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ABSTRACT:

Nowadays we are living an era which is marked by efforts for originality, innovation, collaboration, accumulation of experience and integration with and through many inventions such as computers, the internet, and technologies that have facilitated knowledge sharing and communication among people. This research seeks to extend the existing literature on KMS and knowledge sharing by proposing a conceptual framework, namely ECCCT (Evolution, Collaboration, Connection, Codification and Technical) that can be used to study how knowledge management systems (KMS) facilitate knowledge sharing to support decision making processes in multinational corporations (MNC). In this research, 42 semi-structured interviews have been conducted with participants from 35 MNC in 11 countries. All participants are KMS professionals, managers and employees in MNC who are using KMS in different sectors and at different levels. The work will assist managers in MNC in finding new ways of leveraging and sharing knowledge.

Keywords

Knowledge Management, Knowledge Management Systems, Decision Support Systems, Multinational Corporations, Integration between KMS and DM Processes

INTRODUCTION

In the current global market, knowledge is considered a source of competitive advantage and has become a crucial factor for organisations. Accordingly, MNC are searching for appropriate ways to manage and use their knowledge effectively and efficiently (Ordóñez de Pablos, 2006). Technology helps employees in accessing the knowledge they need when they need it (Chong and Chong, 2009). Bals et al. (2007), highlight that technology merely provides the tools with which decision makers and users can leverage their knowledge in the context of their work. Furthermore, because of the advent of the knowledge economy and the increasing magnitude of knowledge societies, organisations are usually seeking new ways of leveraging and sharing knowledge (SK) to support Decision Making (DM) processes (DeTienne and Jackson, 2001). Therefore, in this highly competitive global environment, MNC are now recognising an urgent need to institutionalise knowledge sharing (KS) as a mean of obtaining the best value from all available knowledge assets (Goh, 2007). Nielsen and Michailova (2007) state that over the past two decades, many MNC have considered information technology based systems for the purpose of sharing, utilising and integrating knowledge, referred to as Knowledge Management Systems (KMS).These systems are part of the agenda in many of today's leading MNC. They are often attributed with increasing the flexibility of MNC, responding faster to the current changing environment, improving decision making and spurring greater innovation. Nemati et al. (2002)

state that knowledge management initiatives can facilitate the capturing, coding and sharing of knowledge within organisations, which is expected to result in well informed decision processes. Thus, KMS can facilitate knowledge management by ensuring knowledge flow from the person(s) who know to the person(s) who need to know throughout the organisation (Bose, 2004). Furthermore, there are many unprecedented challenges facing managers outside their organisations along with environmental "forces of change" such as: globalisation, emerging technologies, emerging best business practices, government regulations, competitive global financial markets, limited knowledge workers and higher worker turnover rates (Cuffe, 2007). Therefore, in order to succeed in the global information society organisations need to identify, value, create, evolve and develop their knowledge assets since knowledge is one of their meaningful economic resources (Ergazakis, 2003).

In view of that, it is important to explore the characteristics of KMS that can facilitate KS to support DM processes in MNC. This raises the interesting question of our research: What are the characteristics of KMS that can facilitate knowledge sharing to support DM processes in MNC. Therefore, the focus of the paper is about KS in MNC and the main objective of this research is to determine KMS's characteristics that can facilitate KS to support DM processes in MNC.

In this paper we summarise an exploratory research to address this issue. We begin this paper by discussing some issues regarding Knowledge Management, Knowledge Management Systems and Decision Making processes in MNC. We then outline the methodology and data collection of the study and present the findings of the research. Finally we draw out some of the implications of our findings with a focus on our future research.

