Knowledge management and the competitive strategy of the firm

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Abstract

Purpose – Knowledge management (KM) has emerged as a strategy to improve organizational competitiveness. Our purpose is to identify the relationship between KM and the firm's competitive advantage.

Design/methodology/approach – We review the existing literature on KM and strategy formulation. We utilize the resource-based view approach as a lens for fitting KM with strategic planning. The concept of strategy and KM integration is introduced.

Findings – We relate KM strategies to business strategy through a thorough review of the literature.

Research limitations/implications – Future research should investigate the circumstances under which KM can create a sustainable competitive advantage within the framework of the RBV. Another area involves the investigation of the degree of integration between the competitive strategy and KM strategy.

Practical implications – A very useful source of information for practitioners to refine their thinking about KM and the firm strategic resources. It offers the practitioner a framework for understanding strategy concepts while illustrating how we can derive business results from KM.

Originality/value – This paper offers practical help for corporate executives and practitioners embarking in a KM initiative or program.

Keywords Knowledge management, Competitive advantage, Corporate strategy

Paper type Conceptual paper

1. Introduction

In 1597, Francis Bacon wrote, "knowledge is power" (Barclay, 2000). In 1962, at a White House reception honoring Nobel Prize winners, President John F. Kennedy said, "in a time of turbulence and change, it is truer than ever that knowledge is power." Knowledge while difficult to quantify and even more difficult to manage is a strategic corporate asset (Shepard, 2000).

The best way to achieve competence in the global market is through planning and upgrading core competencies. Not only will the knowledge economy change the experience of workers, but organizations and countries must also rethink their economic strategies. "How well an individual, an organization, an industry, a country does in acquiring and applying knowledge will become the key competitive factor.

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There will be no poor countries. There will only be ignorant countries" (Anonymous, 1995).

An organization managing knowledge well has the potential to create significant value, but only if it is linked to its overall strategy and strategic decisions. Knowledge management (KM) is the latest strategy in increasing organizational competitiveness (Bell and Jackson, 2001). Stephen Denning's story about the World Bank is one of transition. He tells how a large, bureaucratic organization took knowledge and its use seriously and changed its entire strategy. This new strategy shift going from a financial organization to a knowledge organization is an excellent example of the changes that are sweeping the world when a knowledge-based view takes hold (Ruggles and Holtshouse, 1999).

The concept of treating organizational knowledge as a valuable strategic asset has recently become extremely common (Zack, 1999a). KM efforts have been primarily focused on developing new applications of information technology, complemented to a lesser degree with implementing new organizational forms. The link between knowledge and business strategy has basically been overlooked. Thus KM has unfortunately developed into a matter of information technology primarily, followed by one of organizational behavior with business strategy generally not even considered (Zack, 1999a).

Our purpose is to identify the relationship between KM and the firm's competitive advantage. We examine pertinent literature related to knowledge management and its impact on the competitive advantage of the firm. We begin with a review of the Porter (1979) Five forces model and Wernerfelt's (1984) Resource-based view of the firm. We then address the link between KM and strategy formulation by drawing on the resource-based view of the firm. Next, we examine pertinent literature on KM and strategies. We offer in the last section a summary of our findings, research implications and conclusions.

2. Strategy models

This section provides an overview of Porter's five forces model followed by a discussion of the resource-based view of the firm as defined by Wernerfelt (1984). The difference between competitive advantage and sustained competitive advantage is also clarified.

Porter's five forces model:

The application of the strengths, weaknesses, opportunities and threats (SWOT) framework has been dominated over the last 20 years by Porter's five forces model. According to Porter (1979), the nature and degree of competition in an industry hinge on five forces: the threat of new entrants, the bargaining power of suppliers, the threat of substitute products or services and the jockeying among current contestants. Knowledge of these underlying sources of competitive pressure provides the groundwork for a strategic agenda of action. This model focuses on the external side of strategy, helping firms analyze the forces in an industry that give rise to opportunities and threats. According to Barney (1995), firms that use their internal strengths in exploiting environmental opportunities and neutralizing environmental threats, while avoiding internal weaknesses, are more likely to gain competitive advantage than other types of firms.

Resource-based view of the firm:
One key requirement for corporate success in this competitive environment is recognizing how to sustain competitive advantage. To develop and exploit a competitive advantage, firms must possess capabilities that can be used to create valuable, rare and imperfect imitable resources (Barney, 1991).

