PERSPECTIVES ON RESEARCH IN PROJECT MANAGEMENT

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ABSTRACT

We review the substantial progress and trends of research in Project Management, which we have grouped into nine major schools of thought. We address interactions between the different schools and with other related management fields, and provide insights into current and potential research in each and across these schools.

INTRODUCTION

Organizations have been increasingly using projects to achieve their strategic objectives, while dealing with increasing complexity, uncertainty, and ambiguity affecting organizations and the socio-economic environment within which they operate. Through projects, resources and competencies are mobilized to bring about strategic change, and thereby create competitive advantage and other sources of value. Until the mid-1980s, interest in Project Management was limited to engineering, construction, defense, and information technology. More recently interest has diversified into many other areas of management. World Bank (2007) data indicate that 21% of the world's $45 trillion gross domestic product is gross capital formation, which is almost entirely project-based. In China it is 43% and in India it is 33%. Project Management makes a significant contribution to value creation globally.

Developing relevant competence at all levels is key to better performance, and educational programs in Project Management have grown rapidly to support the need for competence. To support this development it is necessary for Project Management to develop as a rigorous academic field of study in management, so that the rapid economic development that is so dependent on Project Management can be underpinned by sound theory.

PROJECT MANAGEMENT SCHOOLS OF THOUGHT

Project Management is a relatively young academic discipline and its epistemological foundation is still in the early stages of development, but with the help of other fields of management, it is quickly evolving into a field of diversity and richness. We based our paper on an extensive review of academic research literature on Project Management that reflects the evidence advanced by leading thinkers and researches in the field. We organized the literature into nine major schools of thought on the basis of the key premise that drives each one. Our

intent in separating these schools is to gain insight into current and potential research, within a manageable number of research themes without over-simplification of the richness of the underlying thought. Table 1 summarizes the nine schools of thought, the key idea of each school, and when it came to prominence. It also indicates links to other management disciplines.

Table 1 about here

The Optimization School: The Project as a Machine

Modern Project Management has its roots in the field of Operations Research (Morris, 1997). Optimization tools such as the Critical Path Methods (CPM) and Program Evaluation and Review Technique (PERT) reflect the genesis of modern Project Management in the decision sciences field. Bar charts, developed in the early 1900s by Gantt for production scheduling, and network scheduling techniques were adopted during the 1950s. Subsequent developments included resource leveling, project crashing, Critical Chain, and Monte Carlo Simulation of project time and cost. The main premise of this school is to define the objective(s) of the project, break the project into smaller components, ensure careful planning, scheduling, estimating, and execution of project tasks, and strive for efficiency to achieve the optimum outcome.

A current, prominent area of research in this school is the earned value management (EVM) method and its extensions. We expect research to continue into forecasting project completion time, the earned schedule method, integration of management of various project parameters, and the relationship of the project to the operational life cycle.

The Modeling School: The Project as a Mirror

Project Management thought progressed from optimization to modeling the total Project Management system and the interactions among its components (Williams, 2002). The optimization school evolved into the modeling school, in which Project Management is broken into its main elements for study, and these elements are integrated to obtain a full view of the system. This school later encompassed soft-systems methodology and sense-making to address organizational, behavioral, political, and other issues affecting projects and the complex environments within which they operate. Whereas the focus of hard systems is optimization, the focus of soft systems is clarification and making sense of the project and its environment.

Research in this school will continue into integrating hard systems and soft systems methodologies for modeling the total Project Management system, including optimization of multiple objectives under multiple constraints, consideration of various forces in the internal and external project environments, and adoption of lessons learned to enhance the total system.

The Governance School: The Project as a Legal Entity

Research in the governance school studied the relationship between contract management and Project Management, viewed the project as a temporary organization, and moved on to investigate the mechanisms of governance of the project and of the project-oriented parent organization. The focus of the project governance literature covers: 1) the principal-agency

relationship between client and contractor, 2) transaction costs associated with projects, and 3) mechanisms of governance of projects.

Current research in this school includes effective governance of projects, programs, and organizational portfolio, and effective organization and functions of the project management office (PMO). Research in this area may continue into project selection, portfolio refinement and management, the PMO, and the role of compliance in Project Management.

The Behavior School: The Project as a Social System

The behavior school takes as its premise that the project is a social system, and includes several areas focused on organizational behavior (OB), leadership, communication, team building, and human resource management (HRM) (Huemann, Keegan, & Turner, 2007). Important work in this school addressed designing complex organizations, and extended OB research to the project environment, including managing conflict in projects, team formation and maintenance, project leadership skills, communication between the project manager and sponsor, and power and politics in projects (Turner, 1999).

Virtual project teams, HRM in project-oriented organizations, knowledge management, and cross cultural issues are important areas for research, particularly in view of the growing diversity of project teams, globalization, and global sourcing of project work.

The Success School: The Project as a Business Objective

This school focuses on: 1) project success factors–the elements of a project that can be influenced to increase the likelihood of success; the independent variables that make success more likely, and 2) project success criteria–the measures by which we judge the successful outcome of a project; the dependent variables which measure project success. The focus of success criteria progressed from achieving time, cost and performance objectives–in line with the optimization school to a much wider range of factors that have an impact on perceived project success–in line with the governance and process schools.

Research enhanced our understanding of success factors and criteria (Cooke-Davies, 2002), examined the relationship between project success and the use of Project Management software, project risk management practices, and collaborative team processes. Research can continue to refine our understanding of success factors, success criteria, stakeholder satisfaction with project outcomes, and causes of project failure.

