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IT Project Standards and Project Performance: An Integrated Research Framework

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ABSTRACT

Today’s organizations increasingly employ formally structured project teams in a variety of contexts for tasks such as new product development, organizational restructuring, process improvement, and Information Technology implementation. In response, formal project standards have been developed under the assumption that the use of these standards will improve project outcomes. However, past research examining this assumption has yielded mixed results. In this paper we develop an integrated framework for further research on the relationships between project management (PM) methods and final project performance by decomposing the project context into project factors, organizational factors, team factors, and project outcomes. We discuss support for the relationships among these factors and their impact on the relationships between PM methodologies and project performance. We conclude by presenting a set of propositions for future research.

Keywords

Project Management, PMBOK, Project Team.

INTRODUCTION

Today’s organizations increasingly employ formally structured project teams in a variety of contexts for tasks such as new product development, organizational restructuring, process improvement, and Information Technology (IT) implementation. As the environment and collaborations of project teams continue to become more complex and more challenging, project standards have been developed based on the assumption that use of these standards will improve project outcomes and minimize project failures. In spite of widespread use of project management standards, however, there is a paucity of research that demonstrates that adherence to project standards results in better project outcomes. Unless such a linkage can be identified, the usefulness of project standards will be questioned and motivations of applying them by project teams will be discounted.

Moreover, even if the assumption holds true that such a relationship between project standards and project outcomes exists, it is very likely affected by other factors surrounding the project, such as team, cultural, organizational, and environmental influences. For example, given that projects are conducted by teams, the composition and dynamics of the team cannot be ignored when deciding how the project is accomplished and whether it is successful. Truly understanding the relationship between project standards and outcomes will require understanding which factors are important and how they affect the relationship.

The purpose of this paper is to present an integrated framework for studying the relationship between adherence to project standards and project outcomes. Because projects operate within a complex context, however, it is unlikely that the relationship is straightforward. In this paper, we propose how various factors (team, cultural, organizational and environmental) might interact with this relationship, which are captured in our proposed model. Finally, based on this model, we introduce a set of propositions intended as a basis for stimulating discussion and future research.

BACKGROUND CONTEXT

Over the past several decades, organizations have increasingly used projects to achieve business objectives. Although the use of project management originated in the aerospace and defense industries, its use has spread to diverse application domains, including IT. In addition, the complexity and cost of projects have increased tremendously. For example, a KPMG survey showed that project complexity increased in 88% of organizations and budgets increased in 79% of organizations (KPMG, 2005). One of the disturbing by-products of such rise of complexity is that failure rates of projects have been high. KPMG

also reported that 86% of respondents from 600 organizations across 22 countries had IT project outcomes that “fell short of planned expectations” (KPMG, 2005). To improve the chances of success with such projects, project management has emerged as an important discipline in organizations.

Given the increased interest in project management and desires to improve project outcomes, standards have been developed reflecting what are considered “best practices” in the field. The *Project Management Body of Knowledge* (PMBOK) (Project Management Institute, 2004) encompasses 5 project phases and 9 project management knowledge areas. A similar set of standards has been developed by the Centre for Research in the Management of Projects, which became the basis for the *Association for Project Management’s (APM) Body of Knowledge* (Morris, Patel and Wearne, 2000). Specific to software development, the Capability Maturity Model from the Software Engineering Institute and its descendents have been developed, e.g. (Herbsleb, Carleton, Rozum, Siegel and Zubrow, 1994).

The rationale for the use of project management to increase the probability of success rests on the assumption that such approaches will actually enhance project success. This underlying assumption has become more important given the increasing use of projects, and the increased size, complexity, and cost of projects. However, there has been little done empirically to validate this assumption, and the few studies that have been conducted have had conflicting results. The purpose of this paper is to introduce an integrated framework based on previous research from several streams that can be used as a foundation for future research on validating the assumption. This framework is in essence an input-process-output (IPO) model in which the relationship between project management methods (input) and project success (output) is mediated by team dynamics (process) with contextual variables as the moderating factors.

RESEARCH MODEL

The research framework described in this paper is shown in Figure 1 below. This section discusses the factors and the relationships between them as displayed in the model as well as the support for them from the extant literature.

