KEY CHARACTERISTICS IN SELECTING SOFTWARE TOOLS FOR KNOWLEDGE MANAGEMENT

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Abstract: The shift to knowledge as the primary source of value results in the new economy being led by those who manage knowledge effectively. Today's organisations are creating and leveraging knowledge, data and information at an unprecedented pace – a phenomenon that makes the use of technology not an option, but a necessity. Software tools in knowledge management are a collection of technologies and are not necessarily acquired as a single software solution. Furthermore, these knowledge management software tools have the advantage of using the organisation's existing information technology infrastructure. Organisations and business decision makers spend a great deal of resources and make significant investments in the latest technology, systems and infrastructure to support knowledge management. It is imperative that these investments are validated properly, made wisely and that the most appropriate technologies and software tools are selected or combined to facilitate knowledge management. In this paper, we propose a set of characteristics that should support decision makers in the selection of software tools for knowledge management. These characteristics were derived from both in-depth interviews and existing theory in publications.

1 INTRODUCTION

Imagine that, in the same way that a disc failure on your personal computer or laptop erases all information in the file folders, all intellectual capital within your organisation is erased from the employees' minds and the organisation's storage media. There is no doubt that the market value of such an organisation will be affected severely as decisions in an organisation are made based on sufficient, relevant and accurate knowledge (Meyer and Botha 2000).

Knowledge assets are of much greater value than any tangible asset, all of which provided organisations with a competitive edge in the past (Davenport and Prusak 1998). This knowledge asset provides the basis for creating sustainable competitive advantage in the knowledge age (Covey 2004). Furthermore, as new technologies, innovation, organisational flexibility and new and better forms of leadership propel the growth and earnings of knowledge-intensive companies, so the need to extract wealth from brainpower and knowledge (individual and organisational) becomes

increasingly pressing. An organisation that kept its workforce skills and expertise could operate quickly even though it lost all of its equipment. An organisation that lost its workforce, while keeping its equipment, would never recover.

Today's organisations are creating and leveraging knowledge, data and information at an unprecedented pace and the extraordinary growth in on-line information, makes the use of technology not an option, but a necessity (Lindvall, Rus et al. 2001; Abar, Abe et al. 2004). This influence of technology on the maintenance of knowledge management actions is widely accepted, as technology adds value by reducing time, effort and cost in enabling people to share knowledge and information; especially when it is closely aligned with organisational requirements, the way people work and are supported by and integrated with relevant processes (Hoffmann, Loser et al. 1999).

A long-term view of fostering the knowledge-base competence of an organisation is required when selecting knowledge management software tools and information technology is needed that aids an effective and efficient knowledge-conversion process while increasing the swiftness and ease of

switching from one such process to another (Nonaka, Reinmoller et al. 2001; Yu, Kim et al. 2004). However, the challenge is that there is not necessarily a blueprint available for this integrated view or a standard set of characteristics defined that technology must comply with, to be categorised as a typical knowledge management system. This motivates the need for this research where we provide a set of features toward defining a characteristic set for a typical knowledge management solution. Organisation and business decision makers, who invest in expensive systems and infrastructure to support knowledge management, could use this set of features to assist them during the toolset selection process.

In section 2 we provide a knowledge management overview, followed by a synopsis of the method used to gather the characteristics in section 3. In section 4 we list the characteristics derived and the conclusion of the study is reflected in section 5.

2 THE KNOWLEDGE IN KNOWLEDGE MANAGEMENT

While some epistemologists spent their lives trying to understand what it means to know something (Davenport and Prusak 1998; Clarke and Rollo 2001), Plato first introduced the concept of knowledge as justified, true belief in 400 B.C. (Meno, Phaedo and Theaetus as cited by Nonaka and Takeuchi 1995). Advances in knowledge described the achievements of the ancient Greek, Roman, Egyptian and Chinese civilisations and the transforming impact of the industrial revolution was characterised by the application of new knowledge in technology (Clarke and Rollo 2001; Moteleb and Woodman 2007).

For the purpose of this paper, a more pragmatic approach has been followed and the following working description of knowledge has been explored (Davenport and Prusak 1998 : 5): "Knowledge is a fluid mix of framed experiences, values, contextual information and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organisations, it often becomes embedded not only in documents or repositories but also in organisational routines, processes, practices and norms."