The resource-based theory of the firm roots in the work of Penrose (1959), among others, and has been developed in work by Wernerfelt (1984). Resource-based theory of the firm suggests that firm resources and capabilities influence the growth and performance of the firm (Penrose, 1959; Barney, 1991; Mahoney and Pandian, 1992). The resource-based theory focuses on costly to copy firm resources that could be a source of sustainable competitive advantage (Barney, 1991; Dierickx and Cool, 1989; Peteraf, 1993). Researchers and practitioners of this idea attributes sustainable competitive advantage to the possession of valuable, non-susbtitutable and inimitable resources.

Firm's resources consist of all assets both tangible and intangible, human and non-human that are possessed or controlled by the firm and that permit it to devise and apply value-enhancing strategies (Barney, 1991, Wernerfelt, 1984). Wernerfelt (1984) indicated that "resources are tangible and intangible assets that are tied semi-permanently to the firm." Examples of resources are brand names, in-house knowledge of technology, capital, etc. Resources and capabilities that are valuable, uncommon, poorly imitable and nonsubstitutable (Barney, 1991) comprise the firm's unique or core competencies (Prahalad and Hamel, 1990) and therefore present a lasting competitive advantage. Intangible resources are more likely than tangible resources to generate competitive advantage (Hitt *et al.*, 2001). Specifically, intangible firm-specific resources such as knowledge permit firms to add up value to incoming factors of production (Hitt *et al.*, 2001). It represents competitive advantage for a firm (Prahalad and Hamel, 1990; Collis and Montgomery, 1995; Post, 1997; Markides, 1997; Bogner *et al.*, 1999). Such an advantage is developed over time and cannot easily be imitated. Core competencies are the collective learning in the organization (Prahalad and Hamel, 1990). Barney (1991) regards resources as those controlled by a firm that allow the firm to formulate and implement strategies that expand its efficiency and effectiveness. He developed four criteria for assessing what types of resources would present sustainable competitive advantage. These were value creation for the customers, rarity compared to the competition, inimitability, and substitutability. It is important for us to mention, explicitly, that knowledge is one competitive advantage that is difficult and time consuming to imitate. It must be encouraged and developed as part of organization learning and organization memory as it is used. Knowledge is a core competence that does not weaken nor is it consumed with use. As resources cannot at all times be transferred or imitated, organizations must look internally to locate the real sources (Wernerfelt, 1984; Barney, 1986, 1991; Prahalad and Hamel, 1990; Mahoney and Pandian, 1992; Collis and Montgomery, 1995; Post, 1997; Markides, 1997). The resources that the firm can build up have a major influence on their strategies (Barney, 1996) since they might guide the firm's decision making (Grant, 1991).

3. Knowledge management (KM)

Knowledge is not a clear concept. There are many definitions of knowledge and many different methodologies describing how to manage it. Davenport and his colleagues viewed knowledge as the combination of human context and information that makes information actionable (Davenport and Prusak, 1998; Davenport *et al.*, 1998). Sanchez *et al.* (1996) defined knowledge as the ability to maintain the synchronized exploitation of assets and capabilities in a mode that assures the achievement of the goals.

O'Dell and Grayson (1998) define knowledge to be information in action.

As an alternative, Davenport and Prusak (1998) defined knowledge as a fluid mix of framed experience, values, contextual information and expert insight that offers a framework for evaluating and integrating new experience and information.

Defining knowledge management (KM) is also difficult because there are multiple interpretations (Choi, 2000). Here are a few definitions from recent publications.

Knowledge management applies systematic approaches to find, understand, and use knowledge to create value (O'Dell, 1996).

Knowledge management is the formulation of and access to experience, knowledge, and expertise that create new capabilities, enable superior performance, encourage innovation, and enhance customer value (Beckman, 1997). KM is a strategy that turns an organization's intellectual assets-both recorded information and the talents of its members into greater productivity, new value and increased competitiveness, it teaches cooperation from managers to employees, how to produce and optimize skills as a collective entity (Murray, 1998). Knowledge management is a mindful strategy of getting the precise knowledge to the right people at the precise time and helping people share and place information into action in methods that attempt to develop organizational performance (American Productivity Quality Center, 1999a, b).

Knowledge management is a cross-disciplinary field drawing from a wide range of technologies such as cognitive science, expert systems, artificial intelligence and knowledge-based management systems, computer-supported collaborative work (groupware), library and information science, technical writing, document management, decision support (business intelligence) systems, semantic networks, relational and object databases, simulation and organizational science (Barclay and Murray, 2000). KM can be presented as a convergence of ideas promulgated over the past decade, including core competencies and resource-based theories of the firm, "info-mapping" and information resource management, the "balanced scorecard" and intangible/intellectual assets, the learning organization and "communities of practice", total quality management and business process reengineering, the networked organization and the "boundaryless firm" (Corrall, 1998).

