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# RESEARCH ISSUES: A CONCEPTUAL LOOK AT PROJECT MANAGEMENT AS A SOURCE OF COMPETITIVE ADVANTAGE[1]

As a knowledge-based asset, project management contributes to firm performance. Since there is little research on project management as a strategic asset, this paper discusses conceptual issues within the Resource Based View. The paper proposes a research design to examine the relationships between codified and tacit knowledge in project management and its strategic asset profile.

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## Introduction

In the ever competitive marketplace, companies must deliver greater value to customers. The struggle to gain and sustain competitive advantages warrants that companies develop certain resource bundles (known as strategic assets) which are fundamental to firm performance. More often than not, these strategic assets are knowledge-based assets involving organizational processes and human and social capital as opposed to physical assets such as property and technology or financial resources. Successful projects also contribute to business performance, and this translates into improved chances of firm survival. Increasingly, companies are turning to project management as part of their business strategy. Since project management is a knowledge-based discipline, it consists of both codified and tacit knowledge. Tacit knowledge is shared informally through social exchange practices, such as those studied with Social Capital Theory.

For empirical studies on project management as a strategic asset, we need to understand the conceptual and research challenges. This paper presents a preliminary look at the challenges of studying project management's knowledge-based assets (explicit and tacit knowledge). The paper uses the Resource Based View (RBV) of the firm as the overarching theory. As knowledge flows through social networks that connect people, this paper addresses Social Capital Theory. The paper proposes a preliminary research design for discussion based on the explicit and tacit dimensions of project management knowledge and their connections to firm performance.

## Resource Based View of the Firm

A crucial question in the strategy literature asks, "Why do firms differ?" In contrast to the Industry View that emphasizes the environment, the RBV explains firm existence based on internal strategic assets that are scarce, difficult to trade, imitate, appropriate, and give a firm its competitive advantage (Amit & Schoemaker, 1993; Madhok, 2002; Porter, 1991). The RBV emphasizes the creation, maintenance, and renewal of a competitive advantage through a firm's unique resources, their characteristics, and how they change over time (Foss, 1997; Schulze, 1994). The RBV involves concepts from organizational learning and knowledge management (Conner & Prahalad, 1996; Eisenhardt & Santos, 2000; Foss, 1996; Kaplan, Schenkel, von Krogh, & Weber, 2001). The RBV is also known as the Knowledge Based View (Eisenhardt & Santos, 2000). Knowledge management concepts are crucial to understanding complex assets and help explain how some resources can be codified whereas others cannot as well as clarify what makes knowledge-based assets firm specific i.e. – valuable, rare, inimitable, and organizational as per Barney's well known VRIO Framework (Barney, 2001).

### Select Research Challenges Related to the Resource Based View

As evident in the RBV, a perspective differs from a theory in that it involves issues of terminology and concept confusion whereas a theory has addressed many of these matters (Shaw & Gaines, 1995). Some of the terminology and conceptual issues within the RBV relate to how resources are defined. Some define the word "resource" in narrow terms and others in broad terms. Examples of synonyms for the word "resource" included bundles of heterogeneous

resources (Penrose, 1959), endowments, inputs, primary resources, resource bundles, skills, stocks (Dierickx & Cool, 1989), and tangible and intangible assets. Another issue relates to the distinctions between resources, capabilities, and assets. Some indicate that resources are tradable and generally tied to individuals but capabilities are not tradable and may be tied to individuals (Kaplan et al., 2001). Examples of synonyms for the word "capability" (Richardson, 1972) include capacity, combinative capability (Kogut & Zander, 1992), and invisible assets (Itami & Roehl, 1987). The distinctions between resources, capabilities, competences are subtle. What is clear though is that these terms involve a knowledge and human dimension based on the skills, tacitness, and collective learnings of the firm and that firms have more assets than strategic assets.

