Annales Universitatis Apulensis Series Oeconomica, 11(1), 2009

FROM DOCUMENT MANAGEMENT TO KNOWLEDGE MANAGEMENT

Pavel Năstase[1]
Dragoş Stoica[2]
Florin Mihai[3]
Andrei Stanciu[4]

ABSTRACT: Documents circulating in paper form are increasingly being substituted by its electronic equivalent in the modern office today so that any stored document can be retrieved whenever needed later on. The office worker is already burdened with information overload, so effective and effcient retrieval facilities become an important factor affecting worker productivity.

The key thrust of this article is to analyse the benefits and importance of interaction between document management and knowledge management. Information stored in text-based documents represents a valuable repository for both the individual worker and the enterprise as a whole and it has to be tapped into as part of the knowledge generation process.

Key words: document management, knowledge management, Information and communication technologies

JEL codes: L86

Introduction

In the context of a document or document collection, management refers to all issues related to handling the information contained there, yet before we can handle any information, we have to understand it. Understanding information is a prerequisite for coming up with techniques that allow us to exchange and retrieve documents cost-effectively.

Text-based documents such as contracts, reports, bills, correspondence, etc have been in circulation in paper form for centuries. More recently, computers and information technologies have provided varying facilities to manage, store and retrieve either reference to documents or whole documents. Information retrieval databases, GroupWare products and workflow management systems (WFMSs) and more recently knowledge management (KM) tools were developed and enhanced to handle new and varying needs and demands.

GroupWare systems development in the business field has recently shown much interest in the improvement of electronic document retrieval and management functions, due to the number of documents shared in a physical environment and in database systems. With the rapid progress of information technology and the changing economic structure, knowledge has become one of the most important assets in an organization. Also, there is real concern about the knowledge and know-how drain as well as the lack of technology transfer following the retirement of the current experts. For a business organization to enhance its competitiveness, it must acquire collective knowledge in the context of their business, and effectively put into practical use this knowledge and information for various task performances.

In addition, this knowledge and information exist in many types of resource media forms, such as electronic and paper documents. Paper documents have the convenience of instant

[1] Bucharest Academy of Economic Studies, pavel.nastase@ase.ro
[2] IBM Romania, dragos.stoica@ro.ibm.com
[3] Bucharest Academy of Economic Studies, fmihai@gmail.com
[4] Bucharest Academy of Economic Studies, andrei75@gmail.com

readability with the naked eye, portability, and other attributes that are different from electronic documents. There is no denying that users will have to make appropriate user of all types of documents for effective information retrieval. Therefore, a document management technology is needed which can seamlessly process paper documents and electronic documents with the same retrieval method.

While there is a growing body of work and focus on the discipline of Knowledge Management and general acceptance of its value to an organization, effective implementation and application in a large enterprise setting remains elusive. The subject area of knowledge management is relatively young and little consensus has been reached on effective strategy for managing the body of knowledge of large organizations. Some organizations address knowledge management in their learning organizations, others through their process and quality functional groups, while others deploy standalone knowledge management teams and create executive level positions dedicated to the task. Each of these deployment strategies impacts the way that knowledge management initiatives are introduced and managed in the organization and has led to a wide variety of systems, theories, and results.

Literature review

Before computing technology entered the workplace, the term document referred to all company information and data committed to paper: hard copy memos, invoices, customer complaints, and other official correspondence. Most of this correspondence was written for consumption in a more-or-less official and formal setting. Standards in the preparation of this documentation followed formal business style and format. In addition, document retention dealt with information that was primarily accessed and stored in one place or a very limited number of possible physical locations. Paper documentation was generated and stored at the workplace. Later, desktop computers and local area networks were also ‘‘at work.’’ The documents in electronic and physical form were also physically at work: accessing them meant visiting the worksite in person.

The term document, however, became more fluid with the widespread adoption of computing technology. Electronic mail messages also became documents, as did unprinted electronic word processing and spreadsheet files. The term routinely used today to describe all of these documents, in whatever form they take, is electronically stored information; this is abbreviated as ESI[5].

