PROJECT MANAGEMENT SYSTEMS: MOVING PROJECT MANAGEMENT FROM AN OPERATIONAL TO A STRATEGIC DISCIPLINE

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Abstract

This paper illustrates one aspect of the concept of "fit" between an organization's implementation of project management and its organizational context by exploring how the underlying drivers of an organization's strategy might influence not only the nature of projects that it undertakes but also the appropriateness of the arrangements that it makes to manage those projects. The working hypothesis is that when a project management system (PMS) "fits" with the underlying strategic drivers of organizational value, then project management itself contributes strategic value to the organization. A model is sketched with two generic strategic drivers of value: the need for differentiation, and the need for process economics. Four generic strategic scenarios are derived to identify specific requirements for the configuration and implementation of a PMS.

The literature on project management, on innovation management and on entrepreneurship and corporate venturing is then examined to derive strategic requirements that a PMS has to fulfill. Four organizations that have made significant investment in project management over the past five years are then analyzed through the lens of the "Strategic PMS-Value Driver Model." The resulting analysis supports the desirability of a "fit" between an organization's strategic drivers of value and the configuration of its PMS.

Introduction: Does the Project Management System Fit the Business Strategy?

One of the primary concepts explored in the "Value of Project Management" research project is the extent to which an organization managed to establish "a context of project management that is appropriate for them and the types of projects they manage." (Thomas and Mullaly 2008 p24). This paper explores one aspect of that concept: the fit between an organization's strategy, the project management system it chooses to implement, and the type of project that it executes in implementing its strategy.

Although project management standards have, by virtue of their nature as standards, focused on a generic approach to the management of projects (guided by what is applicable to most projects most of the time) there is a growing interest in the differences between projects and their contexts (Crawford, Hobbs, &

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Turner, 2006; Dvir, Lipovetsky, Shenhar,& Tishler 1998) and how this might influence their management. In line with this, several authors claim that the management of a project should be adapted to its specific characteristics (Wheelwright & Clark, 1992; Shenhar & Dvir, 1996; Balachandra & Friar, 1997). The unconditional use of project management standards is criticized, and a misfit between specific project characteristics and the chosen management approach is seen as a major source for project failure. The underlying hypothesis of this perspective proposes that project success is related to choice of the "right" management approach related to specific project characteristics.

Another group of authors suggests that the management of projects could be related to the strategy of the firm. This research stream analyzes the link between a single project and the strategy of an organization and has identified the existence of project strategies that are directly connected to a project's dynamic environment (e.g.,Loch, 2000; Gunther McGrath & MacMillan, 2000; Pitsis, Clegg, Marosszeky, & Rura-Polley, 2003). According to these studies, a project is not always subordinate to the strategy of a parent organization but could, in fact, influence the organizational strategy. From this perspective, project success depends on the choice of the "right" strategy under specific contextual conditions.

Three research streams have independently dealt with factors contributing to the success and failure of projects, each of them relatively independent of the others:

- New Product Development: The strategic role of new product development and innovation (Takeuchi & Nonaka, 1986; Wheelwright & Clark, 1992; Hamel & Prahalad, 1994 Brown & Eisenhardt, 1997)
- Entrepreneurship and Innovation: The strategic role of entrepreneurial efforts and innovation (Burgelman, 1983; Dess, Lumpkin, & McGee, 1999; Kanter, 1985; Abernathy & Clark, 1985; Gann & Salter, 2000; van de Ven, 1986)
- Project management: As an implementation concept for time-constrained unique and complex tasks (Midler, 1995; Hobday, 2000; De Meyer, Loch, & Pich, 2002; Muller & Turner, 2007)

These three research streams co-exist, and each is addressing the implementation of unique, time-constrained and complex tasks from a different perspective. The common underlying hypothesis is that project success of such tasks (e.g. projects) is related to a fit between either the characteristics of the single project and the management processes or the choice of project strategy and the project's context.

Even though different types of "misfit" could cause project failure, the research streams only rarely (Payne & Turner, 1999) consider the influence of a corporate project management system on projects implemented within an organization. Projects are often embedded in the context of a system of management structures, standards and procedures or, as we call it, the project management system (PMS). However, the existing research streams tend not to address the possibility that project managers of failed projects might just have followed the specific rules set by the organization and that these rules may not "fit" the specific context.

Within the project management field, there has been recognition that factors contributing to the success or failure of projects extend beyond the direct control of the project manager and team leading to the development of interest in organizational project management capability (PMI, 2004; Crawford, 2006). This interest has been characterized by formulation of "best practices" and maturity models (Cooke-Davies, 2004a; Cooke-Davies, 2004b, Mullaly, 2006). These models and associated best practices, like standards for single projects, take a generic approach, effectively recommending that there is an ultimate goal for implementation of project management within organizations and an ultimate perfection to which all should aspire. So, while there is a growing interest in differential management of projects, and a recognition that projects are commonly used as a means of implementing specific organizational strategy (Morris and Jameson 2005) there are pressures driving organizations aspiring to "best practice" to adopt

similar project management systems regardless of the differences between the types of projects they manage and their corporate strategies.

This paper sheds fresh light on challenges associated with the management of projects. It explores the proposition that the challenges are caused by the fit or congruence of an individual project with the management systems used at the project level with the underpinning needs of the enterprise to accomplish its chosen strategy. Our basic question is how the configuration of a PMS should fit the strategic requirements an organization is imposing.

We propose that the causes for identified "misfits" between the specific project objectives and the management approach lie beyond the level of a single project (Thomas and Mullaly, 2007). This proposition allows connection of the three independent research streams mentioned earlier on a different level of abstraction. We argue that not only should the main strategic focus of an organization dictate the types of project that it undertakes, or even the way that individual projects are managed (Srivannaboon and Milosovic 2006), but that it should also determine the configuration of project management systems used to plan and deliver its strategic portfolio of projects. Viewed in this light, the perspective of main strategic drivers provides a platform for connecting the three seemingly unrelated research fields that discuss issues of project implementation. From this perspective, organizational project management systems, or the project management model or models chosen for implementation, can be considered more a strategic than an operational concern.