Strategic assets are the "difficult to trade and imitate, scarce, appropriable, and specialized resources and capabilities that bestow the firm's competitive advantage" (Amit & Schoemaker, 1993, p. 36). Examples of strategic assets include quality, reputation, managerial skills, brand recognition, patents, culture, technological capability, customer focus, and superior managerial skills (Barney & Zajac, 1994; Castanias & Helfat, 1991; Chakraborty, 1997; Hawawini, Subramanian, & Verdin, 2002; Kogut & Zander, 1993). Other synonyms for strategic assets include core competences (Prahalad & Hamel, 1990), distinctive competence (Selznick, 1957), dynamic capability (Teece, D., J., Pisano, & Shuen, 1997), dynamic routines (Collis, 1991), indivisible assets (Teece, David J., 1980), integrative capabilities, implicit / social knowledge, meta capability (Kaplan et al., 2001), organizational architecture (Henderson & Cockburn, 1994), and organizational capability.

Though the RBV would benefit from a classification system, some resource frameworks are evident. Resource frameworks show preliminary groupings of elements in a logical order and depict how various components fit into an overall structure e.g. human (individual skills, knowledge), social (external relationships, networks), financial (personal wealth), physical, technology, and organizational (internal structures, processes, relationships) assets (Brush, Greene, Hart, & Haller, 2001). Some frameworks group resources on the basis of complexity, and others look at complexity and use, with strategic assets being most complex (Barney, 1991, 1998; Brush et al., 2001; Grant, 1991; Marino, 1996; Thomas, Pollock, & Gorman, 1999).

There is a lack of clarity on resource characteristics that help develop versus sustain a competitive advantage (Amit & Schoemaker, 1993; Barney, 1991, 1998; Chakraborty, 1997; Collis & Montgomery, 1995; Grant, 1991; Mata, Fuerst, & Barney, 1995; Peteraf, 1993; Priem & Butler, 2001a). For example, Amit and Schoemaker view scarcity as a sustaining feature but Barney and Peteraf view it as a feature that develops a competitive advantage. Although the RBV is gaining interest and empirical studies emerging, there is no widely-adopted instrument on assessing the characteristics of a strategic asset (Lopez, 2001; Wiggins & Ruefli, 2002; Zahra & Nielsen, 2002). A recent empirical study on project management as a strategic asset consolidated the different perspectives and used the breath of terms most commonly noted to develop the VRIO-LDN acronym (Jugdev, 2003). The acronym represents the RBV criteria - valuable (important), rare (unique), inimitable (difficult to copy), organizational focus (management support), low tradable ("sticky" or embedded to the firm), durable (long lasting), and non-substitutable (irreplaceable). These terms represent a combination of firm practices and resource characteristics that *characterize* a competitive advantage and the findings are being used to develop a survey instrument on strategic asset characteristics. The issue of developing versus sustaining a competitive advantage, although important, is one that is beyond the scope of this paper. It is an important topic though as it can help avoid a tautology problem. For example, if resources are described as being valuable and rare, a competitive advantage should be measured with other metrics, such as return on investment (Barney, 2001; Priem & Butler, 2001b).

The above depicts key terms used in the literature, the amount of variation, overlap, and confusion between them, and the complexities of the RBV perspective. "Although these distinctions among resources, capabilities, and competencies can be drawn in theory, it is likely that they will become badly blurred in practice" (Barney, 2001, p. 157). However, from a research perspective, these issues need to be explored and debated to develop theories. The RBV is appropriate to use as a theoretical underpinning for project management for several reasons: a) the RBV has a rich 20-year history, b) the RBV addresses knowledge and process assets and this fits with an exploration of project management, and c) one way of achieving theory status is by conducting empirical studies using perspectives. As many strategic assets are knowledge-based, the next section examines the topics of tacit and explicit knowledge.

## What is Knowledge?

Knowledge is a complex construct and a single answer to this question remains elusive. Knowledge is "the dynamic human process of justifying personal belief toward the 'truth' " (Nonaka & Takeuchi, 1995, p. 58). Knowledge is about creating, acquiring, capturing, sharing and using knowledge (Currie, 2003). Data are the raw discernable elements and information is the medium (commodity) for constructing knowledge (Liebowitz & Megbolugbe, 2003; Nonaka & Takeuchi, 1995). As rules and heuristics are applied to information, knowledge is created as actionable information providing value added benefits (Liebowitz & Megbolugbe, 2003). The common thread between knowledge, data, and information is that they all involve a personal dimension (Fernie, Green, Weller, & Newcombe, 2003b).

