Chapter 3.1
ICT and Knowledge Management Systems

Irma Becerra-Fernandez
Florida International University, USA

Rajiv Sabherwal
University of Missouri – St. Louis, USA

INTRODUCTION

Rapid changes in the field of knowledge management (KM) have to a great extent resulted from the dramatic progress we have witnessed in the field of information and communication technology. ICT allows the movement of information at increasing speeds and efficiencies, and thus facilitates sharing as well as accelerated growth of knowledge. For example, computers capture data from measurements of natural phenomena, and then quickly manipulate the data to better understand the phenomena they represent. Increased computer power at lower prices enables the measurement of increasingly complex processes, which we possibly could only imagine before. Thus, ICT has provided a major impetus for enabling the implementation of KM applications. Moreover, as learning has accrued over time in the area of social and structural mechanisms, such as through mentoring and retreats that en-

able effective knowledge sharing, it has made it possible to develop KM applications that best leverage these improved mechanisms by deploying sophisticated technologies.

In this article we focus on the applications that result from the use of the latest technologies used to support KM mechanisms. Knowledge management mechanisms are organizational or structural means used to promote KM (Becerra-Fernandez, Gonzalez, & Sabherwal, 2004). The use of leading-edge ICT (e.g., Web-based conferencing) to support KM mechanisms in ways not earlier possible (e.g., interactive conversations along with the instantaneous exchange of voluminous documents among individuals located at remote locations) enables dramatic improvement in KM. We call the applications resulting from such synergy between the latest technologies and social or structural mechanisms knowledge management systems. We discuss the topic of KM systems in detail in the next sections.

BACKGROUND

We describe the variety of possible activities involved in KM as broadly intending to (a) discover new knowledge, (b) capture existing knowledge, (c) share knowledge with others, or (d) apply knowledge. Thus, KM relies on four kinds of KM processes as depicted in Figure 1 (Becerra-Fernandez et al., 2004). These include the processes through which knowledge is discovered or captured, and the processes through which this knowledge is shared and applied. These four KM processes are supported by a set of seven KM subprocesses as shown in Figure 1, with one subprocess, socialization, supporting two KM processes (discovery and sharing).

Polyani's (1967) distinction between explicit and tacit is at the heart of most KM papers. These constructs follow in that explicit knowledge is knowledge about things, and tacit knowledge is associated with experience. Nonaka (1994) identified four ways of managing knowledge: combination, socialization, externalization, and internalization. Of the seven KM subprocesses presented in Figure 1, four are based on Nonaka, focusing on the ways in which knowledge is shared through the interaction between tacit and explicit knowledge. New explicit knowledge is discovered through combination, wherein the multiple bodies of explicit knowledge (and/or data and/or information) are synthesized to create new, more complex sets of explicit knowledge. Therefore, by combining, reconfiguring, recategorizing, and recontextualizing existing explicit knowledge, data, and information, new explicit knowledge is produced. In the case of tacit knowledge, the integration of multiple streams for the creation of new knowledge occurs through the mechanism of socialization. Socialization is the synthesis of tacit knowledge across individuals, usually through joint activities rather than written or verbal instructions. Externalization involves converting tacit knowledge into explicit forms such as words, concepts, visuals, or figurative language (e.g., metaphors, analogies, and narratives; Nonaka & Takeuchi, 1995). It helps translate individuals' tacit knowledge into explicit forms that can be more easily understood by the rest of their group. Finally, internalization is the conversion of explicit knowledge into tacit knowledge. It represents the traditional notion of learning.

The other three KM subprocesses—exchange, direction, and routines—are largely based on Grant (1996a, 1996b) and Nahapiet and Ghoshal (1998). Exchange focuses on the sharing of explicit knowledge and it is used to communicate or transfer explicit knowledge between individuals, groups, and organizations (Grant, 1996b).

Figure 1. KM processes
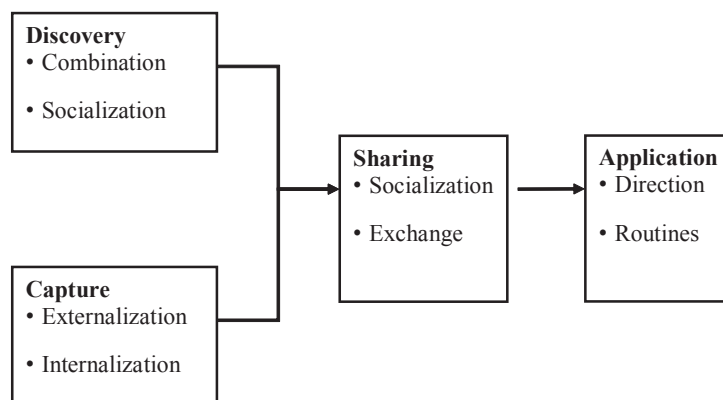
Related Content

Knowledge Management & It's Origin, Success Factors, Planning, Tools, Applications, Barriers and Enablers: A Review
Animesh Agrawaland Suraj Kumar Mukti (2020). *International Journal of Knowledge Management (pp. 43-82).*
www.irma-international.org/article/knowledge-management--its-origin-success-factors-planning-tools-applications-barriers-and-enablers/243638

A Framework for Synthesizing Arbitrary Boolean Queries Induced by Frequent Itemsets
Animesh Adhikari (2013). *International Journal of Knowledge-Based Organizations (pp. 56-75).*
www.irma-international.org/article/framework-synthesizing-arbitrary-boolean-queries/77884

A Cross-National Comparison of Knowledge Management Practices in Israel, Singapore, the Netherlands, and the United States
Ronald D. Camp II, Leo-Paul Dana, Len Korotand George Tovstiga (2008). *Strategic Knowledge Management in Multinational Organizations (pp. 323-341).*
www.irma-international.org/chapter/cross-national-comparison-knowledge-management/29793

A Framework for Managing the Life Cycle of Knowledge in Organizations
Mark Salisbury (2009). *International Journal of Knowledge Management (pp. 60-77).*
www.irma-international.org/article/framework-managing-life-cycle-knowledge/2746

Integrating Deep Q-Networks with Rail Transit Systems for Smarter Urban Mobility: A Knowledge-Driven Optimization Approach to Signal Priority Strategies:
Shujuan Li, Shiwei Wang, Gang Xuand Long Wu (2025). *International Journal of Knowledge Management (pp. 1-20).*
www.irma-international.org/article/integrating-deep-q-networks-with-rail-transit-systems-for-smarter-urban-mobility/372676