KNOWLEDGE MANAGEMENT

In contemporary society the most important source of wealth is knowledge. Bolloju et al. (2002) state that knowledge, as an organisational asset, enables organisations to sustain their competitive advantage and this is one of the most important reasons that explains the increasing interest of MNC in KM. Gupta and Govindarajan (2000) points out that with roots in organisational learning, and innovation, the idea of KM is not new. In the literature, we can find many definitions of Knowledge Management. However these definitions vary widely and often seem arbitrary. For example, Davenport and Prusak (1998) define KM as an effort to capture not only explicit factual information but also the tacit information and knowledge that exists in an organisation, usually in the minds of employees in order to advance the organisation's mission. Jennex (2005) used an expert panel to generate a composite definition of KM as *"the process of selectively applying knowledge from previous experiences of decision making to current and future decision making activities with the express purpose of improving the organisation's effectiveness".*

Accordingly, definitions of KM are varied based on the intention of its use and the way of using it. In this study, we will refer to KM as defined by Holsapple and Joshi (2004) who state that *"KM is an entity's systematic and deliberate efforts to expand, cultivate, and apply available knowledge in ways that add value to the entity, in the sense of positive results in accomplishing its objectives or fulfilling its purpose".* Akbar (2003), Gupta and McDaniel (2002); Ofek and Sarvary (2001); DeTienne and Jackson (2001) point out that companies are constantly striving to employ the best KM practices in organisational processes and business activities to derive a competitive advantage. Moreover, to take advantage of knowledge available both internally and externally, KM implementation is directed not only at influencing organisational productivity, corporate effectiveness and business performance, but also aimed at improving total business value. Grant (1996) highlights the main characteristics of knowledge which allow the firm to create value from using knowledge like: transferability, capacity of aggregation, suitability, specialisation in knowledge acquisition and knowledge requirements of production. Understanding and managing these characteristics of knowledge enable decision makers to choose what the firm needs from all available knowledge sources (Fang, 2004).

Polanyi (1962) highlights the differences between two types of knowledge; *tacit knowledge* and *explicit knowledge*. *Tacit knowledge* is knowledge which is contained within a person's head and is difficult or impossible to express, write down and codify. Tacit knowledge is of great interest to organisations because it involves knowledge that leads to effective practices, policies and procedures. *Explicit knowledge,* on the other hand, is easily collected, organised and transferred through digital means. It can be readily articulated, written down, codified and shared. Nonaka (1994) states that new organisational knowledge is created by a dialectical relationship between tacit and explicit knowledge, which emerges into a spiral of knowledge creation consisting of four types of knowledge conversions: socialisation, externalisation, combination and internalisation (Figure 1)
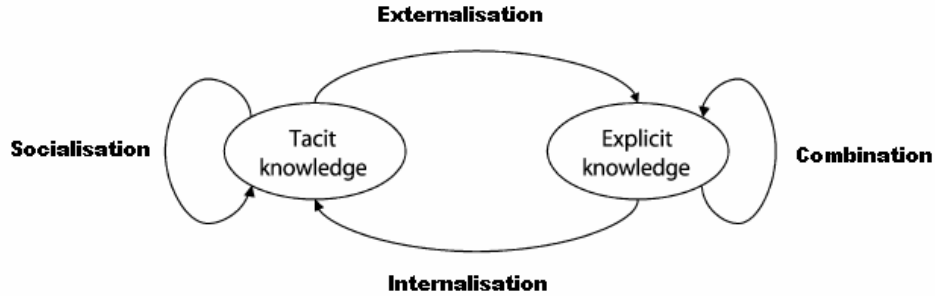
**Figure 1. Nonaka's model of knowledge creation**

In Nonaka's model, individuals interact with others to create knowledge through four modes. The first one is *Socialisation,* it involves the conversion of tacit knowledge to tacit knowledge among individuals; it refers to the creation of new tacit knowledge from shared tacit knowledge. Individuals can acquire tacit knowledge by observation, imitation and practice. The second is *Combination,* which implies the conversion of explicit knowledge to explicit knowledge; it refers to the creation of new knowledge through the exchange and combination of explicit knowledge held by individuals in the organisation. The exchange of explicit knowledge could be done through KS. It could also happen through interactions through meetings, e-mail and casual conversations. The integration of the exchanged knowledge and its reconfiguration throughout sorting, adding, categorisation and re-contextualizing can help to create new explicit knowledge. The third is *Externalisation,* it involves the conversion of tacit knowledge to explicit knowledge. It takes place when individuals use "metaphors" to articulate their perspectives in order to reveal hidden tacit knowledge that is otherwise hard to communicate. Finally *Internalisation* which implies the conversion of explicit knowledge to tacit knowledge, it takes place when explicit knowledge becomes tacit. This involves taking explicit knowledge and deducing new ideas or taking constructive action (Bolloju et al., 2002). Accordingly, this conversion can be seen as somewhat similar to the traditional notion of learning. Thus, individuals try to integrate explicit knowledge that they shared with their prior knowledge in order to update their mental models and produce new tacit knowledge (Nonaka ,1994).

