

***EXAMINING THE LINK BETWEEN KNOWLEDGE
MANAGEMENT, ORGANIZATIONAL LEARNING AND
PERFORMANCE***

Theme: Strategy, Competitiveness and Learning

Crossan, Mary M.

Richard Ivey School of Business
University of Western Ontario

Bapuji, Hari B.

Richard Ivey School of Business
University of Western Ontario

Contact author: Crossan, Mary M.

Richard Ivey School of Business
University of Western Ontario

1151, Richmond Street
London, Ontario
Canada
N6A 3K7

Telephone: (519) 661-3217
E-mail: Mcrossan@ivey.uwo.ca

Abstract

Organizations and researchers have turned their attention to knowledge management in the recent past. Despite the growing interest and investment of resources in knowledge management, there is little research on the relationship between knowledge management and performance. Drawing from the literature on strategy, organizational learning and knowledge management, we develop a model of firm motivations, level of knowledge investments and their relationship with performance. We suggest that firms that are motivated by legitimacy concerns make lower order investments while firms motivated by competitiveness concerns make higher order investments. Firms that make lower order investments receive little or no performance advantage while those firms that make higher order investments derive performance advantage.

Organizations have, in the recent past, focused their attention on knowledge management (KM) because they have realized that “as free natural resources and cheap labor are exhausted, the last untapped source of competitive advantage is the knowledge of people in organizations” (Davenport, 1997: p.191). Further, researchers acknowledge that the need to manage knowledge increases proportionately with the service intensity of companies, and such companies represent a significant component of growth in the economy (Apostolov & Mentzas, 1999). Many organizations have made significant efforts and considerable investment to manage knowledge. Yet, there is little rigorous research in the literature to guide organizations on knowledge management.

The efforts at, and investments made by organizations have largely remained confined to the arena of technology whereas the people and process issues are equally important in knowledge management (Davenport, 1997; McDermott, 1999; Ruggels, 1998). Accordingly, the knowledge management efforts were limited in their ability to yield significant performance advantage. This limitation is further compounded by the fact that performance advantage is derived not from the knowledge resident in an organization but from how it is leveraged (Alavi & Leidner, 2001). Yet, very little research attention has been focused on the issues of knowledge management and performance.

This study intends to develop a better understanding of the issues involved in knowledge management and their implications for performance. Toward this end, we build an integrated model of knowledge management and performance by drawing from existing research in different streams. We draw from the strategy literature to understand the different types of investments that organizations make to manage their knowledge and the consequent performance implications. We draw from the literature on organizational learning to infuse a process orientation to knowledge management and the important contribution it makes to enhancing organizational performance. We then develop propositions about the knowledge management processes and their association with performance. Further, we design a study to empirically test our propositions.

This paper is organized as follows: First, we briefly discuss the relevant literature on knowledge management and organizational learning. Second, we develop hypotheses about the motives of firms that guide knowledge management efforts, the associated investments and their performance implications. Finally, we discuss the research methodology and proposed statistical analyses for testing the hypotheses.

Knowledge management and organizational learning

Knowledge has been defined by researchers in many different ways, from '*what is known*' to '*what provides insight*'. It has also been categorized in many ways. Popular taxonomies include tacit and explicit knowledge, general and specific knowledge, public and private knowledge, and individual and collective knowledge. Building on Polanyi (1967), the taxonomy of tacit and explicit knowledge that Nonaka (1994) has developed, underscored the importance of context in KM. Accordingly, the knowledge creation cycle was seen as consisting of socialization, externalization, combination and internalization (Nonaka and Takeuchi, 1995). Recently, a small but growing group of researchers (notably Cook & Brown, 1999; Orlikowski, 2002) distinguished between 'knowledge' and 'knowing'. This distinction brought forth the importance of practice in understanding knowledge since these researchers assert that knowledge is best revealed and understood in practice.

The literature has developed a rich understanding of what knowledge is and how it is created. It has now been proposed that knowledge has both tacit and explicit dimensions and that it resides at multiple levels in an organization: individual, group and organization. New knowledge is created in the interaction between the tacit and explicit dimensions of knowledge and the various levels at which it resides. Further, it has underscored the importance of context and situation as an integral component of knowledge (Nonaka and Takeuchi, 1995). Despite this acknowledgement, the literature on knowledge management focused largely on the explicit dimension of knowledge and the discussion on group and organizational levels is limited.

