Exploring the relationship between knowledge management practices and innovation performance

Marianne Gloet and
Milé Terziovski

The authors

Marianne Gloet is Senior Lecturer, School of Management, RMIT University, Melbourne, Australia.
Milé Terziovski is Associate Professor, Euro-Australian Cooperation Centre for Continuous Improvement and Global Innovation Management, The University of Melbourne, Parkville, Australia.

Abstract

The process of innovation depends heavily on knowledge, and the management of knowledge and human capital should be an essential element of running any type of business. Recent research indicates that organisations are not consistent in their approach to knowledge management (KM), with KM approaches being driven predominantly within an information technology (IT) or humanist framework, with little if any overlap. This paper explores the relationship between KM approaches and innovation performance through a preliminary study focusing on the manufacturing industry. The most significant implication that has emerged from the study is that managers in manufacturing firms should place more emphasis on human resource management (HRM) practices when developing innovation strategies for product and process innovations. The study shows that KM contributes to innovation performance when a simultaneous approach of "soft HRM practices" and "hard IT practices" are implemented.

1. Introduction

In its ideal form, innovation has the capacity to improve performance, solve problems, add value and create competitive advantage for organisations. Innovation can be broadly described as the implementation of both discoveries and inventions and the process by which new outcomes, whether products, systems or processes, come into being (Williams, 1999). The process of innovation depends heavily on knowledge, particularly since knowledge represents a realm far deeper than simply that of data, information and conventional logic; indeed, the power of knowledge lies in its subjectivity, underlying values and assumptions that underpin the learning process (Nonaka and Takeuchi, 1995). As old distinctions between manufactured objects, services and ideas are breaking down; knowledge assumes a more pivotal role within organisations (Davenport and Prusak, 1998). According to Stewart (1997), the management of knowledge and human capital should be an essential element of running any type of business, yet few individuals understand this challenging area; and, given the potential of knowledge management (KM) and intellectual capital as sources of innovation and renewal, business strategy should be focusing more on these issues. This paper explores the relationship between KM and innovation through measuring the effects of knowledge management approaches and innovation performance through a preliminary study focusing on the manufacturing industry.

2. Literature review

2.1 Defining KM
The focus on issues of power and intellectual capital in the general business and management literature has implications for the study of KM. Where information management was viewed as a somewhat neutral and normative servicing system in the organisational literature in the 1970s (Handy, 1976; McRae, 1971), today KM has emerged as a discrete area in the study of organisations to the extent that it has become recognised as a significant source of competitive advantage (Nonaka, 1991; Nonaka and Takeuchi, 1995; Davis, 1998; Matusik and Hill, 1998; Miller, 1999; Moore and Birkinshaw, 1998; Stewart, 1997). Although having emerged as a field of study in its own right, KM has been criticised for being a misnomer and an oxymoron

(Coleman, 1999), or for being "fuzzy" and imprecise (McCune, 1999). While KM has a concrete and tangible side characterised by people, physical systems and processes, there is a great deal of scope for interpretation, as KM practices are highly subjective in nature and subject to various interpretations. There is no shortage of definitions of KM (Liebowitz, 1999); however, for the purposes of this paper we will highlight two broad definitions. For Beckman (1999), KM concerns the formalisation of and access to experience, knowledge, and expertise that create new capabilities, enable superior performance, encourage innovation, and enhance customer value. Coleman (1999) defines KM as an umbrella term for a wide variety of interdependent and interlocking functions consisting of: knowledge creation; knowledge valuation and metrics; knowledge mapping and indexing; knowledge transport, storage and distribution; and knowledge sharing.

2.2 Approaches to KM

Definitions of the term "knowledge" vary considerably, and often such definitions are not clearly explicated in either the research literature or in the operational context. For the purposes of this paper, information can be characterised as "data endowed with relevance and purpose" (Drucker, 1998), while knowledge can be defined as "information combined with experience, context, interpretation, and reflection" (Davenport *et al.*, 1998). Accordingly, all organisations deal in knowledge. However, organisations can choose between competing systems and processes to acquire, manage, and disseminate knowledge. These systems and processes are explicit as well as implicit and can be influenced by personal and organisational values and ideologies. In terms of an organisation's internal systems, organisations actually filter acquired knowledge. For example, one organisational culture may support a devolved structure in KM while another's culture may choose more centralised systems. In another organisation, information technology (IT) will drive KM while another organisation will favour a more human approach. At various points as knowledge moves through an organisation, choices are made about the most appropriate way to manage its flow.