Knowledge can be categorised as either being explicit or implicit. Explicit knowledge can be defined as knowledge that has been articulated in the form of text, diagrams or product specifications for example (Clarke and Rollo 2001; Nickols 2001). Nonaka (1991) refers to explicit knowledge as formal and systematic, like a computer program. In organisations today, explicit knowledge resides in best practices documents, formalised standards by which goods and services are procured and even within performance agreements that have been documented in line with company and divisional goals and objectives.

Implicit knowledge is far less tangible than explicit knowledge and refers to knowledge deeply embedded into an organisation's operating practices (Kothuri 2002). Tacit knowledge, as a dimension of implicit knowledge, includes relationships, norms and values. It is knowledge that cannot be articulated and it is much harder to detail, copy or distribute, to the contrary, the knowing is in the doing in this instance (Clarke and Rollo 2001). Tacit knowledge can provide competitive advantage to organisations as it is protected from competitors (Hahn and Subramani 2000; Wessels, Grobbelaar et al. 2003).

The management of explicit and implicit knowledge is a multifaceted subject based on the dimensions of knowledge and therefore there are various and varied definitions for it (Newman and Conrad 1999). McCullough (2005) concludes that, based on the vast majority of academic research into knowledge management, there is a general difficulty for organisations to explain what they mean when they use the term knowledge management. For the purpose of this paper the following definition of knowledge management as suggested by Choo (1995) will be used: "a framework for designing an organisation's goals, structures and processes so that the organisation can use what it knows to learn and to create value for its customers and community".

Technology is a key enabler of knowledge management and knowledge management processes as it extends the reach and enhances the speed of knowledge transfer (Chua 2004). Technology permits the knowledge of an individual or group to be structured and codified and allows distribution of knowledge across the world (Davenport and Prusak 1998; Wessels, Grobbelaar et al. 2003). Knowledge management technology is a broad concept and organisations apply a wide variety of technologies to the objectives of knowledge management (Davenport and Prusak 1998; Lindvall, Rus et al. 2001).

Explicit knowledge is found in reports, documents and manuals and can easily be gathered and stored as a knowledge base (Clarke and Rollo 2001). Organisations use groupware applications to

collect, store and share their explicit knowledge, and once this has reached a sufficient level of efficiency, collaborative technologies such as intranet, the internet, extranet, e-mail, video-conferencing and tele-conferencing are used to assist in the growth of tacit knowledge transfer (Wessels, Grobbelaar et al. 2003). In order to enable organisations to retrieve captured knowledge, knowledge route maps and directories are developed to create an understanding of the location of knowledge (Alavi and Leidner 2001; Clarke and Rollo 2001). Knowledge networks are created using virtual business environments such as chat rooms, team web sites and learning communities (Alavi and Leidner 2001; Clarke and Rollo 2001) with the development of specific applications of technology such as databases, workflow systems, personal productivity applications and enterprise information portals (Wilson and Snyder 1999; Wessels, Grobbelaar et al. 2003).

"Knowledge management systems [are] more than just information systems or IT-enabled tools in support of knowledge management activities" according to Tsai and Chen (2007 : 258). Instead, a knowledge management system must be a socio-technical system as a whole which comprises the knowledge itself (the intellectual capital of the organisation), organisational attributes (intangibles such as trusting culture), policies and procedures, as well as some form of electronic storage and retrieval systems.

Different ways of classifying knowledge management technologies are utilised in the literature and Antonova, Gourova et al (2006) categorised technological solutions according to the following knowledge management processes: (1) generation of knowledge, (2) storing, codification and representation of knowledge, (3) knowledge transformation and knowledge use and (4) transfer, sharing, retrieval, access and searching of knowledge.

These specific implications of knowledge and knowledge management on knowledge management systems are important as these different views lead to different perceptions and definitions of knowledge management systems (Asgarkhani 2004).

3 DATA COLLECTION

The purpose of this paper is to collate a set of features towards defining a characteristic set for a typical knowledge management solution. A list of knowledge management system characteristics was compiled from the literature and formed the framework and basis for the research interview questions. Eight in-depth interviews were conducted at one of the major mobile telecommunication providers in South Africa where after the characteristic set was updated. We used different criteria, ranging from technical and systems background to job grade and level, to select research participants. The rationale for selecting the specific criterion and the typical profile of an interview participant complying with the criterion, is depicted in Table 3-1.

