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Resource-Based View of Knowledge Management for Competitive Advantage

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Abstract: We are not only in a new millennium, but also in a new era: the knowledge era. Sustainable competitive advantage is dependent on building and exploiting core competencies. The resource-based view (RBV) of the firm defines a strategic asset as one that is rare, valuable, imperfectly imitable and non-substitutable. Knowledge is seen as a strategic asset with the potential to be a source of competitive advantage for an organization. In this paper, we provide a model that examines how and why knowledge management (KM) can be used to create competitive advantage from the RBV of the firm.

Keywords: Knowledge management (KM), knowledge management systems (KMS), resource-based view of the firm (RBV), sustained competitive advantage.

1. Introduction

We live the *Knowledge Age*, a new era which is likely to have a radically different outlook and which will entail a new business compass to traverse (van Buren, 1999). Quickness is crucial to the success of firms in the rapidly changing setting of the knowledge era.

The development and practice of knowledge management (KM) is continuously and dramatically increasing in organizations. And due to improvements in KM, the race for seeking a competitive edge through knowledge increases at an even faster rate (Hofer-Alfeis, 2003). Businesses have long recognized the importance of managing their intangible assets. The development of brands, stakeholder relationships, reputation and the culture of the organization is readily viewed as providing sustainable sources of business advantage (Chong, Holden, Wilhelmij and Schmidt 2000).

The ability to develop and leverage the value of these intangible assets comprises a core competency for organizations, particularly those providing financial and professional services. In these knowledge-intensive organizations, processing knowledge is central to business success (Pralhad and Hamel, 1990; Drucker, 1998).

There is a general agreement that KM will represent the most important competitive advantage factor for organizations (Drucker, 1993; Quinn, 1992; Stewart, 1997; Toffler, 1990; Ferran-Urdaneta, 1999). Practitioner oriented research, both of US and European origin, points to a general consensus concerning the importance of knowledge as a basis for competitive advantage and superior operational effectiveness (e.g., see Skyrme and Amidon, 1997; KPMG Management Consulting, 1998; Price WaterHouse Coopers and World Economic Forum 1999).

Success in today's global, interconnected economy springs from the fast and efficient exchange of information. Sustainable competitive advantage is no longer rooted in physical assets and financial capital, but in effective channeling of intellectual capital (Seubert, Balaji and Makhija, 2001)

Spender (1996) contended that a firm's knowledge and its capability to create exclusive knowledge are at the center of the theory of the firm. Grant (1996) suggested that knowledge is the significant competitive asset that a firm possesses. Resource-based theory has been developed to understand how organizations achieve sustainable competitive advantages. Within the resource-based view (RBV), researchers assumed 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; Peteraf, 1993). In the resource-based view (Wernerfelt, 1984; Barney, 1986, 1991; Prahalad and Hamel, 1990; Peteraf, 1993; Conner, 1991), knowledge is seen as a strategic asset with the potential to be a source of sustainable competitive advantage for an organization. The knowledge-based view of the firm (Grant, 1995, 1996) builds upon and extends the resource-based theory of the firm initially promoted by Penrose (1959) and expanded by others (e.g., see Alavi and Leidner 2001). It encompasses the facets to knowledge integration (efficiency, scope and flexibility) and the four primary mechanisms by which knowledge is coordinated (rules and directives, sequencing, routines and group problem solving and decision making).

KM has been mentioned for its possible role in creating sustained competitive advantages for firms (Drucker, 1993; Quinn, 1992; Stewart, 1997; Toffler, 1990; Ferran-Urdaneta, 1999). While the assertion that KM might be able to create sustained competitive advantage for firms is provocative, work in this area is relatively underdeveloped, both empirically and theoretically. Research on KM and competitive advantage has emphasized describing *how* rather than systematically *why* KM can lead to such an advantage through case descriptions. Thus, the purpose of our study is to *develop and apply a model that specifies the conditions under which KM can, and cannot, be a source of competitive advantage*. We apply the resource-based view of the firm (Barney, 1991; Conner, 1991) in developing this model.

For the purpose of our research, we have conducted a systematic literature review as a recognized evidence-based tool for theory building. The remainder of this paper is organized as followings. First, we define KM and knowledge management systems. Second, we review the resource-based theory of the firm. Third, we examine pertinent literature on KM in practice and competitive advantage. We

then present our model along with a proposed research methodology. Finally, we draw up some implications for knowledge management and a further research agenda.

