

FROM KNOWLEDGE MANAGEMENT THEORIES TO PRACTICE IN PUBLIC ORGANISATIONS: TOWARDS A TRANSDISCIPLINARY APPROACH (THEORETICAL BACKGROUND)

Jelena Davidova, PhD

Irena Kokina, PhD

Zane Zarina, MA

Daugavpils University, Latvia

Abstract

Scientists and practitioners have developed and continue to refine methodologies of knowledge management with the aim to implement it into practice of public organisations. In recent studies, there has been an emphasis on the development of what can be considered a transdisciplinary approach in knowledge production and usage, where knowledge management, its theories, principles and practices are advanced. The aim of this study is to review the conceptual foundations of knowledge and knowledge management by advancing the conception of knowledge management in the context of transdisciplinary approach.

The authors give an overview of the forms, levels and categories of knowledge. The increasing emphasis placed on knowledge in an organisational context has given rise to a new manifestation of capital which occurs as human or structural intellectual capital. By analysing theories on the essence of knowledge management, the viewpoint formed that knowledge management within an organisation should be viewed through the transdisciplinary approach, namely, production of knowledge that rises above disciplines should be done by collaboration of both academic and non-academic representatives, who offer a new compass and map for complex problem solving.

Keywords: Knowledge, knowledge management (KM), public organisations, transdisciplinary approach

Introduction

The maturity level of the society is determined by the ability to solve a set of fundamental tasks for one's sustainable development. These tasks can be formulated as follows: a) to be able to distinguish the purposes of each stage of development; b) to carry out an analysis of the former stages of development; c) to comprehend results of the former stages of development; d) to develop a mechanism of the socio-economic relationship allowing to achieve the purpose of the forthcoming stages of development; e) to carry out the risk-analysis of the substantiated purposes and mechanism of their achievement; f) to co-ordinate the purposes and tasks of development of the society with the purposes and tasks of development of the ambient world using transdisciplinary approach.

According to Pinchot & Pinchot (1993), institutions are changing as the relationship between employee and employer alter in deep and permanent ways in response to the need for all to contribute their intelligence, creativity, and responsibility to society. It is now expected that employees - both in the public and private sectors - should be innovative, care for customers, work in teams and collaborate with others, as well as follow their own initiative rather than just follow orders. The key factor in the information/knowledge society is the generation and exploitation of knowledge. The World Bank (2007) avers that knowledge management (hereinafter - KM) has become a fundamental source of wealth creation, supplementing industrial capital and land. The World Bank sees KM as representing a management modernisation challenge for the public sector which involves adapting classical management tools in a way that systematically promotes knowledge sharing. The sharing of knowledge in organisations or departments is one of the fundamental functions of any KM programme. It is the contention of the World Bank that countries are anxious to place KM programmes in the public sector but lack the experience or knowledge to do so. KM involves the processing and handling of intellectual capital within and between organisations and communities. It facilitates knowledge generation, sharing and reuse.

The desire to use scientific knowledge appropriately and effectively for human development has enhanced the development and further refinement of methodologies, principles and techniques for managing data, information and knowledge. Scientists and practitioners have developed and continue to refine methodologies of KM with the aim to implement it into practice of public organisations. In recent studies, there has been an emphasis on the development of what can be considered a transdisciplinary approach towards knowledge production and use through KM, its theories, principles and practices.

The aim of this study is to review the conceptual foundations of knowledge and KM by advancing the conception of KM in the context of transdisciplinary approach.

The research undertaken for this article is theoretical and based on a study and synthesis of the existing literature on the topic. The scope of the literature consulted includes classic management literature, futurist articles from the eighties with predictions for the nineties and beyond, articles specifically on KM, artificial intelligence, philosophical papers and scientific articles.