Corporate memory is the generally accepted term for the collection of all organizational information on various media and the institutional knowledge of organizational workers. For business organizations, corporate memory today also includes text messages, instant messages (IMs), voice mail, electronic mail files, Internet search histories, digitized images in digital cameras and cell phones, and files stored in personal digital assistants (PDAs). As the new electronic communication and storage media emerged, they began to replace phone calls and trips down the hall for face-to-face conversations. However, the relaxed attitude of those calls and visits remained in emails, IMs, and text messages.

Document management is the automated control of electronic documents -- page images, spreadsheets, word processing documents, and complex, compound documents—through their entire life cycle within an organization, from initial creation to final archiving. Document management allows organizations to exert greater control over the production, storage, and distribution of documents, yielding greater efficiencies in the ability to reuse information, to control a document through a workflow process, and to reduce product cycle times. The full range of functions that a document management system may perform includes document identification, storage and retrieval, tracking, version control, workflow management, and presentation.

[5] Volonino, L., Sipior, J., & Ward, B., 2007. Managing the lifecycle of electronically stored information. Information Systems Management, 24(3), 231—238.

A document management system is a computer program or a set of computer programs that help you organize the documents on your computer. Any business generates a large amount of documents such as financial reports, human resources reports, memos and many other types of written information. Without an efficient document management system it can take you hours to find the exact information you need. A good document management system helps your business to increase its productivity and to save money at the same time.

Electronic document management systems have been around for several decades and technologies have evolved in recent years so that implementations include a variety of features. Imaging technology provides the facility to replace a paper-based document management system electronically, and multimedia technology involves the capture and display of various data types, together with the facility to retrieve constituent objects of the multimedia document. In addition, systems may incorporate GroupWare, workflow and text retrieval functionality, with some overlapping between them.The most important functions of current document management systems enable users to:

- directly manipulate the documents;
- index and store to retrieve the documents;
- communicate through the exchange of documents;
- collaborate around documents;
- model and automate the flow of documents.

Individual customer needs are best satised through getting to know the customer as closely as possible. Customer focus thus becomes an information handling issue and the worker needs more support to cope with the increase in information. In practical terms, this means the formalising and storing information about the market and the associated experiences so that it can be used later in a diferent context, providing new knowledge. Knowledge is then created through the correlation and putting into context of disparate information.

Knowledge has been recognized as an important source of competitive advantage and value creation, as an indispensable ingredient for the development of dynamic core competencies and, more generally, as a determinant factor for firms with global ambitions. Moreover, knowledge that firms acquire is a dynamic resource that needs to be nourished and managed carefully.

Knowledge management systems have been defined as "an emerging line of systems (which) target professional and managerial activities by focusing on creating, gathering, organizing and disseminating an organization's `knowledge' as opposed to `information' or `data'"[6].

Robert Grant indicates that tacit knowledge cannot be codified in his description of Types of Knowledge[7]. This is contrary to the many knowledge management theories where encoding is considered one of the great opportunities of the discipline. Irma Becerra-Fernandez indicates that "tacit knowledge can sometimes be converted into explicit knowledge, as happens when an individual with considerable tacit knowledge about a topic writes a book or manual formalizing that knowledge."[8] While admittedly more challenging, the encoding of tacit knowledge is rewarding to the enterprise by capturing the experience and capabilities of employees as they come and go, creating a reusable and transferable form of knowledge that contributes to competitive advantage.

Research methodology

Current document management technology grows out of the business community where some 80% of corporate information resides in documents. The need for greater efficiencies in handling business documents to gain an edge on the competition has fueled the rapid development

[6] M. Alavi, D. Leidner, 1999. Knowledge management systems: issues, challenges, and benefits. Communications of the Association for Information Systems .

[7] Grant, R. 2005. Contemporary Strategy Analysis. Blackwell. Publishing. Malden, Massachussets.

[8] Bercerra-Fernandez, I., Gonzalez, A., & Sabherwal, R. 2004. Knowledge Management. Pearson Education. Upper Saddle River, New Jersey.

of document management systems over the last five years. Most events and processes in an enterprise are initiated, accompanied, or formalised by some form of documentation, and a detailed approach to classifying documents reflects this situation.