The main criteria that informed the participant profile were environments where knowledge and knowledge sharing are key priorities, behaviours regarding knowledge sharing and some knowledge on human resource aspects in order to obtain input on the human-computer interface and related issues. Furthermore, research participants with a technical background, who understand systems with broad business process knowledge, as well as a systems and business architecture background, informed the profile. Lastly, these criteria were applied across different management (job grade) levels and leadership styles in the organisation. The interviews were transcribed and the outcome obtained from the interviews, as well as theory from the literature, was used to compile a comprehensive list of characteristics described in section 4.

4 KNOWLEDGE MANAGEMENT SOLUTION CHARACTERISTICS FOR TECHNOLOGY TOOL SELECTION

The development and evolution of a large number of software tools have been facilitated based on the application of technologies to the creation of knowledge management solutions (Lindvall, Rus et al. 2001; Xie, Zhang et al. 2006). Although knowledge management tools are enhancements of existing technologies, true knowledge management technologies differ in several important aspects from the traditional workflow, document management, intranet and groupware solutions (O'Leary 1998; Frappaolo and Capshaw July 1999).

Each characteristic is described by means of the classification of knowledge management technologies. This description includes the distinguishing characteristic of a knowledge management system, a description of the feature and

Table 3-1: Criteria for defining research participant profile.

	Criteria	Rationale	Typical Participant Profile
1	Technical / technology / systems background	Utilise their understanding of systems and systems architecture	Information Systems and Network Group (engineering) participants
2	Human resources / behavioral background	Obtain input on the human computer interface and any issues around this interface	Organisational Development (Human resources) participants
3	Environments where knowledge and knowledge sharing are key for success; environments where key assets go home every day	Determine issues around knowledge sharing within the Group and of key specialist skills and knowledge	System, Business Architecture and System Architecture specialists
4	Job grade in Group and in South African operation	Obtain input from different levels of work and different operational levels; obtain input from different management and leadership styles	Different levels of participants w.r.t. job grades e.g. Executives, General managers, Senior Managers, etc.
5	Broad business, people, process and system knowledge	Obtain input on "big picture" issues / requirements around business, people and knowledge management	Generalists in company, participants required to integrate all management aspects in order to deal with their respective departments

an example clarifying the characteristic.

4.1 Classification 1: Generation of Knowledge

The first classification dimension is generation of knowledge, which comprises of activities for knowledge creation, acquisition and capturing as shown in Table 4-1.

With regard to knowledge content generation, authoring, knowledge creation, knowledge objects and content validation are important. Authoring encompasses sources of explicit knowledge line documents, manuals, proposals, e-mail messages, etc., as well as implicit knowledge. Knowledge creation refers to the generation of new knowledge through thinking or reasoning and knowledge objects encompass an object of structured information, un-structured information, insight, facts, practical and theoretical experience, as well as best practice to be stored and manipulated. Content validation points to the validation and auditing of knowledge objects when they are captured and resolves data and information conflicts.

Knowledge discovery allows the generation of knowledge through knowledge harvesting, content evolution and ensuring that this is made easily accessible and available via various distribution bearers. Knowledge harvesting is the process of pro-actively facilitating the harvesting and capturing of ideas. Knowledge, expertise and content evolution refer to the creation of knowledge by combining new sources of knowledge, optimising feedback loops and by re-applying and re-creating knowledge.

Data capturing tools enable the capture of knowledge and consists of characteristics such as externalisation, maintenance and update, storing and content capture. This toolset ensures that knowledge in the repository is maintained by providing mechanisms to refresh data and information. Externalisation refers to the connection of information source to information source and to creating interrelationships while maintenance and update ensure that knowledge objects in the knowledge management system stays valid and recent. It includes a formal change process for captured knowledge and also provides versioning of content. Storing supports knowledge creation through exploitation, exploration and codification and content capture facilitates the capture of knowledge through mechanisms such as a keyboard, optical character recognition, bar code identification and real-time location sensors.

4.2 Classification 2: Storing, Codification and Representation of Knowledge

The second classification dimension is storing, codification and representation of knowledge, which comprises of activities contributing to effective storage, human-readable knowledge and the organisation of knowledge, as depicted in Table 4-2.