Knowledge in an organisational context

Essence of knowledge

Principally there are two approaches to defining knowledge: one uses the concept of a value chain or hierarchical structure among data, information, and knowledge; the other focuses on the analysis of the process of knowing. According to Harris (1996), the lowest level of known facts is data. Data has no intrinsic meaning: it must be sorted, grouped, analysed, and interpreted. When data is processed in this manner, it becomes information, which has a substance and a purpose. When information is combined with context and experience, it becomes knowledge. According to Kock & McQueen (1998), data is carrier of information and knowledge, information is relating to descriptive and historical fact, but knowledge is new or modified insight or predictive understanding. Zack (1999) defines data as observation or facts, information as data in a meaningful context, but knowledge as meaningfully organized accumulation of information.

Churchman (1971) notes that to define knowledge as a collection of information does not consider the complicated interactions between the users of information and the collection of information. He stresses that knowledge is a combination of a process elements (such as, e.g., authentication, user's perception, or context) and information.

There are principally different views about knowledge essence: one group of researchers defines knowledge as an object (Zeleny, 1987; Gopal & Gagnon, 1995; Tenkasi & Boland, 1996); the other defines knowledge as a process related to application (Bohn, 1994; McDermot, 1999; Zack, 1999).

Knowledge is the combination of information, context, and experience. When knowledge is transferred from one person to another, the knowledge is drawn into the receiver's context and experience (Harris, 1996). The new knowledge is interpreted according to the receiver's context and experience: if the receiver does not have an appropriate background for interpreting the new knowledge, the new knowledge will not be interpreted correctly and the knowledge will have little or no value. At the same time, if the sender uses a poor symbolic representation of the knowledge, the

receiver will be misled or may even be unable to understand the new knowledge (Mezirow, 1991).

Turban & Frenzel (1992) define these concepts from a computer science and specifically an artificial intelligence perspective as follows: data refers to numeric or alphanumeric strings that by themselves do not have meaning. Information is data organised so that it is meaningful to the person receiving it. Knowledge has several definitions: understanding, a clear and certain perception of something, learning, all that can be perceived or grasped by the mind, practical experience or skill, cognisance, recognition, organised information applicable to problem-solving.

Knowledge is shared between groups and communities through shared experience and through the transfer of knowledge, both tacitly and explicitly. Wilson (2002) stresses that knowledge involves the mental processes of comprehension, understanding and learning that go on in the mind and only in the mind, however much they involve interaction with the world outside the mind, and interaction with others. Thus the individual and organisation or community has a knowledge pool.

Alternatively, data, information and knowledge can be classified by their degree of abstraction and by their quantity: knowledge is the most abstract and exists in the smallest quantity (Turban & Frenzel 1992, 11). Turban & Frenzel (1992) tend to favour a semantic examination of the concepts information and knowledge: information is the noun of the verb to inform whereas knowledge is the noun of the verb to know. Thus information is that which informs by means of a process and implies two parties (a sender and receiver), but knowledge is what is known and requires one party to internalise, what has been received through the process of informing. According to Churchman, "...to conceive of knowledge as a collection of information seems to rob the concept of all of its life ... Knowledge resides in the user and not in the collection. It is how the user reacts to a collection of information that matters" (Churchman, 1971, 10). This view confirmed the subjective nature of knowledge.

Tsoukas (1996) notes that individual knowledge is built up by social practices engaged in by the individual; therefore the two kinds of knowledge are highly interdependent. In this context the value chain can be used to explain to some degree social knowledge and its interactions with individual knowledge. It is essential that the KM value chain should be strategically driven in order to realize the objectives of an organization, and resulting in a continuously cycling process (Shin, Holden & Schmidt, 2001).

Probst, Raub & Romhardt (1999) define knowledge as "the whole body of cognitions and skills which individuals use to solve problems. It includes theories and practical, everyday rules and instructions for action" (p.24). Davenport & Prusak (1998) define knowledge as a fluid mix of

framed experience, values, contextual information and expert insight that provide the framework for evaluating and incorporating new experiences and information. It originates and is applied in the mind of the knower. In an organization it often becomes embedded not only in documents or repositories but organizational routines, practices and norms. Davenport, Long & Beers (1998) conclude that knowledge is a high-value form of information that is ready to be applied to decisions and actions.