The ideas presented in this paper and the data used to support them have been generated in the context of a globally conducted research project exploring the value of project management (Thomas and Mullaly, 2007). We have drawn upon the literature on project management and the related areas of innovation management and entrepreneurship from a strategic perspective as a basis for comparing chosen project management systems with the strategic drivers of organizational value. From this we have developed and will describe a conceptual framework that we refer to as the Strategic PMS—Value Driver Portfolio model. This model is then used as a framework for analysis of four case studies that demonstrate how project management systems contribute to the success or otherwise of the entire population of projects undertaken within an organization. We then conclude with a specific set of recommendations to design and implement a PMS that could better meet the specific strategic requirements and that maximizes the value to the organization of projects implemented.

Strategic Drivers of Project Management Systems

Organizations undertake a multitude of projects to pursue their specific goals. They define general structures, standards and regulations in the attempt to ensure satisfactory governance and accomplish these projects successfully, and in so doing establish cultural norms. Taken collectively we refer to the whole of these structures, standards, regulations, processes, policies, methods, supporting tools and their surrounding culture as the "project management system." This recognizes that the organization's strategy not only has consequences for the choice and funding of a specific project and the definition of its goals, but it also has consequences in terms of what is valued and how outcomes are achieved and reported. Following this line of thought it is the organization's strategy that drives not only its choice of projects, but also the configuration of its project management system.

The strategic value drivers constitute the starting point of our analysis. The literature on management strategy is extensive and it would not be possible in the context of this paper to acknowledge all different discussions and contributions. An elaborate discussion of strategy typologies is also not important for the argument in this paper. In a sense, the different ways of classifying strategy are immaterial to the hypothesis being proposed in this paper. Our main purpose is to discuss the extent to which value is created or destroyed depending on the extent of "fit" or "misfit" between a an organization's drivers of strategic value and the specific characteristics of its project management system. For our discussion it is

sufficient to start with Porter's widely accepted and discussed classification scheme of strategies (Porter 1985). He has developed a method of analyzing competitors in any given industry by first identifying, and then mapping, strategic factors that distinguish clusters of firms competing in the same market, such as increased product differentiation or vertical integration to control the value chain (e.g. Porter, 1985). Other authors have suggested different ways of classifying strategies (Miles & Snow 1978, Mintzberg & McHugh, 1985; Mintzberg, 2007).

Following Porter we have chosen for our analysis the degree of product differentiation, and the degree of process economics (efficiency). The rationale for this choice is that certain organizations seeking to compete in their markets through product differentiation are likely to derive strategic value predominately through successful innovation of new products and services, whereas organizations seeking to compete through offering lower cost solutions will derive value predominately through improvement of the economics of process. This is not to suggest that any organization can compete if it ignores one or the other – clearly every competitive organization has to offer desirable products for a price that consumers are willing to pay. The point being made is that organizations competing through a product differentiation strategy have to develop systems for maximizing the value that they derive from investment in product or service innovation, whereas organizations competing on the basis of cost must derive maximum value from the efficiency of their manufacturing value chain.

By connecting these two general strategic positions in a matrix it is possible to differentiate four strategic value driver scenarios that specify corresponding value drivers of what we might expect to see reflected in the characteristics of projects that will be undertaken in pursuit of the strategy and the configuration of project management systems. Consideration of whether a particular driver can be classified as "high" or "low" depends upon an assessment of different factors, for example:

- Vertical axis (degree of product differentiation)
    - Novelty of product/market mix
    - Brevity of window of opportunity
    - Brevity of product life cycle
    - Intensity of innovation-led competition
- Horizontal axis (degree of process economic improvement)
    - Reduction in/pressure on cycle-time
    - Reduction of waste
    - Minimization of cost

Each of the four resulting strategic value driver scenarios defines a quite unique set of requirements for the implementation of a project management system. The requirements are derived from the organization's need to manage its projects in a manner that is in harmony with its overall strategic drivers. This model, which we have named the Strategic PMS-Value Driver Portfolio Model, can be used to relate specific types of projects to a specific configuration of strategic value drivers derived from a specific strategy (See Figure 1).