Knowledge management (KM) has been defined as the process of identifying/creating, capturing, and applying knowledge to exploit new opportunities and enhance organizational performance (Bassi, 1997; Lank, 1997; Zack, 1999a). These definitions of KM highlight mainly the information-processing dimensions of knowledge management, such as its capturing, refining, storage, retrieval and distribution. Accordingly, some models of knowledge management focus on managing the codified knowledge (for ex. Zack, 1999b). Other models of knowledge management (Boisot, 1987; Hedlund & Nonaka, 1993; Wiig, 1997) do not focus on managing codified knowledge alone but their focus on context and practice is limited.

Empirical evidence indicates that, in practice, managers concentrate on creating technology for knowledge management such as creating an intranet, data warehousing/creating knowledge repositories, implementing decision support tools, and implementing groupware to support collaboration. In contrast, managers feel that HRD related issues in knowledge management and soft issues such as people, behaviour, culture, attitudes, lack of ownership and shared understanding are what they should be focusing on (Ruggels, 1998).

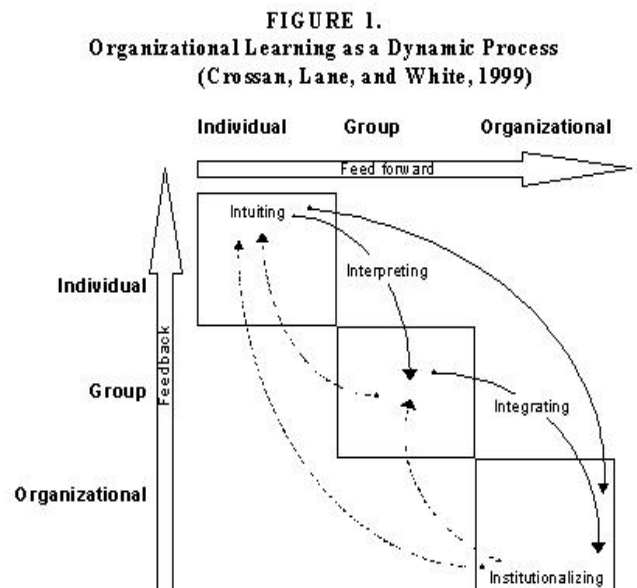
Many KM researchers have emphasized the importance of focusing on people and process issues and have argued that information technology can only inspire knowledge management but cannot deliver it (Davenport, 1997; McDermott, 1999; Ruggels, 1998). Yet, the field of organizational learning offers some useful theoretical models on how learning occurs at individual, group and organizational levels. Integrating the research on organizational learning with KM, therefore, is likely to yield answers to the troubling questions related to

KM. This is particularly so because the process orientation of organizational learning research will provide significant insight into knowledge management, which has largely been dominated by an information technology perspective (Vera & Crossan, 2002).

Organizational learning has received increased attention from researchers and practitioners alike as a means to address how firms respond to rapidly changing environments (Crossan and Guatto, 1996). Many researchers have suggested that the only sustainable competitive advantage may be an organization's ability to learn faster than its competitors (De Geus, 1988; Stata, 1989). Organizational learning has many models and frameworks that explain how learning occurs at the individual, group and organizational level. Notable among the organizational learning models are: single loop and double-loop learning (Argyris & Schon, 1978), exploitation – exploration (March, 1991), and information acquisition, information distribution, information interpretation, and organizational memory (Huber, 1991).

We adopted the 4I framework of organizational learning (Crossan, Lane, and White, 1999), which Mintzberg et al. (1998) acknowledged as “particularly insightful” (p. 212) in their discussion of the organizational learning school of strategy.