The Decision School: The Project as a Computer

This school focuses on factors relevant to the initiation, approval, and funding of projects as well as factors relevant to project completion, termination, and conclusions about their success or failure. This approach addresses economic, cultural and political rules that cause investments in projects. This school focuses on decision-making processes in early stages of projects, and on information processing in projects and uncertainty reduction (Morris, 1997; Winch, 2002). This links to the process school and to the success school, and brings Project Management research a full circle to its optimization and decision making roots while considering various issues that affect organizational decisions.

Current research is addressing factors affecting initial estimates of project cost and time, methods for improving deliberately optimistic estimates (Flyvbjerg, 2006), and the relationship of the organization's portfolio of projects and programs to its strategy.

The Process School: The Project as an Algorithm

The premise of this school is to define structured processes from the conceptual start of the project to achieving the end objectives. Turner (1999) suggested that Project Management is about converting vision into reality. Winch (2002) suggested that through projects we convert desire into memory. The project is like an algorithm that helps us solve the problem of how to get to that desired future state. Bendoly and Swink (2007) extended this approach to the effect of information on post-task sense-making and suggested that visibility of situational information impacts project outcomes by affecting the project manager's actions.

Research in this area can continue into the effectiveness and refinements of processes used to manage various categories of projects in different environments, as well as project audits and post project reviews aimed at improvement of Project Management processes.

The Contingency School: The Project as a Chameleon

This school recognizes the difference between different types of projects and project organizations, considers the approaches most suitable for various project settings, and adapts Project Management processes to the needs of the project. It stresses that every project is different, and so the management approach and leadership style need to be adapted to the needs of the project. Significant research included work on project categorization systems to ensure alignment of capability with strategy, and on the different competencies, and leadership styles, required to manage different types of projects.

Further research in this school should clarify the Project Management approaches most suitable for different project settings and methods for adapting the organization's existing approaches to various types of projects, and highlight interactions between success factors and criteria, Project Management approaches, and project categories.

The Marketing School: The Project as a Billboard

This school focuses on the identification of stakeholders' needs, stakeholder management, formation of project organizations, internal marketing of the project to the organization, marketing the project to its customers, and selling Project Management to senior executives.

Future research in this school may investigate the integration of strategic and tactical components of business success, address the linkages between strategic goals and project objectives, and investigate effective approaches for alignment of Project Management with the strategic perspective of senior executives and their common view of Project Management as an operational/tactical matter. Research can also investigate customer relationship management in Project Management, as well as public and media relations for temporary project organizations.

INTERACTIONS BETWEEN PROJECT MANAGEMENT SCHOOLS OF THOUGHT

The discussion above indicates a fair amount of distinction yet overlap in research in various Project Management schools of thought. Our aim in separating them is to gain insight

into current and potential research in each area, but we should not lose sight of their inevitable interactions. The main interactions between Project Management schools of thought are:

- Governance defines the objectives of the project, success criteria. Governance defines project review points along the process.
- The success school defines what has to be marketed. The project has to be marketed to the organization, client(s), and governance council.
- Success provides the vision for the process. The process provides a path for making decisions directly and through appropriate model(s). The process is a model of the project.
- Success provides the objectives for optimization and the objectives for decision-making.
- Governance influences the nature of OB and HRM in the project. Behavior of the project team needs to be included in models. Nature of the project influences how success will be judged. Project nature influences what has to be optimized and how it will be optimized.
- Modeling helps us to optimize the project. Modeling helps us to make better decisions.
- The decision school provides guidance for improved decision-making. Over time, better decisions at various levels support the success of projects, strengthen the competitive position of organizations, and ultimately enhance the well-being of society.

CONCLUSIONS

Modern Project Management is a relatively young academic discipline. After borrowing tools from Operations Research and Operations Management, Project Management research was mainly inward-looking. More recently, research in Project Management has been interacting with other management disciplines, benefitting from their research progress, adopting their ideas, and applying them to the management of projects. Project Management is an identifiable field of study. We illustrated its diversity and richness by nine schools of thought. We outlined research trends in these nine schools and showed that they will continue to draw strongly on other fields of management. We also expect that they will continue to make contributions back in return.

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TABLE 1
The Nine Schools of Project Management Thought

School	Metaphor	Key idea	Came to prominence	Influence
Optimization	The project as a machine	Optimize outcome of the project using mathematical tools	Late 1940s	Operations Research
Modeling	The project as a mirror	Use of hard and soft-systems theory to model the project	Hard-systems: mid 1950s; Soft-systems: 1990s	Systems theory, Soft systems methodology
Governance	The project as a legal entity	Govern the project and the relationship between project participants	Contracts: early 1970s; Temporary organization and governance: 1990s	Contracts and law, Governance, Transaction costs, Agency theory
Behavior	The project as a social system	Manage the relationships between people on the project	OB: mid 1970s HRM: early 2000s	OB HRM
Success	The project as a business objective	Define success and failure Identify causes	Mid 1980s	Internal to Project Management
Decision	The project as a computer	Information processing through the project life cycle	Late 1980s	Decision sciences, Transaction costs
Process	The project as an algorithm	Find an appropriate path to the desired outcome	Late 1980s	Information systems, Strategy
Contingency	The project as a chameleon	Categorize the project type to select appropriate systems	Early 1990s	Contingency theory, Leadership theory
Marketing	The project as a billboard	Communicate with all stakeholders to obtain their support	Stakeholders: mid 1990s Board: early 2000s	Stakeholder management, Governance, Strategy