Research by Hansen *et al.* (1999) has indicated that organisations do not adopt a uniform approach to knowledge management. They outline two distinct strategies utilised when selecting a KM approach: a codification strategy, centred around IT resources; and a personalization strategy, centred around human resources (HR). Their research also suggests that in the rare cases when organisations attempt to adopt elements of both approaches, this leads to problems of a serious enough nature to undermine a business. Sveiby (1997) has also referred to two distinct approaches to knowledge management, one focusing more on people, the other more on technology.

Indeed, contemporary knowledge management approaches appear to represent extensions of either organisational learning or business information systems, and these KM approaches tend to be driven predominantly within an IT or humanist framework or paradigm, with little if any overlap (Gloet, 2000). This divide between KM approaches has ramifications for both organisational learning and innovation processes. One body of literature on KM has its origins in approaches to IT, information systems and related issues. This canon supports an IT paradigm. In contrast, a competing body of literature supports a humanist paradigm in which the social relations of organisational knowledge are paramount. While this latter paradigm recognises the technical side of KM, it also highlights the significant influence of people in the process of managing and interpreting knowledge. Whereas literature in the IT paradigm focuses more on tangible aspects of KM, such as collection and manipulation of information, the humanist paradigm concerns itself more with the nature of learning and the harnessing knowledge as an organisational resource. Compared to the "hard" IT paradigm, the "soft" humanist paradigm accords more attention to organisational slogans, metaphors, and symbols (Nonaka, 1991). Consequently, the analysis of KM in a humanist paradigm is open to more interpretive explanations.

To confound the study of KM in general, the two paradigms necessitate two very different approaches. In the IT paradigm, researchers have accepted various extensions of information processing/business information systems management as springboards into KM. As a consequence, their research focuses on the collection, storage, and manipulation of essentially objective or explicit data, employing methodologies that implicitly construct an organisation as an information processing system. This diverts attention to how data are processed, collected, and stored (Lado and Zhang, 1998). Given this implicit focus in the IT paradigm, most KM tools revolve around information systems and software (Fusaro, 1998).

Within the humanist paradigm, recent literature highlights the role of individuals and groups in the processes of knowledge sharing and manipulation, particularly with regard to highly interpretative

forms of knowledge. Other themes in the paradigm include the distinctions between tangible and intangible knowledge, or explicit versus tacit knowledge (Nonaka and Takeuchi, 1995; Nonaka, 1991). In addition, other studies explore the role of knowledge and learning at the systems, organisational, and cultural level of an organisation (Nevis et al., 1995).

Other literature in the area of KM suggest that a number of organisational or infrastructural elements have the power to influence the success or otherwise of KM within an organisation. These include: a healthy organisational culture and support infrastructure (Beckman, 1999; Zand, 1997; Quinn et al., 1997); management support and proactive leadership (Davenport, 1996; Beckman, 1999), empowerment of employees (Davenport and Prusak, 1998; Liebowitz and Beckman, 1998); understanding KM as a business strategy (Ruggles and Holtshouse, 1999); strong communication channels (Kouloopoulos and Frappaolo, 1999); and a commitment to developing and sustaining a climate for learning within the organisation (Starbuck, 1997; Liebowitz and Beckman, 1998).

2.3 Innovation

There are numerous definitions of innovation in the literature; however, most definitions share common themes relating to knowledge, which may be turned into new products, processes and services to improve competitive advantage and meet customers' changing needs (Nystrom, 1990). Carnegie and Butlin (1993) define innovation as "something that is new or improved done by an enterprise to create significantly added value either directly for the enterprise or directly for its customer." Livingstone et al. (1998) refer to innovation as "new products or processes that increase value, including anything from patents and newly developed products to creative uses of information and effective human resource management systems". Regarding the sources of innovation in management, De Toni et al. (1998) identify six sources of innovation, Drucker (1985) identifies seven sources and Edquist (1997) refers to nine. More recently, the Continuous Improvement and Innovation Management Project (CIMA) has identified four enabling mechanisms that contribute to continuous innovation and improvement, these being capabilities, behaviours, contingencies and levers (Gieski, 1999).

2.4 KM and innovation

From the literature, a number of elements of successful KM have been identified. HR can be seen as a strategic lever in creating competitive advantage through the value of the knowledge,

skills and training (Becker and Gerhart, 1996). There is also reference to the need for a strong IT infrastructure within the organisation (Beckman, 1999; Libowitz and Beckman, 1999; Zand, 1997; Davenport and Prusak, 1998). In addition, in order to understand better the nature of innovation, management must ensure that innovation is woven into an organisational culture (Cottrill, 1998). Several researchers have emphasised the pivotal role of the management of knowledge, particularly in creating an internal working environment that supports creativity and fosters innovation (Amabile et al., 1996; Carnegie and Butlin, 1993; Soderquist et al., 1997). The literature indicates the need to formulate a method within a framework, to confront empirical data in the interest of pursuing further insights into the complex relationship between knowledge and innovation. The following research questions are articulated for analysis in this paper:

RQ1. Is a KM model based on IT and human resource managment (HRM) a reliable and valid instrument for measuring and predicting the relationship between KM practice and innovation performance?

