers, it contributes a universal generalized framework, which allows for localized specific assumptions. It also confirms the relevance of some known concepts in knowledge management.

REFERENCES

Akrich, M. "The Description of Technical Objects," In Bijker W. and Law J. (Eds), *Shaping Technology /Building Society: Studies in Sociotechnical Change.* Cambridge: The MIT Press, 2000, pp205-224

Alavi, M. and Leidner, D. "Knowledge Management and Knowledge Management Systems: Conceptual Foundations and Research Issues," *MIS Quarterly*, (25:1), 2001, pp107-136.

American Productivity and Quality Center (APQC), Knowledge Management: Consortium Benchmarking Study Final Report 1996 Available in http://www.store.apqc.org/reports/Summary/know-mng.pdf [Accessed April 3rd, 2000]

Anandarajan, M., Igbaria, M., and Anakwe, U. "Technology Acceptance In The Banking Industry: A Perspective From a Less Developed Country," *Information Technology and People*, 13(4), 2000, pp. 298-312

Avgerou, C. *Information Systems and Global Diversity*, Oxford: Oxford University Press. 2002

Broadbent, M., Weill, P., and St. Clair, D. "The Implications of Information Technology Infrastructure for Business Process Redesign," *MIS Quarterly*, (23:2), 1999, pp159-182

Calaberese, F. *A Suggested Framework of Key Elements Defining Effective Enterprise Knowledge Management Programs*. George Washington University, The School of Engineering and Applied Science, PhD Dissertation, May 2000

Davenport, T. and Prusak, L. *Working Knowledge: How organisations manage what they know.* Harvard Business School Press: Cambridge, MA, 1998.

Deans, C.P., Karawan, K.R., Goslar, M.D., Ricks, D.A. and Toyne, B. (1991), "Identification of key international information systems issues", *Journal of High Technology Management Review*, (2:1), pp. 57-81

Earl, M. "Knowledge Management Strategies: Towards Taxonomy," *Journal of Management Information Systems*, Summer (18:1), 2001, pp. 215-233

Galbraith, J. *Organisational Design.* Reading. Mass.: Addison Wesley, 1977

Hedlund, G. "A Model of Knowledge Management and The N-Form Corporation," *Strategic Management Journal*, (15), Summer1994, 73-90

Hofstede, G. *Cultures and Organisations – Software of the Mind*, New York: McGraw Hill, 1997

Holsapple, C. and Joshi, K. "Description and Analysis of Existing Knowledge Management Frameworks". In *Proceedings of the 32nd Hawaii International Conference on System Sciences*, 1999

Holsapple, C. and Joshi, K. (2000). "An Investigation of Factors that Influence the Management of Knowledge in Organisations," *Journal of Strategic Information System*, (9:2-3), 2000, pp. 235-261

Holsapple C. and Joshi K. "Organisational Knowledge Resources." Decision Support Systems. 31(1), 2001, pp. 39-54

ICRISAT Medium Term Plan 2002-2004, *People First!* International Crops Research Institute for Semi-Arid Tropics, Patancheru AP, India, May 2001

INDEHELA-Methods project, 1999, Available at http://www.uku.fi/atkk/indehela/ [Accessed Sunday, 02 March 2003]

Korpela, M. "Traditional culture or political economy? On the root causes of organisational obstacles of IT in developing countries," *Information Technology for Development*, (7), 1996, pp 29-42

Korpela, M., Mursu, A, and Soriyan, H. A."Two times four integrative levels of analysis: a framework," in *Realigning Research and Practice in Information Systems Development. The Social and Organisational Perspective*, N.L. Russo, B. Fitzgerald, and J. DeGross (eds.), Boston: Kluwer Academic Publishers, 2001, pp. 367-377

Lai, H. and Chu, T. "Knowledge Management: A Theoretical Frameworks and Industrial Cases", *Proceedings of the 33rd Hawaii International Conference on System Sciences*, 2000

Lateef, A. "The Global Software Industry", *International Institute for Labour Studies, New Industrial Organisation Programme*, 1997, DP/96/1997

Lau, T., Wong, Y. Chan, K., and Law, M. "Information Technology and The Work Environment – Does IT Change the Way People Interact at Work?" *Human Systems Management*, (20:3), 2001, pp. 267-280

Leavitt, H.J., Applied organisational change in industry: Structural, technological, and humanistic approaches, in March J. (ed), *Handbook of Organisations*, Rand McNally & Co. Chicago 1965, pp.1144-1170

Maier, R. and Remus, U. "Toward a Framework for Knowledge Management Strategies: Process Orientation as Strategic Starting Point". In *Proceedings of the 34th Hawaii International Conference on Systems Sciences*, 2001.