KNOLWEDGE MANAGEMENT SYSTEMS

Knowledge Management Systems and Decision Support Systems

In the DM process, decision makers combine different types of data like internal and external data and different types of knowledge like tacit and explicit knowledge which are available in a variety of forms in the organisation. Bolloju et al. (2002) draw attention to the fact that researchers in the fields of Decision Support Systems (DSS) and KMS have not effectively considered the combination of such systems and the interdependencies between knowledge creation and DM processes.

Papamichail and French (2005) state that decision analysis can be seen as *"a consultation process that attempts to focus the attention of a decision maker on the important aspects of a decision problem"*. Regan and Holtzman (1995) highlight that decision analysis can be considered as a carefully engineered consultation which starts with the definition of a decision problem at hand and ends with a commitment to a real action. The decision process can be decomposed into three stages as shown in (Figure 2)
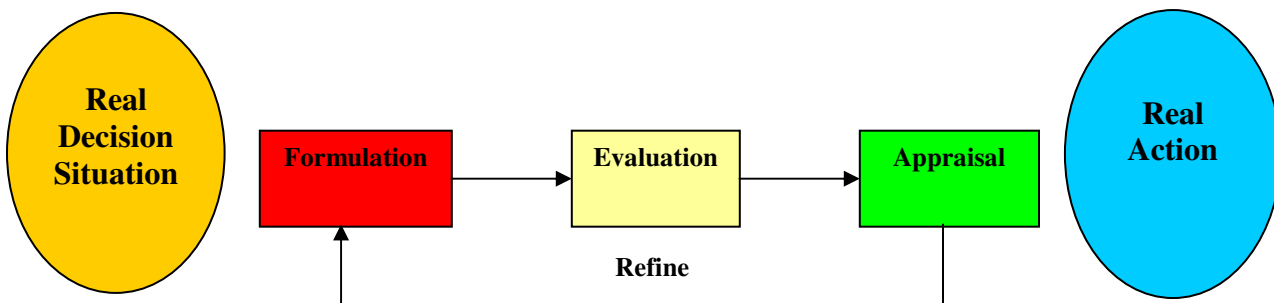
Formulation of the decision model reflects the decision problem, i.e. generating alternatives and identifying evaluation criteria. *Evaluation* of the decision model likes computing the implications of the decision model, evaluating it using a formal decision method and producing recommendations. *Appraisal* in the decision model represents the appraisal of recommendations through analysing the recommendations and presenting the interpretation in a natural language form.