While there are numerous knowledge management beliefs and methodologies, they all focus around the belief that knowledge is an important asset to be handled carefully and that the core of KM is to develop approaches to get the right knowledge to the right person at the right time, in the right format. Organizations need to ensure that they set an adequate KM infrastructure. In theory, the process is simple, but the implementation can be quite complex. Organizations must openly describe the policies to direct the implementation of the KM infrastructure within the enterprise. They must have top-down support for the effort with generous details of the causes behind the addition of the capability. They must establish a culture that places value on knowledge (Shepard, 2000). Finally, organizations must recognize that KM solutions are generally only 10 percent to 20 percent technology efforts; the major efforts involve those that are cultural, managerial and behavioral.

4. Knowledge management (KM) and strategy formulation

Strategy can be defined as "the match an organization makes between its internal resources and skills, and the opportunities and risks created by its external environment" (Grant, 1991). Strategies emerge from the interaction between the firm and its environment as well as between knowledge workers and management (Nurmi, 1998). According to Porter (1996), the essence of strategy is in its activities, that is choosing to perform activities differently or to perform different activities than rivals.

How can knowledge be linked to strategy formulation? Fahey (1996) stated that both strategy and knowledge are dynamic, multifaceted concepts. A company's strategy might involve its existing strategic position, or where its executives want its strategy to take it in the future. Future strategy may involve working within an existing strategy context, or creating a new game. Strategy-oriented knowledge might include many diverse fields, consisting of customers, competitors, industry entrances and exits, suppliers, technologies, regulators and regulations. A company can look at an existing strategy to reveal what knowledge will make it thrive, or look at its existing knowledge and identify what strategy will best take advantage of it. Furthermore, it is possible to perceive the strategy knowledge relationship in terms of how knowledge and its effective management can create strategic or competitive advantage for a firm.

According to Zack (1999a, b) for the organization to describe the relationship between strategy and knowledge, it must articulate its strategic plan, identify the knowledge needed to fulfill its proposed strategy and compare that to its actual knowledge, thus revealing its strategic knowledge gaps.

Teece (1998) stated that researchers must collect evidence to examine the proposal that the firm-level competitive advantage in open economies flows essentially from difficult-to-replicate knowledge assets.

Knowledge management strategies

In simple terms a KM strategy is the process of generating, codifying, and transferring explicit and tacit knowledge within an organization, getting the right information, to the right people, in the right place and at the right time. Business leaders, organizational consultants, and management leaders tend to use four main management strategies that permit an organization to manage its knowledge. These management strategies are generally known as culture, leadership, technology and measurement (Davenport and Prusak, 1998; O'Dell and Grayson, 1998; Davenport, 1999).

The knowledge strategy defines the needs, way and actions to achieve objectives. It drives knowledge issues, e.g. a product strategy to drive product decisions. A knowledge strategy is different from a KM strategy, which is a strategy or roadmap of the organization responsible for KM and other knowledge relevant issues, to enable KM. Both strategies are necessary and have to be aligned continuously (Hofer-Alfeis, 2003). Developing a knowledge strategy is relatively simple (Clarke, 1998). The first step is to develop superior scenarios for current and future competitive environments. The next step is to portray ideal profitable companies with respect to the future scenarios. The next important step is to recognize individuals within the firm who possess the knowledge required or have the capability to obtain that knowledge. The last step for the organization is to model its efforts on those of a conceptually ideal company. The business strategy for such a perfect company consist of a plan for acquiring and maintaining essential knowledge. Once the knowledge management strategy is in place, the stage is set.

A company's KM strategy must uncover its competitive strategy. Additionally, the competitive strategy must drive KM strategy (Civi, 2000).

According to McKinsey Quarterly (1998), the first step in framing a knowledge strategy is to understand four characteristics specifically:

(1) extraordinary leverage and increasing returns since knowledge is not subject to diminishing returns;
(2) uncertain value since the value of an investment in knowledge is frequently hard to guess;
(3) uncertain value sharing; and
(4) fragmentation, leakage and the need for refreshment.

As knowledge grows, it tends to branch and fragment.

