

Formality and discretion in successful R&D projects

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Abstract

In the quest to improve execution of research and development (R&D) projects, this paper focuses on the association between attainment of R&D project performance objectives and the conflicts R&D project management sparks between *discretion*, which refers to spontaneity, desire for change and breaking of rules, and *formality*, which refers to structure, stability, and following the rules. Since no solid theory exists, managers are uncertain whether both formality and discretion can be simultaneously applied, though it is clear that both are needed in R&D projects. This study aims to develop a model that conceptualizes and brings empirical evidence for the relationship between formality, discretion and R&D project performance. More than 1500 participants from 62 R&D projects, and 248 customer representatives in one high technology electronics company responded to questionnaires that measured formality, discretion, uncertainty, and additional control variables. Each project's performance was assessed using the company's information system on deviation from objectives in unit-cost (in US\$), total project cost (in US\$), time-to-market (in months), project product mean time between failures (MTBF) and mean time to repair (MTTR), and customer satisfaction. Results demonstrated that formality and discretion are distinct constructs of project execution. Each was found to positively affect R&D project performance; moreover, interaction existed in their relationships with performance. In other words, the positive relationship between formality and the performance achievement in R&D projects is stronger in projects that allow higher discretion than in projects that restrict members' discretion. Implications for R&D management theory and practice are discussed.

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Keywords: R&D project; Discretion; Formality

1. Introduction

Research and development (R&D) projects are a vital source of competitive advantage and organizational renewal, but success is often elusive (Lewis et al., 2002). Many R&D projects deviate seriously from their planned unit-cost, project cost, time-to-market, and product reliability objectives' performance, and do not meet the expected customer satisfaction (Dougherty, 1996; PMBOK Guide, 2000; Tatikonda and Rosenthal, 2000; Verma and Sinha, 2002).

Recently, in the quest to improve execution of R&D projects, many R&D project experts have focused on the association between attainment of R&D project performance objectives and the fact that R&D project management sparks conflicts between *discretion*, which refers to spontaneity, desire for change and breaking of rules and *formality*, which refers to structure, stability, and following the rules (Dougherty, 1996; Lewis et al., 2002; Naveh, 2005; Tatikonda and Rosenthal, 2000). However, it is clear that both formality and discretion are needed in R&D projects. To be competitive in the global market, R&D projects must continuously develop innovative and high quality products and services, and deliver them on time and at a lower cost than their competitors. Therefore, today's employees

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are required to be creative, yet also conform to rules and standards, and work efficiently to meet time and budget constraints (Naveh and Erez, 2004).

Although the paradox of the simultaneous existence of formality and discretion is receiving increased attention (Leana and Barry, 2000; Tatikonda and Rosenthal, 2000), the relationships between formality and discretion and their effect on meeting R&D project performance objectives have not yet been empirically tested. Juggling the tension between formality and discretion, R&D managers allow different combinations of formality and discretion in R&D projects. Yet, should R&D managers implement more rules and procedures aiming to improve their team's performance or maybe allowing more discretion will be more beneficial for performance? With no solid theory existing for the relationships between formality and discretion, managers are not sure as to how best to apply these two behaviors. Although there is broad agreement about the need for discretion, 90% of Fortune 500 companies mainly focus on formal initiatives when running R&D projects (Industry Week, 1998). Learning to manage the tension between formality and discretion in R&D projects remains a challenge (Benner and Tushman, 2003).

This study suggests a theory about the relationships between formality and discretion in R&D projects that argues that each behavior is distinct. In other words, both can be applied concurrently and each positively affects performance. Nevertheless, it is our contention that the positive relationship between formality and the fulfillment of R&D project performance objectives is stronger in projects characterized by a higher degree of discretion than in projects with a lower degree of discretion. In other words, the interaction between formality and discretion was found to be associated with the achievement of R&D project performance objectives. The effect of the differences in uncertainty between projects was also discussed and explored. The study model is presented in Fig. 1. Empirical evidence is provided based on 62 completed development projects in one high technology electronics company.

The paper continues as follows. In the next section the theory is developed and hypotheses are generated. The following section presents the methods that were used to empirically support the research hypotheses. Then the results are presented and discussed.

2. Theory and hypotheses

The literature on R&D project execution tends to explore the effects of formality and discretion on

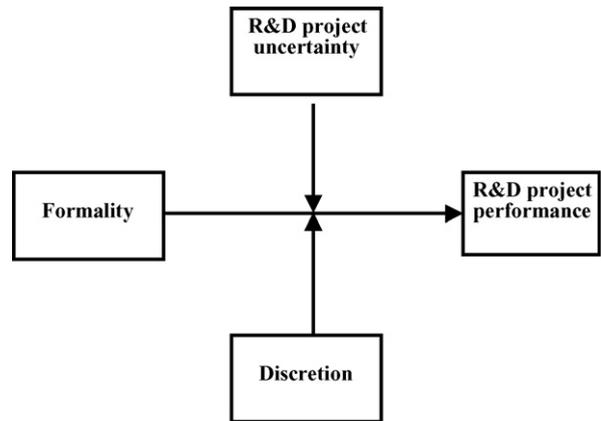


Fig. 1. The moderation effects of formality, discretion and uncertainty on R&D project performance.

performance separately. Thus, while a growing number of studies hint at the positive effect of formality on performance (PMBOK, 2000), others argue for the positive effect of discretion (Tukel and Rom, 2001). In this section a theory that combines and advances the two lines of study will be presented. It emphasizes the joint relationship of formality and discretion on performance of R&D projects, which has hardly been studied. The variance in levels of uncertainty between different R&D projects is also taken into consideration.

2.1. Formality

Recent literature has emphasized the need for formality in project management (McDermott, 1999; PMBOK, 2000). Additionally, today's customers demand that new product development contracts underscore the need for formality in R&D project management. The term formality in R&D projects refers to the degree to which rules, policies, and procedures govern the R&D project (Tatikonda and Montoya-Weiss, 2001). These rules, policies, and procedures, which are based on past knowledge and experience of both the particular organization and of other organizations, are considered good and the general advice they proffer is thought to be applicable to a broad range of projects. They guide toward homogeneity and uniformity in project management. Formality is the proven solution that has been devised to meet previously defined needs (Matusik and Hill, 1998), as it ensures the existence of a comprehensive process and structure for the R&D project, emphasizing cost and schedule control. Formality refers to adherence to standards such as routine operation, well-defined responsibilities and priorities, careful and analytical performance, coordination, precision, and accuracy.

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