### Tacit and Explicit Knowledge

Deploying knowledge assets contributes to a firm's competitive advantage (Teece, David J, 1998a). Knowledge can be divided into such groupings as explicit and tacit knowledge, observable and non-observable knowledge, positive and negative knowledge, and autonomous and systematic knowledge (Teece, David J, 1998a). Tacit knowledge is personal, experiential, context-specific, and rooted in action (Polanyi, 1966). Experience is a personal asset and a valuable source of intellectual capital (Geisler, 1999). Tacit knowledge is expressed in attitudes and points of view. Tacit knowledge involves subjective insights and intuition. Actionable knowledge is embedded in stories and practice (Ramaprasad & Prakash, 2003). Such stories often involve analogies and metaphors and are a good way with which to share tacit knowledge because they allow people to relate to new concepts with ones they are more familiar (Tsoukas, 1991). Tacit knowledge has analog properties connoting a continuous nature. In contrast, explicit knowledge is more formal, codified and transmitted systematically (Polanyi, 1966). Explicit knowledge is easy to transfer through words, numbers, data, formulae, and manuals (Nonaka & Konno, 1998). Explicit knowledge (the knowledge of rationality) is context free and often described as discrete and digital. It is the "know-what" that can be documented.

Nonaka further divides tacit knowledge into a technical dimension and a cognitive one (Nonaka & Konno, 1998). The technical dimension covers informal personal skills and crafts and could be called "know-how". The cognitive dimension involves beliefs, ideals, values, and mental models. Nonaka developed the well-known knowledge creation spiral that involves the dynamic process of moving from tacit to explicit knowledge between individuals, groups, and organizations. The model involves four kinds of knowledge: socialization (tacit-tacit),

externalization (tacit-explicit), combination (explicit-explict) and internalization (explicit-tacit) (Nonaka & Konno, 1998). The framework emphasizes the organic nature of knowledge. Nonaka also introduced us to the Japanese concept of "*Ba*" which has to do with shared space of the physical, virtual, or mental nature. *Ba* is a platform for advancing individual and collective knowledge (Nonaka & Konno, 1998). Knowledge is embedded in *Ba* and without *Ba*, one is left with information. A useful way of looking at knowledge is with the iceberg analogy (Fernie et al., 2003b; Nonaka & Takeuchi, 1995). The tip of the iceberg represents the explicit or visible body of knowledge. However, the larger component of the iceberg is submerged and is tacit. It remains ignored because of the focus on the visible.

Tacit knowledge involves the ability to innovate and innovation can also be a source of competitive advantage (Leonard & Sensiper, 1998). Innovation involves creativity. "The essence of innovation is to re-create the world according to a particular ideal or vision (Nonaka & Takeuchi, 1995, p. 10). The nature of innovation involves both divergent and convergent thinking and it is not a linear process (Leonard & Sensiper, 1998). Tacit knowledge has also been likened to the currency of the informal economy. It is shared through socialization (Granovetter, 1973). Although Nonaka and Takeuchi infer the concept of Social Capital in their theory of knowledge creation, the concept is not addressed explicitly.

**Select Research Challenges Related to Knowledge-Based Assets**

Three issues for the 21st century have to do with conceptualizing knowledge as a central organizational asset, incorporating knowledge capital into the strategic management process, and designing organizations to facilitate knowledge use (Miles, G., Miles, Perrone, & Edvinsson, 1998). However, we face some conceptual and research barriers as non-economic forms of capital are process-oriented and inter-dependent (Miles, G. et al., 1998).