The 4I framework, shown in Figure 1, depicts organizational learning as a dynamic process of strategy renewal occurring across three levels of the organization: individual, group and organizational. Four key premises form the foundation for the framework. First, organizational learning involves a tension between assimilating new learning (exploration) and using what has already been learned (exploitation). Second, organizational learning is multi-level: individual, group, and organization. Third, these three levels of organizational learning are linked by four broad categories of social and psychological processes: *intuiting*, *interpreting*, *integrating*, and *institutionalizing* (4I's). Finally, cognition is seen to affect action (and vice versa). As mentioned, the four associated processes (4I's) link the three levels of analysis and define learning within organizations. Intuiting and interpreting occur at the individual level; interpreting and integrating at the group level; with integrating and institutionalizing occurring at the organizational level.



The challenge for organizations is to manage the tension between exploitation and exploration. This tension can be maintained through the feed-forward and feedback of learning. Feed-forward Learning: Whether and how individual learning feeds forward into group learning and learning at the organizational level (e.g. changes to structure, systems, products, strategy, procedures, and culture). Feed-back Learning: Whether and how the learning that is embedded in the organization (e.g. systems, structure, and strategy) affects individual and group learning.

Crossan and Hulland (1998) operationalized the 4I framework in the form of the Strategic Learning Assessment Map (SLAM). The SLAM examines the stocks and flows of knowledge in a comprehensive organizational learning system. Consistent with the 4I framework, the SLAM suggests that knowledge resides at three levels: individual, group, and organization with flows between the levels. An empirical examination of the SLAM model established that the learning stocks (individual, group, and organizational-level) and feed-forward and feedback flows are positively related to performance. However, misalignment between the stocks and flows, i.e. high stocks and low flows or vice-versa is negatively associated with performance (Bontis, Crossan and Hulland, 2002). This study further points to the importance of process and people issues in knowledge management.

In summary, the literature underscored the tacit component of knowledge while most KM models focus on the explicit knowledge, particularly its acquisition, processing, storage and retrieval. The literature highlighted the different levels at which knowledge can reside, however, KM research has largely focused on the role of individuals in knowledge management. Further, the literature has suggested the importance of leveraging knowledge through people and processes while organizational efforts to management knowledge were aimed at providing the technology required for managing knowledge (Ruggels, 1998). The literature on organizational learning indicates that investing in both stocks and flows and creating an alignment between them is important for firm performance.

Firm motivations and knowledge management

Knowledge management has focused on providing normative prescriptions concerning the importance of knowledge management and its implications for performance. Some researchers have argued the need for developing strategies to manage knowledge (Zack, 199b). However, there is little discussion on what motivates organizations to invest in knowledge management. The strategy literature offers many theories that explain firm behavior and the consequent performance implications. In particular, we borrow from institutional theory for two reasons: first, institutional isomorphism is a phenomenon that is more pronounced in the presence of uncertainty, and causal ambiguity (DiMaggio & Powell, 1983). The current business environment and the state of the knowledge management field represent uncertainty and causal ambiguity, respectively. Second, it was successfully used to explain phenomenon such as sustainable development and ecological responsiveness (Bansal & Roth, 2000) which share many characteristics with knowledge management such as causal ambiguity and the long-term nature of performance benefits. Further, it was found that institutional variables explain corporate commitment to sustainable development more than the resource-based variables do (Bansal, Evans & Roth, 2002).

Studying the ecological responsiveness of 53 firms in the United Kingdom and Japan, Bansal and Roth found that firms were motivated by three primary motivations for ecological responsiveness: competitiveness, legitimation and ecological responsibility. Firms that are motivated by competitiveness believed that ecological responsiveness led to sustained advantage. Firms that were motivated by the legitimation concerns believed that ecological responsiveness is a mechanism to improve the appropriateness of their actions while those motivated by the ecological responsibility concern believed that they had social obligations and values to be met (Bansal & Roth, 2000). The motivation of ecological responsibility, *prima facie*, is specific to ecological responsiveness. Therefore, in the following paragraphs,

we argue that the concerns of legitimation and competitiveness guide the knowledge management efforts of firms.