Wiig (1997a, b) identified five basic knowledge-centered strategies. Some practice knowledge management as a business strategy where the focus is on knowledge creation, capture, organization, renewal, sharing and use in all organizational activities. Others focus on the intellectual asset management strategy which includes enterprise-level management of specific intellectual assets such as patents, customer relationships, and other organizational structural capital. A third approach is to concentrate on a personal knowledge strategy, which highlights each employee's personal responsibility for KM. A fourth strategy is the knowledge creation strategy which stresses organizational learning, research (both basic and applied) and development, and motivation of employees to innovate, learn from past experiences, and obtain new and better knowledge to enhance competitiveness. The fifth strategy is the knowledge transfer strategy which emphasizes the systematic transfer of knowledge across the organization and the adoption of best practices.

Drew (1999) explored how managers can build KM into the strategy process in their firms. He stressed the need to build KM into the process of business strategy formulation, from mission statement to environmental scanning to core competencies to scenario analysis. In his view, a portfolio model is helpful in strategic thinking about knowledge content and awareness. He identified four categories of business knowledge (see Table I):

(1) What we know we know.
(2) What we know we don't know.
(3) What we don't know we know.
(4) What we don't know we don't know.

Drew added that many KM programs are concerned by the first of these: what we know we know. This includes sharing best practices across internal boundaries. From a strategic perspective, it is the fourth type of knowledge – what we don't know we don't know – that creates the greatest threats and opportunities for an organization.

Knowledge awareness/ knowledge content	1. What we know we know	2. What we know we don't know	3. What we don't know we know	4. What we don't know we don't know
Emphasis	Knowledge sharing, access and inventory	Knowledge seeking and creation	Uncovering hidden or tacit knowledge	Discovering key risks, exposures and opportunities
Tools	Benchmarking, communities of practice	R&D, market research, competitive intelligence	Knowledge maps, audits, training and networks	Creative tension, audits, dilemmas, complexity science

Source: Adapted from Drew (1999)

Table I.
A knowledge portfolio

By managing all four areas and building a knowledge dimension into the use of strategy tools, organizations take the first step toward developing a knowledge-based strategy where unique knowledge-driven sources of competitive advantage can both provide superior value to customers and be hard for competitors to imitate.

As stated by Broadbent (1998), the goal is for businesses to become more competitive due to the competencies of their people to be more adaptable and innovative. The key to KM strategies is the transformation of knowledge from tacit to tacit, explicit to explicit, tacit to explicit and explicit to tacit, with emphasis on the last two processes as the key challenges of KM. She summarized four steps in getting started in KM:

(1) making knowledge visible;
(2) building knowledge intensity;
(3) developing a knowledge culture; and
(4) building a knowledge infrastructure.

Organizations can gain several benefits from implementing a KM strategy. Tactically, they can lessen the loss of intellectual capital from people leaving the company, reduce costs by decreasing and achieving economies of scale in obtaining information from external providers, reduce the redundancy of knowledge-based activities, increase productivity by making knowledge available more quickly and easily, and increase employee satisfaction by enabling greater personal development and empowerment. The best reason may be a strategic need to gain a competitive advantage in the marketplace (Knapp, 1998).

Zack (1999b) suggested that knowledge assets should be analyzed in relation to their support of business strategy by performing a SWOT (strengths, weaknesses, opportunities and threats) analysis. In a 1999 survey of 200 IT managers, 94 percent considered knowledge management strategic (Stahl, 1999).

The American Productivity and Quality (APQC) study team identified six key strategies that organizations were using to compete more effectively with knowledge by promoting an information sharing culture. These strategic factors were shown to impact employees' eagerness to share knowledge and included connection with business strategy, core cultural value, integration with daily work, role of leadership, role of human networks and rewards and recognition. However, to sustain competitive advantage, an organization must give people incentives to transfer their knowledge (The American Productivity and Quality Center, 1999b).

Bierly and Chakrabarti (1996) quantitatively determined the existence of several different generic strategies in the way firms acquire and generate knowledge, focusing on one industry, the US pharmaceutical industry. They labeled these generic knowledge strategies: innovators, explorers, exploiters and loners.

Knowledge management in practice: strategies and competitive advantage
Differences in direction toward KM are established by empirical studies (see Table II).

5. Implementation implications

Two companies that have demonstrated a commitment to fully integrating knowledge management into their corporate strategy, organizational culture, business practices, and human resources practices have recognized the benefits of utilizing knowledge management to obtain and maintain competitive advantage.