RQ2. Is there a significant and positive relationship between KM practices based on IT and HRM and innovation performance?

3. Theory and framework

Rigorous research involving the management of innovation is scarce (AECD, 1998). While a growing body of literature has attempted to understand innovation, the literature shows definite gaps in the investigation of KM processes and innovation. Therefore, this study will pose specific, relevant hypotheses in an attempt to gain a greater understanding of the relationship between innovation and KM practices relating to both human resources and IT resources. The following hypotheses are tested in this study:

H1. A KM model based on humanist/IT criteria is a reliable and valid instrument for measuring and predicting the relationship between KM practice and innovation performance.

H2. There is a significant and positive relationship between elements of HR/ humanist approaches to KM and innovation performance.

H3. There is a significant and positive relationship between elements of IT focus on technological advancement (e-commerce) to KM and innovation performance.

8. Conclusions and implications for managers

Based on the results of this exploratory study we conclude by answering the two questions articulated at the beginning of this paper. Our first conclusion is that a KM model based on IT and HRM focus is a reliable and valid instrument for measuring and predicting the relationship between KM practices and innovation performance. Our second conclusion is that there is a significant and positive relationship between KM practices based on a combination of IT/HRM and innovation performance. From this point it can be argued that organisations should strive for an integrated approach to KM in order to maximise innovation performance leading to competitive advantage.

However, we found a significant and negative relationship between elements of IT focus on technological advancement (e-commerce) and innovation performance. This may be explained to a certain extent by the fact that e-commerce is still in its early stages, and therefore a sense of confidence in e-commerce as a major force in improving and sustaining innovation performance may not be shared by the managers surveyed. As the study was limited to the manufacturing sector, it may be argued that a multiple sector survey could yield different results. It may, for instance, be speculated that managers in the service sector may view e-commerce as having greater potential to influence innovation performance. Given the exploratory nature of the study, and the small sample size, it is clear that further investigation into the relationship between e-commerce and innovation performance is needed on a larger scale.

The most significant implication that has emerged from the study is the conclusion that managers in manufacturing firms should place more emphasis on HRM practices when developing innovation strategies for product and process innovations. The study shows that KM contributes to innovation performance when a simultaneous approach of "soft HRM practices" and "hard IT practices" are implemented.

References

AECD (1998), *Hard and Soft Technologies: Integrated Benchmarking and Best Practice in the Australian Electronics Industry*, AECD, Melbourne.

Amabile, T., Conti, R., Coon, H., Lazenby, J. and Herron, M. (1996), "Assessing the work environment for creativity", *Academy of Management Journal*, Vol. 39 No. 5, pp. 1154-84.

Becker, B. and Gerhart, B. (1996), "The impact of human resource management on organizational performance, progress and prospects", *Academy of Management Journal*, Vol. 39 No. 4, pp. 779-801.

Beckman, T.J. (1999), "The current state of knowledge management", in Liebowitz, J. (Ed.), Knowledge Management Handbook, CRC Press, Boca Raton, FL.

Carnegie, R. and Butlin, M. (1993), *Managing the Innovative Enterprise: Australian Companies Competing against the Worlds Best*, Business Council of Australia, Melbourne.

Coleman, D. (1999), "Groupware: collaboration and knowledge sharing", in Liebowitz, J. (Ed.), *Knowledge Management Handbook*, CRC Press, Boca Raton, FL.

Cottrill, K. (1998), "Reinventing innovation", *Journal of Business Strategy*, Vol. 19 No. 2, pp. 47-51.

Davenport, T. (1996), "Some principles of knowledge management, strategy, management", *Competition*, p. Winter.

Davenport, T. and Prusak, L. (1998), *Working Knowledge*, Harvard University Press, Boston, MA.

Davenport, T.H., De Long, D.W. and Beers, M.C. (1998), "Successful knowledge management projects", *Sloan Management Review*, Vol. 39 No. 2, pp. 43-57.

Davis, M.C. (1998), "Knowledge management", *Information Strategy*, Vol. 15 No. 1, p. Fall.

De Toni, A., Nassimbeni, G. and Tonchia, S. (1998), "Innovation in product development within the electronics industry", *Technovation*, Vol. 19 No. 2, pp. 71-80.