Internal documents cover meetings-memoranda, service documentation such as job schedules, progress reports, delivery notes, sales figures and projections, educational material, and administrative documents. External documents include presentations, advertising and promotional material, orders and invoices, queries, complaints, technical drawings of components and parts, price lists, product ranges, legal and safety regulations and standards. The variety of documents that are stored contain information that forms a large part of the organisation memory

The discipline of knowledge management became very popular in recent decades and generated a lot of attention. However, this excitement led to ill conceived initiatives which have contributed to tarnishing the reputation of the discipline. Some organizations trumpet their knowledge management systems as a tremendous source of advantage while other organizations have become disenchanted with the concept through failed projects.

Knowledge management starts from a simple premise: The critical resource that determines competitive advantage in today's economy is knowledge. Consequently, the same kinds of tools and strategies that companies once devoted to optimizing the use of natural resources, capital and labor in the old industrial economy now must be applied to maximizing the productivity of their knowledge assets. Knowledge management refers to the collection of management practices and associated enabling technologies.

The reality today is that effective knowledge management has become a point of parity in many industries, rather than a point of differentiation. It is required to compete effectively, and therefore should not be ignored, but rarely provides a significant, let alone sustainable, competitive advantage. The best characterization of knowledge management today may be that ineffective knowledge management is a competitive disadvantage. Regardless of the view on advantage or disadvantage, it is important to remember that the impact of knowledge management is correlated to the size of the organization, making it even more critical for large enterprise.

Knowledge management systems have appeared in various forms and formats in different industries. Indeed, there is no single model for knowledge management systems. There is no single role of IT in knowledge management, just as there is no single technology comprising knowledge management systems.

Similar to the way legacy systems built and deployed over many years set the stage for ERP system demand, isolated small-scale deployments of knowledge management throughout a large enterprise is creating pools of knowledge dispersed throughout many organizations today and creating a need for centralization. A disparate strategy creates as many off-setting inefficiencies in having to locate the right knowledge source as it does efficiencies in the knowledge gleaned from those sources. An effective knowledge management system is centralized and gives a role-based view of the most relevant explicit knowledge, supported through integration with enterprise directories and intranets already in place.

In the age of globalization, two conflicting trends are taking place that affect enterprise knowledge management. To remain competitive, many enterprises have had to manage continual cost takeout initiatives and scrutinize the value-add of all activities like never before. The impact of this trend is that while many organizations and managers believe in the importance of knowledge management, they often look for the least expensive way to deploy tools that support it, thus compounding the integration issue.

Initiatives cannot be successfully deployed with linear thinking and processes. The global business environment we operate in today makes knowledge management more valuable than ever as team members must efficiently and effectively share both tacit and explicit knowledge from coast to coast and continent to continent. To empower the organization in this environment, management and funding boards must look for the most cost effective way to deploy knowledge management

while still meeting minimum integration and ease of use requirements. The bellow figure illustrates the cyclical, ongoing process required for effective knowledge management.