Although we understand that knowledge-based assets such as those studied with the RBV are vital to a company's success, they are not easy to research or study with the traditional economic lens that looks at divisibility, appropriability, scarcity, decreasing returns to use, or depreciation (Glazer, 1998). Knowledge is an intangible asset that is difficult to capture using traditional accounting or financial metrics (Bontis, Dragonetti, Jacobsen, & Roos, 1999). Knowledge is a unique "commodity" that increases in value with use. Appropriability refers to whether a person has an asset or if the company owns it. Appropriability is difficult to ascertain with knowledge because it is a concept that can be applied at the individual, group, and organizational level (Nonaka & Takeuchi, 1995).

The dominant focus in Western management studies has been on explicit knowledge and related financial and economic metrics (Nonaka & Takeuchi, 1995). Management theory has emphasized the importance of knowledge (acquiring, accumulating, and using existing knowledge), the role of the individual, and analyzing knowledge, but not on how it is created (Nonaka & Takeuchi, 1995). The Eastern epistemology on knowledge is more group-based, tacit knowledge oriented, and emphasizes experience. In the Eastern view, creating knowledge draws on "the subjective, bodily, and tacit aspects of knowledge and is still relatively neglected" in the West (Nonaka & Takeuchi, 1995, p. 49). Since knowledge is a collective "horizontal phenomenon" that resists direct control and manipulation, a combination approach of knowledge-based metrics supplemented with economic indicators would enhance triangulation (Jick, 1979; Mason, 1998; Maxwell, 1996; Miles, M. B. & Huberman, 1994). As a coherent framework for conceptualizing knowledge in non-economic ways is missing, Miles suggests that we develop an inventory of current measurement systems of intangible assets and look at their successes and

failures (Miles, G. et al., 1998). Bontis provided a review of four popular measurement systems on intangible assets - human resource accounting, economic value added, balanced score cards, and intellectual capital (Bontis et al., 1999). However, not one approach emerges as a clear winner. Other research approaches include the use of qualitative historical comparisons between companies, or histories on matched pairs (Teece, 1998b).

As the RBV is a stream of study in strategy, it involves both qualitative and economic indicators. Although there is a scarcity of empirical studies on tacit knowledge and intuition in strategy, the psychology literature provides a basis for the general nature of knowledge (Brockmann & Anthony, 2002). Intuition can be a proxy for tacit knowledge and the Myers Briggs instrument on personality styles is a good measure of one's ability to use intuition. Little is available on tacit knowledge instruments though, other than the work by Sternberg and his research group at Yale (Sternberg, Wagner, William, & Horvath, 1995). Their instrument is based on scenarios that participants rank using Likert scales. The results are compared to the responses of experts (as determined by experience) as experience is a proxy for tacit knowledge. As discussed in the next section, Social Capital Theory can also be used to assess tacit knowledge sharing practices, particularly at the group level, such as that which exists on projects.

## Social Capital

Social complexity is the link between the RBV and Social Capital Theory and refers to the interpersonal relationships, cultural aspects, and routines within a firm. Social complexity involves ambiguity due to the number of technologies, routines, and experiences. Social Capital is based on making connections with others, promoting durable networks, enabling trust, and fostering cooperation (Prusak & Cohen, 2002). Close ties and mutual respect help build Social Capital. Social Capital is an intangible attribute of the relationships among members of a social unit (Portes, A, 1998; Woolcock, 1998). Group members can access Social Capital because of their membership in the unit, but they do not own it individually (Portes, Alejandro, 1998).

Adler and Kwon (2002) identified three requisite conditions that must exist to develop Social Capital within the firm - opportunity, motive, and the ability to engage Social Capital. "And social capital, because it represents the organic growth of trust, understanding, and loyalty, takes time to develop" (Prusak & Cohen, 2002, p 93). Since tacit knowledge is shared through Social Capital, knowledge is a social process. Knowledge flows through social networks that connect people (Currie, 2003). Social Capital also connotes the concept of caring (von Krogh, 1998). Social Capital warrants a light touch as opposed to heavy handed, structured approaches. It needs to be nourished, not blue printed (Prusak & Cohen, 2002).