This dimension focuses on knowledge management processes and the quantity, quality, accessibility and representation of the acquired knowledge. Several technologies for storage consisting of several relevant characteristics have been identified in the literature and obtained from the research participant interviews. Archiving refers to archiving ability based on certain criteria and

Table 4-1: Characteristics for the generation of knowledge.

Generation of knowledge			
Dimension	**Characteristic**	**Description**	**Example**
Knowledge content generation	Authoring	Encompasses knowledge objects i.e. sources of explicit (e.g. documents, manuals, proposals, email messages) or implicit knowledge (e.g. people)	Supported by standard authoring tools like word processors and database management systems (DBMS)
	Knowledge creation	Refers to generation of new knowledge through thinking or reasoning	Brainstorming
	Knowledge objects	Knowledge is an object of structured information, un-structured information, insight, facts, practical and theoretical experience, as well as best practice to be stored and manipulated.	KMS will not appear radically different from existing IS, but will be extended toward helping in user assimilation of information. Role of IT involves gathering, storing and transferring knowledge.
	Content validation	Validation and auditing of knowledge objects when they are captured and resolution data and information conflicts	Knowledge object auditor validates submissions for knowledge repository before it is published
Knowledge discovery	Knowledge harvesting	Pro-active facilitation of harvesting and capturing of ideas, knowledge, expertise	Knowledge harvesting workshops and focus groups, defining tangible knowledge and capturing it
	Content evolution	Knowledge creation, combining new sources of knowledge, optimise feedback loops and re-apply, re-create	Data mining and learning tools
	Various distribution bearers	Ease of access and availability	SMS knowledge source to knowledge seeker
Data capturing tools	Externalisation	Refers to the connection of information source to information source and creating interrelationships; integration of organisational interdependencies	Focuses on explicit knowledge and provides a means to capture and organise this knowledge into a knowledge repository
	Maintenance and update	Ensures that knowledge objects stay valid and recent	Workflow enabled review indicator
	Storing	Support knowledge creation through exploitation, exploration and codification	Technology enabled store or knowledge repository that can support less structured information
	Content capture	Facilitates the capture of knowledge through different mechanisms	Keyboard, optical character recognition, bar code identification and real-time location sensors

business rules specified by knowledge base administrators, while capability is the characteristics indicating the potential to influence action, processing, decision-making and application. Customisation points to the configuration and set up of the system reflecting the specific organisation or user context (personalisation). Flexibility refers to the characteristic regarding the handling of various media. Security is an important characteristic that addresses physical and logical security, since knowledge is such a valuable asset, while storing in this context refers to the commitment of knowledge to the data warehouse, knowledge warehouse, lessons learnt knowledge base or the data mart. Some characteristics like application scalability, back-up and housekeeping and hardware platform independence ensure that the knowledge management application can be adapted to the size, application and hardware configuration of an organisation while ensuring accessibility and proper housekeeping of the physical infrastructure.

Human-readable knowledge consists of the characteristic set including heuristic and content capture. Heuristic means that the solution should constantly learn about its users and the knowledge it possesses as it is used. Its ability to provide a knowledge seeker with relevant knowledge should therefore improve over time. Content capture refers to the characteristics that ensure that knowledge is committed to the knowledge repository based on certain rules.

Knowledge organisation includes classification, indexing, internalisation, taxonomy and content upload. Classification handles content management according to the context of the organisation, Indexing means content management according to the context of organisation. Corporate taxonomy refers to the definition of how the knowledge is stored, where internalisation involves the extraction of knowledge from the external repository and subsequent filtering ensuring greater relevance and appropriateness to the knowledge seeker.

Table 4-2: Characteristics for storing, codification and representation of knowledge.