Markus, L., and Robey, D. "Information Technology and Organisational Change: Causal Structure in Theory and Research." *Management Sciences*. 34(5), 1988, pp 583-598

Nonaka, I. and Takeuchi, H., T*he Knowledge-Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press: Oxford, UK, May 1995

Odedra, M., Lawrie M., Bennett M. and Goodman S. "International Perspectives: Sub-Saharan Africa: A Technological Desert," *Communications of the ACM*, (36:2), 1993, pp25-29

Okunoye, A. "Towards a Framework for Sustainable Knowledge Management in Organisations in Developing Countries," *In Proceedings of the IFIP World Computer Congress Canada (WCC2002)*, Brunnstein and Berleur (eds.), 2002a, pp. 225-237.

Okunoye, A. North in the South: Comparative Analysis of Information Technology Infrastructure in International vs. National Research Organisations in sub-Saharan Africa. *In Proceedings of The Global Information Technology Management World Conference*, 2002b, pp. 140-143

Okunoye, A and Karsten, H. "Information Technology Infrastructure and Knowledge Management in sub-Saharan Africa: Research in Progress". In *Proceedings of Second Annual Global Information Technology Management (GITM) World Conference*, June 10-12, 2001 in Dallas, TX, USA, 2001

Okunoye, A. and Karsten, H. "Where The Global Needs The Local: Variation in Enablers in the Knowledge Management Process," *Journal of Global Information Technology Management*, (5:3), 2002a, pp. 12-31.

Okunoye, A. and Karsten, H. "ITI as enabler of knowledge management: empirical perspective from research organisations in sub-Saharan Africa," *Presented to the HICSS conference*, January 2002, Hawaii, 2002b.

Okunoye, A. and Karsten, H. "Global Access to Knowledge in Research: Findings from Organisations in sub-Saharan Africa," *In press - Information, Technology and People*, (16:3), 2003

Okunoye, A., Innola, E. and Karsten H. "Benchmarking Knowledge Management in Developing Countries: Case of Research Organisations in Nigeria, The Gambia, and India." *In proceedings of the 3rd European Conference on Knowledge Management.* (CD-Rom), Dublin Ireland , 24-25 September 2002

Orlikowski, W. and Barley, S. "Technology and Institutions: What Can Research On Information Technology And Research On Organisations Learn From Each Other," *MIS Quarterly*, (25:2), 2001, pp. 145-165

Pettigrew, A. M. "Context and action in the transformation of the firm," *Journal of management studies*, (24:6), 1987, 649-670.

Powell, W. W. and DiMaggio, P.J., Ed. *The New Institutionalism in Organisational Analysis.* Chicago, University of Chicago Press, 1991.

Rubenstein-Montano, B., Liebowitz, J., Buchwalter, J., McCaw, D., Newman, B., Rebeck, K. and The Knowledge Management Methodology Team. "A Systems thinking Framework for Knowledge Management," *Decision Support Systems*, (31:1), 2001, pp. 5-16

Schein, E. *Organisational Culture and Leadership*, San Francisco: Jossey-Bass, 1985

Schneider, S.C. and Barsoux, J.-L. *Managing across cultures,* London: Prentice Hall., 1997

Scott, W. *Organisations: Rational, Natural and Open Systems.* Upper Saddle River, New Jersey: Prentice-Hall, Inc, 1998

Simon, S. "The impact of Culture and Gender on Web Sites: An Empirical Study". *The DATA BASE for Advances in Information Systems*, (32:1), 2001, pp. 18-37.

Stewart, T. (1997). Intellectual Capital: The New Wealth of Organisation. New York: Double Day

Straub, D., Keil, M, and Brenner, W. "Testing the Technology Acceptance Model across Cultures: A Three Country Study," *Information & Management,* (31:1), 1997, pp. 1-11

Straub, D. The effect of Culture on IT Diffusion: Email and Fax in Japan and the US, Information Systems Research, (5:1), 1994, pp 23-47.

Tessler, S. and Barr, A. (1997). Software R&D Strategies of Developing Countries, *Stanford Computer Industry Project, Position Paper*, January.

The World Bank Group, Data and Map, Available from http://www.worldbank.org/data/countrydata/ictglance.htm 2002 [Accessed Sunday, 02 March 2003]

Walsham, G. *Making a World of Difference: IT in a Global Context.* New York: John Wiley and Sons, 2001.

Weill, P. and Vitale, M. "What IT Infrastructure Capabilities are Needed to Implement E-Business Models?" *MIS Quarterly Executive,* (1:1), 2002, pp.17-34

Weisinger, J. and Trauth, E. "Situating Culture in The Global Information Sector," *Information Technology and People,* 15(4), 2002, pp. 306-320

Yin R. K., *Case Study Research: Design and Methods 2nd ed.* Sage Publications: Newbury Park, CA. 1994.

ABOUT THE AUTHOR

Adekunle Okunoye is a doctoral student at the University of Turku/Department of Information Technology and Turku Center for Computer Science, Finland. His dissertation examines knowledge management and global diversity, and develops a framework to guide knowledge management efforts of organisations in developing countries. Adekunle is from Nigeria and his practical industry experience includes software development, data management, and consulting in Nigeria, The Gambia and Finland. To date, he has published in various journals and conference proceedings. Adekunle can be reached at adeokun@it.utu.fi or through his homepage at http://www2.cs.utu.fi/~adeokun