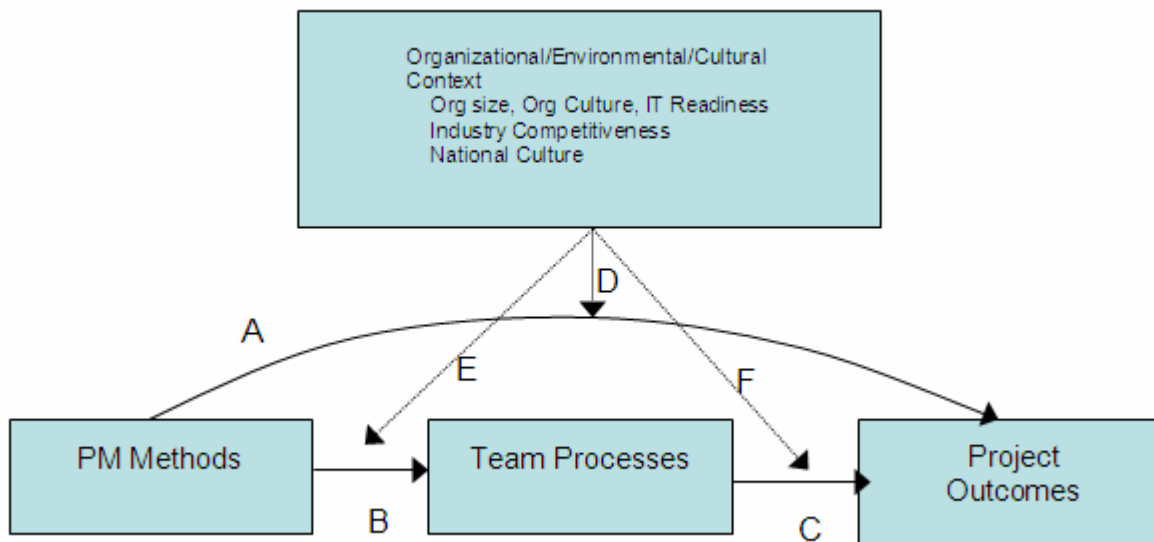


Figure 1.

Project Management Methods and Project Success

Before discussing the relationship between Project Management (PM) methods and project success, we need to define each of them. PM methods encompass standards, processes, tools, document deliverables, and methodologies used to initiate, plan, execute, monitor, control, and close projects, and are exemplified by the PMBOK and the APMBOK, as mentioned above. The PMBOK incorporates not only generic processes, but also specific knowledge areas needed for comprehensive PM, including project planning and integration, scope, time, cost, control, quality, procurement, risk, communication, and human resources.

The IT domain also offers numerous methodologies aimed more specifically at software process management. A well-known comprehensive approach, as mentioned above, is the Capability Maturity Model and successive evolutionary variations. An assumption is made that a more consistent, measurable process will result in higher quality products.

However, an increasing number of IT projects are no longer “software development” projects per se. Instead they are much more diverse, often involving the implementation, enhancement, and integration of packaged software such as ERP or data warehousing systems (Kirsch, 2000). A generic domain-independent PM standard such as the PMBOK is frequently more relevant to IT projects than a more narrowly focused software development methodology. This paper will thus focus on more general PM practices and standards.

Project success can be defined using several dimensions. Frequently, project success means completion within budget, within schedule, and production of quality deliverables (Zwikael, Shimizu and Globerson, 2005). However, some consider these dimensions to be too narrow. Additional measures of success include client satisfaction, project team satisfaction, and business value to the organization (Crawford, 2005; DeLone, Espinosa, Lee and Carmel, 2005).

The few studies that have linked PM methods to project success have generally focused on only a subset of PM, such as planning, control, or risk management. The results have been largely mixed. One research group developed and used a project management planning quality index (PMPQ) to evaluate project planning (Globerson and Zwikael, 2002; Zwikael and Globerson, 2004). Higher quality scores positively correlated with project success. Gowan and Mathieu (Gowan and Mathieu, 2005) used five dimensions of PM to show that use of formal PM methods can mitigate the negative impacts of project size and complexity on project success, which was measured as completion date. Crawford (Crawford, 2005) observed that knowledge of and adherence to PM practices did not correlate with management’s ratings on project personnel in terms of their value and effectiveness.

One likely reason for these mixed results is that the relationship between PM methods and project success is indirect and mitigated by other variables. We propose in this framework that team dynamics is a mediating factor, while contextual variables related to environment, organization structure, and culture are moderating factors. These relationships are discussed in the next sections.

Project Management and Team Dynamics

A long and rich research stream exists that has examined numerous dimensions of group dynamics (for example, cohesion, conflict, and coordination) and their relationships to group performance e.g., (Hackman and Morris, 1975; McGrath, 1984; Watson and Michaelsen, 1988). We propose that one implicit but important purpose of PM methods is to proactively reduce the negative effects of group dynamics and to leverage the positive effects. For example, ensuring that all relevant stakeholders are identified and involved in appropriate ways in defining and accepting a shared scope definition may prevent potential conflict between parties about the project goals. Another example is that development of a comprehensive schedule should enhance coordination by clearly indicating what needs to be accomplished and when. Finally, development of trust among team members is considered an important factor in project outcomes, e.g., (Jarvenpaa, Knoll and Leidner, 1998). The PMBOK provides explicit communication processes that are intended, among other things, to foster trust among team members.

The relationship between PM methods and team dynamics has received little research attention. We propose that the interaction of these constructs offers potential insight into understanding project outcomes.

Contextual Factors

Projects and project teams operate within a larger organizational context, often across organizational partnerships and within an even larger external global competitive environment. A variety of research streams have investigated organizational factors such as global scope, culture, and IT readiness, and industry specific factors such as industry type, and competitive intensity in general IS research.