Legitimation motive is the desire of a firm to achieve legitimacy, which is ‘a generalized perception or assumption that the actions of an entity are desirable, proper or appropriate within some socially constructed system of norms, values, beliefs, and definitions’ (Suchman, 1995:574). Suchman suggests that legitimacy enhances both the stability and comprehensibility of organizations leading to persistence of organizations. Firms are constantly in the pursuit of legitimacy: to acquire it, to maintain/protect it and to repair it. Accordingly, firms respond differently depending on their need for legitimacy, i.e. the strategies employed for acquiring legitimacy are different from the strategies employed for maintaining it and repairing it (Suchman, 1995). The responses that firms make to repair legitimacy are reactive and are generally in response to some adverse impact from the environment. Therefore, we will develop our arguments based on the strategies that firms employ to acquire and protect legitimacy.

Building on Bansal & Roth (2000) and Suchman (1995), we suggest that firms are motivated by three concerns: legitimacy acquisition, knowledge protection, and competitiveness. Each of these motivations would lead to a different type of KM efforts, as we explain in the following paragraphs.

Legitimacy acquisition

Firms that intend to gain legitimacy take various actions to conform to the demands of its current audiences, or engage in some manipulative behavior to change the audience and/or the environment structures. These actions, however, do not call for any significant changes in the prevailing cognitive frames (Suchman, 1995). Accordingly, these actions generally result only in symbolic changes (DiMaggio & Powell, 1983) and impression management (Bansal & Roth, 2000) although sometimes they can even result in cynical revisions to core mission statements of the organizations (Pfeffer & Salancik, 1978). Organizations in uncertain environments often pursue legitimacy through mimetic isomorphism, i.e. by imitating the successful organizations in the institutional field (DiMaggio & Powell, 1983).

Impression management and mimetic isomorphism usually take the form of symbolic efforts such as making investments in the related technology and designating other resources, particularly people, to send appropriate signals to the relevant audience (Bansal & Roth, 2000). In the context of knowledge management, these actions take the form of making investments in technology such as computers, networks, and knowledge databases. Further, firms can send a positive signal to the environment by employing knowledge managers and/or constituting a knowledge management committee.

Knowledge protection

Knowledge protection can be viewed as an effort to maintain the existing knowledge of the organization to protect from future uncertainties. Firms motivated by the knowledge protection concerns believe that KM is important to maintain the status quo and the existing performance level. They view KM as a tool to exploit their existing knowledge and insulate them against losses in the future. These firms believe that knowledge is a resource like any

other resource and it must be managed, i.e. identified, captured, refined, indexed, stored, and distributed according to the need.

Firm actions will be aimed at protecting the existing knowledge resources of an organization, particularly capturing the knowledge of employees and storing it for future usage. Taking an information-processing perspective, these firms focus on creating repositories of explicit knowledge to accumulate, refine, manage and distribute the knowledge with the help of knowledge managers (Zack, 1999).

Competitiveness

Firms motivated by competitiveness understand the strategic importance of knowledge management and how it would affect their long-term profitability. Bansal and Roth (2000) define the term 'competitiveness' as 'the potential to improve long-term profitability' (Bansal & Roth, 2000:724). Accordingly, the firms that are motivated by competitiveness look for lower costs, better reputation, and highest returns (Bansal & Roth, 2000).

The firms motivated by competitiveness will have a better understanding of the knowledge management processes and how they can provide long-term profitability. These firms are interested in the long-term survival and their approach is to maximize the returns. Therefore, they make investments not only in the technology but also in people and processes. Investment in people and processes will facilitate the utilization of knowledge stored in the technology and available with individuals, groups, and the whole organization. In short, these firms invest in organizational learning. As conceptualized by SLAM (Crossan and Hulland, 1998), these investments would include practices to facilitate organizational learning, i.e. high learning stocks and high learning flows.

In summary, firms are motivated by different concerns to invest in knowledge management. The nature of the motivation will determine the kind of investments and efforts a firm makes for knowledge management. For the sake of brevity, we refer to the investments yielded by legitimacy acquisition, knowledge protection, and competitiveness as Level I, Level II and Level III investments, respectively. Therefore, we hypothesize:

- H1: Firms motivated by legitimacy acquisition concerns make Level I investments (aimed at signaling the environment) for knowledge management.
- H2: Firms motivated by knowledge protection concerns make Level II investments (aimed at knowledge protection) for knowledge management.
- H3: Firms motivated by competitive concerns make Level III investments (aimed at organizational learning) for knowledge management.