One of the most important characteristics of knowledge is abstraction - the suppression of detail until it is needed and the exposure of the patterns of organisation of detail. In this context knowledge is the minimisation of information gathering and reading not increased access to information (Murray, 1996). Furthermore, abstraction implies that knowledge does not rely on access to the original information: a symbol can be created to represent the original information and, as a result, knowledge can be transferred from one person to another without having to transfer all of the information.

Knowledge assets are mostly referred to as intellectual capital. According to Huang (1997), intellectual capital consists of information, knowledge, assets, experience, wisdom, and/or ideas that are structured to enable sharing for reuse and to deliver value to customers and shareholders. Huang (1997) highlights the following criteria of intellectual capital: a) be reusable in a variety of contexts; b) be a unique, innovative concept, approach, or solution applied to a client situation; c) create or enhance a methodology or technique; d) present a comprehensive summary of information.

By analysing the mentioned conceptions, it is obvious that knowledge is directly related to information and data, but they are not synonymous terms. Information can be defined as ideas, facts, and imaginative workings of the mind and valuable data that are potentially useful in decision making, question answering and problem solving. Therefore, information in itself is not knowledge and does not solve problems, but simply makes one aware of and provides possible courses of action. Data, on the other hand, are symbols with rules of syntax applied to them. Data and information can be context independent, they can exist independent of a person or community. However, knowledge is bound to a person, organisation or community: it is constructed by individuals and represented by their beliefs.

Forms of knowledge

Knowledge may be categorised into two types or classes with common characteristics. It is critical, particularly in a discussion of KM, to have a clear understanding of these types. Nonaka (1994) identifies the two types of knowledge as explicit knowledge and tacit knowledge: a) explicit

knowledge is formal and systematic in nature; it is expressed in symbols and words: it can be communicated easily and shared in product specifications, scientific formulae or computer programs as well as recorded or stored in artefacts, in printed, audio-visual and electronic format; b) tacit knowledge is highly personal: it represents personal knowledge and involves personal beliefs, values, intuition and insight.

Explicit knowledge is knowledge that can be readily identified, explained, documented, captured in databases, and shared. According Brown & Duguid (2001), explicit knowledge is synonymous with information. Shin, Holden & Schmidt (2001) note, that explicit knowledge is codified and communicated in symbolic form or language; however tacit knowledge resides in the individual's experience and action. Tacit knowledge is difficult to articulate, hard to record, based on experience, and intimately connected to the way we carry out tasks and solve problems (Polanyi, 1966). Tacit knowledge is more like a process of learning: comprising the understanding we gain of how to learn particular skills, rather than the information related to the skills themselves (Wilson, 2002).

Nonaka (1994) stresses, that knowledge is created by the interaction between tacit and explicit knowledge; the boundary between them is not clear. Spender (1996) indicates that the boundary is both porous and flexible: in this context tacit knowledge is created by explicit knowledge and vice versa.

Shared experiences give the richest opportunities for transferring tacit knowledge, as when a master craftsperson passes his/her knowledge to an apprentice. Frequent, intense personal interaction in a work context can enable tacit knowledge to be shared; this process is called socialization (Nonaka, 1994). There is some evidence that less frequent personal interaction may work just as well in supporting tacit knowledge transfer, provided that the lessons to be learned are clearly identified in advance and the people involved trust each other (Levin & Cross, 2004). Metaphors and stories offer another vehicle for the sharing of tacit knowledge (Swap et al., 2001; Leonard & Swap, 2004). By using metaphors and stories, we are able to articulate experiences that we are otherwise unable to express (Srivastva & Barrett, 1988). Their usage supports the generation and transfer of tacit knowledge (Nonaka, 1994). Metaphors and stories also allow complex situations to be described in a way that others can identify with, so that they can recognize and anticipate similar situations.