Siemens is a highly diverse organization that participates in a wide variety of businesses. In its history, the company has been called a conglomerate and was known for its strong hierarchy. Siemens is a company built on technology. Since KM is greatly enhanced by the effective use of information technology, it is not surprising that Siemens was a relatively early and enthusiastic adopter of KM. Siemens has initiated and successfully implemented numerous KM projects driven by the corporate KM Team and KM organizations in groups and regions. Siemens is meeting the challenges of a global knowledge-based business all the way through business specific as well as enterprise-wide knowledge management solutions to share existing knowledge better and create new knowledge quicker (Hofer-Alfeis, 2003). At Siemens, knowledge is regarded as the means for effective action. Consequently, KM encompasses competence building, knowledge dissemination in all classes of organizational structures and across company borders in addition to knowledge codification in documents, processes or systems. Effective KM systems are considered as socio-technical systems. Its approach to KM has been "bottom up". The IT-driven nature of the company's businesses provides a strong motivation to manage knowledge effectively. The movement by Siemens AG toward KM over the last two or

Author(s)	Category
Blackler (1995)	Competitive advantage
Brown and Duguid (1998)	Competitive advantage
Davenport and Prusak (1998)	KM projects
Davenport *et al.* (1998)	Successful knowledge management projects
Grant (1995, 1996)	Competitive advantage
Hansen *et al.* (1999)	KM strategies
McKinsey Quarterly (1998)	Knowledge-based strategies
Ruggles (1998)	KM projects
Skyrme and Amidon (1999)	KM projects
Zack (1999a, b)	Competitive advantage
Zack (1999a, b)	Competitive advantage and strategy

Table II. Research on KM, strategy and competitive advantage:

three years, has been a quite extraordinary transformation. KM at Siemens is a de-centralized approach of groups and regions of the company, with joint coordinating and proficiency-building efforts, where necessary, driven by the company-wide community of practice for KM. Without suggestion or prompting from above, a number of mid-level employees and managers of Siemens business units began to create repositories, communities of practice, and informal sharing approaches for knowledge. KM at Siemens goes far beyond purely IT-based systems. As a result of KM, Siemens business units will become more knowledge-based. Knowledge became embedded in the product and service strategies of all the units. Significant portions of the value Siemens provides to its customers will be a result of knowledge, both tacit and explicit. Siemens AG corporate KM introduced the knowledge strategy process (KSP) into the corporation as a method for business owners and their teams to determine strategy and action plans. The KSP was tested as a pilot project by Siemens AG from January to October 2001 and found to be very useful (Davenport and Probst, 2002).

Support Central, the knowledge based portal implemented by General Electric Corporation is the implementation of retired CEO Jack Welch's vision to transform the organization into a superior knowledge network. It demonstrates how strategic commitment to utilizing existing resources for continuous transformation can achieve results realized throughout an entire organization. General Electric is an extremely large, diverse international corporation that manufactures products that range from light bulbs to aircraft engines. A knowledge management strategy was essential for them to transform their organization to a knowledge sharing culture and to enable to enable them to implement a platform that would be a conduit to sharing information across divisions and across international borders. Knowledge management as a concept has been defined in several ways using numerous technologies. Dynamic organizations find methods to effectively support their tasks in a manner that is embraced by the vast majority of the employees. Support Central has had dynamic growth since its initial implementation, demonstrating its widespread acceptance within GE. GE has demonstrated that knowledge management systems can have an immediate impact, and financial benefit to international organizations that have a willingness to embrace a knowledge sharing culture (McCarthy and Aronson, 2004).

5. Implications for managers

A growing mix of knowledge management products is launched every year, it is meant to enhance and enable the knowledge management process. This article offers the practitioner a framework for understanding strategy concepts while illustrating how we can derive business results from KM. From this framework, the practitioner can expand his current understanding of KM and justify a knowledge management program.

Corporate executives are requiring better justification for investments in KMS infrastructures and anticipated business performance outcomes. As with any other application, there are concerns to consider prior to introducing a new KM system. Concerns such as planning your new KM system, presenting it to the employees and top management, offering high-quality service and sustaining security, are very critical. KM must be an enabler to achieve strategic business objectives. Therefore, after evaluating the existing infrastructure, the company should devise a strategic plan with vision destined at the development of the short-term and long-term objectives for the business with the KM system in mind.

It is dubious to immerse yourself prior to strategizing. First, there needs to be a strategy assessment that includes the firm's business goals and objectives. The practitioner should consider the following areas:

- Vision – what is your business trying to achieve? How it will be done? How will the KM system fulfill the goals? How will you measure success?
- Resources – how much can your business afford to build the right KM system? Is there talent aboard that can take the responsibility and assure that vision becomes reality?
- Culture – is your business politically amenable for coordinating efforts to support this new approach to knowledge sharing? Who will ultimately control the KM system's content and user feedback?