Bolloju et al. (2002) state that KM and decision support processes are mutually dependent activities in many organisations. To a great extent organisations become complex with an emphasis on decentralised DM. This tendency leads organisations to using KMS with DSS to make effective support and successful decisions. Appropriate integration of DSS and KMS will not only support the required interaction but will also create and find new opportunities for improving the quality of support provided by each system. Abdelrahman et al. (2010) use USUQ framework to analyse the perceived value of using KMS in supporting DM processes. The first factor is the "Usage"; it assesses the experience of using KMS, awareness, types of KMS used and the effectiveness of each tool of KMS in supporting DM processes. The second factor is User's "Satisfaction" of using KMS; it assesses the ease-of-use, accessibility and friendliness of KMS. The third factor is the "Usefulness" of using KMS in organisations; it assesses the benefits of using KMS, effectiveness and efficiency of KMS and the value added to organisation. The last factor is concerned about the "Quality of DM"; it assesses the DM processes and how KMS can support each step in this process and how KMS can support strategic, tactical and operational decisions (See Figure 3).
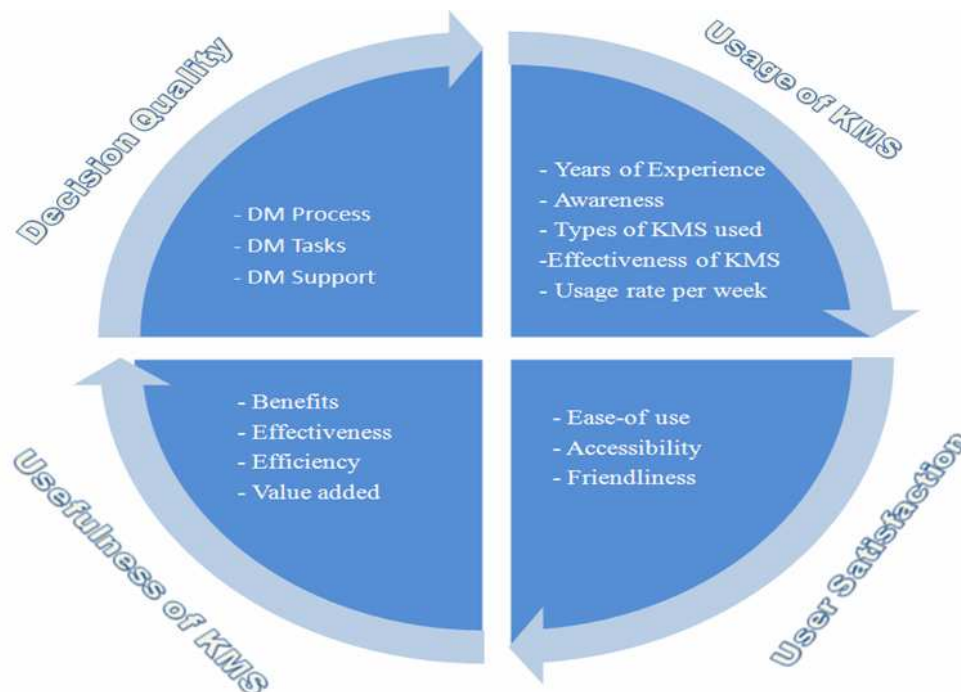
Figure 3. (USUQ) Framework to analyse the perceived value of using Knowledge Management Systems

in supporting Decision-Making processes

Regarding the first factor "Usage", the research reveals that participants use different KMS tools, the most used tool is Search Engine and it is very effective in supporting DM processes, but the least used tool is Knowledge Harvesting tools. The analysis of the second factor "User's Satisfaction" indicates that participants are satisfied with KMS regarding the ease of use, accessibility and friendliness of the systems, but they perceive that mental fatigue might occur from using KMS for long time. The third factor "Usefulness of KMS" revealed that KMS are efficient in reducing cost and saving resources and most of participants perceive several benefits of using KMS in supporting DM processes like enhancing collaboration within organisation, sharing best practices, improve employee skills and learning, improve working processes, increase profits, increase productivity, easily adjust to the rapid change in the environment and adding value to the organisation. The final factor "Quality of DM"; the results indicate that KMS are significant in the DM processes and KMS are very significant in

evaluating alternatives. It also reveals that KMS support operational, tactical and strategic decisions, but KMS support operational decisions more than strategic and tactical decisions. Moreover, the study indicates that KMSs improve and create high quality decisions, and can support unstructured and semi-structured decisions. In addition, most of participants perceive KMS as flexible, they can minimise errors and provide appropriate help when the decision maker has a trouble.

Nemati et al. (2002) state that "*knowledge provides the perceptual and conceptual filters which the decision maker uses to firstly select and organise data into information and then to use that information to support and inference, forecast or decision*". Bals et al. (2007), highlight that technology merely provides the tools with which decision makers and users can leverage their knowledge in the context of their work. However, many organisations pursue KMS initiatives with different degrees of success. Thus, how decision makers and users perceive the technology and interact with it is assumed to play a major role in KMS and DM initiatives' success.