Storing, codification and representation of knowledge			
Dimension	Characteristic	Description	Example
Technologies for storage	Archiving	Encompasses knowledge objects i.e. sources of explicit (e.g. documents, manuals, proposals, email messages) or implicit knowledge (e.g. people)	Supported by standard authoring tools like word processors and database management systems (DBMS)
	Capability	Knowledge is the potential to influence action, processing, decision-making, application.	Role of IT is to enhance intellectual capital by supporting development of individual and organisational competencies.
	Customisation	Configuration and set up of the system reflecting the specific organisation or user context	Organogram of organisation
	Flexibility	Solution should be able to handle knowledge of any form as well as different subjects, structures, taxonomies and media	If knowledge seeker wants to learn about gramophone records, it should supply knowledge on the technology as well as purchasing trends and examples of famous recordings
	Security	Have to address physical and logical security since knowledge is such a valuable asset	Implemented using inherent mechanisms in each tool or by using specific tools in addition to the existing system
	Hardware platform independent	Allows application setup to size and infrastructure of organisation	SMME applications
	Storing	Support knowledge creation through exploitation, exploration and codification	Technology enabled store or knowledge repository that can support less structured information
	Application scalability	Allows application setup to size of organisation	SMME applications
	Back-up and housekeeping	Handles all backups and housekeeping around knowledge repository	Relevant backup cycles
Human-readable knowledge	Heuristic	Solution should constantly learn about its users and the knowledge it possesses as it is used i.e. continually refine itself as a user's pattern of research is tracked by the system. Its ability to provide a knowledge seeker with relevant knowledge should therefore improve over time	If the solution responds to many requests on a particular subject, it should learn how to assist multiple users in more depth on that subject
	Content capture	Ensures that knowledge is committed to the knowledge repository based on certain rules	Organisation knowledge map and taxonomy
Knowledge organisation	Classification	Handles content management according to context of organisation	Corporate taxonomy as knowledge map supported by classifying and indexing tools
	Date and time stamp	Refers to the tagging of knowledge objects to track recency	Date and time linked to knowledge objects
	Indexing	Handles content management according to context of organisation, corporate taxonomy	Corporate taxonomy as knowledge map supported by classifying and indexing tools
	Internalisation	Refers to the connection of explicit knowledge to people or knowledge seekers	Involves extraction of knowledge from the external repository and subsequent filtering ensuring greater relevance to knowledge seeker
	Knowledge gap identification	Allows a knowledge user to identify areas of the knowledge repository that is utilised significantly vs. underutilisation, as well as to identify areas where more content can be uploaded and populated in the knowledge repository	Knowledge repository usage report
	Content upload	Identifies areas where more content can be uploaded and populated in the knowledge repository	Taxonomy elements without any references
	Taxonomy	Refers to the definition of how the knowledge is stored	Organisation knowledge map and taxonomy

Knowledge gap identification is a feature that allows a knowledge user to identify areas of the knowledge repository that is utilised significantly vs. underutilisation, as well as to identify areas where more content can be uploaded and populated in the knowledge repository. Date and time stamp refers to the tagging of knowledge to track recency and the mechanism to add more knowledge areas respectively.

Table 4-3: Characteristics for knowledge transformation and knowledge use.

Knowledge transformation and knowledge use			
Dimension	Characteristic	Description	Example
Knowledge transformation	Search and retrieval	Primarily concerned with enhancing the interface between the user and information / knowledge sources, user-friendliness and learning agility	Help users better understand the information and knowledge available by providing subject-based browsing and easy navigation
	Access to information	Encompasses the transformation of end-user collected data and information before it is committed to the knowledge repository	Knowledge object auditor validates submissions for knowledge repository before it is published
Knowledge reconstruction	User sensitive	Solution should be able to organise the knowledge in the way most useful to the specific knowledge seeker	Should give knowledge relevant to knowledge seeker's current knowledge level, facilitating easier understanding
Knowledge use and retrieval	Application	Timeous availability of organisational and individual memory, just in time learning. Inter-group knowledge access	Expert systems, rapid application of new knowledge through workflow systems
	System learning agility	Refers to the ease of learning and teaching how to utilise the knowledge management system	Guided e-learning and assessment module

4.3 Classification 3: Knowledge Transformation and Knowledge Use

Classification dimension three is depicted in Table 4-3 consisting of knowledge transformation, knowledge reconstruction and knowledge use. This refers to the fact that once knowledge has been acquired it cannot be used in its raw form and must be transformed in order to become a valuable knowledge asset.

Knowledge transformation ensures that the knowledge conforms to the format of the target repository and consists of two allocated characteristics namely search and retrieval and access to information, encompassing the transformation of end-user collected data and information before it is committed to the knowledge repository.

