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The effects of organic and mechanistic control in exploratory and exploitative innovations

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ABSTRACT

This study investigates the indirect effects of mechanistic and organic types of control on project performance acting through innovativeness in exploratory and exploitative innovation projects. It also examines the interaction effect of these controls on performance. The research model is empirically tested with survey data from 119 projects in various project organizations, using Partial Least Squares (PLS) with controls for the size of the project and task uncertainty. The results illustrate that organic control, acting through innovativeness on project performance is an important form of control in exploratory innovations, and also enhances performance in exploitative innovations. In addition, the results indicate that the interaction effect of organic and mechanistic control types enhances performance in both exploratory and exploitative innovation projects, suggesting a complementary effect. The findings are discussed in relation to theory and their managerial implications.
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1. Introduction

Scholars have long considered innovation a major determinant of organizational long-term performance (e.g., Bisbe and Otley, 2004; Kanter, 2001) and an effective management of innovation projects is a challenge facing today's organizations (e.g., Jansen et al., 2006; Tushman and O'Reilly, 1996). Empirical studies investigating the innovation–performance relationship have also suggested that the relationship's strength is moderated by the type of innovation (Calantone et al., 2010). As an innovation project is the most widespread vehicle for organizing and managing innovation activities (Chiesa et al., 2009; Martino, 1995), this study takes exploratory and exploitative innovation projects as its unit of analysis. Exploratory (radical) innovations cause fundamental, revolutionary changes in technology and represent clear departures from existing practice (Ettlie et al., 1984) by developing new products and services for emerging customers or markets and pursuing new knowledge. In contrast, exploitative (incremental) innovations are other changes in products and processes, which are generally less significant or which do not introduce considerable novelty (OECD, 2004) as they extend existing products and services for existing customers and build on existing knowledge (Benner and Tushman, 2003).

Previous research has asserted that control mechanisms exert differing influences on exploratory and exploitative innovations (e.g., Benner and Tushman, 2003; Davila et al., 2009b; Hill and Rothaermel, 2003), but empirical studies examining such relationships have produced mixed results (Cardinal, 2001; Damanpour, 1991; Dewar and Dutton, 1986; Ettlie et al., 1984; Jansen et al., 2006). For example, results by Cardinal (2001) at the organizational level show that input, behavior, and output control enhance exploratory (radical) innovation, and input and output controls enhance exploitative (incremental) innovation, and

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Cardinal concluded that incremental and radical innovations should not be managed differently. Conversely, results by Jansen et al. (2006) at an organizational unit level indicate that centralization negatively affects exploratory innovation; formalization positively influences exploitative innovation; and connectedness (social relations among unit members) appears to be an important antecedent of both exploratory and exploitative innovations. Thus, the issue of whether exploratory and exploitative innovations require different control mechanisms remains largely unresolved. Examining these innovations separately, but within the same empirical study, offers a means to analyze whether project controls differ across innovation projects.

Drawing on the classification in Chenhall (2003), this study adopts the concepts of the mechanistic control (MC) and organic control (OC) forms of project control mechanisms to represent two opposing forms of control. Mechanistic project controls rely on formal rules, standardized operating procedures and routines, whereas organic project controls are more flexible, responsive, involve fewer rules and standardized procedures and tend to be richer in data (Chenhall, 2003). Organic project control as used here reflects two important characteristics: (i) informal control reflecting norms of cooperation, communication and emphasis on getting "things done", and (ii) open channels of communication and free flow of information between project manager and subordinates (Burns and Stalker, 1961).

Prior studies (Burns and Stalker, 1961) maintain that a formal management control system (MCS) supports the periodic execution of the same routines in organizations where changes are small or non-existent. Empirical evidence also confirms this (e.g., Ouchi, 1979). In this regard, mechanistic forms of project controls would appear to be of little relevance to the innovation process associated with high level of uncertainty. These limitations proposed for the traditional MCS have, however, been questioned and proved unfounded in more recent studies, as researchers find that these systems may be important in providing the discipline to help manage uncertainty, and show that there is also a need for formal MCSs in uncertain settings, such as project environments (see e.g. Abernethy and Brownell, 1999; Bisbe and Otley, 2004; Cardinal, 2001; Davila et al., 2009a). Furthermore, Adler and Borys (1996), distinguishing between coercive and enabling bureaucracies, found that an MCS may be instrumental to innovation, and Simons (1995) that an interactive systems concept can play an explicit role in sparking innovation around strategic uncertainties. Thus, for the most part recent empirical evidence indicates that innovation processes may gain from the presence of an MCS.

More recent studies have also suggested that opposing control mechanisms should be implemented simultaneously to foster innovativeness and performance (e.g., Chenhall and Morris, 1995; Henri, 2006; Lewis et al., 2002; Sheremata, 2000). Despite prior studies, scholars claim that there is little systematic evidence of potential indirect effects or whether the effects of one form of control are governed by the level of simultaneous reliance on another form of control (Abernethy and Brownell, 1997; Malmi and Brown, 2008).

Moreover, although scholars generally agree that innovation contributes to firm performance and that the understanding of innovation and control issues requires a unit of analysis other than the organizational level (e.g. Davila et al., 2009b), there are few accounting studies that have investigated the relevance of MCSs in project environments (Chenhall, 2008). In projects resembling temporary matrix organizations that draw on resources from many functions and are characterized by a high level of uncertainty (Tatikonda and Rosenthal, 2000a), project managers may face issues managing the dynamics of their project teams. That is because innovation and development require a high degree of flexibility in the structural and communication processes (Burns and Stalker, 1961; Van de Ven, 1986) as well as efficiency. Therefore, drawing on Dougherty (1996), it is suggested that a focus on the relationships between project controls, innovativeness and performance at the project level permits a more thorough treatment of the particular project controls acting at this level and will likely produce greater stability in the proposed relationships.

Therefore, the objective of this study is to examine the effects of mechanistic and organic forms of control on project performance through innovativeness in exploratory and exploitative innovation projects. Innovativeness or innovative accomplishments are here defined very broadly to include any policy, structure, method or process, product or market opportunity that the project manager perceives to be new (Kanter, 1983; Zaltman et al., 1973). In comparison, innovation in addition to novelty also comprises commercialization and implementation of accomplishments (e.g., Dewar and Dutton, 1986). Adopting the approach introduced by Gupta and Govindarajan (1984), project performance was measured by comparing actual project performance and a priori expectations rather than measuring it on an absolute scale. By assessing project performance relative to targets and other projects, the effects of strategic choice on project performance are indirectly controlled for.

The current research develops a conceptual model and tests it through PLS analysis on a sample of 119 projects, divided into two sub-samples: exploitative and exploratory settings. Previous studies (e.g., Bisbe and Otley, 2004; Jansen et al., 2006) suggest an indirect positive effect of an organic form of control on performance through innovativeness in exploratory and a similar effect brought about by a mechanistic form of control in exploitative projects. Moreover, prior research (e.g., Chenhall and Morris, 1995; Henri, 2006; Lewis et al., 2002) indicates that performance within different innovation projects can be enhanced by the effects of combined use of organic and mechanistic project control.

Although prior research on opposing control forces in exploratory innovation settings does exist (e.g., Lewis et al., 2002; Sheremata, 2000), empirical research reporting on the indirect and interaction effects of opposing forms of project control in both exploratory and exploitative innovative project settings was not found. Thus, this study contributes to literature by extending prior research in MCSs (Chenhall and Morris, 1995; Bisbe and Otley, 2004; Henri, 2006; Jørgensen and Messner, 2009; Mundy, 2010)

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