2. Knowledge Management (KM)

There is a general acceptance that sustainable competitive advantage in the 21st century will be accomplished thru KM. Large organizations are becoming progressively more alert to the significance of knowledge for efficiency and competitiveness. The principal cause for this concern with KM is the idea that knowledge and its application are the means by which creativity can be promoted (Nonaka and Nishiguchi, 2000; Nonaka and Takeushi, 1995), innovation facilitated (Hargadon, 1998; von Krogh, Ichijo and Nonaka, 2000), and competencies pulled in such a way as to advance overall organizational performance whether in the public, private or not-for-profit sectors (Pitt and Clarke, 1999). Some of the KM drivers include competition, customer focus, the challenge of a mobile workforce, equity in the workplace, and the global imperative (Macintosh, 1998). KM is crucial to organizational survival. Nonetheless, KM is complex involving great outflows of resources. As such KM is becoming an ever more persistent subject within the business community.

However, it has become clear that the term 'Knowledge Management' has been applied to a very broad spectrum of activities designed to manage, exchange and create or enhance intellectual assets within an organization, and that there is no widespread agreement on what KM actually is (Haggie and Kingston, 2003)

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 'boundary less firm' (Corral, 1998). KM is a multi-dependent discipline integrating business strategy and process, organizational

community and culture, collaboration, learning, expertise, and technology (Silver, 2000).

Defining KM is difficult because it has multiple interpretations (Choi, 2000).

KM is a conscious strategy of getting the right knowledge to the right people at the right time and helping people share and put information into action in ways that will improve organizational performance (van Ewyk, 2000). KM can be thought of as a deliberate design of processes, tools, structures, with the intent to increase, renew, share or improve the use of knowledge represented in any of the three elements (structural, human, and social) of intellectual capital (Seemann, DeLong, Stucky and Guthrie, 1999). KM is about encouraging individuals to communicate their knowledge by creating environments and systems for capturing, organizing, and sharing knowledge throughout the company (Martinez, 1998:89). KM has two main objectives: (1) to make the organization act as intelligently as possible in order to secure its viability and overall success, and (2) to otherwise realize the best value of its knowledge assets (Wiig, 1997). Knowledge management's purpose, thus, is to leverage an organization's intellectual assets in sustaining competitive advantage.

3. Knowledge Management Systems (KMS)

KMS are predominant in both theory and practice. Broadly defined, knowledge based system's use extensive domain specific knowledge to solve problems and support decision processes. KMS refer to the use of modern information technologies (e.g. the Internet, intranets, extranets, collaborative computing/groupware, software filters, agents, data warehouses) to systematize, enhance and expedite intra and inter firm knowledge management (Alavi and Leidner, 1999). KMS refer to a class of information systems applied to managing organizational knowledge. They are IT-based systems developed to support and enhance the organizational processes of knowledge creation, storage/retrieval, transfer and application (Alavi and Leidner, 2001). KMS address both the past and the future since they focus on problem solving, they support both tacit and explicit

knowledge, they should support both objective and subjective aspects, they are highly dependent on Internet-based technologies, and they enable the sharing of knowledge throughout the organization (Wickramasinghe, 2003).

4. Resource-based view of the firm

One key requirement for corporate success in this competitive environment is recognizing how to sustain competitive advantage. According to Porter (1999), we can create competitive advantage as we make tough choices about what we will do and not do. Competitive advantage is normally defined as the ability to earn returns on investment consistently above the average for the industry (Porter, 1985). Barney (1991) indicates that a firm is said to have a competitive advantage when it implements a value creating strategy not simultaneously being implemented by any current or potential competitors. Sustained competitive advantage is recognized as the level of exceptional performance that a firm attains when it devises and implements a value-enhancing strategy that is not concurrently being followed by any existing or possible competitors and when these firms are either incapable or reluctant to reproduce the benefits of this strategy (Barney, 1991; Lado and Zhang, 1998). Sustainable competitive advantage results only from strategic assets (Meso and Smith, 2000). According to Mahoney and Pandian (1992), competitive advantage is a function of industry analysis, organizational governance and firm effects in the form of resource advantages and strategies.