Many organizations treat knowledge as if it were synonymous with information (Wilson, 2002). This leads them to overlook the tacit dimension, although tacit knowledge is a key source of sustainable competitive advantage (Ambrosini & Bowman, 2001).

Explicit and tacit knowledge are similarly interwoven in the new product development context. If we consider information as explicit knowledge, then we must recognize the importance of the tacit dimension in its understanding and interpretation.

Categories of knowledge

According to Willard (1997), the forms of knowledge directly give rise to the categories of knowledge, namely personal, embedded and recorded knowledge, which in turn is directly coupled to the area of management: people, processes or information. Therefore, information management is seen as a subdivision or specific category of knowledge management. However, in this case knowledge is not seen as internal to the human being but also seen as existing externally. Knowledge therefore has a dual nature: both objective (external) and subjective (internal).

Turban and Frenzel (1992) highlight the following categories of knowledge: a) declarative knowledge answers the “what” question and is shallow-explicit knowledge or surface-level knowledge; b) procedural knowledge answers the “how” question - it elucidates the procedure or method that must be followed in a certain situation through step-by-step instruction; c) semantic knowledge reflects the cognitive structure of the subject and involves the use of long-term memory; d) episodic knowledge is autobiographical and experimental (thus empirical) information organised by case or episode, classified by date and place and resides in long-term memory; e) meta-knowledge is knowledge about how to reason, how to apply knowledge and how to learn. According to Turban and Frenzel (1992), the knowledge mostly captured in today’s knowledge-based systems is declarative and procedural knowledge and not semantic, episodic and meta-knowledge, which is really the knowledge that organisations and managers aspire to capture in knowledge management systems. Thus the difference between a knowledge-based system and a knowledge management system would be the categories of knowledge it contains. Although a KM system could contain the knowledge of the knowledge-based system the reverse would not be true as the knowledge-based system is very much the expert system of rules and cases.

Knowledge management as a transdisciplinary definition

KM is not a radically new concept: the management of knowledge already began during the 1980s which comprised expert systems and artificial intelligence and which recognised the economic and cultural value of knowledge. Many of the principles of KM have historical roots in a variety of disciplines and thus similar ideas with different names have evolved in all these disciplines that are contributing to KM. Interpretations

and use of the terminology may differ according to duties and functions: managers, practitioners and technologists may have their own ideas and perspectives on what KM actually is. This makes finding a clear cut definition of KM a difficult task.

KM is a transdisciplinary field and indeed incorporates many disciplines such as philosophy (especially epistemology and ontology), economics, management, information technology, human resources, psychology, artificial intelligence, linguistics, sociology, communication studies and many more. The term “transdisciplinarity” and the suggestion of discussing the topic of “transdisciplinarity in science” were made by Jean Piaget in 1970. The first definition of transdisciplinarity also belongs to him: after the stage of inter-disciplinary research we should expect a higher, transdisciplinary, stage which would go beyond the interdisciplinary relationships and would place these relationships within the global system without any strict borders among the disciplines. An active discussion of transdisciplinarity in the world science started in the middle 80’s of the 20th century. Now the problems of transdisciplinary research methods are studied by scientists and scientific groups in many countries.

According to Nicolescu (1996), transdisciplinarity is globally open: transdisciplinarity entails both a new vision and a lived experience; it is a way of self-transformation oriented towards knowledge of the self, the unity of knowledge, and the creation of a new art of living in the society.

The basic task of the transdisciplinary approach is to ensure the study of unity, completeness of space of a phenomenon or process under study. For the solution of this task the transdisciplinary approach is represented as an independent general scientific discipline with its own concept, language, models, method of analysis of the information and risk from the taken decisions.