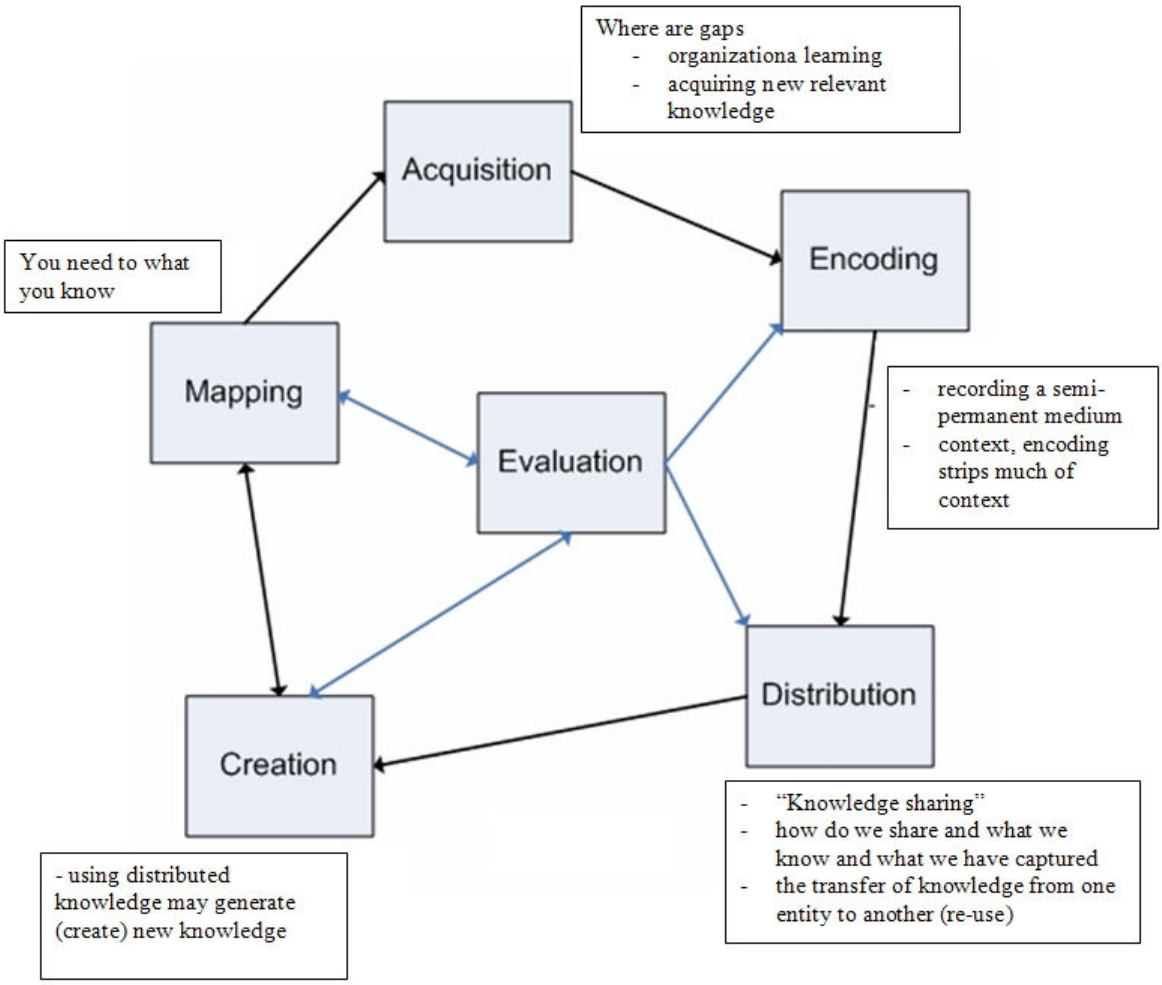

Figure 1: A knowledge management model[9]

Much of the dissatisfaction in knowledge management system deployments has been driven by the challenge of measuring the benefits. Where value is created and how it is counted is a significant challenge with any intellectual capital system. Is the number of pieces of intellectual capital submitted to the system an indication of the value generated? Obviously if no one is searching and reusing the assets, the organization has enjoyed little benefit from this effort.

Another common measurement is the number or reads or downloads on the assets available. This is a de facto measurement that is often used as the best measurement of value without incurring additional cost. However, this metric also leaves much to be desired as it does not provide a representation on how the asset was used. To truly capture the value of intellectual capital, there must be a survey component that generates a record of how an asset is used and an estimate of time saved or quality derived from its use. Instinctively, most managers and practitioners balk at an explicit step to measure the value of intellectual capital because it counteracts the very benefit of intellectual capital reuse by taking explicit time away from the practitioner.

[9] Walczak, S 2005. Knowledge Management Lecture. University of Colorado at Denver.

There are several aspects to knowledge management, but in a computer-based environment, this invariably includes the formalising, storing and access of knowledge that increasingly is being kept in text form. Capitalising company knowledge includes the locating of strategic company knowledge, formalising it, making it accessible and easy to use.

The development of knowledge management systems demands that knowledge be obtained, produced, shared, regulated and leveraged by a steady conglomeration of individuals, processes, information technology applications and a knowledge-sharing organizational culture.