The resource-based view of the firm dominates the strategic management literature and has also found use in the management information systems (MIS) literature (Priem and Butler, 2001). It was developed to explain how organizations achieve sustainable competitive advantages. Advocates of the resource-based view have tried to explain why firms differ and how it matters (Barney, 1991; Wernerfelt, 1984, Hoopes, Madsen and Walker, 2003).

Resource-based theory treats enterprises as potential creators of value-added capabilities, and the underlying organizational competences involves

viewing the assets and resources of the firm from a knowledge-based perspective (Prahalad and Hamel, 1990; Conner and Prahalad, 1996). It focuses on the idea of costly-to-copy attributes of the firm as sources of business returns and the means to achieve superior performance and competitive advantage (Barney, 1991; Rumelt, 1987; Conner, 1991, Prahalad and Hamel, 1990).

A firm's resources consist of all assets both tangible and intangible, human and nonhuman that are possessed or controlled by the firm and that permit it to devise and apply value-enhancing strategies (Barney, 1991; Wernerfelt, 1984). Unique resources and capabilities are discussed under a variety of names, e.g. distinctive competences, core competences, invisible assets, core capabilities, internal capabilities, embedded knowledge, corporate culture, and unique combinations of business experience (von Krogh and Roos, 1995). 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, Bierman, Shimizu and Kochhar, 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, Thomas and McGee, 1999). Such advantage is developed over time and cannot easily be imitated. 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 the VRIO framework for assessing what kinds of resources would present sustainable competitive advantage. These were value creation for the customers, rarity compared to the competition, inimitability, and organization.

Priem and Butler (2001) summarized the RBV statements in the two following mathematical expressions:

$$\text{Prob (CA)} = f^+(v \cap r)$$

$$\text{Prob (S)} = f^+(CA \cap i_n \cap s_n \cap t_n)$$

Where CA is competitive advantage, v is resource value, r is resource rarity, S is sustainability, i_n is non-imitability, s_n is non-substitutability, and t_n non-transferability.

The first statement shows that the probability of achieving competitive advantage is a positive function of the joint occurrence of resource value and rarity. The second statement shows that the probability of sustainability of an existing competitive advantage is a positive function of the joint occurrence of competitive advantage, non-imitability, non-substitutability and non-transferability.

Graham and Pizzo (1996) developed a framework to help companies' position and manage knowledge for competitive advantage. The process of applying the framework "Configuring for Knowledge" has four interdependent and dynamic elements that exist in a closed loop system and is always focused on the balance between fluid and institutional domains that will yield operating efficiencies and strategic flexibility. In the fluid domain, knowledge originates and grows from individual intuition, personal networks and improvisation. In the institutional domain, work is structured controlled and measured. The elements were:

- Identifying the strategic business drivers,
- Establishing the knowledge core and interrelationships. That knowledge core includes both tangible and intangible assets in values and culture, people, technology, and business capabilities. Determining what and where business critical knowledge exists, how it is used and how is also important as well as constructing a knowledge value chain that traces the patterns of knowledge use and movement through the informal and formal sides of the organization;
- Applying just-enough-discipline (JED) which begins with a highly centralized focus on culture and a consideration of variables such as speed, or precision with which knowledge is disseminated; and
- Monitoring and rebalancing.

5. Knowledge Management (KM) in practice

Differences in direction toward KM are established by empirical studies. There was common agreement that KM will symbolize the largest competitive advantage for organizations in the new millennium (Drucker, 1993; Quinn, 1992; Stewart, 1997; Toffler, 1990).

Brown and Duguid (1998) addressed the organization of knowledge itself. They suggested that capabilities could be a source of competitive advantage for an organization. The key premise is that knowledge will reside in different areas of the organization. However, the focus of the firm should be on organizing that knowledge by providing translators, knowledge brokers and boundary spanners. They also stressed the role of communities of practice in providing common structure and meaning for the transfer of experience.

Coyne (1986) postulated that the sources of sustainable competitive advantage include four types of capability gaps/differentials: (1) the functional/business system gap, (2) the positional gap, (3) the cultural or organizational quality gap, and (4) the regulatory or legal gap. Process differential is the gap between an organization and its competitors based on the efficiency of their business processes or supply chains. Cultural differential incorporates the habits, attitudes, beliefs and values with permeate the individuals and groups, that compromise the organization into a working unit. Positional differential exists because of past actions, which may have created a certain reputation with customers or a certain advantageous location of facilities. Regulatory differential occurs due to the existence of intellectual assets.