Once business strategy is made final, the next step is to demonstrate a viable link between KM and strategy. The idea is to elevate KM to a higher level of strategy and ensure that the final system is in compliance with strategy. Related to this step is the importance of analyzing knowledge gaps and relating them to strategic gaps. There is also the need to determine the right questions to ask and to package knowledge as part of the proposed KM system.

6. Discussion and conclusion

The knowledge-based economy is a reality. In spite of the considerable publicity and general distrust enclosing the knowledge management measures, there are organizations that are forging forward. KM is emerging as a significant organizational and management challenge. The pressures of the emergence of this global knowledge economy, and recognition of KM as a key are making the effective management of KM a priority. We relate KM strategies to business strategy through a thorough review of the literature. Business globalization continues to accelerate. Globalization has direct impact on nations and the ability of entities within them to develop and maintain a competitive posture around the globe. Nations compete for markets based on their core competencies, and knowledge is one of the fundamental base for competition. KM is becoming a key success factor for many organizations.

The two organizations discussed in this paper are all approaching somewhat different problems and are interpreting knowledge management in different ways. What is shared, nonetheless, is the harvesting of actual business efficiencies that can be transformed into tangible benefits. Knowledge management pleads you to gaze at informal networks and protocols, some and all approaches to sharing experiences and know-how, in addition to any and all cultural, technological and personal elements that drive creativity and innovation in response to varying stimuli. The organizations discussed have established a management program and governance structure and approached knowledge management generating a business culture where knowledge sharing and contribution has grown to be the means they perform things.

The knowledge-based economy is a reality. Firms are, to a large extent, larger, and in some areas turnover is high, fueling the need for better tools for collaboration, communication, knowledge sharing and knowledge maintenance. Firms must build strategies to sustain competitive advantage by leveraging their intellectual assets for optimum performance (Turban *et al.*, 2001). Resource-based theories of the firm offer the promise of a solid intellectual foundation for validating these claims made for knowledge by the popular press. Within the resource-based view, researchers assume that the firm is a pool of hard-to-copy resources and capabilities (Conner, 1991) and those discrepancies in size distribution and competitiveness of firms occur from their distinctive capabilities to build up, expand, and organize those resources and capabilities to create and apply value-enhancing strategies (Amit and Schoemaker, 1993; Barney, 1991; and Peteraf, 1993).

Many organizations do not understand the strategic importance of their knowledge assets in building and maintaining sustainable competitive advantage. They are failing to notice the strategic perspective on KM. KM needs a stronger link to the fundamental strategy of companies. However, many firms do not have well-developed strategic models that integrate knowledge methods, technologies and organizational forms to business strategy. Ideally, an organization needs a practical, yet theoretically reliable knowledge strategy model.

Hence, future research should involve critically investigating the circumstances under which KM can create a sustainable competitive advantage within the framework of resource-based theory. We suggest continued investigation into how organizations justify their knowledge management activities with regard to competitive advantage, and whether knowledge truly yields competitive advantage. Another potential area of research involves investigating the degree of integration between the competitive strategy and KM strategy and the actual impacts of such alignment.

References

American Productivity and Quality Center (1999a), available at: www.it-consultancy.com/extern/apge.html.

American Productivity and Quality Center (1999b), *APQC Benchmarking Study*, American Productivity and Quality Center, Houston, TX.

Amit, R.H. and Schoemaker, P.J. (1993), "Strategic assets and organizational rent", *The Resource-Based View of the Firm*, Vol. 14, pp. 33-46.

Anonymous (1995), "The rise of the knowledge worker", *Civilization*, Vol. 2 No. 1, p. 19.

Barclay, R.O. (2000), *Leading the Knowledge Enterprise CIOs, CLOs and Beyond*, Corporate Education.Biz, LCC, NY, available at: www.ktic.com/topic6/ 13_LEAD.HTM.

Barclay, R.O. and Murray, P.C. (2000), *What is Knowledge Management?*, Available at: www.media-access.com/ whatis.html.

Barney, J.B. (1986), "Strategic factor markets: expectations, luck and business strategy", *Management Science*, Vol. 32, pp. 1231-41.

Barney, J.B. (1991), "Firm resources and sustained competitive advantage", *Journal of Management*, Vol. 17 No. 1, pp. 99-120.

Barney, J.B. (1995), "Looking inside for competitive advantage", *Academy of Management Executive*, Vol. 9 No. 4, pp. 49-61.