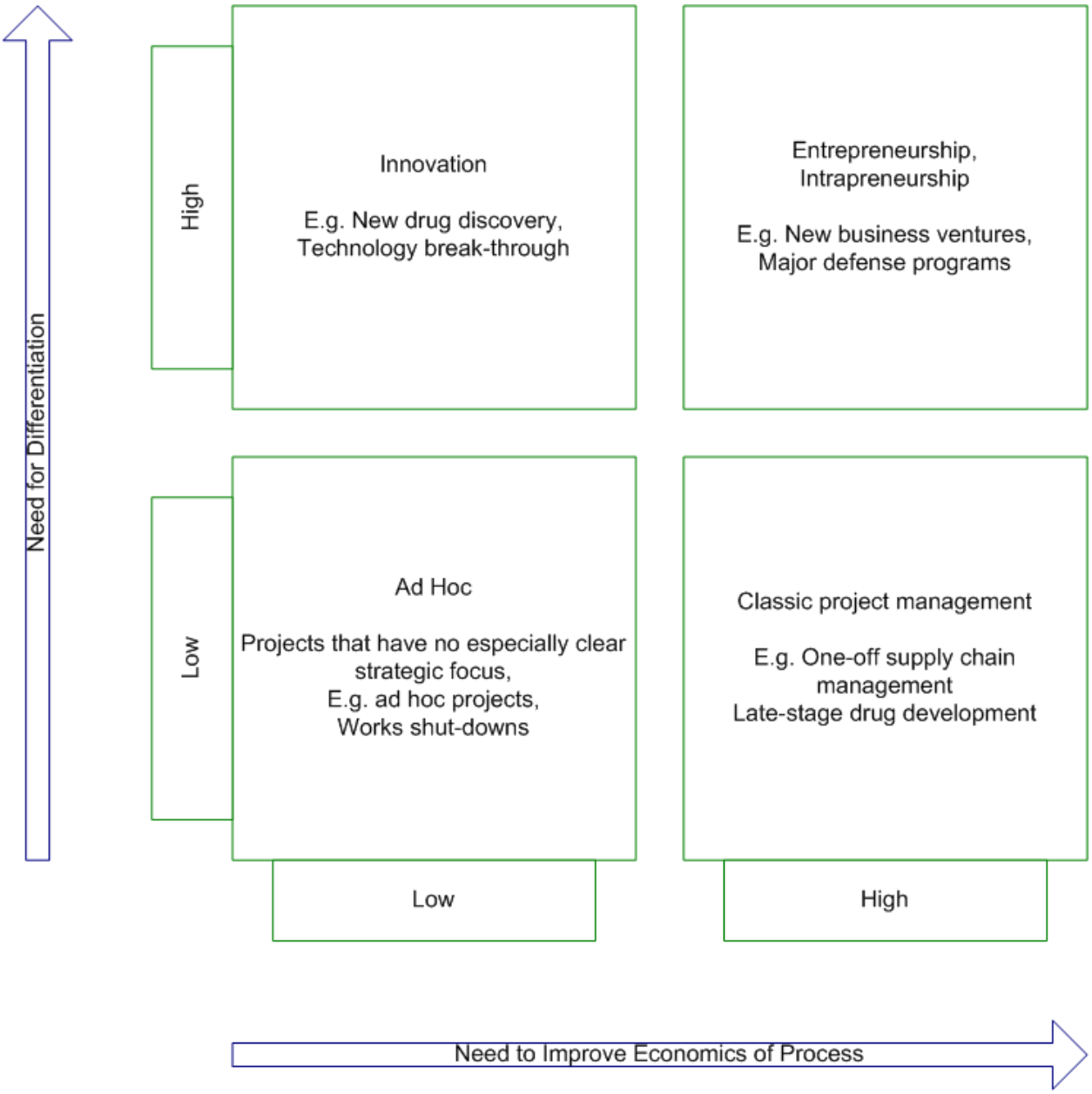

Figure 1. Strategic PMS—Value Driver Portfolio Model

The Strategic PMS-Value Driver Portfolio differentiates between the following four strategic contexts:

Scenario 1—Low Process Economics Driver, Low Differentiator Driver

This quadrant describes a scenario in which project management is not recognized as playing an important role. The strategy behind this could be described as “ad hoc” since a clear strategic focus for projects is missing. Organizations operating in this quadrant are likely to be predominantly operations based in relatively stable market sectors. Focus is very much on continuity and business as usual. Techniques, such as six sigma, are likely to yield high returns by making operational improvements to major business processes (Hammer, 2002) and projects are implemented on an “ad hoc” basis. Projects that are implemented under these conditions are expected to make incremental contributions to the organization and are not perceived as important ROI contributors. There is no strategic need for a

rigorous and well structured PMS and it is in this case more an "ad hoc" concept, e.g. some basic standards might exist but projects are implemented on a kind of informal basis.

Context 2—High Process Economics Driver, Low Differentiator Driver

Large engineering organizations have led the way in managing large-scale complicated projects (Cooke-Davies & Arzymanow, 2002). These unique and challenging processes require radical process learning to improve particular process efficiencies. This is the field of the "classic" project management represented by the *PMBOK® Guide*. The cost strategy is to constantly reduce the costs along the value chain to deliver specific products or services to customers for the lowest price possible consistent with satisfying the customers' requirements for quality.

Competitive advantage is only possible if these organizations are able to offer their outputs faster or for lower costs than their competitors. Projects within these organizations contribute best by being implemented with high efficiency. Organizations in this quadrant are competing for new project contracts. The Process Economics (Cost Leadership) strategy focuses at the project level on the following:

- Operational excellence
- High degree of efficiency

This strategic driver requires from the implemented PMS highly efficient project implementation processes. Projects in this environment are often implemented under fixed-price contracts for external project owners. Learning objectives appear in this environment as related to increased process efficiencies. Thus, radical process solutions will create a competitive advantage.

Of the four different quadrants, this is perhaps the best understood by the project management community, with excellent summaries of different elements of the necessary project management model contained in such handbooks as Cleland and King (1988) and Morris and Pinto (2004).

The processes for managing projects in this quadrant are well understood, but they are usually viewed from the perspective of individual projects, for example in broadly based standards such as PMBOK® Guide. Viewed from the perspective of the project-based enterprise, and built around its ability to deliver such projects consistently and well (which is the perspective adopted by this paper). The implications of such processes for the broader organizational PM Systems are less well understood. Turner and Keegan (2001) have demonstrated, for example, the need for governance structures that reflect the project-based paradigm.

Context 3—Low Process Economics Driver, High Differentiator Driver

Innovation-driven organizations (such as those involved in pharmaceutical drug development) need a project management system that is designed to manage highly uncertain processes. The differentiator strategy is related to the need to constantly innovate new products or services. Projects within these organizations contribute to achieve a competitive advantage best by creating products or services that are novel or at least more innovative than their competitors. These projects are mainly focused on generating new revenue streams by creating new markets and satisfying new market (customer) needs or increasing revenues in existing markets. The differentiator strategy focuses at the project level on the following:

- Innovation excellence
- High degree of creativity

This is precisely the area, however, where the different strands of literature reveal a paradox—the conflicting requirements to support innovation and to manage projects efficiently. On the one hand, studies have shown that strong project management is an essential precondition to the successful

management of innovation projects (e.g., Loch, 2000), as is the involvement of customers throughout the project (Loch, 2000; Jouini & Churue-Duboc, 2007).

On the other hand, Turner, Keegan, and Crawford (2002) have demonstrated that in project-based organizations the very practices of project management that are meant to facilitate innovation tend to stifle it, and this should logically hold true for all kinds of organizations. This is particularly true during the formative stages of the innovative concept, what has been referred to as the "fuzzy front end" of the innovative project (Reid & de Brentani, 2004).

A PMS that encourages and supports such discontinuous innovation is likely to look very different from the traditional models that have been developed to deal effectively with Case 2. For example, such a PMS is likely to allow considerably greater flexibility to individuals in the early stages of the project when creativity is at a premium (Jouini & Charue-Duboc, 2007). It is also likely to be focused on identifying and then eliminating barriers to innovation (Sapsed, Bessant, Partington, Tranfield and Young., 2007).

Projects within this environment are mainly internally funded and based on internal contracts or cost reimbursement contracts. These projects are successful if learning processes allow for loops in the implementation process. The innovation management literature discusses many topics about the conditions supporting the success of innovation processes (e.g., Brown & Eisenhardt, 1995; Hall & Andriani, 2002; Kanter, 1985). Learning is focused on identifying new markets and/or new technical solutions. To be successful these need to allow for radical learning processes to create innovative outcomes.