Collectively held knowledge evokes the concept of communities of practice (Brown & Duguid, 1998; Wenger, 1998). A community of practice can be an engine for developing Social Capital (Lesser, 2000; Lesser & Storck, 2001). In project management, a community of practice is defined as a group where "members regularly engage in sharing and learning, based on their common interests" (Fernie, Green, Weller, & Newcombe, 2003a; Huang & Newell, 2003; Lesser & Storck, 2001, p. 831). Although beyond the scope of this paper, some of the research issues that relate to Social Capital are similar to those in knowledge management as the two deal with tacit knowledge. "All firms are in essence knowledge organizations" (Brown & Duguid, 1998, p.

91). Project management is a knowledge-based discipline and more and more companies are relying on cross-functional project teams to help them manage complex tasks.

## Project Management

Competitive pressures such as time to market, customer and supplier demands, increasingly complex and technical products, and the growth of international competition force companies to use project management (Cleland & Ireland, 2002; Pinto, 2001). Project management is defined as the tools, techniques, and knowledge-based practices applied to achieve organizational goals such as products or services. Project management is gaining ground as an important organizational asset. Projects are unique undertakings and involve creativity and innovation. The discipline involves cultural, structural, practical, and inter-personal aspects (Cooke-Davies, 1990). Much of the original research in project management came out of the engineering and operations management disciplines and focused largely on developing techniques to coordinate work (Meredith & Mantel, 1995).

A recent meta-analysis of the project management literature indicated that in the 1970s, publications focused on techniques i.e. software, work breakdown structures, and Program Evaluation and Review Techniques (Kloppenborg & Opfer, 2002). In the 1980s, literature began to focus on the importance of the "profession." The literature remained technically oriented as it covered design-to-cost, lifecycle costing, risk management, cost / schedule control, and control systems. However, the literature has also started to address team building and quality. Since the 1990s, the literature has focused on leadership, competences, stakeholders, performance measures, communication, and project management as a career path (Cleland & Ireland, 2002).

### Select Research Challenges Related to Project Management

As projects are conducted in complex, dynamic environments, they cannot continue to be managed merely on the basis of the traditional time, cost, and scope constraints or basic processes and knowledge areas that address planning, execution, control, and closeout, as projects are not independent of the business and strategic context (Atkinson, 1999; Turner & Crawford, 1994). However, literature on the advantages of using project management continues to widely emphasize efficiency indicators such as increasing profitability and reducing costs, cycle time, and risks of failure (Bounds, 1998; Kerzner, 1994; Wallace & Halverson, 1992). Effectiveness is often secondary as it involves longer-term measures, is subjective, and harder to assess (Belout, 1998; Young & Calnan, 1993). The focus on efficiency measures is related to the historical emphasis on project success being limited to the project lifecycle and not extending into the production phases that more appropriately deal with product success and customer satisfaction (Frame, 1994; Freeman & Beale, 1992; Munns & Bjeirmi, 1996; Pinto & Prescott, 1990).

Considerable work has been done by project management associations to develop standard bodies of knowledge and these guides are the basis of project management maturity models (Australian Institute of Project Management, 2000; IPMA, 2000; Project Management Institute, 2000). These bodies of knowledge are valuable and provide explicit standards on practice in the areas of time, cost, scope, quality, human resources, risk, communications, procurement, and integration (Project Management Institute, 2000). The guides are a form of codified knowledge. An underlying assumption is that these bodies of knowledge retain meaning

devoid of context (Fernie et al., 2003b). However, knowledge is inseparable from context and involves a tacit and experiential dimension. This is not addressed in the bodies of knowledge or project management maturity models.

Project management maturity models are promoted in the literature as sources of competitive advantage (ESI-International, 2001; Hartman, 2000; Ibbs, C William & Kwak, 1997, 1998; Ibbs, C William & Kwak, 2000; MicroFrame, 2001). Most maturity models are based on the Carnegie-Mellon Software Engineering Institute's Capability Maturity Model for software development, which is atheoretical (Carnegie-Mellon, 2002). The models consist of five linear stages reflecting *project* processes and practices that are increasingly more defined and repeatable. The five stages are: initial, repeatable, defined, managed, and optimized. Most of the maturity models are also based on the standard areas covered in the bodies of knowledge.