Barney, J.B. (1996), "The resource-based theory of the firm", *Organization Science*, Vol. 7 No. 5, p. 469.

Beckman, T. (1997), A Methodology For Knowledge Management, International Association of Science and Technology for Development AI and Soft Computing Conference: Banff, Alberta, Canada.

Bell, D.K. and Jackson, L.A. (2001), "Knowledge management: understanding theory and developing strategy", *Competitiveness Review*, Vol. 11 No. 1, pp. 1-11.

Bierly, P. and Chakrabarti, A. (1996), "Generic knowledge strategies in the U.S. pharmaceutical industry", *Strategic Management Journal*, Vol. 17, Winter, pp. 123-35.

Blackler, F. (1995), "Knowledge, knowledge work and organizations: an overview and interpretation", *Organization Studies*, Vol. 16 No. 6, pp. 1021-46.

Bogner, W.C., Thomas, H. and McGee, J. (1999), "Competence and competitive advantage toward a dynamic model", *British Academy of Management*, Vol. 10, pp. 275-90.

Broadbent, M. (1998), "The phenomenon of knowledge management: what does it mean to the information profession", *Information Outlook*, Vol. 2 No. 5, pp. 23-31.

Brown, J.S. and Duguid, P. (1998), "Organizing knowledge", *California Management Review*, Vol. 40 No. 3, pp. 90-111.

Choi, Y.S. (2000), "An empirical study of factors affecting successful implementation of knowledge management", Doctoral Dissertation, Graduate College at the University of Nebraska, University of Nebraska, Lincoln, NB.

Civi, E. (2000), "Knowledge management as a competitive asset: a review", *Marketing Intelligence & Planning*, Vol. 18 No. 4, pp. 166-74.

Clarke, P. (1998), "Implementing a knowledge strategy for your firm", *Research Technology Management*, Vol. 41 No. 2, pp. 28-31.

Collis, D.J. and Montgomery, C.A. (1995), "Competing on resources: strategy in the 1990s", *Harvard Business Review*, July-August, pp. 118-28.

Conner, K.R. (1991), "A historical comparison of resource-based theory and five schools of thought within industrial organization economics: do we have a new theory of the firm?", *Journal of Management*, Vol. 17 No. 1, pp. 121-54.

Corrall, S. (1998), "Knowledge management: are we in the knowledge management business?", *Ariadne*, No. 18, available at: www.ariadne.ac.uk/issue18/knowledge-mgt.

Davenport, T.H. (1999), *Some Principles Of Knowledge Management*, McCombs Graduate School of Business, University of Texas, Austin, TX, available at: www.mccombs.utexas.edu/kman/kmprin.htm.

Davenport, T.H. and Probst, G.J.B. (2002), *Knowledge Management Case Book*, 2nd ed., John Wiley & Sons, Weinheim.

Davenport, T.H. and Prusak, L. (1998), *Working Knowledge: How Organizations Manage What They Know*, Harvard Business School 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.

Dierickx, I. and Cool, K. (1989), "Asset stock accumulation and sustainability of competitive advantage", *Management Science*, Vol. 35 No. 12, pp. 1504-11.

Drew, S. (1999), "Building knowledge management into strategy: making sense of a new perspective", *Long Range Planning*, Vol. 32 No. 1, pp. 130-6.

Fahey, L. (1996), "Putting knowledge into strategy", Presentation at the Ernst & Young Managing the Knowledge of the Organization Conference, Phoenix, AZ.

Grant, R.M. (1991), "The resource based theory of competitive advantage: implications for strategy formulation", *California Management Review*, Vol. 33 No. 3, pp. 114-35.

Grant, R.M. (1995), "A knowledge-based theory of inter-firm collaboration", *Academy of Management – Best Paper Proceedings*, pp. 17-21.

Grant, R.M. (1996), "Toward a knowledge-based theory of the firm", *Strategic Management Journal*, Vol. 17, Winter, pp. 109-22.

Hansen, M.T., Nohria, N. and Tierney, T. (1999), "What's your strategy for managing knowledge?", *Harvard Business Review*, Vol. 77 No. 2, pp. 106-18.

Hitt, M.A., Bierman, L., Shimizu, K. and Kochhar, R. (2001), "Direct and moderating effects of human capital on strategy and performance in professional service firms: a resource-based perspective", *Academy of Management Journal*, Vol. 44 No. 1, pp. 13-28.