Scenario 4—High Economic Driver, High Differentiator Driver

Of interest are in particular those organizations that face both strategic drivers with the same importance. The intrapreneurial/entrepreneurial strategy focuses at the project level on the following:

- Leadership excellence
- High degree of entrepreneurial autonomy

Which PMS should such organizations choose? Many organizations just manage projects in separate entities, or they manage all projects utilizing a PMS that is optimized for one of the two strategic drivers. It seems to be a paradox to be efficient and innovative at the same time. Organizations that are not aware of this paradox fall into a PMS value trap of failing to achieve satisfying results from their projects. Intrapreneurship and entrepreneurship behaviors have to be fostered simultaneously so as to provide both operational and innovation excellence (Kanter, 1985). Project managers have to be empowered to act like entrepreneurs by being able to identify and exploit market opportunities. In this case, project managers are more in a role of business leaders and need to have these skills to be successful.

This is not simple, as is attested by the literature on intrapreneurship and entrepreneurship. One of the dominant themes during the 1980s and 1990s was the extent to which outsiders enjoyed the "attackers advantage" (Foster, 1986; Christensen & Rosenbloom, 1995). More recently, this has given way to a more nuanced discussion about the challenges faced by organizations when confronted by discontinuous innovation (e.g., Brown & Eisenhardt, 1997) and the need to develop what could be referred to as "semi-structures." As Burgelman (1983) has pointed out, firms need both diversity and structure so that there is an inevitable tension between individual initiative and corporate attempts to impose uniformity.

In this quadrant, the imperative to deliver results economically combines with the need for creativity and innovation in both the ends (what) and the means (how) in a way that does not submit readily to the classic paradigm of rational deconstruction on which the structures, methods and tools of traditional project management are based (Thomas, 2006). It is in this arena that the management of projects with a high degree of complexity is found—an area that is crying out for further research (Kim & Wilemon, 2003; Cooke-Davies, Cicmil, Crawford, & Richardson, 2007).

In summary, we suggest that differing strategic drivers will lead to differing requirements for PMS to enable a consistent and reliable creation of value with the implementation of projects, e.g., it will only be possible to maximize the value resulting from projects if the PMS "fits" the strategic requirements of the organization as suggested by Child and Mansfield's (1972) structure follows strategy hypothesis. This leads to our fit hypothesis: Only a PMS that "fits" with its strategic drivers is able to maximize the value contribution of projects.

Research Method and Data Collection

We analyzed the actual configuration as well as the historical development of a PMS and their strategit fit in four organizations. A case study concept was necessary to be able to capture the specifics also from a historical perspective of a PMS and the prevalent value drivers of an organization. The data were collected as part of an ongoing study to analyze the value contribution of project management (Thomas and Mullaly 2008). In accordance to the protocols established for the overall research on the value of project management (Thomas and Mullaly, 2007 and 2008) document analysis, interviews and questionnaires were used to collect the data. In average, for each of the four case study organizations, three senior managers, five project managers and three customers were interviewed. In addition surveys were used in each organization to collect data from another group of five project managers and from at least three customers.

Table 1. Project Management Context

Attributes	Organization No. 1	Organization No. 2	Organization No. 3	Organization No. 4
Project Categories	Software development	Defense system development	New product development	Pharmaceutical drug development
Average Number of Projects per Year	50	700	200	150
Average Project Size	$90K–$4M	$3M–$75M	$3M–$35M	$5M–$500+M
Average Project Duration	6–60 months	18–48 months	18–36 months	3–12 years

The data in Table 1 demonstrate a high variation of project management applications within and across the participating organizations. The industry background, the high number of projects and their significant size suggests that projects are important to these organizations and as a consequence the development of a PMS is imperative for their competitive position..

Attributes of Implemented Project Management Systems

The basic attributes to describe the configurations of a PMS were derived largely from the early work in the "value of project management" study (Thomas and Mullaly 2008). The components have been grouped for convenience under four elements — Policy, People, Structure and Process — which correspond broadly to the 7-S model used to describe the configuration of management systems (Pascale and Athos, 1982; Peters and Waterman, 1982).

Policy—This component describes senior management's perception of the strategic role of project management for the organization.

- Strategic importance of project management
- Organizational commitment to project management
- Overall maturity of organizational project management

People—This component describes project management personnel-related issues, , particularly how the organization ensures that it has enough people with the right level of expertise to deliver the organization's project-based workload.

- Industry and project management experience of people managing projects
- Expertise and professionalism of project managers
- Project management training
- Project management career path
- Project management certification

Structure—This component describes the organizational structures that link the temporary organization (project or program) to the permanent organization.

- Use of governance and steering committees.
- Project organization.
- Extent, function and purposes of project management offices.
- Means of allocating resources to projects and programs

Processes—This component describes the process that are followed within the organization's project-based workload.

- Portfolio and program management processes and practices
- Project management methodology
- Breadth and depth of application of the methodology
- Use of standards

What is significant is the breadth of these elements, particularly if decisions concerning different elements are made at different levels in the nested hierarchy of a single organization. For example, a policy might be decided at the enterprise level and portfolio and program management processes and practices at the business unit level and the use of steering committees might vary at the project level. This multiplicity of elements and levels helps to create the potential not only for a lack of coherence within the PMS itself, but also for "misfit" between an organization's PMS and its strategic drivers of value.

Table 5. Attributes of Implemented PMS

Attributes	Organization No. 1	Organization No. 2	Organization No. 3	Organization No. 4
PM Policy Attributes				
Strategic Importance of PM	Medium	Medium to High	Low	Medium to high
Organizational Commitment to Project Management	Very high	Very high	Moderate	Variable
CMMI Maturity Level	Level 2	Level 5	Level 1	Level 1
People Related Attributes				
Project Management Industry Experience	Average 5 years	Average 20 years	Average 20 years	Average 20 years

Attributes	Organization No. 1	Organization No. 2	Organization No. 3	Organization No. 4
PM Project Management Experience	Average 3 years	Average 3 years	Average 3 years	Average 5 years (est.)
Project Management Training	No standardized training	Standardized training	No standardized training	Some standardized training
Project Management Career Path	No	Yes	No	Embryonic
Project Management Certification	Less than 10 project manager's certified	40 project manager's certified	20 project manager's certified	Ca 10% project manager's certified
Structural Attributes				
Project Organization	Functional	Balanced Matrix	Functional	Matrix
Steering Committee Use	Most projects	Largest projects only	Largest projects only	All projects
PMO	Yes	Yes	No	Yes
Resource Allocation	Centralized within business unit	Centralized within business unit	No	Functional lines
Process Attributes				
Project Management Methodology	Moderately formal high adherence	Moderately formal med. adherence	Relatively informal documentation	Moderately formal med. adherence
% Projects Following Formal Methodology	100%	Top 5%	Top 10%	100% follow some elements

The configurations of the implemented PMSs show a large variety across the participating organizations. Looking across all organizations it is clear that none of the organizations has implemented a PMS that matches all formal attributes. All PMS show some strengths but have still potential for improvements. Specifically, two organizations have implemented a thorough and rigorous system that supports the implementation of most of their projects. They use a Project Management Office (PMO) to maintain and improve their PMS. One organization implemented a PMS with similar characteristics but only the top 5% of the projects are supported by it. On the other hand, this organization was the only one that has a clearly defined career path for project managers and uses standardized training. One organization does only maintain an "as hoc" PMS. Some elements of a PMS are implemented but overall there is a lack of cohesiveness and completeness. For our further strategic fit analyses we note that three organizations have an explicitly defined PMS and only one organization still maintains a system that is ad hoc.