The project management maturity models address tangible assets but not intangible assets (knowledge assets). The models do not emphasize *organizational* processes and practices. The models typically lack a connection between operations management and strategy. Few project management models have been empirically tested and many are based on anecdotal material, case studies, or espoused best practices (ESI-International, 2001; Hartman & Skulmoski, 1998; MicroFrame, 2001; Pennypacker, 2001; Schlichter, 2000; Skulmoski, 2001). In addition, as these models do not draw from the economic or strategy literature on competitive advantage, or meet the VRIO-LDN criteria, the arguments put forth towards winning in the marketplace with such models are weak at best (Jugdev, K & Thomas, 2002).

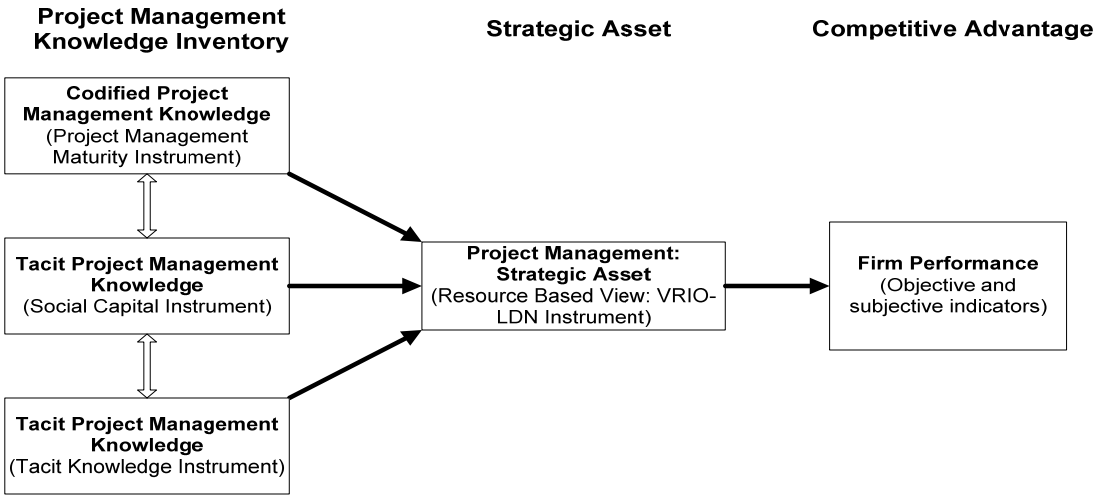
A review of the 2003 issue of the International Journal of Project Management that focused on knowledge management indicated that few publications were empirical in nature. Although they discussed the concepts of knowledge management, few discussed Social Capital, in its true sense (Bresnen, Edelman, Newell, Scarbrough, & Swan, 2003; Currie, 2003; Fernie et al., 2003b; Koskinen, Pihlanto, & Vanharanta, 2003; Liebowitz & Megbolugbe, 2003; Ramaprasad & Prakash, 2003; Schindler & Eppler, 2003). Project teams share what they know through communities of practice, a concept with Social Capital underpinnings. However, the project management literature indicates a paucity of empirical studies measuring the effectiveness of project management Social Capital towards project success (Disterer, 2002; Lesser & Storck, 2001). There are also few empirical publications in the project management literature on tacit knowledge, let alone project management as a strategic asset as per the RBV. With the aforementioned look at concepts within the RBV, knowledge, and Social Capital Theory, we propose to study project management using the following approach.