Type of investments and performance

Organizational learning research suggests that firms must maintain a balance between exploitation and exploration to derive sustained performance benefits because excessive focus on either exploitation or exploration leads to learning traps (Levinthal & March, 1993). Empirical evidence also suggests that exploitation is related to performance in an inverted U shape, i.e. performance advantages do not last for a long period of time (Haleblian & Finkelstein, 1999).

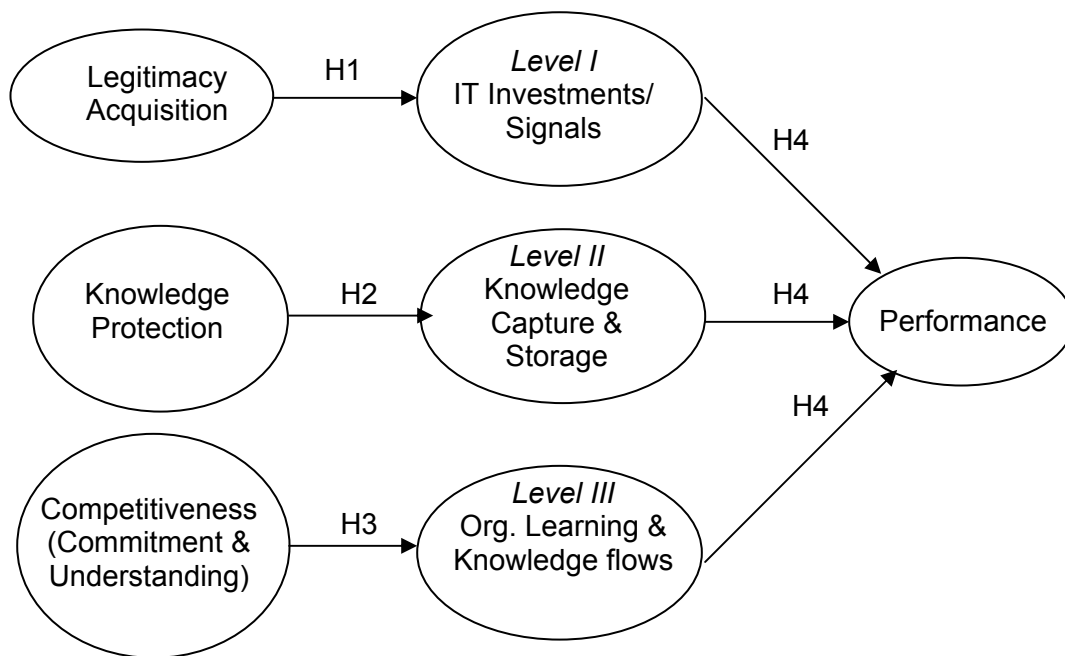
Bontis, Crossan and Hulland (2002), established that learning stocks and flows are positively associated with performance while misalignment of learning stocks and flows is negatively associated with business performance. Knowledge management investments that focus exclusively on exploitation of knowledge are likely to underemphasize the importance of flows and inadvertently create a misalignment. Further, in the case of KM the focus on IT is necessary but not sufficient to deliver competitive advantage because it is not merely the knowledge that resides in an organization that delivers competitive advantage but how it is leveraged (Alavi & Leidner, 2001). Further empirical evidence suggests that legitimacy motivated actions are marginally negatively associated with a firm achieving expertise whereas efficiency motivated actions are positively associated (Grewal et al., 2001)

Firms that make Level I investments merely make investments in the technology needed for managing the knowledge whereas firms that make Level II investments are only interested in knowledge protection and exploitation of the existing knowledge. It is expected that Level I investments will yield little, if any return. Level II investments are expected to yield higher performance, but far less than Level III investments, which focus on knowledge management in a comprehensive fashion. Level III investments not only enhance the learning stocks and flows but also create an alignment between them. Consequently, the Level III investments will provide performance benefits to firms. Therefore, we hypothesize:

H4: Level III investments (aimed at organizational learning) will be positively associated with performance whereas Level II investments and Level I investments will not be significantly associated with performance.