Drucker, P. (1985), *Innovation and Entrepreneurship*, Heinemann, London.

Drucker, P.F. (1998), "The coming of the new organization", *Harvard Business Review on Knowledge Management*, Harvard Business School Press, Boston, MA.

Edquist, C. (1997), *Systems of Innovation: Technologies, Institutions and Organizations*, Pinter, London.

Fusaro, R. (1998), "Rating intangibles no easy task: Eli Lilly measures the value of knowledge management", *Computerworld*, Vol. 32 No. 48, p. 8.

Gieski, J.F.B. (1999), "Continuous Improvement and Global Innovation Management Trial Project", *Euro-Australian Cooperation Centre Newsletter*, No. 2.

Gloet, M. (2000), "Knowledge management: implications for TQM", in Ho, S. and Leong, C. (Eds), *Proceedings of the Fifth International Conference on ISO9000 and TQM*, Hong Kong Baptist University, April.

Hair, J., Anderson, R., Tatham, R. and Black, W. (1992), *Multivariate Data Analysis*, 3rd ed., Macmillan, Sydney.

Hair, J.F. Jr, Anderson, R.E. and Tatham, R.L. (1987), *Multivariate Data Analysis with Readings*, Macmillan, New York, NY.

Handy, C. (1976), *Understanding Organizations*, Penguin, Harmondsworth.

Hansen, M.T., Nohria, N. and Tierney, T. (1999), "What's your strategy for managing knowledge?", *Harvard Business Review*, March-April.

advantage: a resource based model", *Journal of Management*, Vol. 24 No. 4.

Liebowitz, J. (Ed.) (1999), *Knowledge Management Handbook*, CRC Press, Boca Raton, FL.

Liebowitz, J. and Beckman, T. (1998), *Knowledge Organizations: What Every Manager Should Know*, St Lucie Press, Boca Raton, FL.

Livingstone, L., Palich, I. and Carini, G. (1998), "Viewing strategic innovation through the logic of contradiction", *Competitiveness Review*, Vol. 8 No. 1, pp. 46-54.

McCune, J.C. (1999), "Thirst for knowledge", *Management Review*, April.

McRae, T.W. (Ed.) (1971), *Management Information Systems*, Penguin, Harmondsworth.

Matusik, S.F. and Hill, C. (1998), "The utilization of contingent work, knowledge creation and competitive advantage", *Academy of Management Review*, Vol. 23 4 October.

Miller, W. (1999), "Building the ultimate resource", *Management Review*, Vol. 8 No. 2.

Moore, K. and Birkinshaw, J. (1998), "Managing knowledge in global service firms: centres of excellence", *Academy of Management Executive*, Vol. 12 No. 4 November.

Nevis, E.C., DiBella, A.J. and Gould, J.M. (1995), "Understanding organizations as learning systems", *Sloan Management Review*, Vol. 36 No. 2, pp. 73-85.

Nonaka, I. (1991), "The knowledge creating company", *Harvard Business Review*, November/December.

Nonaka, I. and Takeuchi, H. (1995), *The Knowledge Creating Company: How Japanese Companies Create the Dynamics of Innovation*, Oxford University Press, New York, NY.

Nunnally, J. (1978), *Psychometric Theory*, McGraw Hill, New York, NY.

Nystrom, H. (1990), *Technological and Market Innovation: Strategies for Product and Company Development*, John Wiley & Sons, London.

Quinn, J.B., Baruch, J. and Zien, K.A. (1997), *Innovation Explosion: Using Intellect and Software to Revolutionize Growth Strategies*, The Free Press, New York, NY.

Ruggles, R. and Holtshouse, D. (1999), *The Knowledge Advantage*, Capstone, Dover, NH.

Soderquist, K., Chanaron, J. and Motwani, J. (1997), "Managing innovation in French small and medium sized enterprises: an empirical study", *Benchmarking for Quality Management and Technology*, Vol. 4 No. 4, pp. 259-72.

Starbuck, W. (1997), "Learning by knowledge-intensive firms", in Prusak, L. (Ed.), *Knowledge in Organizations*, Butterworth-Heinemann, Boston, MA.

Stewart, T. (1997), *Intellectual Capital: The New Wealth of Organizations*, Nicholas Brealey, London.

Sveiby, K. (1997), *The New Organizational Wealth: Managing and Measuring Knowledge-based Assets*, Berrett-Koehler Publishers, San Francisco, CA.

Williams, A. (1999), *Creativity, Invention and Innovation*, Allen & Unwin, Sydney.

Zand, D. (1997), *The Leadership Triad: Knowledge, Trust and Power*, Oxford University Press, London.