## A Proposed Research Design on Studying Project Management as a Strategic Asset

While knowledge-based assets are vital to company success, we lack a clear understanding of how the codified and tacit knowledge components relate to one another in the project management context as well as a clear understanding of what project management as a strategic asset entails when examined through the RBV lens. As outlined in Appendix 1, we are preparing a research study on this topic and the following presents some highlights in view of the topics in this paper. We begin with our two research questions and conceptual diagram:

1. *How do parts of the knowledge inventory (codified and tacit knowledge) help project management become a strategic asset for an organization?*
2. *What is the relationship between project management as a strategic asset and firm performance?*

**Figure 1: Study Constructs**




Data will be gathered with a mail out survey. We propose to study project management at the business unit level by investigating multiple project management teams within organizations. The knowledge inventory refers to explicit and tacit knowledge. With valid and reliable instruments available in project management, we can use such an instrument to obtain information on how mature a company's project management practices are in terms of standards, guidelines, and processes e.g. PM Solutions ™. We can also use an existing instrument on Social Capital as a proxy for tacit knowledge at the group level. We will examine the following aspects of Social Capital on projects: the personal interaction among team members, the social identification among team members, the norm of reciprocity, the strength of the socialization process for new members, the intensity of social sanctions against non-conforming behaviors, the individual conformity to team's expectations, and the members' ability to reach outside the project teams for resources and diversity of ideas. Since tacit knowledge is difficult to study, we can triangulate findings with another instrument on tacit knowledge that assesses an individual's tacit knowledge, such as the one by Sternberg (Sternberg et al., 1995). The aggregation of such assessments for each project team will represent a proxy for the amount of tacit knowledge that the project management profile offers for the whole business unit. To study project management as a strategic asset, we plan to survey top executives at these companies as they are better able to address strategic issues within their firm. We plan on operationalizing the VRIO-LDN Framework based on an earlier study (Jugdev, 2003). This will be supplemented with key financial indicators of firm performance as derived from Moody's Mergent™ on-line database.

Data analysis will involve statistical tests that allow us to assess what variables predict a competitive advantage and other tests that allow us to examine a path diagram on competitive

advantage. The study will investigate the connections between codified and tacit project knowledge within project management, and assess project management against the strategic asset criteria. The study will also help us understand the connection between project management and firm performance in terms of competitive advantage. This study is important because knowledge-based assets are vital to company success.

## Discussion

Although there has been an increased emphasis on knowledge-based practices in project management this past decade, the relationships between codified and tacit project management knowledge have not been explored. Furthermore, little work has been done on project management as a strategic asset. In this paper we discussed conceptual issues related to the RBV, knowledge-based assets, and Social Capital.

We began with a look at the RBV because it addresses strategic assets. There are some conceptual issues within the perspective related to terminology, the lack of a resource classification system, and a lack of agreement on which resource characteristics contribute to developing versus sustaining a competitive advantage. We also looked at knowledge-based assets and noted that they involve both an explicit and tacit dimension. The Western epistemology to knowledge focuses on explicit knowledge and related financial and economic metrics, but as non-economic resources, knowledge-based assets are better studied using knowledge management metrics. However, these metrics are under development and a widely accepted framework is lacking. There has been some work done on tacit knowledge measures based on creativity and intuition. We also looked at Social Capital Theory and discussed how it involves the network of relationships based on trust, mutual respect, and strong and weak ties. Social Capital ties can be used as a proxy for tacit knowledge.

Recent work on competitive advantage through project management has proposed that project management maturity models are a source of superior firm performance. However, these approaches are atheoretical and not related to the strategy literature. These approaches also focus on explicit knowledge within project management, yet the discipline is understood to involve a strong tacit component. There has been a lack of empirical studies on: Social Capital within project management, tacit knowledge in project management, or an application of the RBV to project management.

With the above in mind, we proposed a preliminary research design of how project management could be studied as a strategic asset. The design is based on two tacit knowledge instruments and a codified knowledge instrument that comprise the project management knowledge inventory. The design also includes an instrument based on the VRIO-LDN Framework to assess strategic asset features of project management. Data analysis will involve tests that allow us to assess what variables predict a competitive advantage and other tests that allow us to examine a path diagram on competitive advantage.

Study designs are not easy to develop. By sharing a preliminary design with readers and discussing conceptual and design issues, we look forward to improving our understanding of these concepts and developing a more coherent research approach to research.