KNOWLEDGE MANAGEMENT SYSTEMS AND SHARING KNOWLEDGE IN MNC

Over the past two decades, many organisations have developed information technology-based systems designed specifically to facilitate the sharing, integration and utilisation of knowledge, referred to as KMS (Nielsen and Michailova, 2007). Alavi and Leidner (2001) define KMS as "*Information Technology based systems developed to support and enhance the organisational processes of knowledge creation, storage/retrieval, transfer, and application*". They also point out that IT can be used as an enabler in KM initiatives but KM initiatives do not necessary involve the implementation of IT solutions.

MNC now recognise the need to integrate all types of knowledge in formal information systems, KMS use modern information technologies *(e.g the Internet, Intranets, Extranets, Lotus, Data Warehouses, Notes, Software filters, Agents)* to systematise, enhance, and expedite intra- and inter-firm KM (Alavi and Leidner, 1999). Organisational knowledge is usually derived from individual knowledge, so KMS can support the acquisition, organisation and communication of both tacit and explicit knowledge of employees. Moreover, in order to assist the creation of new knowledge effectively, KMS must support not only the creation, but also the gathering, organisation and dissemination of existing knowledge (Bolloju et. al, 2002).

MNC use KMS for several reasons. Davenport and Prusak (1998) highlight three main reasons for implementing KMS in organisations. The first reason is Firsly, to enhance the availability of knowledge in organisations; through the use of maps, hypertexts, yellow pages and directories. Secondly, to build KS culture; through creating tools for employees to share knowledge. Thirdly, to develop knowledge infrastructure that can create a suitable environment for collaboration that is necessarily supported by technology. However, according to Ambrosio (2000) no system is flawless, there are many failure KM cases . The failure rate is around 50 percent to 70 percent (a failure here implies that all of the major objectives were not achieved nor met by the organisations). Malhotra (2004) states that "*failures typically happen when the KM effort mostly relies on technology and does not take in hand whether the proposed system will meet the objectives and needs of the organisation and its employees*".

Chong and Chong (2009), state that many organisations are still struggling with KM implementation and in this knowledge-based economy it represents the core competency that can determine their success. Monteiro et al. (2008), highlight that MNC can create value from their knowledge assets and from the internalisation of their gathered knowledge as well. Moreover, there is a broad consensus nowadays in view of MNC as "an international network that creates, accesses, integrates and applies knowledge in multiple locations". Therefore, SK is a significant issue in MNC and KM cannot be effective unless knowledge is shared. As a result, there are plenty of tools available for SK known as KMS. Turban et al. (2005), state that there are different kinds of KMS, and they can be used to support DM in several ways, including allowing employees to have a direct access to knowledge and to individuals who have the knowledge. They state that most KM software packages include one or more of the following tools: Collaborative Computing Tools, Knowledge Servers, Enterprise Knowledge Portals, Electronic Document Management, Knowledge Harvesting Tools, Search Engines, Knowledge Management Suites and Intelligent Techniques.

Minbaeva (2007) developed and tested a model regarding KS in MNC through analysing the joint effect of four determinants of KS on the degree of KS from headquarters to subsidiaries, these determinants are: characteristics of knowledge, characteristics of knowledge sender, characteristics of knowledge receiver, and characteristics of the relationships between knowledge sender and receivers (See figure 4).
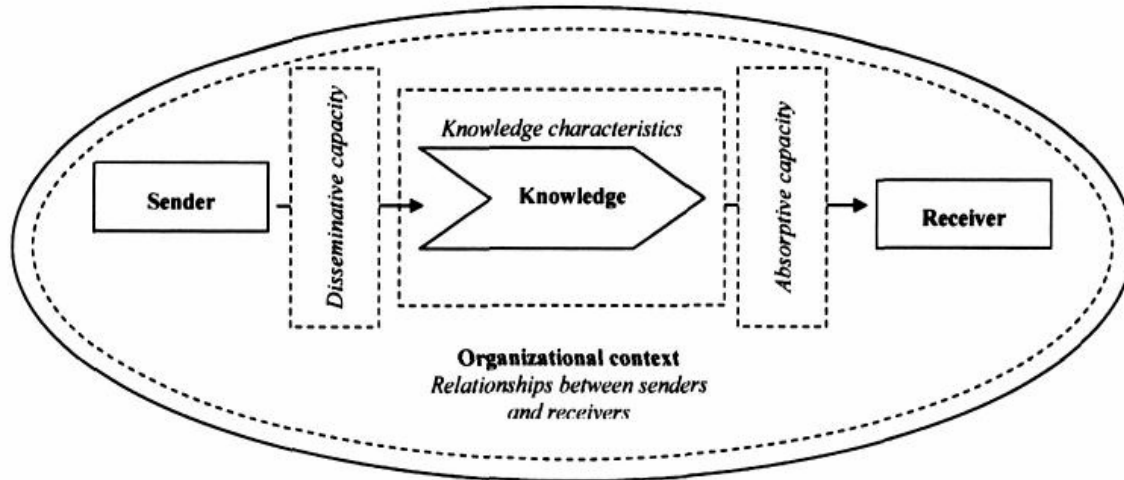
Figure 4. Knowledge Sharing in Multinational Corporations