Historical Development of Project Management Systems

In this section we analyze the historical development steps the organizations undertook to implement and/or improve their PMS. This allows evaluation of the initial position in the Strategic PMS—Value Driver Portfolio Model and a possible change of a position.

First Organization

Organization 1 develops and offers databases, expert system software and risk assessment expertise to clients in the insurance industry. Most projects are internal and half of them are new product development

projects. Organization 1 has a very strong market position and does not have major competitors. The recent development of project management in the organization is set out in Table 1.

Table 1. Critical Project Management Events of Organization 1

Year	Milestone	Key Accomplishments
1998	New CIO	• Focus on cost and performance of IT projects • Introduction of project management as a discipline • Improved strategic alignment of project portfolio
2002	Implementation of PMO	• Standardization of project management methodology • Benchmarking with project management best practices • Creation of project management data repository • Post implementation reviews
2003	Introduction of Critical Chain	• Achieving organizational efficiencies in resource utilization and project schedule performance
2004	CMMI Maturity Level 2 Achievement	• 80% reuse of JAVA code • Rapid prototyping • Improved competitiveness for government contracts

Organization 1 was positioned in the lower left quadrant in 1997. No strategic drivers were defined and project management was not seen as a core competency. That changed with the hire of a new CIO in 1998. One major strategic objective was to reduce significantly the number of employees within the IT department. From this perspective, the strategic focus was cost containment. After project management was formally implemented, its main purpose was to cut project costs and increase the project budget. Further concepts to radically increase the efficiency were implemented in following years, with critical chain in 2003 and the CMMI maturity Level 2 achievement in 2004.

In value terms, the different steps undertaken to move into the lower right quadrant seem to have paid off. In the view of senior management, the following was achieved:

Total reduction of the IT staff from 600 in 1998 to 380 in 2004 without reducing the number of projects implemented per year.

The increased formalized project management procedures led to 90% of projects meeting the specifications today as compared to 50% before 1998.

According to organizational records, 96% of the 50 projects started in the past year were completed on-time and on-budget.

Other current process improvement efforts, including the move to CMMI Level 3 and the use of quality function deployment (QFD) for software development, are targeted to improve process efficiency and product quality.

Second Organization

Organization 2 is a governmental agency servicing the U. S. Department of Defense. This organization interfaces with the private sector defense industry in a variety of scenarios, ranging from project management of internal and external resources to professional services and facilities provider for externally managed projects. The organization both competes directly with and collaborates with private military contractors. The recent development of project management in the organization is set out in Table 2.

Table 2. Critical Project Management Events of Organization 2

Year	Milestone	Key Accomplishments
2004	Formalized Project Management	• Creation of PMO (Project Integration Office) • Standardization of PM methodology • Benchmarking with PM best practices • Creation of PM data repository • Post implementation reviews
2006	Demonstrated software development excellence	CMMI Software Level 5

Organization 2 was positioned in the lower left quadrant in 2004. The PMS was ad hoc even though project management was recognized as an essential part of the strategic core competencies. The main strategic driver was efficiency and product quality. The competitive pressure increased over the past five years, leading to a significant reorganization in 2003 (from 22 business units to five) to better service existing clients and to compete more effectively against private military contractors. In 2004 Organization 2 started to formally introduce project management by installing a PMO to provide guidance and project management documentation to project leaders throughout the organization, particularly those who manage the top 40 projects. Project management standards are followed rigorously for the large projects, but the organization still has many problems in implementing the magnitude of small and medium projects. A standardized training for project managers would be necessary to improve process-focused learning processes. One division of the technical organization has achieved Level 5 of the CMMI software maturity model. SAP Software and Microsoft Project are used for project management and financial control.

In value terms, the different steps undertaken to move into the lower right quadrant seem to have paid off. In the view of senior management, the following occurred:

Internal and external customers are happier with deliverables.

More development projects are transitioning to external customers.

The organization's reputation for on-time delivery has been enhanced compared to privately held competitors.

Further improvements like the wider use of steering committees, the implementation of an organization-wide training program for project managers and the consequent use of project management standards for all projects are planned.

Third Organization

Organization 3 develops petroleum additives for the fuels and lubricants industry. The projects are in many cases internal product development projects that are focused to satisfy new market needs. The recent development of project management in the organization is set out in Table 3.

Table 3. Critical Project Management Events of Organization 3

Year	Milestone	Key Accomplishments
2004	Product development process	Implementation of stage gate process model

This organization was basically positioned in the lower left quadrant. It achieved relatively weak project results caused by an inconsistent PMS before 2004. To improve this situation the organization introduced in 2004 a stage gate model to improve the controlling of projects.

In value terms, the implemented stage gate model led to some improvements:

Today 65% of projects are on budget/schedule compared to 50% that met budget/schedule goals before the introduction.

In summary, the results point out that a standardized portfolio management concept is missing. Projects are mainly initiated ad hoc on external demand. Learning processes are not institutionalized. Due to the high experience of the project managers, the organization is still possible to maintain a relatively satisfying success rate, even though many projects do not meet the expectations.

Fourth Organization

Organization 4 is the research and development department of a large pharmaceutical company, operating widely across the globe. It takes output from the drug-discovery process, in the form of new molecular entities, and develops them into new medicines approved for sale in global markets. It also takes existing medicines and develops improved applications for them. The recent development of project management in the organization is set out in Table 4.