Grant (1995, 1996) discussed the facets of knowledge integration and coordination capabilities that are a source of competitive advantage for the firm. He pointed to four mechanisms for integrating specialized knowledge: (1) rules and directives, (2) sequencing, (3) routines and (4) group problem solving and decision-making.

Hall (1992) produced a framework for strategic analysis of intangible resources

leading to sustainable competitive advantage, which formed the basis of a national survey of chief executives in the U.K. Some of the more interesting findings were that employee know-how and reputation are perceived as the resources that make the most important contribution to business success and that for most companies operations is the most important area of employee know how.

Miller and Shamsie (1996) used a resource-based orientation in examining the performance of seven major Hollywood film studios over thirty years that began with a period of stability but turned into one of change. They hypothesized contexts within which particular resources were determined to be more or less valuable. They found that property-based resources in the form of exclusive long-term contracts with stars and theatres helped financial performance in the stable, predictable environment of 1936-1950. In contrast, knowledge-based resources in the form of production and coordinative talent and budgets boosted financial performance in the more uncertain (changing and unpredictable) post-television environment of 1951-1965.

Prahalad and Hamel (1990) proposed the notion of core competencies relating to the internal capabilities of organizations. They listed three tests to be applied to identify a core competence: (1) it should provide potential access to a wide variety of markets, that is it possesses leverage potential; (2) it should be relevant to the customer's key buying criteria; and (3) it should be difficult for competitors to imitate. They emphasized the application of 'invisible' assets, innovation, leadership and competencies, or knowledge as the basis for competitive viability.

Spender (1996) noted that an organization's knowledge and its ability to generate new knowledge is the key to achieve competitive advantage. Similar to the resource-based view of the firm, he also argued that this competitive advantage only arises from the use of scarce, intangible, firm-specific knowledge. He further identified four heuristics that managers could use to help them define the firm as a knowledge-based activity system, and to understand their relationship to it. The four heuristics include (a) interpretive flexibility, (b)

boundary management, (c) identification of institutional influences and (d) the distinction between systemic and component features.

Zack (1999a,b) postulated that competitive advantage arises due to the strategic use of resources and capabilities, of which knowledge is believed to be the most significant. He offered an outline for describing and assessing an organization's knowledge strategy. Zack's approach to integrating knowledge strategy with business strategy was illustrated with cases drawn from a number of high profile organizations that include Dow Chemical, Buckman Laboratories, and Image Corp. His knowledge strategy framework matches the traditional strengths-weaknesses-opportunities-threats (SWOT) analysis, and is depicted along two dimensions. The first focuses on the extent to which the firm is mainly a creator, rather than a user of knowledge. The second dimension focuses on whether the primary sources of knowledge are internal or external. Together, these two dimensions help a firm explain its current or desired knowledge strategy. Zack advises that knowledge-based SWOT analysis can lead to mapping knowledge-resources and capabilities against strategy opportunities and threats to clearly understand advantage and weakness. Yet to do so, the organization should express its strategic intent and afterward identify the knowledge required in executing it. The required knowledge should be compared to the actual knowledge. The comparison is expected to guide the detection of gaps, two of which are the strategic gap and the knowledge gap.

In Table 1, we list major published research on KM, strategy and competitive advantage.

Table 1: Research on KM, strategy and competitive advantage:

Author(s)	Year	Category
Brown and Duguid	1998	Competitive Advantage
Coyne	1986	Competitive Advantage
Grant	1995, 1996	Competitive Advantage
Hall	1992	Competitive Advantage
Miller and Shamsie	1996	Resource-Based View of the Firm
Prahalad	1990	Core

and Hamel Spender	1996	Competencies Competitive Advantage
Zack	1999a,b	Competitive Advantage and Strategy

6. The resource-based model of KM for competitive advantage

KM is clearly a key approach to solving current problems such as competitiveness and the need to innovate, which is faced by businesses today (Wickramasinghe, 2003). We seek to assess how and why KM can yield competitive advantage.