The creation, renewal and sharing of knowledge are clearly critical to the delivery of innovative, and cost effective, products and services. Yet, despite this dependency, the processes and practices used by organisations to manage their knowledge assets are often disconnected from those employed to manage the services and products they underpin. This disconnect will often result in a failure to identify critical issues, and also reduces the visibility and uptake of knowledge management tools.

One symptom of this problem is the tendency for knowledge management initiatives to focus purely on capturing, and making visible, knowledge. Knowledge management should be equally concerned with ensuring processes and practices incentivise individuals to share knowledge. This shift in focus is required to address what many believe to be the biggest challenge facing knowledge management : Individuals, and hence projects and services, invariably show a reluctance to look for knowledge outside of their local, well established, networks. Knowledge management professionals talk about the need to create a culture in which knowledge is shared. For this to happen knowledge management must be embedded into existing management processes, strategy, policy and accountabilities.

In most organisations it is possible for a product or service to progress from cradle to grave without management checking whether knowledge has, or should be, exchanged with the organisation's knowledge portfolio. This is clearly unacceptable, and can be remedied by ensuring knowledge management is addressed within existing management processes. Almost all organisations make use of a range of standardised management processes, these can range from the completion of a datasheet to formalise the closure of correspondence with a customer, to the preparation of a business case to demonstrate that a proposal meets pre-defined business criteria. In most instances there is the opportunity to embed knowledge management criteria within these standardised processes.

These new criteria may do no more than seek confirmation that a check has been made to ascertain if there is knowledge that should be imported from, or flagged to, existing knowledge management tools. In the event that such confirmation cannot be given, then an explanation should be requested.

However, these knowledge criteria must be chosen with care. The simple example given above may be appropriate for minor tasks. In other cases a much more detail submission should be mandated, and in many instances the submission of a knowledge plan should be required. In the case of a project, say for the building of a waste treatment plant, such a knowledge plan would need to address:

- The completeness of actions being taken to control,competitor, customer, supplier and distributor's access to the organisation’s knowledge.
- The completeness of actions being taken to maintain access to, and freedom to exploit, the knowledge required by the project.
- The sufficiency of the knowledge available to the project.
- Whether there is particular know-how that the project should be importing from, or exporting to, the rest of the organisation.
- Whether the project's deployment of knowledge will have an impact on the organisation's other activities.

It is clearly vital to monitor the adequacy of responses to these criteria or questions. Ideally such checks should be embedded in whatever processes are already used to approve the release of funding. Hence a failure to provide an adequate response to such knowledge criteria will result in a reduction in funding.

By integrating knowledge management into existing business processes it is possible to create an environment it which knowledge management is recognised to be part of normal good practice. It therefore becomes just another activity that is planned and budgeted for, and not an add-on activity that must be accommodated by stretching budgets and working longer hours. Ultimately, the checks and controls become invisible because participation in knowledge management becomes second nature. However, simply mandating that services and products should address knowledge management is not the complete answer. Generally the organisation also needs to provide guidance to help individuals contribute to knowledge management; this is especially important in two areas.

Firstly, it is important that everyone in the organisation is clear who is accountable for carrying out the key activities needed to make knowledge management work. Secondly, there must be sufficient guidance, in the form of an overarching knowledge strategy, to steer decision-making so that all elements of the organisation are working to a common approach.

An organisation's policy should describe the principles it will adhere to, in this case, when managing its knowledge assets. I believe that key accountabilities should flow naturally out of this policy. There is inevitably considerable variation in the detail presented within different organisation's policy framework. Some organisation's may decide to limit their policy to a series of statements analogous to those given in the top line of the above table. However, the policy statements of this type are often little more than motherhood statements that rarely aid in the running of the organisation. Conversely, some organisation's policy contains detailed procedures describing not only what should be done, but how. Policies of this type are often ignored because of the sheer volume of information users must navigate.

The knowledge policy framework recommended is normally structured as follows:

- A number of short policy statements are given defining the principles the organisation wishes to follow in the management of its knowledge assets.
- Each policy statement is accompanied by clear accountabilities, identifying both those responsible for policy implementation, and the actions that need to be undertaken to ensure compliance.
- Supporting procedures can be prepared where necessary. However, in general these should be kept outside of the policy framework.