## Appendix 1: Study Design

This study can be described as a cross-sectional, quantitative mail survey. The population of interest is North American companies practicing project management. Our unit of analysis is a business unit that may be a segment of a larger firm or the whole of a small business. The study will use a random sample of 1,000 executives from the Project Management Institute®. Company executives will be sent the strategic asset survey based on the VRIO-LDN Framework. The executives will be asked to have project managers at their company complete the on-line project management knowledge inventory survey consisting of three instruments.

Our dependent variable is firm performance. Using Moody's Mergent Online™ database[2], we can calculate firm performance with objective measures such as return on assets, return on equity, and profit margin. These indicators are widely used in the competitive advantage literature to assess firm performance and will be used here to compare values for companies within the same Standard Industry Classification code. Subjective measures to corroborate the dependent variable will include questions on project management success. Our independent variables of codified knowledge, tacit knowledge, and social capital will be assessed with Likert Scale surveys. We will use a similar scale for the VRIO-LDN characteristics.

A survey design is appropriate because are using three existing perspectives (RBV, knowledge management, and Social Capital) within which constructs have been developed and studied empirically to some extent. These theories will guide our investigation into these relationships and allow us to objectively test propositions (Newsted, Chin, Ngwenyama, & Lee, 1998). Surveys are useful in determining relationships and their strengths among constructs. In addition, this study uses a survey approach to confirm and quantify prior qualitative findings on project management. Appropriate control variables such as project size, complexity, type, company size, and industry will be used.

We are aware that tacit knowledge is difficult to study because of its unspoken nature. We will manage some of these problems by using multiple questions on each item of interest and triangulating findings. We are aware that surveys offer a snapshot of the phenomenon being studied. Since the study uses mail out surveys, we may get a low response rate. We will manage this risk with reminders to participants, using incentive awards, ensuring that the survey is short and aesthetic, providing clear instructions, using postage paid envelopes, and identifying prominent sponsors in the surveys to enhance study credibility (Bickman & Rog, 1998).

We plan to conduct up to ten pre-test interviews to refine our understanding of the constructs. These interviews will include participants from companies where project management practices are "best of breed" and those from companies where project management practices are average or poor. In addition, our interviews will include participants where project working relationships are collegial and highly interactive, and those where the organization is more hierarchical and less collegial. The project management knowledge inventory instrument and VRIO-LDN instrument will be supplemented with open ended questions. We will do a pilot

[2] Moody's Mergent™ on-line database contains financial and economic information on over 10,000 publicly trading international companies. It also provides Standard Industry Classification details.

study to test for construct and content validity and assess reliability. This will help ensure that the design evokes meaningful responses, determine an appropriate sample size for study significance, and finalize the statistical tests. The pilot study will involve a convenience sample based on participant availability and reflect the populations of interest.

The surveys will include the introductory letter and consent form. The informed consent will elaborate on the study purpose, the survey, participant benefits, confidentiality, and anonymity. Executives will be asked to complete and mail back the strategic asset survey, and forward our request to up to 30 project managers at their company asking them to complete an on-line survey on the project management knowledge inventory.

On-line survey participants will be able to view and print copies of the consent forms. At least two follow up reminders will be sent by mail and/or phone calls to improve response rates (Bickman & Rog, 1998). We will e-mail reminder notices to the executives requesting that they forward these to the project management participants at their company. Neither the executives nor researchers will be able to identify the respondents by name. A gift certificate will help enhance participation. Data will be collected over a three month period to allow for follow up reminders and to receive the surveys.

In terms of data analysis, we will assess interdependences among variables using factor analysis. Pearson correlations will measure the association (magnitude and direction) between the codified and tacit knowledge variables. Multiple regressions will allow us to determine how well the project management knowledge inventory variables and the strategic asset variables predict project management as a strategic asset. In order to examine the simultaneous relationships among the variables (and others as elucidated from the data collected), multivariate techniques such as linear structural relationships will also be used and a meaningful path diagram developed. Our response rate will determine if structural equation modeling is possible.

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# RESEARCH ISSUES: A CONCEPTUAL LOOK AT PROJECT MANAGEMENT AS A SOURCE OF COMPETITIVE ADVANTAGE

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