Our research aims to answer the following questions:

1. Do Knowledge Management Systems yield competitive advantage?
2. If so, what is the nature of relationship between knowledge management and competitive advantage?

Competitive advantage is normally defined as the ability to earn returns on investment persistently above the average for the industry (Porter,1985).

Competitive advantage can be created in numerous ways, for instance, by size, location, access to resources (Ghemawat,1986), or even by plain luck (Barney, 1996). Lasting advantage comes from using knowledge management systems to support what we do well and to add value to resources we possess that are not readily available to competitors. For organizational knowledge to offer sustainable competitive advantage, it should have the following four properties: it should be valuable, rare, imperfectly imitable and non-substitutable or imperfectly substitutable. A prerequisite of implementation of KM is to understand and develop the infrastructure elements required to support the acquisition, management, and transfer of tacit and explicit organizational knowledge. Three areas of emphasis form the literature on organizational knowledge infrastructure; these are the emphasis on people, process and technology. Innovations that exploit a firm's assets are likely to add value to those resources, and the competitive advantage that results is likely to be sustainable. The literature on KM highlights the importance of a sharing culture to support and foster a knowledge

management focus (Alavi, 1999; Zack, 1999a,b; Davenport and Prusak, 1998).

KM can be viewed as a socio-technical system of tacit and explicit business policies and practices. It is enabled by the integration of information technology tools, business processes, human or social capital, continuous learning and innovations. Huber (1991: 89) argues that an organization learns if any of its units acquires knowledge that it recognizes as potentially useful to the organization. Productive learning exploits, explores, and restructures an organization's values and criteria, enhances organization capability and improves an organization's performance. This is the type of learning that organizations promote (Argyris and Schon, 1996). Learning is identified as a quantifiable improvement in activities, increased available knowledge for decision-making or sustainable competitive advantage (Cavaleri, 1994; Dodgson, 1993).

As with any major, enterprise-wide effort/system, knowledge management systems have been demonstrated in the popular, technical press as having

significant impact for organizations that implement it right and well. Also, previous implementations of enterprise-wide efforts (e.g., Enterprise Resource Planning and CRM) have exhibited similar properties. Finally, the RBV literature indicates that competitive advantages can be created and sustained via knowledge use. Therefore, we believe that the RBV is an appropriate theory to explain whether knowledge management systems indeed formally and empirically yield competitive advantage, and to formally and empirically explain the nature of the relationship between knowledge management and competitive advantage. Thus, question 1 above essentially is answered in the literature, and question 2 is the key one we plan to explore in our research.

We postulate the following hypothetical four variables model to empirically investigate the causal relation between knowledge management systems usage and the firms' competitive edge. Figure 1 portrays our preliminary research model. The added three precursors to knowledge management systems use are drawn from theories on organization systems usage, strategy, learning and innovations.

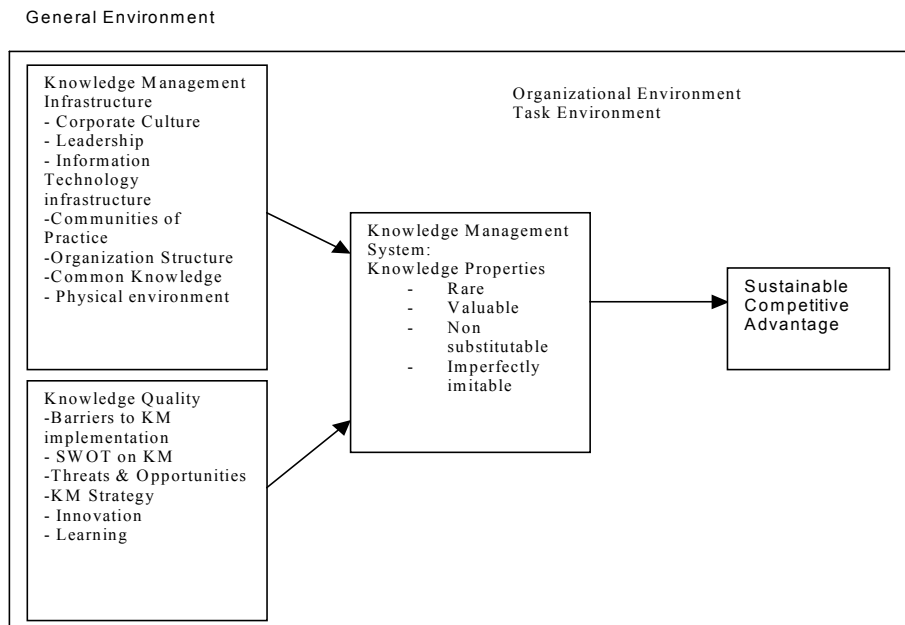


Figure 1: Research model

We plan to explore the model in Figure 1. Note that it could be expanded to include organizational environmental factors that are strategy related as independent constructs. These include literal and separate measures of strategy, innovation, and learning that would influence the KM