A pictorial representation of our theoretical model is presented in Figure 2:

Figure 2: Knowledge Management and Performance



Methodology

This study is best suited for a cross-sectional and survey based method. Initial items to measure various constructs were developed based on prior research, notably Bansal & Roth, 2000; Bontis, Crossan and Hulland (2002); Gold et al. (2001) and Gray (2002). These items were validated with the help of seven professionals familiar with the field (knowledge management consultants and practitioners). The constructs and sample items are listed in Appendix A.

In the pilot test, the survey instrument will be administered to 30 employees drawn from a sample of 4 firms, to be selected to capture the range of KM efforts. The reliability, internal consistency, convergent validity, and discriminant validity of the constructs and the survey items will be evaluated (Hinkin, 1995). Moreover, our hypotheses relating to KM practices and to performance will be pre-tested in order to validate our theoretical model and predictions.

It is important to capture a range of knowledge management practices in our sample to test the model. Accordingly, we plan to select four knowledge intensive industries to conduct this study. Although there is no unanimous, clear-cut definition of the knowledge-intensive industry, according to the OECD, the concept refers to those industries that are relatively intensive in their inputs of technology and/or human capital: the high technology investments; high-technology industries; more highly skilled labor and associated productivity gains (OECD 1996:7). As such, the knowledge-intensive industries include firms in high-tech and communications, pharmaceutical and biotechnology, and chemicals.

We plan to sample a cross-section of organizations to achieve generalizable results. We will target Canadian firms operating in the following four knowledge intensive sectors (as per SIC classification): communications, chemicals, instruments, and electrical equipment. We propose several criteria to define the appropriate target group of firms. Our model investigates 'knowledge intensive firms' and analyzes the impact of KM practices on their performance. We exclude from this research the specific growth dynamics of start-up and de-novo companies. Accordingly, companies included in the sample need to have 'a minimum of five years' of financial history. A related characteristic to this age requirement is the 'size' of these firms. Firm size is an important criteria for our research because 'intensive and face-to-face interaction between people' can compensate for the presence of many formal systems in small firms, including KM systems. The U.S. Small Business Administration treats firms employing less than 100 as small business, although in certain sectors the limit is at 500 and above. Therefore, we plan to include in our sample all firms that employed over 100 people.

Following the protocol set out by Bontis (1999) for multi-level research, we will obtain surveys from 30 individuals within each organization, selected from senior management, middle management, and front-line employees. Secondary data on firm size, age, growth, R&D intensity, and financial performance will be collected from Standard and Poor's Compustat database, Compact Disclosure, and Lexis-Nexis.

Our study involves hierarchical and clustered data, as data is streamed from various levels of the organization operating in different industries. Hence, the use of multi-level modeling is needed and accordingly, we plan to use structural equation models or partial least squares

(PLS). Structural equation models are considered as multilevel models and as generalizations of path analysis. They are adequate as they permit multiple dependent variables or latent variables as well as multiple levels of measurement. They also enable us to test for the reliability and validity of our measurement items in addition to developing models that test our hypotheses (Barclay, Higgins, and Thompson, 1995). PLS is similar to structural equation models and other covariance structure analysis techniques in that it combines data and theory to simultaneously estimate paths and loadings (Hulland, 1999). The advantage of using PLS over structural equation models is that it works well with smaller samples. Hence, in this study, various PLS models will be built using the knowledge management constructs, organizational learning constructs, performance, and control variables in order to test for the hypothesized relationships.

Conclusion

In conclusion, we have developed a theoretical model of knowledge management and performance by integrating the relevant research from knowledge management, strategic management, and organizational learning. The intent of the model is to better understand the motivations and investments in KM and their ultimate impact on performance. It is expected that firms motivated to invest in KM for legitimacy or simply for the protection of knowledge will experience lower performance than firms who integrate knowledge management and organizational learning in a more comprehensive fashion.