From this study, we can see that the success of KS among MNC units is not only a function of the characteristics of that knowledge but it is also essential to take into consideration the characteristics of both sender and receiver involved in the transfer process as well as the characteristics of the context in which KS takes place.

Alavi and Leinder (2001) review the KM literature in different lines of research by shifting the centre of attention toward identifying the key areas for research. They focus on the role of Information Systems (IS) in the process of KM in organisations. They discuss previous research and discuss the role of IS and its support to KM processes. As Alavi and Leinder (2001) point out "*there is a little research regarding the analysis, integration and implementation of different types of KMS and the potential benefits of these systems to organisations*". Moreover, there is scarcity of empirical studies on this particular research issue. Therefore, the question of *"What are the characteristics of KMS that can facilitate KS in MNC"* has not received considerable attention. Accordingly, this is the primary concern of this exploratory research, to expand our understanding of the role that KMS actually play in MNC.

Generally, the literature review presented above indicates that there is a gap in the literature which requires further investigation regarding KMS's characteristics that can facilitate KS, particularly in MNC which try to link all the branches globally and facilitate the sharing of best practice to support DM processes and to achieve corporate objectives and goals. Accordingly, further research is required to enhance our understanding in this important area of SK within MNC.

To the best of our knowledge, no study to-date examines the characteristics of KMS that can facilitate KS to support DM processes in MNC. This gap found in the literature led to the development of the main objective of this research i.e. to determine KMS's characteristics that can facilitate KS to support DM processes. This study will contribute to the existing knowledge by devising a conceptual framework that includes KMS characteristics in KS.

RESEARCH METHODOLOGY

This study is an exploratory research that seeks to offer new insights and highlight the characteristics of KMS that can facilitate KS to support DM processes in MNC. Therefore, semi-structured interviews and template analysis were conducted with a view toward finding out KMS's Characteristics that can facilitate KS practices across MNC units to support DM processes. Template Analysis is used as an analysis of qualitative data that involves creating and developing a hierarchical template of data codes or categories representing themes revealed in the data collected (Saunders et al. 2007). Template analysis helps to select key themes to identify and explore emergent issues that arise and come through the process of data collection and analysis (King, 2004). In this research, 42 semi-structured interviews have been conducted with participants from 35 different MNC in 11 countries. Participants in the research are KMS professionals, managers and employees in MNC who are using KMS in various sectors and at different levels in MNC (See table 1).

	Numbers
Countries	11
MNC	35
Top Level Management	12
Middle Level Management	19
Lower Level Management	11
MNC from Services Sector	18
MNC from Industry Sector	17

Table 1. Data Collection and participants

DISCUSSION AND ANALYSIS

Our findings indicate that participants in MNC tend to use KMS regularly to share best practices and knowledge with other branches all over the world. Knowledge is the core of their business and is the reason for their existence and survival. Without KMS they cannot SK properly. In this section we will focus on the main findings of our exploratory research.