Knowledge reconstruction ensures that knowledge is presented in the particular reasoning method that is used by the knowledge management system, e.g. editing into case formats to support case-based reasoning or a business intelligence dashboard.

Knowledge use and retrieval encompasses expert systems, decision support systems, visualisation tools and knowledge simulation. This classification dimension consists of processes of applying expertise to knowledge, the ease of learning and teaching how to utilise the knowledge management system through a user-friendly user interface. Application includes the timeous availability of organisational and individual memory and just in time learning, as well as inter-group knowledge access.

4.4 Classification 4: Transfer, Sharing, Retrieval, Access and Searching of Knowledge

The fourth classification dimension is transfer, sharing, retrieval, access and searching of knowledge, which comprises of knowledge access, searching, collaboration and sharing characteristics, as shown in Table 4-4.

With regard to knowledge access and transfer, allocation of characteristics and features consisting of content delivery, access to information, multi-language support and user-friendly user interface were concluded. Access to information is facilitated via a user-friendly user interface and the delivery of content consisting of the gathering of user-information and delivering appropriate content to meet specific user needs.

Collaboration includes person to person as well as team collaboration features encompassing the support of the knowledge sharing process through a social network analysis and collaborative tools, as well as collective insights across operations and different geographical locations. Workflow enablement connects people in different ways supporting increased work performance and productivity.

Knowledge sharing includes intermediation - the connection of people to people, i.e. bring together those who are looking for a certain piece of knowledge and those who are able to provide this piece of knowledge.

Table 4-4: Characteristics for transfer, sharing, retrieval, access and searching of knowledge.

Dimension	Characteristic	Description	Example
Transfer, sharing, retrieval, access and searching of knowledge			
Knowledge access and transfer	Content delivery	Personalisation involves gathering of user-information and delivering appropriate content to meet specific user needs aligned to user profile	Electronic bulletin boards, through portals is knowledge distributed as needed by different applications
	Access to information	Encompasses the transformation of end-user collected data and information before it is committed to the knowledge repository	Knowledge object auditor validates submissions for knowledge repository before it is published
	Multi-language support	Refers to language setting of user interface or translation feature to support knowledge seeker	User interface language configuration
	User-friendly user interface	Encompass ease of use of user interface	Context-sensitive in-line help facility
Person to person and team collaboration	Collaboration	Support the knowledge sharing process through a social network analysis and collaborative tools; collective insights across operations and different geographical locations; multi-dimensional collaboration	Facilitate communication between users, collaboration among users and workflow management
	Expertise applying process	Knowledge is a process of applying expertise.	Role of IT is to provide link among sources of knowledge to create wider breadth and depth of knowledge flows.
	Workflow enabled	Encompasses workflow enablement of knowledge requests, content update notification and knowledge object validation requests	Email information knowledge seeker that knowledge object has been updated
Knowledge sharing	Intermediation	Refers to the connection of people to people i.e. bring together those who are looking for a certain piece of knowledge and those who are able to provide this piece of knowledge	Primarily positioned in the area of tacit knowledge based on its interpersonal focus
Search and find	Accessibility	Knowledge is a condition of access to information via different mechanisms (e.g. web based) and locations.	Role of IT is to provide effective search and retrieval mechanisms for locating relevant information.
	Appropriateness	Refers to display of suitability indicator based on keywords specified by knowledge seeker	Appropriateness scale 1-15 where 1 is very relevant and 5 least relevant
	Context sensitivity	Solution should be able to understand the context of the knowledge requirement and tailor response accordingly	Should be able to understand and respond differently between animal reproduction and document reproduction
	Heuristic	Solution should constantly learn about its users and the knowledge it possesses as it is used i.e. continually refine itself as a user's pattern of research is tracked by the system. Its ability to provide a knowledge seeker with relevant knowledge should therefore improve over time	If the solution responds to many requests on a particular subject, it should learn how to assist multiple users in more depth on that subject
	Suggestive	Solution should be able to deduce what the knowledge seeker's knowledge needs are	Suggest knowledge associations the user is not able to do
	Relevance	Indicates the significance of knowledge objects retrieved	Result set includes direct keyword retrieval and well as context specific retrieval set
	Search and retrieval	Primarily concerned with enhancing the interface between the user and information / knowledge sources, user-friendliness and learning agility	Help users better understand the information and knowledge available by providing subject-based browsing and easy navigation
	Timeliness	Knowledge is available whenever it is needed.	Eliminates time-wasting distribution of information just in case it might be required
	Responsiveness	Encompasses almost immediate retrieval and presentation cycles	Query response time