Organization size is one of the most relevant moderating factors in the IS literature (see (Damanpour, 1992) for a meta-analysis). Firm size can be defined by either the number of employees in the firm or the annual revenue of the firm. In the context of projects, large firms tend to have more projects and more resources to support them than small firms. This could potentially lead to a project success bias toward large firms. In addition, since large firms are better established than small ones, it is more likely that they would employ formal project standards.

Scope refers to the geographical extent of a firm’s operations in the global market (Zhu, Kraemer, XU and Dedrick, 2004). Project teams may behave differently in a globally-oriented firm than in a domestic firm, influenced by geographic and

temporal dispersion of team members, as well as cross-functional and cross-cultural team composition. Organizational culture also plays an important role in project success. Firms that cultivate and value collaboration are better suited for the team-based project environment. Since an increasing number of projects are geographically dispersed, communication and collaboration are critical to their success. Whether a firm's IT infrastructure (networking, collaboration software, knowledge search and retrieval) can support the needed communication and co-ordination functions has a direct relationship to the operations and outcome of projects. Hence, it is also important to include IT readiness in the model.

Industry-specific factors included in this model are industry type and competitiveness. Although general project standards such as PMBOK are intended for all industries, how to apply them in a particular industry may differ. We use information intensity to define industry type. Industries with high information intensity include IT, finance, e-commerce retailers, and airlines (Lee and Kim, 2006). Competitive intensity is defined as the degree to which a firm is affected by competitors in the market (Zhu et al., 2004). The higher the intensity, the more rapid the responses required. This affects directly how a project is managed. Tougher competition forces projects to operate with tighter timelines and faster turnaround.

Cultural Influences on Project Management Methods and Performance

Identifying the role of culture on PM and project outcomes is especially challenging. This is due to the difficulty of clearly identifying the cultural perspectives of any one individual. These are influenced by national culture, ethnic culture, gender, organizational culture, and immediate work team culture, among other influences (Straub, Loch, Evaristo, Karahanna and Strite, 2002). Nevertheless, several researchers have acknowledged that cultural context may mitigate the relationship between PM methods and project outcomes.

Most of the research relevant to our model examines the influence of culture on team processes. Cultural diversity within a team can increase creativity, learning, and innovation (Iles and Hayers, 1997; Distefano and Maznevski, 2000), can increase cooperation (Cox, Lobel and McLeod, 1991), but can also increase conflict, make consensus more difficult, and affect trust (Evaristo, 2003). Watson and colleagues (Watson, Kumar and Michaelson, 1993) found that team processes and performance were initially lower for more culturally diverse groups but that the differences decreased over time as the teams progressed. Shore and Cross (Shore and Cross, 2005) showed cultural influences on project team behavior, but not performance.

RESEARCH PROPOSITIONS

Based on the discussion above, we present the following research propositions, intended to foster future research:

- (1) The variance from PM standards is correlated with project performance. This is shown by relationship A in the model.
- (2) The relationship between variance from PM standards and project performance is mediated by Team Dynamics. This is shown by relationships B and C in the model.
- (3) The relationship between variance from PM standards and project performance is moderated by cultural and environmental context variables. This is shown by relationship D in the model.
- (4) The relationship between variance from PM standards and Team Dynamics is moderated by cultural and environmental context variables. This is shown by relationship E in the model.
- (5) The relationship between Team Dynamics and Project Performance is moderated by cultural and environmental context variables. This is shown by relationship F in the model.

CONTRIBUTIONS AND FUTURE RESEARCH

This paper presents an integrated framework to investigate the relationship between project management methods and project success. It proposes that the relationship is both mediated by team dynamics variables and moderated by organizational, environmental, and cultural variables. This represents a major difference for the current research on project management which is only part of our integrated model. For example, most of the extant studies investigate either Relationship A (A with D to some extent) or C in our integrated model in Figure 1. Thus, PM researchers should consider the more complex context suggested by the model when studying the factors that contribute to project outcomes.

Research on Group Behavior

Our framework suggests that project management methods may influence (as well as be influenced by) team behavior and performance. Thus, organizational researchers should consider to what extent groups employ PM standards, when pursuing continuing studies of team dynamics and performance.

Virtual Teams

As project teams increasingly operate across geographical and temporal borders, a growing number of researchers have begun examining the similarities and differences between face-to-face team processes and dispersed, or “virtual” team processes, and subsequent consequences for team outcomes, e.g., (Townsend and DeMarie, 1998; Massey, Montoya-Weiss and Hung, 2003; Rico and Cohen, 2005). We note that very little empirical research has linked PM practices to either face-to-face or dispersed team processes, and this provides a rich opportunity for future research, in order to gain a better understanding of how to manage dispersed project teams.

Measurement of Adherence to PM Standards

Finally, there may be a gap between the PM standards that are mandated in organizations and the PM standards that are actually applied in individual projects. In order to test the relationships proposed in the framework, future research is needed to develop and validate metrics for determining to what extent PM standards are used.

In conclusion, we present this framework as a foundation for our own and others’ future research. We welcome discussion and studies resulting in further refinement and enhancement of the model. The ultimate goal is to encourage and support the benefits of deployment of PM standards in practice, by providing evidence of their effectiveness.

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