Speaking about the essence of KM, we would like to stress that it is possible to select definitions from different perspectives. Here are some examples:

- Policies, procedures and technologies employed for operating a continuously updated linked pair of networked databases (Anthes, 1991, 28);
- Creation, acquisition and transfer of knowledge and modification of organisational behaviour to reflect new knowledge and insights (Garvin, 1994);
- Bringing tacit knowledge to the surface, consolidating it in forms by which it is more widely accessible, and promoting its continuing creation (Birkett, 1995);
- Identification of categories of knowledge needed to support the overall business strategy, assessment of current state of the firm’s knowledge and transformation of the current knowledge base into a new and more

powerful knowledge base by filling knowledge gaps (Gopal & Gagnon, 1995);

- Identifying, managing and sharing all of an enterprise's information assets. identifying, managing and sharing all of an enterprise's information assets, which include databases, documents, policies and procedures, as well as previously unarticulated expertise and experience resident in individual workers (Corrall, 1998);
- Identification, optimisation and active management of intellectual assets, either in the form of explicit knowledge held in artefacts or as tacit knowledge possessed by individuals or communities (Snowden, 1999). Snowden also stated that the optimisation of explicit knowledge is achieved by consolidation and by making the artefacts available, but optimisation of tacit knowledge is achieved through the creation of communities to hold and share the tacit knowledge, and to allow it growth;
- A systematic and organisationally specific process for acquiring, organising and communicating both tacit and explicit knowledge so that employees may utilise it to be more effective and productive in their work (Alavi & Leidner, 1999);
- Collection of processes that govern the creation, dissemination and utilisation of knowledge (insight and experiences) to fulfil organisational objectives (Botha & Van Rooyen, 2000);
- Collection, recording, organization, filtering, analysis, retrieval, and dissemination of explicit and tacit knowledge: knowledge integration amalgamates pieces of knowledge in the minds of individuals within a team or a project, stating that new knowledge results from "... meetings, collaboration, and the interaction of minds" (Tiwana, 2002, 91);
- Knowledge processing that is permeated by each of the following stages: understanding and discovering knowledge; capturing and acquiring knowledge from a variety of sources; selecting, filtering and classifying existing knowledge; storing and saving knowledge; designing knowledge ontology; adapting and/or creating new knowledge; measuring and evaluating knowledge; visualising knowledge; distributing and/or transferring knowledge to others; sharing and applying knowledge; retaining and maintaining knowledge as an asset (Sun, 2004).

The task of KM is to identify and facilitate the utilization of valuable tacit knowledge that is potentially useful when it becomes explicit, not to elucidate tacitness itself (Shin, Holden & Schmidt, 2001). In this context there are two main theoretical perspectives of the interaction types of tacit and explicit knowledge, focusing on taxonomy in character and on the nature of organizational knowledge respectively. In the learning organisation context KM can be seen as the management of what has been learnt through

organisational learning (the process of acquiring or collecting these intellectual assets whereas the structure wherein the learning takes place) (Malhotra, 1996). This manifestation of knowledge through learning in an organisation is also referred to as intellectual capital.

According to Wiig (2002), KM could make a significant contribution to rendering a country's public administration more effective. He specifically identifies the following areas where KM can play a role: a) enhancing decision-making within the public service; b) aiding members of the public to participate effectively in public decision-making; c) building competitive societal intellectual capabilities; d) developing a knowledge competitive workforce. He further argues that the KM objectives for the public administration in a democracy may be expressed as the intent to provide a) effective public administration services and functions to implement the public agenda; b) a stable, just, orderly and secure society; c) acceptable quality of life, particularly through building, maintaining, and leveraging commercial and public intellectual capital; d) a prosperous society for developing its citizens to become competent knowledge workers and its institutions to be competitive.

Heck & Rogger (2004) suggest that KM interventions in the public service could in the mid and long term achieve the following: a) significant improvement of service delivery in terms of efficiency, transparency and quality as a result of the transparent and configurable flow of information and more equitable distribution of responsibilities; b) creating a public administration that is based on well organised and technically functional internal business processes, e.g. the development of e-government projects; c) leveraging and optimizing skills that are related to workflow in the various government departments.