Table 4. Critical Project Management Events of Organization 4

Year	Milestone	Key Accomplishments
2003/2005	Introduced central department for project management in discovery and early stage development	• Development of a cadre of project managers and support organization within discovery and early stage development. Significant success in moving early development projects into late stage development. • Improvement in the health of the drug development "pipeline"
2005/2006	Created single department for portfolio and project management	• Creation of a single organizational unit responsible for project management of both early and late-stage development world-wide • Aim is to create a professional family, • Implement "state-of-the-art" planning processes and tools, • External certification.

The drug development industry is an interesting one, in that the strategic drivers change at a key point in the development process. This point is known within the industry by terms such as "proof of concept." Before this point, in early stage development, the task facing the project teams is to demonstrate that a new medicine is both effective in treating the target disease and safe to humans at the prescribed dose. Thereafter, in late stage development, the task becomes one of demonstrating this to the regulatory authorities as comprehensively and cheaply as possible.

In effect, this means that the strategic drivers of early development (increased product differentiation, upper left quadrant) switch for the later development stages, (increased process economics, lower right quadrant). The late development stages include mainly the process of obtaining regulatory approval, conducting clinical trials, production preparation, etc.,

Between 2003 and 2005 the organization enjoyed significant success through the effective management of early development projects using a combination of portfolio management and project management. As a consequence, it was decided to provide a greater coherence to the portfolio and project management function by creating a single unit to be responsible for these functions worldwide. The newly formed group sees as its task the creation of a professional job family for project managers, supported by state-of-the-art project and portfolio planning processes and tools.

This development contains the potential to either improve the fit between the PMS and the strategic drivers or not, depending upon the details of the improved PMS that is eventually implemented.

Prior to 2006, there was a good fit between the PMS and the strategic drivers in early development, through the use of increasingly rigorous portfolio management and project management methods that were flexible enough to allow innovation and creativity from the researchers. It was this fit that enabled the organization to reap the benefits of a significant improvement in its development pipeline and led senior management to recognize the value that can be added through good project management.

On the other hand, there was a poor fit between the PMS and strategic drivers in late development, due to the lack of rigor in the planning process, the patchy nature of integration between line functions and project management, and the lack of integrated project planning and management systems, thus the inability for steering committees to exercise the right balance between support and governance. Few of the late-development project managers were trained in project management in the traditional industries that operate in Quadrant 2; thus, a PMS that fits this quadrant is likely to feel alien to many of the people working in this organization.

By encouraging external certification, and seeking to implement state-of-the-art planning processes and tools that are suited to late development, the organization is taking steps to improve the fit within late development and to move for this process into the right lower quadrant.

Applying the Model and Discussion

In our discussion we proposed that a fit between strategic drivers and the PMS must exist to maximize the value from projects. After reviewing the data of on the basic characteristics of the PMS and there historical development allows now to position the four organizations in the value driver portfolio model (Table 6).

Table 6. PMS Positioning in the Value Driver Portfolio Model

		Process Economics	
		Low	High
Differentiation	High	Organization 4 (pre-2006) Organization 4 early development (2007)	
	Low	Organization 2 (2004)----→ Organization 1 (1997) ---→ Organization 4 late development (pre 2007) → Organization 3 (2007)	Organization 2 (2007) Organization 1 (2007) Organization 4 late development (2007)

The initial positioning of organization One was in the lower left quadrant because both the prevalent strategy was not clearly focusing on specific strategic value drivers (ad hoc) and a PMS was not existent (ad hoc). This changed over the past decade dramatically. One of the main reasons was the hiring of a new CIO. Today the characteristics of the PMS match the strategic drivers for a cost containment strategy to implement projects. The case also demonstrates the learning effects and the continuous improvement of project efficiencies resulting in a clear move from the lower left quadrant to the lower right quadrant that is characterized by the efficiency focus.

The positioning of the Organization 2 is not clear cut. The initial positioning was in the lower left quadrant even though the value drivers for process efficiencies and product quality were clearly defined but there was a clear “misfit” with the rudimentary PMS. This misfit was the origin for many different

steps to install a PMS starting with the re-structuring in 2003. The value drivers did not change and we could still identify a gap in 2007 between the strategic position and the implemented PMS. Some of the key attributes of the PMS still show significant potential for improving the efficiency of projects, e.g. 95% of the projects are not managed within the PMS. From a historical perspective the gap is clearly closing and we position the organization in the lower right quadrant.

The third organization shows the highest misfit between its strategic position to innovate and the implemented PMS. The strategic value drivers are clearly defined as product differentiation but the PMS (ad hoc) is clearly not positioned to meet the needs of the organization. The organization should be positioned in the upper left quadrant since value could be only created with highly innovative products that are successful in the market. Still the implemented PMS does not "fit" the differentiation value driver. The PMS is rudimentary and is more based on ad hoc approaches that do not clearly foster internal learning processes. The implementation of the stage gate model is a clear indication that the management perceives the misfit. Overall, Organization 3 still remains in the upper left quadrant in terms of strategic drivers, whilst its PMS is characteristic of the lower left..

The analysis of Organization 4 is interesting as it suggests actually two different positions depending on the specific development functions. Prior to 2006 the positioning the strategic drivers were clearly focused on the differentiation values and there was a high fit with the installed PMS (upper left quadrant). Until that time the late development processes were not clearly supported by the PMS (ad hoc) and there were no strategic value drivers defined (ad hoc). This group of activities is therefore positioned in the lower left quadrant. This changed after 2006. The organization identified the need to improve the late stage development projects and started to modify the PMS to support these processes effectively. We see a relative fit between the second set of value drivers and the PMS and positioned the post 2007 PMS in the lower right quadrant. Nothing changed by now for the early stage development processes that still are well supported by the existing PMS. We left the positioning of these activities in the upper left quadrant.

The risk to change the existing PMS instead of creating a second PMS is that if a single PMS becomes the norm for both early development and late development, the "early good, late poor" scenario will be replaced by an "early poor, late good" one or mediocrity for all processes. From a strategic perspective and our fit discussion it is likely that a single PMS approach under the discussed circumstances will lead to problems in the future.

Conceptually, the value driver portfolio model suggests a fourth quadrant that we called entrepreneurial or intrapreneurial. This quadrant suggests that exceptional profits are only possible by meeting both value drivers. But, entrepreneurial behavior and rigidly-applied process excellence seem to be contradictory. This is also reflected in the innovation literature that discusses the barriers to innovation. We have not yet found an organization that could be positioned in the upper right quadrant. Even though, Organization 3 may be a candidate for this positioning as the projects are in many cases entrepreneurial efforts. Several products are developed to create new markets and the project managers are both managers and entrepreneurs. Under the increasing market pressures efficiency is getting as important as innovativeness and significant profit will only be possible if both value drivers are met.