We find that most interviewees want KMS to be analogous to the tools used in social networking which they use in their daily life like *(Twitter, Facebook, YouTube, Wikipedia, smart phones and Google)*. They said that "No one teaches us how to use them, so we need KMS to be easy like these tools". Furthermore, they want KMS to have an interactive, consolidated and user-centred design to allow them to interact and collaborate with each other in a social media dialogue. They want to have KMS applications on their smart phones to SK with their colleagues easily at any time. Moreover, participants in MNC would like to have internal media broadcasting like TV and Radio inside the organisation to keep them updated with the latest news regarding their work.

They also want KMS to be unified at all branches and to have one system that can be operational everywhere and for everyone. They empasise that knowledge must be centralised, which means that there must be a committee in place to review knowledge uploaded and saved before it is shared to avoid any bad decisions or mistakes that can happen based on any wrong knowledge uploaded on the system.

They want KMS with advanced and smart searching tools that enable them to search and find knowledge by codes, abbreviations, product, country, branch, region…etc. They prefer to combine search engines with artificial intelligence tools that can recognise the user and his/her history of searching and link them together, so that knowledge can be offered, matched, shared and sentautomatically without any attempt for searching.

Regarding the language used in KS in MNC, participants usually use two different languages in KS, English and sometimes their national language if different. This is because some employees can not speak English, so they need a translator and dictionary to be available in KMS to facilitate reading and writing knowledge in any language easily. They also draw attention also to the importance of unifying words and terminology used in SK, because sometimes you can not identify knowledge because it is available but it is offered in different words, as sometimes people use different words to attach the same meaning. For example some employee say systems other say servers and they mean the same concept.

Most of the top managerial levels in MNC prefer traditional ways in communication like phone and face to face meetings rather than using these KMS, because they forget from time to time how to use KMS tools and the criteria of using them if they are away for a while. Therefore, they emphasise the importance of receiving training in order to use KMS and other KMS like communication tools in (camera, chat, fax and telephone).

Participants highlight the importance of having speedy KMS, accessible from anywhere at anytime, customised easily and easy to use. They also combine KMS with feedback tools regarding any knowledge they share to know how important it is and how many employees used it and where and whether it is right or wrong.

Regarding DM support, they emphasize that KMS can not take decisions, but can offer knowledge that can help them in DM processes. For example, they may want to check lessons learned from projects, problems or decisions that have been taken before through using KMS, so that they can decide what is acceptable and what is not acceptable in MNC based on other experiences and past evidence, as they do not want to eliminate the risk of taking wrong decisions. Moreover, participants agree that KMS can be used in the formulation, evaluation and appraisal phases of the DM process, but they are more helpful in the formulation stage rather than the evaluation and appraisal stages. Furthermore, they also agree that they cannot take

decisions on their own and depend on KMS to support DM processes. They emphasize that KMS are used as a source of input in the DM processes.

They underline that there is no DM process based on individuals. DM processes are based on group DM that must be supported by insights or evidence to enable them to verify their decisions at any circumstances. They also emphasize the role of KMS in helping them to indentifying experts who must be contacted and who have experience and knowledge in specific issues.