Barclay & Murray (1997) identify three approaches to organisational KM:

- The mechanistic approach focuses on the application of technology and associated resources as tools for facilitating access to information, and helps organisations achieve more with less;
- The cultural/behavioural approach emphasises innovation and creativity, which are important for learning organisations. The introduction of new ways and new experiences that force organisations and communities to adopt a holistic view of their relationships with the environment, further influences community and organisational culture;
- The systematic approach uses systems thinking, which incorporates all aspects of KM to ensure continuous evaluation and a sustainable process. This requires the recognition and utilisation of the various cross-disciplines to develop KM systems and processes (pp. 10 – 11).

Probst et al. (1999) identify the following core processes of KM: knowledge identification, knowledge acquisition, knowledge development, knowledge sharing and distribution, knowledge utilisation, knowledge retention. The level and amount of knowledge that an individual, organisation or community possesses at a particular time cannot resolve or facilitate all the problem-solving and decision-making processes encountered in the course of the “knower’s” existence. The implications are that an individual or organisation must be continuously learning, acquiring new knowledge and generating new knowledge, and be aware of who owns appropriate knowledge that is relevant to particular situations. Based on this assumption, the emphasis in today’s environment is on learning how to learn and/or changing organisations into learning organisations.

Probst et al. (1999) argue that it is vital that knowledge is shared and distributed within an organisation (and community) so that the whole community can use isolated information or experience. Knowledge sharing is the essence of how we bring innovations to change the way the world works and lives. According to Snowden (1999), without trust among the members of the community or organisation, it will be impossible to tap the tacit components of the community or organisation’s intellectual assets. The key issue is to identify the factors that motivate people within an organisation or community to share their intellectual assets. A learning community and organisation build collaborative relationships in order to draw strength from the diverse knowledge, experience, capabilities and ways of doing things that people and communities in general have and use. The above mentioned proves that transdisciplinary approach is necessary both to study the phenomenon of KM, and to apply KM into practice.

Conclusion

Knowledge is one’s understanding of why and how things work or should work, combined with the step-by-step skills for accomplishing a task. Knowledge is what one is familiar with owing to experience and is thus internalised as part of one’s life. It must be noted, however, that an individual, organisation or community cannot possess or internalise all the knowledge that is required to deal with all the “problematic” situations that are, or may be, encountered. At the same time, the level and amount of knowledge that an individual, organisation or community possesses at a particular time cannot resolve and facilitate all the problem-solving and decision-making processes encountered in the course of the “knower’s” existence. The implications of this are that an individual or organisation must learn continuously and acquire and generate new knowledge. They must be aware of who owns knowledge that is relevant and appropriate to particular situations.

Speaking about organization as a knowledge system and knowledge as competitive resources, most researchers (e.g., Probst et al., 1999; Shin, Holden & Schmidt, 2001; Wiig, 2002) look at KM as a process. In this context KM also consists of an interaction procedure linking up individual knowledge to create social knowledge. The procedure includes creation, storage, distribution, and application, as well as becomes a controlled implementation aspect of organizational strategy and vision. KM involves the processing and handling of intellectual capital within and between organisations and communities; it facilitates knowledge generation, sharing and reuse. While technology is crucial to KM, the human dimension plays an important role in knowledge creation and renewal. Knowledge generation, sharing and reuse are requirements for organisational and community efficiency and productivity. The whole purpose of KM is to facilitate knowledge generation, sharing and reuse for the common good or benefit.

KM is concerned with a) the identification of knowledge needs and assets, knowledge problems and opportunities; b) the development and implementation of KM strategies and solutions. The key components of organisational knowledge are people, processes, products, customer interactions and information systems. KM involves imparting and/or facilitating acquisition of the right knowledge and information to the right person within an organisation, at the right time and in a manner most appropriate to him/her. It involves identifying and applying efficient methods of business practices and empowering benefits to all role-players in and members of an organisation.