Hofer-Alfeis, J. (2003), "Effective integration of knowledge management into the business starts with a top-down knowledge strategy", *Journal of Universal Computer Science*, Vol. 9 No. 7, pp. 719-28.

Knapp, E.M. (1998), "Knowledge management", *Business and Economic Review*, Vol. 44 No. 4.

McCarthy, R. and Aronson, J.E. (2004), "Knowledge management at GE: a technology transfer case study", working paper.

McKinsey Quarterly (1998), "Best practice and beyond: knowledge strategies", *McKinsey Quarterly*, Vol. 1, pp. 19-25.

Mahoney, J.T. and Pandian, J.R. (1992), "The resource-based view within the conversation of strategic management", *Strategic Management Journal*, Vol. 13, pp. 363-80.

Markides, C. (1997), "Strategic innovation", *Sloan Management Review*, Spring, pp. 9-23.

Murray, P.C. (1998), *New Language For New Leverage. The Terminology of Knowledge Management*, CorporateEducation. Biz, LLC, NY, available at: www.ktic.com/topic6/13_term2.htm.

Nurmi, R. (1998), "Knowledge-intensive firms", *Business Horizons*, May-June, pp. 26-32.

O'Dell, C. (1996), "A current review of knowledge management best practice", Conference on Knowledge Management and the Transfer of Best Practices, Business Intelligence, London.

O'Dell, C. and Grayson, C.J. (1998), "If only we knew what we know: identification and transfer of internal best practices", *California Management Review*, Vol. 40 No. 3, pp. 154-74.

Penrose, E.T. (1959), *The Theory of the Growth of the Firm*, Wiley, New York, NY.

Peteraf, M.A. (1993), "The cornerstones of competitive advantage: a resource-based view", *Strategic Management Journal*, Vol. 14, pp. 179-91.

Porter, M.E. (1979), "How competitive forces shape strategy", *Harvard Business Review*, Vol. 57 No. 2, pp. 137-45.

Porter, M.E. (1996), "What is strategy?", *Harvard Business Review*, Vol. 74 No. 6, pp. 61-79.

Post, H.E. (1997), "Building a strategy on competences", *Long Range Planning*, Vol. 30 No. 5, pp. 733-40.

Prahalad, C.K. and Hamel, G. (1990), "The core competence of the corporation", *Harvard Business Review*, Vol. 68 No. 3, pp. 79-91.

Ruggles, R. (1998), "The state of notion: knowledge management in practice", *California Management Review*, Vol. 4 No. 3, pp. 80-9.

Ruggles, R. and Holtshouse, D. (Eds) (1999), *The Knowledge Advantage*, Capstone Publishing Limited. Ernst & Young LLP, Dover, NH.

Sanchez, R., Heene, A. and Thomas, H. (1996), *Dynamics of Competence-based Competition: Theory and Practices in the New Strategic Management*, Elsevier, Oxford.

Shepard, S. (2000), *Telecommunications Convergence*, McGraw Hill, New York, NY.

Skyrme, D.J. and Amidon, D.M. (1999), "The knowledge agenda", in Cortada, J.W. and Woods, J.A. (Eds), *The Knowledge Management Yearbook 1999-2000*, Butterworth-Heinemann, Boston, MA, pp. 109-26.

Stahl, S. (1999), "Knowledge yields impressive returns", *Information Week*, April.

Teece, D.J. (1998), "Capturing value from knowledge assets: the new economy, markets for know-how, and intangible assets", *California Management Review*, Vol. 40 No. 3, pp. 55-79.

Turban, E., McLean, E. and Wetherbe, J. (2001), *Knowledge Management. Information Technology for Management: Transforming Business in the Digital Economy*, Wiley, New York, NY, pp. 385-432.

Wernerfelt, B. (1984), "A resource-based view of the firm", *Strategic Management Journal*, Vol. 5, pp. 171-80.

Wiig, K. (1997a), "Knowledge management: an introduction and perspective", *Journal of Knowledge Management*, Vol. 1 No. 1, pp. 6-14.

Wiig, K.M. (1997b), "Knowledge management: where did it come from and where will it go?", *Expert Systems with Applications*, Vol. 13 No. 1, pp. 1-14.

Zack, M. (1999a), *Knowledge and Strategy*, Butterworth-Heinmann, Boston, MA.

Zack, M.H. (1999b), "Developing a knowledge strategy", *California Management Review*, Vol. 41 No. 3, pp. 125-45.

Further reading

Spender, J.C. (1996), "Making knowledge the basis of a dynamic theory of the firm", *Strategic Management Journal*, Vol. 17, pp. 45-62.

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