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Babita Gupta
California State University - Monterey Bay

Lakshmi Iyer
University of Dayton

Jay Aronson
The University of Georgia

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Babita Gupta, California State University Monterey Bay, babita_gupta@monterey.edu

Lakshmi S. Iyer, University of Dayton, iyer@udayton.edu

Jay E. Aronson, The University of Georgia, jaronson@blaze.cba.uga.edu

Abstract

Knowledge Management (KM) is an emerging new tool for harnessing an organization's largely untapped resource - Knowledge. KM is a process that includes the development, storage, retrieval, and dissemination of information and expertise, explicit as well as tacit, within the organization to support and improve an organization's business performance. There are as many techniques to implement KM, as there are definitions of KM. Knowledge Management requires a major shift in organizational culture and a commitment at all levels of a firm to make it work. This paper explores what Knowledge Management is, the links between KM and innovation, the imperatives for KM, and technological tools for KM implementation in an organization.

Introduction

As we move towards the era of the knowledge-based economy, Knowledge Management (KM) is emerging as a tool to harness and manage the knowledge assets of an organization as a key to sustaining competitive advantage. KM is a process that helps organizations find, select, organize, disseminate, and transfer important information and expertise, explicit as well as tacit, necessary for activities such as problem solving, dynamic learning, strategic planning and decision making.

Early in the industrial era, organizations improved their efficiency, effectiveness and hence, their competitive edge by automating manual labor and reducing redundancy. However, now, in the age of the knowledge worker, many organizations have gone through massive restructuring to eliminate redundant workers and jobs. These activities have been swept into the Business Process Re-engineering movement. In the last decade alone, the nature of competition has changed radically due to increased global connectivity, distributed expertise, and shorter product development cycles. Unlike the era of mass-production, we are fast approaching the "market of one," where, with the right level of knowledge, an organization may produce highly individualized products. To stay competitive, companies must still be innovative in reducing their costs and expanding their markets. Thus, organizations are streamlining their processes and looking for ways to *work smarter*. At this stage, Knowledge Management (KM) emerges with the need for organizations to be cost efficient and managerially effective in problem solving, decision making, innovation, and all other elements that organizations need to maintain and develop their competitive edge. More specifically, KM is crucial for capturing, cataloguing, preserving, and disseminating the expertise and knowledge that are part of the organizational memory that typically resides within the organization in an unstructured way.

Knowledge

There is a vast amount of literature about what "knowledge" and "knowing" means in epistemology, social sciences, philosophy and psychology. Although the business perspective is much more pragmatic, there is still no one definition or consensus on what KM specifically means. Davenport and Prusak (1998) define knowledge as ". . . a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information . . ." Dr. Carla O'Dell, President of the American Productivity & Quality Center quotes "Knowledge is information that has value..." (Elliott, 1996). Clarke (1998) defined knowledge as "the understanding of why and how something works." Most organizations already have a massive reservoir of knowledge in a wide variety of organizational processes, best-practices, know-how, policy manuals, customer trust, MIS, culture and norms. However this knowledge is usually diffused, and mostly unrecognized. Oftentimes, organizational culture itself prevents people from sharing and disseminating their know-how in an effort to hold on to their individual power base and viability.

Polanyi (1958) first conceptualized and distinguished between tacit and explicit knowledge. *Tacit knowledge* is usually in the domain of subjective, cognitive and experiential learning, whereas *explicit knowledge* deals with more objective, rational and technical knowledge (data, policies, procedures, software, documents, etc.). Explicit knowledge usually exists in some articulated form and therefore can be easily transferred or communicated to another person, or transformed into a process or strategy. Tacit knowledge, in contrast, is

diffused, without any tangible form and therefore, difficult to codify.

Organizations are just now beginning to recognize and develop specific methodologies to convert tacit knowledge into explicit knowledge to be codified and therefore captured, stored, transmitted, used and be acted upon by others. This powerful concept has fueled the development of KM methodologies, tools and applications. Nonaka and Takeuchi (1995) point out the often overlooked asset of companies are intangibles like insights, intuitions, hunches, gut feelings, values, images, metaphors and analogies. Mining this intangible asset can add great value to the daily operations of a company.

Knowledge Management

KM is fundamentally the management of corporate knowledge and intellectual assets that can improve a range of organizational performance characteristics and add value by enabling an enterprise to be more "intelligent acting" (Wiig, 1993). It is not a new movement per se, as organizations have been trying to harness their internal processes and resources that have resulted in various movements over the years as total quality management, expert systems, business processes re-engineering, the learning organization, core competencies, and strategy focus (Shukla, 1997). For centuries, knowledge has been documented in traditional ways: oral traditions, clay tablets, scrolls, books, manuals, etc. Good managers in organizations have been using the know-how of people they hired with skills and experience, and processes for effective management on an *ad hoc*, casual basis. However, only recently have organizations begun to focus their interest on this aspect in a more systematic and a deliberate manner. Managers have learned that knowledge has value to an organization and should be treated as a resource, and managed and utilized as such. The primary goal of a knowledge management system is to have processes to manage:

- Knowledge creation through learning
- Knowledge capture and explication
- Knowledge sharing and communication through collaboration
- Knowledge access
- Knowledge use and reuse
- Knowledge archiving

The four basic functions or processes of KM are externalization, internalization, intermediation, and cognition (Frappaolo 1998):

Externalization is capturing knowledge in an external repository and organizing it according to some framework in an effort to discover the existence of similar bodies of knowledge. Technologies that support it are imaging systems, databases, workflow technologies, document management systems using clustering techniques, etc.