References

- Alavi M, Leidner E. (2001). Knowledge management and knowledge management systems: Conceptual foundations and research issues. *MIS Quarterly*, 25(1):107-136.
- Apostolov D, Mentzas G. (1999). Managing corporate knowledge: A comparative analysis of experience in consulting firms. *Knowledge and Process Management*, 6(3):129-138.
- Argyris C, Schon D. (1978) *Organizational Learning: A Theory of Action Perspective*, MA: Addison – Wesley, 1978.
- Bansal P, Roth K. (2000). Why companies go green: A model of ecological responsiveness. *Academy of Management Journal*, 43(4):717-747.
- Bansal P, Evans J, Roth K. (2002) Evolving sustainably: A longitudinal study of corporate commitment to sustainable development. Paper presented at Academy of Management Meeting, Denver, Co.
- Barclay D, Higgins C, Thompson R. (1995). The partial least squares (PLS) approach to causal modelling. *Technology Studies*, 2, 285-323.
- Bassi, L. (1997). Harnessing the power of intellectual capital. *Training and Development*, 12: 25-30.
- Boisot, M. (1987). *Information and organizations: The manager as an anthropologist*, Fontana/Collins:London.
- Bontis, N. (1999). *Managing an organizational learning system by aligning stocks and flows of knowledge: an empirical examination of intellectual capital, knowledge management, and business performance*. Doctoral Dissertation (London, Ontario: Richard Ivey School of Business, University of Western Ontario).
- Bontis N, Crossan M, Hulland J. (2002). Managing an organizational learning system by aligning stocks and flows. *Journal of Management Studies*, 39(4):437-470.

- Cook S, Brown J. (1999). Bridging epistemologies: The generative dance between organizational knowledge and organizational knowing. *Organization Science*, 10(4): 381-400.
- Crossan M, Guatto T. 1996. Organizational learning research profile. *Journal of Organizational Change Management*, 9, 1, 107-112.
- Crossan M, Hulland J. 1998. Assessing the stocks and flows of organizational learning. Working paper (London, Ontario: Richard Ivey School of Business, University of Western Ontario)
- Crossan M, Hulland, J. (2002). In Choo, C., Bontis, N. (eds.) 2002. *Strategic Management of Intellectual Capital and Organizational Knowledge: A Collection of Readings*. Oxford University Press: New York.
- Crossan M, Lane H, White R. (1999). An organizational learning framework: From intuition to institution. *Academy of Management Review*, 24: 522-538.
- Davenport, T. (1997). Ten principles of knowledge management and four case studies. *Knowledge and Process Management*, 4(3):187-208.
- DeGeus, A. (1988). Planning as learning. *Harvard Business Review*, March-April: 70-74.
- DiMaggio P, Powell W. (1983) The Iron Cage Revisited : Institutional Isomorphism and Collective Rationality in Organizational Fields, *American Sociological Review*, 147-160.
- Gold A, Malhotra A, Segars, A. (2001). Knowledge management: An organizational capabilities perspective. *Journal of Management Information Systems*, 18(1): 185-214.
- Gray, P. (2002). *Knowledge sourcing effectiveness*. Doctoral Dissertation (Kingston, Ontario: Queen's University).
- Grewal R, Comer J, Mehta R. (2001). An investigation into the antecedents of organizational participation in business-to-business electronic markets. *Journal of Marketing*, 65 (3): 17-33.
- Haleblian J, Finkelstein S. (1999) The Influence of Organizational Acquisition Experience on Acquisition Performance : A Behavioral Learning Perspective, *Administrative Science Quarterly*, 29-56.
- Hedlund G, Nonaka I. (1993). Models of knowledge management in the West and Japan, in Lorange B, Chakravarthy B, Roos J, Van de Ven H. (Eds), *Implementing strategic processes, change, learning and cooperation*, 117-144, Macmillan:London.
- Hinkin, T.R. (1995). A review of scale development practices in the study of organizations. *Journal of Management*, 21, 5.
- Hulland, J. (1999). Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strategic Management Journal*, 20, 195-204.
- Lank, E. (1997). Building structural capital: A new key to generating business value. *Knowledge and Process Management*, 4(2):73-79.
- Levinthal D, March J. (1993). The myopia of learning. *Strategic Management Journal*, 14: 95-112.
- March, J.G. (1991) Exploration and Exploitation in Organizational Learning, *Organization Science*, 1:71-87.
- McDermott, R. (1999). Why information technology inspired but cannot deliver knowledge management. *California Management Review*, 41(4):103-117.
- Mintzberg H, Ahlstrand B, Lampel J. (1998). *Strategy Safari: A guided tour through the wilds of strategic management*. New York: The Free Press.
- Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5, 14-37.
- Nonaka, I., & Takeuchi, H. (1995). *The knowledge creating company*. New York : Oxford University Press.