This structured approach provides a clear description of; the organisation's policy, the minimum actions needed to ensure compliance, and identifies those responsible for monitoring compliance. Knowledge strategy should provide a vision that helps services and projects to take decisions on the capture, maintenance, protection and disclosure of knowledge assets, instead of describing the approach being taken to knowledge management. As such it should, amongst other issues;

- Identify where, or the circumstances when, communities of practice and databases should be formed.
- Discuss knowledge gaps and how they are to be filled.
- Identify key knowledge assets and what actions are necessary to ensure it is appropriately managed.

For most organisations, the critical area of their knowledge strategy concerns the management of the knowledge that underpins their differentiatoring and enabling capabilities. Differentiators and enablers can be defined as follows:

- Differentiators are capabilities to which an organisation wishes to have unique access (these are critical to company's in the private sector).
- Enablers are capabilities, with limited availability, that are essential to product and service

delivery (here the focus is on ensuring secure and cost effective access, rather than pursuing the creation of a unique capability).

Differentiating and enabling capabilities can range from disciplines such as project management, to technical expertise such as an understanding of specific chemical reactions. Enablers and differentiators are likely to exist in the following areas:

- Service delivery / product manufacture.
- The supply chain and its management.
- Customer management (attraction / retention /interface).

To be a true differentiator or enabler a capability will typically underpin a range of products or services. Clearly, individual projects and functions should not be allowed unlimited freedom on how to manage the knowledge underpinning the organisation's enablers and differentiators. The knowledge strategy must therefore provide a framework to guide local decisions and actions. For each enabler or differentiator the knowledge strategy should therefore identify; key knowledge that should be captured and shared, whether inventions should -as a default- be patented or kept secret, who is responsible for decision-making, etc.

Once strategy, policy and accountabilities are clear, then the process of making visible the performance of accountability holders is an extremely effective lever for change. Senior management, or the corporate body, should therefore routinely challenge how effectively knowledge is being managed by the functions. Metrics or other indicators can be of considerable use in this process of challenge and can both[10]:

- Make visible the quality of the organisation's knowledge management.
- Make visible the alignment of the organisation's knowledge assets to strategy. ie: measuring the "role" and "utility" knowledge assets in each business area.

Intellectual asset management brings together knowledge and intellectual property management. Specifically, it seeks to:

- Minimize third party access to, and freedom to exploit, key intellectual assets.
- Ensure ongoing access, and freedom to exploit, key intellectual assets.
- Raise the visibility of, and ensure full exploitation of, key intellectual assets.

Ultimately, intellectual asset management, like knowledge management, must be addressed by its integration into existing processes, strategy, policy and accountabilities.
Specifically:

- Management processes should check whether projects and services are both managing and protecting key intellectual assets.
- Internal management reports should make visible both the strength of the intellectual asset portfolio and the quality of its management.
- Policy and accountabilities should clearly define responsibilities for the management of intellectual assets.
- Intellectual assets should be visible to projects and services.

In other words, intellectual asset management can, and therefore should, evolve naturally from knowledge management using the tools and processes described.

Traditional decision support tools that are based on data warehousing and data mining technologies enable knowledge creation. Main providers of analytical solutions are IBM, SAS, ORACLE, Cognos, Business Objects, etc. Data warehousing technologies are also integrated into the offer of the biggest provider of ERP systems SAP. Apart from in-house knowledge production, knowledge could be captured from outside. Scanning of project documentation, buying information about customers, or hiring new people are examples of knowledge capture. Most document

[10] Fugate B.S., Stank T.P., Mentzer J.T., 2009, Linking improved knowledge management to operational and organizational performance, Journal of Operations Management, Volume 27, Issue 3, 247-264

management systems support this function[11].

New technologies including high-speed networks, mobile telecommunications, videoconferencing, virtual reality software alter the way the organizations do their business and communicate with their customers, suppliers, and partners and also dislocated employees. They enable binding of enterprises into virtual organizations, associations or alliances with the aim to exchange information, knowledge and experience, and to respond agile to customer requirements. Like other management strategies, knowledge management initiatives are expected to make the most of the intellectual capital, enable innovation and competitiveness necessary to survive on the market, satisfy customers, and hence, create profit.