Internalization is the process of identifying knowledge, usually explicit, relevant to a particular user's needs. It involves mapping a particular problem, situation or point of interest against the body of knowledge already captured through externalization.

Intermediation is akin to the brokering process to match a knowledge seeker with the best source of knowledge (usually tacit) by tracking the experience and interest of individuals and groups of individuals. Some of the technologies used to facilitate this process are groupware, Intranets, workflow, and document management systems.

Cognition is the ultimate goal of KM by applying the knowledge exchanged through the preceding three processes. This is probably the component of KM most difficult to automate as this relies on human cognition to recognize where and how knowledge can be used.

Knowledge Management Techniques in Practice

KM as a discipline shares ideas and concepts from a variety of other disciplines and philosophies. Although knowledge management is not a new concept in itself, only recently has it come to the forefront of researchers and practitioners. Driving the recent developments in knowledge management are two main factors: the explosive growth of information resources such as the Internet; and the accelerating pace of technological change. This leaves knowledge workers feeling both overwhelmed by information (information overload) and technology, and fearful that they are missing important details. Also, the recent flurry of mergers and acquisitions has flooded companies with information. A healthy U.S. economy has also spurred companies to invest in people's expertise rather than to downsize.

A variety of technologies can make up a knowledge-management system: Intranets, data warehousing, decision-support tools, and groupware are just a few, among many. In particular, much work is being done in the field of artificial intelligence relating to knowledge engineering, tacit to explicit knowledge transfer, knowledge dispersion, etc. Companies are taking the approach to realign these technologies and resultant products with KM. For example, KM and Group Support Systems (*i.e.*, collaborative computing) share the concepts of working, sharing, and facilitating in groups/teams. KM and data mining are related as KM deals with knowledge creation that can be performed by identifying creative

means to glean knowledge from existing data (in databases, data warehouses, text documents, etc.). The real essence of these approaches is the development of a *knowledge core*, a smart engine that knows what it would take to fashion information in disparate locations and differing databases into answers -- knowledge, that could be used anywhere and at anytime in the enterprise.

Technology vendors are responding to the growing demand for KM tools with equal parts innovation and hype. Young software companies such as GrapeVine Technologies, Intraspect, and KnowledgeX are bringing products to market that are designed specifically for knowledge management. Search-and-retrieval vendors Excalibur, Fulcrum, and Verity are transforming older products into what are called knowledge-management platforms. Even Lotus Development Corp. and Microsoft Corp. are repositioning their groupware products in light of the knowledge-management trend (Hibbard 1997).

However, technology is secondary to the human element in the knowledge management process. A major problem is how to convince, coerce, direct or otherwise motivate people within an organization to share their information. Another thorny issue within KM is deciding who manages the knowledge content that is produced/collected. It's a major *change management problem* that poses serious leadership challenges. In an effort to address these problems, companies are beginning to assign a Chief Knowledge Officer (CKO) with the responsibility to implement KM strategies and practices within the organization. Effective knowledge sharing and learning requires cultural change within the organization, new management practices, senior management commitment, and technological support. The organization needs a process of articulation and codification of tacit knowledge into explicit knowledge so that it can create a repository of corporate memory. Successful technologies include desktop video-conferencing, Lotus Notes, multimedia mail, data warehouses, document management systems, Intranet-based Webs and artificial intelligence tools.

Achieving effective knowledge management is a complex problem with human and organizational factors. It is important for leaders of organizations to understand who has knowledge, and to develop support systems for its creation and application. They must make decisions about what kind of data and experience is valuable for the organization to retain and publish in the knowledge architecture. They then must create the knowledge maps that identify where knowledge resides and which knowledge needs to be shared with whom, how and why, with an appropriate reward structure for knowledge creators and brokers.

Davenport, DeLong, and Beers (1998) identify the following factors that contribute to effective knowledge management: link to economic performance or industry value; technical and organizational infrastructure; standard, flexible knowledge structure; knowledge friendly culture; clear purpose and language; change in motivational practices; multiple channels for knowledge transfer; and senior management support.

KM is fast emerging as the new information system paradigm to retain and expand market share and customer loyalty leading to increased profits. However, there is much skepticism about KM. There is an urgent need to develop success metrics for KM for a CEO to recognize when KM works for an organization, what value is added to its processes and products, and what implications there are for competition by enhanced sharing and collaboration.

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