quality and/or other factors. For now, these are incorporated in the current model in the KM quality construct. We plan to expand the model to include these constructs explicitly as the topic of a further study.

7. Discussion and Implications

In the information system literature, Ives, Hamilton and Davis (1980) proposed a model for IS research using two information system environments: the external environment which includes legal, social, political, cultural, economic, educational, resource, and industry trade considerations and the organizational environment. Variables in the external environment can affect information systems within organizations through the resources and constraints that these variables can impose or offer.

Bozeman and Bretschneider (1986) maintained that the frame for public management information systems consists of three levels: society which includes variables that define resources and constraints on MIS, organization which includes variables within the organizational context that affect information system such as size, structure, time frame, organizational resources and organizational maturity, and the individual which reflects characteristics of individual actors within an organization, including cognitive style, level of satisfaction within MIS and other personal and demographic information.

Three environments are incorporated in our model. The organizational environment includes all internal variables that exist within the organizational boundaries. The middle frame or task environment includes the external variables with immediate relevance and direct interactions with the organization. The outer frame, or general environment includes the external variables with potential relevance and no direct interaction with the organization. Our model has several important constructs, namely the knowledge management infrastructure construct, the knowledge quality, the knowledge management system and sustainable competitive advantage. The knowledge management infrastructure block defines the KM infrastructure in terms of the following five constructs: corporate culture, leadership, information technology infrastructure, communities of practice and common knowledge. The knowledge quality block defines the knowledge quality in terms of six constructs: barriers to implementation, SWOT analysis, identification of threats

and opportunities, KM strategy, innovation, and learning.

Such considerations suggest the following hypotheses:

H1. Knowledge management infrastructure is positively related to KMS knowledge properties.

H2. Knowledge quality is positively related to KMS knowledge properties.

H3. KMS knowledge properties are positively related to sustainable competitive advantage.

H4. Knowledge management infrastructure and knowledge quality are positively related to the knowledge management systems properties.

H5. Knowledge management infrastructure, knowledge quality and knowledge management systems properties are positively related to sustainable competitive advantage.

H6. Sustainable competitive advantage is a function of knowledge management infrastructure, knowledge quality, knowledge management systems properties, organization environment, task environment and general environment.

The firm's competitive advantage represents its *raison d'être*. Therefore, the understanding of the basis for competitive advantage is of vital importance in today's economy.

The RBV explains why and how firms achieve competitive advantage. Wernerfelt (1984), Barney (1986, 1991), and others have contributed to the subsequent development of the RBV of strategic management. In much of the conceptual and empirical RBV work, researchers have either paraphrased Barney's RBV statements or simply stated his article. Attempts to further define underlying RBV constructs or specify causal relationships have been extremely sparse (Priem and Butler 2001). Consequently, we will spend

much of our research effort determining how to measure the sustainable competitive advantage construct. This elusive measure is readily understandable in the strategic management literature, yet few have truly defined it empirically or even come close to attempting to measure its dimensions.

Despite growing interest about the strategic perspective on knowledge management (KM) there is no published or available procedure or a measurement instrument. A large number of knowledge management instruments both organizational, information and communication instruments have been proposed but none of them measured competitive advantage. Our research is a first step in providing a push in empirically supporting previous arguments and creating an instrument to measure them.

Our model has implications for both researchers and practitioners. For researchers, the model suggests the types of the variables that need to be included in future empirical tests of the relationship between KM and competitive advantage. Consequently, the model extends understanding of what is becoming an increasingly important issue in knowledge management, the relationship between KM and competitive advantage. Practitioners, on the other hand, could use the model to refine their thinking about KM and their firm's strategic resources.

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