KM is based on a wide range of disciplines and technologies; these include a) cognitive science, expert systems, artificial intelligence and knowledge-based management systems, computer-supported work (groupware), library and information science, technical writing and document management; b) other disciplines on which KM is based include decision support systems, semantic networks, relational and objective databases, and simulation and organisation science. Different disciplines should be considered when KM is studied from the point of view of transdisciplinary approach, which allows to co-ordinate the purposes and tasks of development of the society with the purposes and tasks of development of the ambient world.

References:

Alavi, M., & Leidner, D.E. (1999). Knowledge management systems: Issues, challenges and benefits. *Communications of the AIS*, 1, Article 7. Retrieved from <http://blog.ub.ac.id/izuaf/files/2013/11/Knowledge-Management-Systems-ISSUES-CHALLENGES-AND-BENEFITS.pdf>

- Ambrosini, V., & Bowman, C. (2001). Tacit knowledge: Some suggestions for operationalization. *Journal of Management Studies*, 38(6), 811-829.
- Anthes, G.H. (1991). A step beyond a database. *Computerworld*, 25(9), 26-32.
- Barclay, R.O., & Murray, P.C. (1997). *What is Knowledge Management?* <http://www.media-access.com/whatis.html>
- Birkett, B. (1995). Knowledge management. *Chartered Accountants Journal of New Zealand*, 74(1), 14-18.
- Bohn, R. E. (1994). Measuring and managing technological knowledge. *Sloan Management Review*, 26 (1), 61-73.
- Botha, M., & Van Rooyen, L. (2000). Knowledge management. *Meta-info Bulletin*, 9(3), 28-36.
- Brown, J.S., & Duguid, P. (2001). Knowledge and organization: A social-practice perspective. *Organization Science* 12(2), 198-213.
- Churchman, C.W. (1971). *The Design of Inquiring Systems: Basic concepts of systems and organizations*. New York: Basic Books.
- Corrall, S. (1998). Knowledge management: Are we in the knowledge management business? *Ariadne*, 18. Retrieved from <http://www.ariadne.ac.uk/issue18/knowledge-mgt/>
- Davenport, T. H., Long, D. W., & Beers, M. C. (1998). Successful knowledge management projects. *Sloan Management Review*, 39 (2), 43-57.
- Davenport, T.H., & Prusak, L. (1998). *Working Knowledge: How organizations manage what they know*. Boston, MA: Harvard Business School Press.
- Garvin, D.A. (1994). Building a learning organization. *Business Credit*, 96(1), 19-28.
- Gopal, C., & Gagnon, J. (1995). Knowledge, information, learning and the IS manager. *Computerworld (Leadership Series)*, 1(5), 1-7.
- Harris, D. B. (1996). Creating a knowledge centric information technology environment. *Technology in Education Institute*. Retrieved from URL: <http://www.htcs.com/ckc.htm>
- Heck, U., & Rogger, A. (2004). Knowledge management for e-service-delivery: A conceptual approach within e-government. In M.A. Wimmer (Ed). *Knowledge Management in Electronic Government*. Retrieved from <http://www.springerlink.com/content/rr3bueqacmkd3yxu/fulltext.pdf>
- Huang, K.-T. (1997). Capitalizing collective knowledge for winning, execution and teamwork. *Journal of Knowledge Management*, 1(2), 149 – 156.
- Kock, N., & McQueen, R. (1998). Knowledge and information communication in organizations: an analysis of core, support and improvement process. *Knowledge and Process Management*, 5 (1), 29-40.