Knowledge management solutions related to the customer processes are the following: domain-specific knowledge bases to promptly answer customer questions in call centers; sophisticated sales and marketing tools to better track the interactions with the customer; intelligent knowledge-based systems to learn more about customer preferences, behaviors, profitability, and overall potential; business process modeling and analysis tools to optimize and automate the customer processes, etc. The analyzed information technologies are applicable to traditional hierarchical organization of the enterprises as well as to modern forms of enterprise organizations.

Conclusions

All organisations have a number of resources, some of which can be converted into capabilities such as know-how or tacit knowledge. Knowledge management's purpose, simply put, is the creation, collection and conversion of individual knowledge into organisational knowledge. Knowledge management's strength lies in its ability to harness knowledge resident in an organisation, for the benefit of itself, its customers and shareholders.

If an effective knowledge management strategy is developed and implemented, it can greatly facilitate the collection and sharing of meaningful knowledge, reducing lost time searching for that expertise. Thus employee knowledge can be converted to corporate knowledge, building on organisational memory. Knowledge management can improve efficiency and effectiveness, and increase responsiveness to market changes. It can also be used to improve product development and quality, and develop a better understanding of customer and stakeholder relationships

Knowledge Management has certainly entered the Trough of Disillusionment as it relates to Gartner's hype cycle[12], but the discipline has much to offer when deployed in a manner consistent with the needs of an organization and addressing the three key factors of integration, funding, and measurement.

If a large enterprise were to plan a knowledge management system that integrated well with other systems across the company, had funding support from management that was focused on the long-term success of the initiative, and carefully thought out the types of measurement that truly equate to value-add activity, the organization would be well positioned to enrich its knowledge capture, sharing, and reuse. Whether this would translate to a competitive advantage or a qualifier to compete depends on the specific industry and competitors and their knowledge management maturity.

References

1. Bercerra-Fernandez, I., Gonzalez, A., & Sabherwal, R., 2004.Knowledge Management. Pearson Education. Upper Saddle River, New Jersey.
2. Grant, R., 2005. Contemporary Strategy Analysis. Blackwell Publishing. Malden, Massachussets.
3. Walczak, S, 2005. Knowledge Management Lecture. University of Colorado at Denver.

[11] Vandaie R., 2008, The role of organizational knowledge management in successful ERP implementation projects, Knowledge-Based Systems, Volume 21, Issue 8, 920-926

[12] Understanding hype cycles. (n.d.). Gartner, Inc. retrieved 6/27/2007 from: http://www.gartner.com/pages/story.php.id.8795.s.8.jsp

4. Alavi M, Leidner D., 1999. Knowledge management systems: issues, challenges, and benefits. Communications of the Association for Information Systems.
5. Luoma, V., 2006. Computer forensics and electronic discovery: The new management challenge. Computers & Security 25, 91-96.
6. Jones M.C., Cline M., Ryan S., 2006, Exploring knowledge sharing in ERP implementation: an organizational culture framework, Decision Support Systems 41, 411-434.
7. Hoegl M., Schulze A., 2005, How to Support Knowledge Creation in New Product Development: An Investigation of Knowledge Management Methods, European Management Journal, Volume 23, Issue 3, 263-273
8. Chua A., 2004, Knowledge management system architecture: a bridge between KM consultants and technologists, International Journal of Information Management, Volume 24, Issue 1, 87-98
9. Vandaie R., 2008, The role of organizational knowledge management in successful ERP implementation projects, Knowledge-Based Systems, Volume 21, Issue 8, 920-926
10. Fugate B.S., Stank T.P., Mentzer J.T., 2009, Linking improved knowledge management to operational and organizational performance, Journal of Operations Management, Volume 27, Issue 3, 247-264
11. Understanding hype cycles. (n.d.). Gartner, Inc. retrieved 6/27/2007 from: http://www.gartner.com/pages/story.php.id.8795.s.8.jsp