- OECD. (1996). *The Knowledge-Based Economy*, OECD, Paris.
- Orlikowski, W. (2002). Knowing in practice: Enacting a collective capability in distributed organizing. *Organization Science*, 13(3):249-273.
- Pfeffer J, Salancik G. (1978) *The external control of organizations : A resource dependence perspective*. New York: Harper & Row.
- Polanyi, M. (1967). *The tacit dimension*, London : Routledge.
- Ruggels, R. (1998). The state of the notion: Knowledge management in practice. *California Management Review*, 40(3):80-89.
- Stata, R. (1989). Organizational Learning - The Key to Management Innovation. *Sloan Management Review*. Spring.
- Suchman, M. (1995) Managing legitimacy: Strategic and institutional approaches. *Academy of Management Review*, 20(3):571-610.
- Vera, D. & Crossan M, (2002) Organizational learning and knowledge management: Toward an integrative framework, In M. Easterby-Smith and M.Lyles (Eds.) *Handbook of Organizational Learning and Knowledge Management* (forthcoming).
- Wiig, K. (1997) Knowledge management: Where did it come from and where will it go? *Expert systems with applications*, 13(1)1-14.
- Zack. M. (1999a) Managing codified knowledge. *Sloan Management Review*, 40(4):45-58.
- Zack. M. (1999b) Developing a knowledge strategy. *California Management Review*, 41(3):125-145.

Appendix

Knowledge Management Study – Constructs and Sample Items

To be scored on a seven point Likert type scale where 1 indicates ‘strongly disagree’ and 7 indicates ‘strongly agree’

Legitimacy Acquisition

My organization continues to invest in Knowledge Management because

- LI1 Other organizations make similar investments.
- LI2 Our competitors make similar investments.

Knowledge Protection

My organization continues to invest in Knowledge Management because

- RA1 It enables us to continue operations even when critical employees leave.
- RA2 It helps in avoiding some costly mistakes of the past.

Competitiveness (Commitment / Understanding)

My organization continues to invest in Knowledge Management because it

- CU1 Gives us an edge over our competitors.
- CU2 Increases business opportunities.

Level I investments (KM Signals)

Knowledge management systems & processes in my organization include

KS1 Computer software and applications.

KS2 Electronic databases.

Level II investments (Knowledge Protection)

Knowledge management systems & processes in my organization include

KP1 Experts to manage trademarks, copyrights and patents.

KP2 Experts who capture and store employees' knowledge.

Level III investments (Organizational Learning & Knowledge Flows)

Individual Knowledge Stocks

My organization makes every effort to ...

IK1 Give individuals a clear sense of direction in their work.

IK2 Give individuals a sense of accomplishment in what they do.

Group Knowledge Stocks

My organization fosters an environment that ...

GK1 Develops among groups a common understanding of departmental issues.

GK2 Effectively resolves conflicts when working in groups.

Organizational Knowledge Stocks

In my organization ...

OK1 We have a strategy that positions us well for the future

OK2 The organizational structure allows us to manage knowledge effectively

Feed-forward Knowledge Flows

In my organization ...

FF1 Employees feel they have input into the critical decisions made by management.

FF2 Groups propose innovative solutions to organization-wide issues

Feed-back Knowledge Flows

In my organization ...

FB1 Policies and procedures aid individuals to enhance their knowledge and skills

FB2 Reward systems recognize the contribution made by groups

Performance Measures

In my overall assessment ...

PP1 Our group makes a strong contribution to the organization

PP2 Individuals are satisfied with their own performance

PP3 Our organization is successful

- Return on Sales
- Return on Assets