- Leonard, D., & Swap, W. (2004). Deep smarts. *Harvard Business Review*, 82(9), 88-97.
- Levin, D. Z., & Cross, R. (2004). The strength of weak ties you can trust: The mediating role of trust in effective knowledge transfer. *Management Science*, 50(11), 1477-1490.
- Malhotra, Y. (1996). Organizational learning and learning organizations: An overview. Retrieved from [http:// www. brint.com/OrgLrng.htm](http://www.brint.com/OrgLrng.htm)
- McDermot, R. (1999). Why information technology inspired but cannot deliver knowledge management. *California Management Review*, 41 (4), 103-117.
- Mezirow, J. (1991). *Transformative Dimensions of Adult Learning*. San Francisco: Jossey-Bass.
- Murray, P.C. (1996). Information, knowledge, and document management technology. *Knowledge Management Briefs*, 1 (2).
- Nicolescu, B. (1996). *La Transdisciplinarité*. Paris, France: Rocher.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14-28.
- Pinchot, G., & Pinchot, E. (1993). *The End of Bureaucracy and the Rise of the Intelligent Organisation*. San Francisco: Berret-Koehler.
- Polanyi, M. (1966). *The Tacit Dimension*. Garden City, NJ: Doubleday.
- Probst, G., Raub, S., & Romhardt, K. (1999). *Managing Knowledge: Building blocks for success*. Chichester, NY: John Wiley.
- Shin, M., Holden, T., & Schmidt, R.A. (2001). From knowledge theory to management practice: towards an integrated approach. *Information Processing and Management*, 37, 335-355.
- Snowden, D. (1999). Liberating knowledge. In J.Reeves (Ed). *Liberating Knowledge: Business guide*. London: Caspian Publishing, 6–19.
- Spender, J. C. (1996). Organizational knowledge learning and memory: Three concepts in search of a theory. *Journal of Organizational Change Management*, 9 (1), 63-78.
- Srivastva, S., & Barrett, F. J. (1988). The transforming nature of metaphors in group development: A study in group theory. *Human Relations* 41(1), 31-64.
- Sun, Z. (2004). A waterfall model for knowledge management and experience management. In *Proceedings of the Fourth International Conference on Hybrid Intelligent Systems*. Retrieved from <http://csdl.computer.org/dl/proceedings/his/2004/2291/00/22910472.pdf>
- Swap, W., Leonard, D., Shields, M., & Abrams, L. (2001). Using mentoring and storytelling to transfer knowledge in the workplace. *Journal of Management Information Systems*, 18(1), 95-114.

- Tenkasi, R. V., & Boland, R. J. (1996). Exploring knowledge diversity in knowledge intensive firms: A new role for information systems. *Journal of Organizational Change Management*, 9 (1), 79-91.
- Tiwana, A. (2002). *The Knowledge Management Toolkit: Orchestrating IT, strategy, and knowledge platforms*. Upper Saddle, NJ: Prentice Hall PTR.
- Tsoukas, H. (1996). The firm as a distributed knowledge system: A constructionist approach. *Strategic Management Journal*, 17 (Winter Special Issue), 11-25.
- Turban, E., & Frenzel, L E. (1992). *Expert Systems and Applied Artificial Intelligence*. New York: Macmillan.
- Wiig, K.M. (2002). Knowledge management in public administration. *Journal of Knowledge Management*, 6(3), 224-239.
- Willard, N. (1997). Knowledge management: What does it imply for IRM? *Managing Information*, 4(8), 31-32.
- Wilson, T. D. (2002). The nonsense of “knowledge management”. *Information Research* 8(1), paper no. 144. Retrieved from <http://infomationr.net/ir/8-1/paper144.html>
- World Bank (2007). *World Development Indicators*. Retrieved from http://www-wds.worldbank.org/external/default/WDSContentServer/IW3P/IB/2006/09/13/000112742_20060913111024/Rendered/PDF/359990WDR0complete.pdf
- Zack, M. H. (1999). Managing codified knowledge. *Sloan Management Review*, 40 (4), 45-58.
- Zeleny, M. (1987). Management support systems. *Human Systems Management*, 7 (1), 59-70.