Accordingly, this study has endeavoured to determine KMS's characteristics that can facilitate KS to support DM processes in MNC. Based on this discussion we can summarise and highlight these KMS characteristics in this conceptual framework (See figure 5).
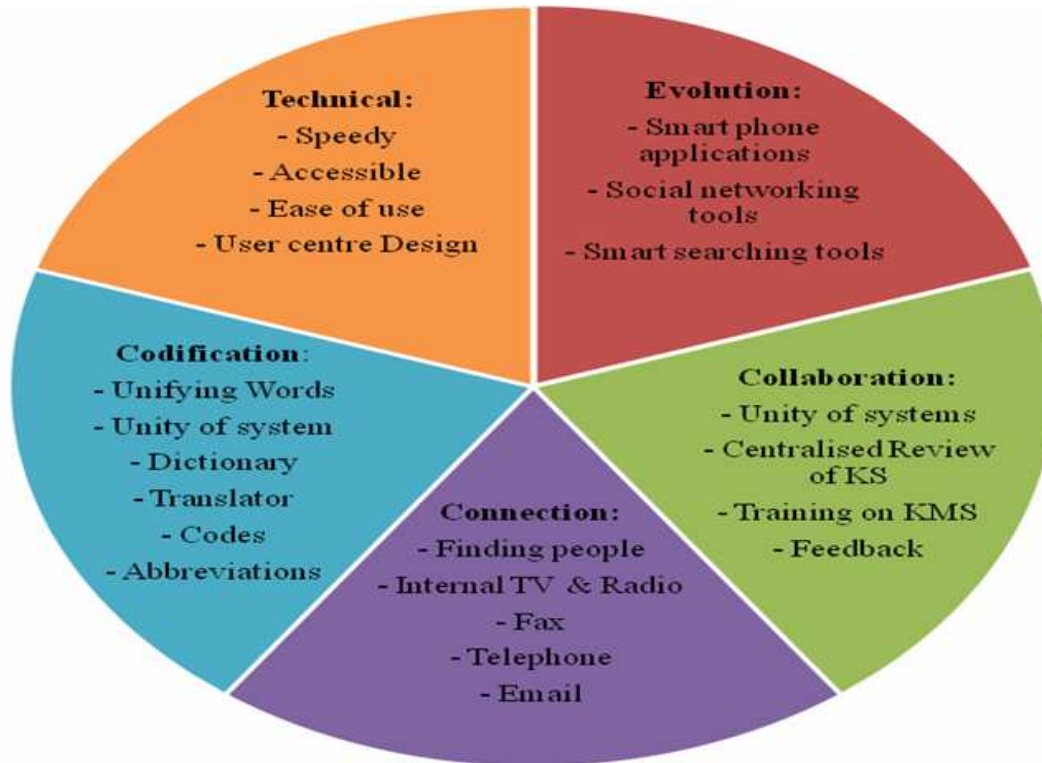

Figure 5. Framework (ECCCT): KMS Characteristics that Facilitate Knowledge Sharing to support DM processes in MNC

CONCLUSIONS

Through the advent of the knowledge economy and the increasing magnitude of knowledge societies, this study highlights some characteristics of KMS that can facilitate KS to support DM processes in MNC, these characteristics are about five aspects: Evolution, Collaboration, Connection, Codification, and Technical issues. Evolution by meeting employee's wants and needs as they are affected by the latest technologies such as social networking tools that they use in their daily life. Therefore, it will be easy and comfortable for them to transfer the applications that they use in their personal lives to their work. Collaboration will enable people to work together, it occurs when social connections are established. Connection will ensure using interactive tools to be updated with news that happen in their MNC and the world. Codification will codify knowledge in an explicit form so that it is easily accessible by employees. Technical tools of KMS allow for fast KS where knowledge can easily be accessible everywhere and enabling users to customise it according to their needs.

Accordingly, MNC need to take into account human needs; as their employees are affected by the latest technologies and in particular the social networking tools that they use in their daily lives (e.g. Google, Wiki, Twitter, Facebook, Skype, MSN, Smart Phones, Radio, TV channels for work, ...etc). Employees will feel comfortable if they use the same applications in their work.

Limitations

The main limitation of this study is its sample size, therefore the results of this exploratory study may not be generalised. The framework has been tested and analysed using qualitative analysis only. A mixed method approach combining both qualitative and quantitative research methodologies will be undertaken in the next stage of this study.

Suggestions for further research

The research findings can help us in identifying new areas of interest for further research, like testing the new conceptual framework through a questionnaire with a larger sample size to establish the relationship between KMS characteristics and DM processes. Moreover, it will also be valuable if the study is conducted in a specific business sector or country of MNC.

Contribution

The conclusions and findings generated from this study contribute further to the fields of KMS and KS in MNC. This study offers insights for analysing the usage of KMS in sharing knowledge to support DM processes in MNC. The research will extend existing literature of KMS and KS and will contribute to this stream by the "ECCCT" Conceptual Framework, which will help MNC to identify new ways of leveraging and SK to support DM processes. The beneficiaries of this research are both academics and practitioners. Academics, such as researchers who are interested in this area of research and practitioners such as senior and middle managers and decision makers in MNC.

ACKNOWLEDGMENT

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