Conclusions and Further Work

This paper contributes to a discussion of the nature of "fit" between the drivers of an organization's strategy and the way it chooses to manage those projects by implementing a PMS. A model has been developed that allows the elements of a PMS to be related to an organization's strategic drivers and to identify strategic gaps by highlighting the need for a clear definition of strategic value drivers and a clear definition and implementation of a PMS to maximize the value resulting from projects. Strategic drivers influence the nature of value expected from project management, and a PMS should be adapted to the specific strategic positioning of each organization in order to deliver maximum value. The cases we

analyzed demonstrated that the effort to close the gap improved the overall project performance. Further research is needed to support our findings and to establish the link between strategy and PMS.

Our discussion has shown that separate strands of research literature each illuminate different aspects of this discussion, that each has something to contribute in terms of how an organization can best manage its projects, and that elements of a PMS are likely to differ according to an organization's strategic drivers. We could conclude that the strategic cost containment position leads to a rigorous implementation of process standards and structures enforcing the use of these standards. The differentiator position is related to less rigorous process implementations but to structures that allow for initiative. These perspectives seem to be contradictory and need further exploration. Questions are raised about how projects are or should be implemented if their strategic purpose is in conflict with the overall strategic direction of the PMS. We see this problem arising in Organization 4. Such organizations may need different project management systems and implementations for different parts of their businesses. This may be the most appropriate response for mature organizations with strategic drivers that place them in these quadrants.

Although this work is embryonic, qualitative and theoretical in its intent, it has further strengthened the case for research into project management being seen as a part of the mainstream discourse on management research, through engaging in dialogue with the discourses on strategic management, innovation and entrepreneurship.

For practitioners, the model highlights how decisions taken at different levels of an organization's hierarchy each contribute to the design of its PMS and thus contribute to "fit" between the PMS and the strategic drivers of value only if they are carried out in a "joined up" manner. Such joined up decision making calls for the elevation of project management from an operational discipline to a strategic discipline, with the organization exercising coordinated oversight over the way the different decisions contribute to a coherent PMS that is consistent with the organization's strategy.

Further research on the concept of "fit" between an organization's implementation of project management and its organizational context is necessary and should explore how the underlying drivers of an organization's strategy might influence not only the nature of projects that it undertakes but also the appropriateness of the arrangements that it makes to manage those projects. Literature in each of the research categories discussed however briefly in this paper needs to be combed for its specific implications for elements of a coherent PMS. The model itself needs to be refined both through the definition of which elements of the PMS will vary between which quadrants, and also through the development of additional and alternative strategic "lenses". And finally the historical development of project management within individual organizations needs to be examined empirically from three perspectives: firstly the coherence of the PMS that results from decision-making carried out at different hierarchical levels; secondly how well the PMS fits with the strategic drivers of value; and thirdly how the value derived from project management varies with both the coherence of the PMS and its fit with the organization's strategic drivers.

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References

Abernathy, W.J., & Clark, K.B. (1985). Innovation: Mapping the winds of creative destruction. *Research Policy, 14*(1), 3-22.

Ansoff, H. I. (1965) Corporate Strategy: An Analytic Approach to Business Policy for Growth and Expansion. McGraw Hill. New York.

Balachandra, R., & Friar, J.H. (1997). Factors for Success in R&D Projects and New Product Innovation: A Contextual Framework *IEEE Transactions on Engineering Management, 44*(3), 276-288.

Barney, J. B. (1996) *Gaining and Sustaining Competitive Advantage.* Addison-Wesley. Reading, MA

Bowman, E. H., Singh, H., & Thomas, H. (2002) The domain of Strategic Management: History and Evolution in Pettigrew, A., Thomas, H. & Whittington, R. *Handbook of Strategy and Management.* Sage Publications. Los Angeles and London.

Brown, S.L., & Eisenhardt, K.M. (1995). Product development: past research, present findings, and future directions. *Academy of Management Review, 20*(2), 343-378.

Brown, S.L., & Eisenhardt, K.M. (1997). The art of continuous change: Linking complexity theory and time-paced evolution in relentlessly shifting organizations. *Administrative Science Quarterly 42*(1):1-34.

Burgelman, R.A. (1983). Corporate entrepreneurship and strategic management: Insights from a process study. *Management Science, 29*(12), 1349-1364.

Child, J., & Mansfield, R. (1972, 6 September). Technology size, and organization structure. *Sociology,* 369-373.

Christensen, C.M., & Rosenbloom, R.S. (1995). Explaining the attacker's advantage: Technological paradigms, organizational dynamics, and the value network. *Research Policy, 24*(2), 233-257.

Cleland, D.I., & King, W.R. (1988). *Project management handbook* (2nd ed.). New York: VanNostrand Reinhold.

Cooke-Davies, T.J. (2004a). Measurement of organizational maturity. In D.P. Slevin, David I. Cleland, & J.K. Pinto (Eds.), *Innovations—Project management research 2004* (211-228).Newtown Square, PA: Project Management Institute.

Cooke-Davies, T.J. (2004b). Project management maturity models. In P.W.G. Morris, & J.K. Pinto(Eds.) *The Wiley guide to managing projects*. Hoboken, NJ: John Wiley and Sons.

Cooke-Davies, T.J., & Arzymanow, A. (2002). The maturity of project management in different industries. In J.R. Turner, (Ed.), *Proceedings IRNOP V. Zeeland,* Rotterdam: Erasmus University.

Cooke-Davies, T.J., Cicmil, S.J.K., Crawford, L.H., & Richardson, K. (2007). We're not in Kansas anymore, Toto: Mapping the strange landscape of complexity theory, and its relationship to project management. *Project Management Journal, 38*(2), 50-61.

Crawford, L.H. (2006). Developing organizational project management capability: Theory and practice. *Project Management* Journal, *37*(3), 74-86.

Crawford, L.H., Hobbs, J.B., & Turner, J.R. (2006). Aligning capability with strategy: categorizing projects todo the right projects and to do them right. *Project Management Journal, 37*(2), 38-51.

De Meyer, A., Loch, C.H., & Pich, M.T. (2002). Managing project uncertainty: From variation to chaos.*MIT Sloan Management Review, 43*(2), 60-67.