For the search and find dimension accessibility, appropriateness, context-sensitivity, heuristic, suggestive, relevance, search and retrieval, timeliness and responsiveness are important. Accessibility provides an effective search and retrieval mechanism for locating relevant information, while appropriateness indicates the appropriateness level based on the filtering of multiple inputs for the same knowledge object. Context-sensitivity refers to the feature that the solution should be able to understand the context of the knowledge requirement and tailor responses accordingly. Heuristic indicates that as the solution responds to many requests on a particular subject, it

should learn how to assist multiple users in more depth on that subject, while suggestive deduces what the knowledge seeker's knowledge needs are. Relevance indicates the significance of knowledge objects retrieved, and search and retrieval are primarily concerned with enhancing the interface between the user and information, knowledge sources, user-friendliness and learning agility. Timeliness and responsiveness refer to the feature that knowledge must be available whenever it is needed with almost immediate retrieval and presentation cycles.

4.5 Knowledge Management Solution Selection

The characteristics defined in sections 4.1 to 4.4 were compiled based on the nature of knowledge and knowledge management and may be applied in different ways. One option is as a requirement specification of a knowledge management system before technology is acquired. Another option is to use it as a checklist to evaluate existing technologies for compliance to knowledge management solutions, to identify gaps in existing technologies and to assess suitability before purchasing new technology to close the gaps.

Table 4-5: Knowledge management system characteristics evaluation checklist (illustration only).

KMS characteristic checklist		Technology		
Dimension	Characteristic	eGain Knowledge	Sharepoint	Video-conferencing
Person to person and team collaboration	Collaboration	✔	✔	✔
	Expertise applying process			✔
	Workflow enabled	✔		

Such a typical checklist is depicted in Table 4-5, where one dimension, namely person to person and team collaboration, with the characteristics collaboration, user-sensitivity, expertise applying process, refreshing of data and information and workflow enablement, was used as a requirement of a knowledge management solution. Three technology solutions, namely eGain Knowledge, Sharepoint and video-conferencing, were evaluated against these characteristics to establish whether it

complies with requirements for a knowledge management solution. From the result of the evaluation reflected in Table 4-5, a combination of eGain Knowledge and video-conferencing will comply with all the requirements listed for person to person and team collaboration, and a combination of these two technologies can then facilitate knowledge management in this example.

5 CONCLUSIONS

Knowledge assets are of much greater value than any tangible asset within a company and provide an organisation with a competitive edge, which ultimately results in higher profits for the company. A company with poor knowledge management systems risk financial losses when losing its skills and knowledge encapsulated within its workforce. Leadership and management considering the different management systems available to capture its knowledge, is faced with numerous options as a plethora of software tools are available.

The literature study emphasised that knowledge is an organisational asset. Organisations today are creating and leveraging knowledge, data and information at an extraordinary rate and it makes the use of technology not an option, but a necessity. However, technology aimed at knowledge management is not the only answer, as it is also about the way knowledge workers create, disseminate and manage information. The development of a comprehensive knowledge management system that supports all phases of knowledge management is both a technological and organisational solution and is not necessarily available as a single technology. In order to ensure that the technology and software tools fulfill knowledge management requirements, organisations must consider the definition of knowledge, knowledge management principles, knowledge management processes and the organisation's particular knowledge management requirements.

In this paper, we identified a set of characteristics for decision makers in selecting software tools that will comply with most of the knowledge management solution characteristics in supporting knowledge management within a company. The main categories to be considered include generation of knowledge, storing, codification and representation of knowledge, knowledge transformation and knowledge use and transfer, sharing, retrieval, access and searching of knowledge.

The study was conducted at a mobile telecommunication organisation within the South African context, in an environment with a great demand for skills and an extremely competitive industry where innovation and value proposition are key differentiators to increasing market share. The characteristics were derived from a qualitative study and further research is needed to generalise the list of characteristics. However, according to informal discussions with key decision makers within different companies in South Africa, there is strong evidence that these may also be appropriate for smaller companies.

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