Dess, G.G., Lumpkin, G.T., & McGee, J.E. (1999). Linking corporate entrepreneurship to strategy,structure, and process: Suggested research directions. *Entrepreneurship: Theory & Practice, 23*(3), 85-102.

Dvir, D., Lipovetsky, S., Shenhar, A., & Tishler, A. (1998). In search of project classification: A non-universal approach to project success factors. *Research Policy, 27*(9), 915-935.

Foster, R. (1986). *Innovation: The attackers advantage*. New York: McMillan.

Gann, D.M., & Salter, A.J. (2000). Innovation in project-based, service-enhanced firms: The construction of complex products and systems. *Research Policy 29*(7-8), 955-972.

Gunther McGrath, R., & MacMillan, I.C. (2000). Entrepreneurial mindset: Strategies for continuously creating opportunity in an age of uncertainty. In *Harvard Business School Press Books* (1).

Hall, R., & Andriani, P. (2002). Managing knowledge for innovation. *Long Range Planning, 35*(1), 29-48.

Hamel, G. and Prahalad, C.K. (1994) Competing for the Future. *Harvard Business Review 72*(4), 122.

Hammer, M. (2002). Process management and the future of Six Sigma. *MIT Sloan Management Review, 43*(2), 26-32.

Henderson, B. (1979) *Henderson on Strategy*. ABT Books. Boston, Mass.

Hobday, M. (2000). The project-based organisation: An ideal form for managing complex products and systems. *Research Policy, 29*(7-8), 871-893.

Jouini, S.B.H., & Churue-Duboc, F. (2007). Managing concepts generation for discontinuous innovations: An organizational creativity perspective. In *Proceedings of IRNOP VIII*. Brighton, UK.

Kanter, R. (1985). Supporting innovation and venture development in established companies. *Journal of Business Venturing, 1*(1), 47-60.

Kim, J., & Wilemon, D. (2003) Sources and assessment of complexity in NPD projects. *R&D Management*, 33 (1), 16-30.

Loch, C. (2000). Tailoring product development to strategy: Case of a European technology manufacturer. *European Management Journal, 18*(3), 246-258.

Midler, C. (1995). "Projectification" of the firm: The Renault case: Project management and temporary Organizations. *Scandinavian Journal of Management, 11*(4), 363-375.

Miles, R.E. & C.C. Snow (1978) *Organizational strategy, structure, and process*. McGraw-Hill (New York).

Morris, P.W.G. and Jamieson, A. (2005).Moving from corporate strategy to project strategy . *Project Management Journal* **36** (4):5-18.

Morris, P.W.G., & Pinto, J.K. (2004). *The Wiley guide to managing projects*. Hoboken, NJ: John Wiley and Sons.

Mullaly, M (2006) Longitudinal analysis of project management maturity. *Project Management Journal, 37(3),* 62-74

Muller, R., & Turner, R. (2007). The influence of project managers on project success criteria and project success by type of project. *European Management Journal, 25*(4), 298-309.

Pascale, R.T., & Athos, A.G. (1982). *The art of Japanese management*. Harmondsworth, Mddx: Penguin Books.

Payne, J.H., & Turner, J.R. (1999) Company-wide project management: The planning and control of programmes of projects of different type. *International Journal of Project Management, 17*(1), 55-59.

Peters, T. J., & Waterman, R. H. (1982). *In search of excellence: Lessons from America's best-run companies*. New York: Harper and Row.

Pitsis, T.S., Clegg, S.R., Marosszeky, M., & Rura-Polley, T. (2003). Constructing the Olympic dream: A future perfect strategy of project management. *Organization Science, 14*(5), 574-590. 10477039.

PMI. (2004). *Organizational project management maturity model*. Newtown Square, PA: Project Management Institute.

Porter, M.E. (1985). Competitive advantage: Creating and sustaining superior performance. New York: The Free Press.

Reid, S.E., & de Brentani, U. (2004). The fuzzy front end of new product development for discontinuous innovations: A theoretical model. *Journal of Product Innovation Management, 21*(3), 170-184. 07376782.

Sapsed, J., Bessant, J., Partington, D., Tranfield, D. & Young, M. (2007). Persistent innovation barriers, and how to breach them with projects. In *Proceedings of IRNOP VIII*. Brighton, UK: International Research Network on Organizing by Projects.

Schoeffler, S., Buzzell, R. D. & Heany, D. F. (1974). "*Impact of Strategic Planning on Profit Performance."* Harvard Business Review, March-April 1974. Cambridge, Mass.

Shenhar, A.J., & Dvir, D. (1996). Toward a typological theory of project management. *Research Policy, 25*, 607-632.

Srivannaboon, S. and Milosevic, D.Z. (2006) A two-way influence between business strategy and project management. *International Journal of Project Management* 24 (6):493-505.

Stalk, G., Evans, P. and Shulman, L. (1992) *"Competing on Capabilities: the new rules of corporate strategy."* Harvard Business Review. March-April 1974. Cambridge, Mass.

Sudharsan, D. (1995) Market Strategy: Relationships, Offerings, Timing & Resource Allocation. Prentice-Hall. Englewood Cliffs, NJ.

Takeuchi, H. and Nonaka, I. (1986) The new product development game. *Harvard Business Review* 64(1), 137-146.

Thomas, J. L (2006) Problematizing Project Management. In Cicmil and Hodgson, *Making Projects Critical*. Palgrave Macmillan. Hampshire, UK and New York, USA.

Thomas, J. and Mullaly, M.E. (2007) Understanding the value of project management: First steps on an international investigation in search of value. *Project Management Journal* 38(3), 74-89.

Thomas, J and Mullaly, M. E. (2008) *Researching the Value of Project Management.* Project Management Institute, Pennsylvania.

Turner, J.R., & Keegan, A. (2001). Mechanisms of governance in the project-based organization: Roles of the broker and steward. *European Management Journal, 19*(3), 254-267.

Turner, J.R., Keegan, A., & Crawford, L.H. (2002) Delivering improved project management maturity through experiential learning. *International Project Management Journal, 8*(1), 72-81.

van de Ven, A.H. (1986). Central problems in the management of innovation. *Management Science, 32*(5), 590-607.

Wheelwright, S.C., & Clark, K.B. (1992). Creating project plans to focus product development. *Harvard Business Review, 70*(2), 67-83.