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Timing is everything: A meta-analysis of the relationships between organizational performance and innovation

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ABSTRACT

The relationship between innovation and firm performance has been uncertain. In previous empirical tests of both causal directions of the organizational performance and innovation relationship, the temporal sequence of research designs has often been flawed. We meta-analytically test both temporal sequences of this relationship using 158 effect sizes from 55 empirical studies. We find that many empirical studies hypothesized one temporal sequence (e.g. innovation and future performance), but used data based on the opposite temporal sequence (e.g. past performance and innovation). Correcting the studies based on the actual temporal sequence used reveals that while the relationship between innovation and future performance is positive (based on economic rent-seeking), the relationship between past performance and innovation is less clear, especially when the study's framing is taken into account. Focusing on temporal sequencing suggests new research avenues on the organizational performance and innovation relationship.

1. Introduction

Does innovation today spur superior performance tomorrow? Is innovation driven by past firm performance? Unpacking the relationships between innovation and organizational performance is a compelling research challenge. We need to understand whether past performance is a key driver of firms' innovative activity, and whether innovation today spurs superior future performance. A number of studies have investigated both temporal sequences of the organizational performance and innovation relationship. However, our review of previous papers suggests a surprising number of studies with conceptual frameworks specifying one temporal sequence (e.g. innovation and future performance), but where the timing of the data gathered within the research design suggests the opposite (e.g. performance measured before innovation). Even meta-analyses of the antecedents and consequences of innovation have not explicitly corrected for the relative data timing of organizational performance and innovation (Damanpour, 1991; Vincent et al., 2005).

Given the lack of attention paid to data timing, it is hardly surprising that there are studies demonstrating a positive (Matsuo, 2006), negative (Balkin et al., 2000) or non-significant (Hitt et al., 1997) relationship between innovation and future organizational performance, as well as those indicating a positive (Bolton, 1993), negative (Greve, 2003b; Lant and Milliken, 1992) or non-significant (Ettlie, 1983) relationship between past performance and innovation. One explanation for these inconsistent results is inappropriate temporal sequencing of the data. We meta-analytically test explanations for the two temporal directions of the organizational performance and innovation relationship based on 55 empirical studies conducted between 1975 and 2005. We begin by using the economic rent-seeking and managerial cognition perspectives to develop rationales for the conventionally predicted signs of the innovation and performance relationships.

2. Innovation and performance

At its core, the term innovation captures the newness of an idea that attempts to improve organizational performance (e.g. Camisón-Zornoza et al., 2004). Many different definitions of innovation share the idea of "newness". Damanpour and Gopalakrishnan (2001: 47) defined innovation as "the adoption of an idea or behavior pertaining to a product, service, device, system, policy or programme that is new to the adopting organization". Nohria and Gulati (1996) defined innovation to include any policy, structure, method or process, or any product or market opportunity that the manager of an innovating unit perceives to be new, and Zaltman et al. (1973: 10) defined it as "any idea, practice, or material artefact perceived to be new by the relevant unit of adoption".

We will use Damanpour and Gopalakrishnan's (2001) inclusive definition of innovation above, including all sub-types of innovation in our analysis. This definition captures a wide range of potential innovative activity from undertaking R and D (e.g. Lin et al., 2006; O'Brien, 2003), through the launch of new products (e.g. Greve,

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2003a; Nerkar and Roberts, 2004), or filing patents (e.g. Katlia and Ahuja, 2000), to maintaining a culture of creativity in organizations (e.g. Baer and Frese, 2003; Matsuo, 2006; Menon et al., 1999).

Given the diversity of innovative activities, researchers have categorized types of innovation since not all innovative activity will relate to performance in the same way (Damanpour, 1991). Common categorizations of innovation include product, process or administrative innovation (Damanpour and Evan, 1984; Damanpour and Gopalakrishnan, 2001), and incremental, architectural or radical innovation (Henderson and Clark, 1990). Camison-Zornoza et al. (2004: 334) summarized much of this work and identified four dimensions of innovation: "the stages of the innovation process, the level of analysis, the types of innovation, and the scope of innovation".

It is clearly important to recognize that different types of innovation might relate to past or future performance in different ways. However, an advantage of our meta-analytic approach is that resolving these issues is treated as an empirical question rather than a theoretical one (Hunter and Schmidt, 2004; Damanpour, 1991). Here, we will discuss the theoretical relationships between innovation and performance at a general level, and later test empirically which factors might moderate the relationships.

2.1. The innovation and future performance relationship

The economic rent-seeking view posits a positive impact of innovation on future performance. The resource-based view of the firm explains competitive advantage as rent generation from heterogeneous and immobile resources. Innovation can help generate new valuable, rare and inimitable resources within the firm that are costly-to-copy (Barney, 1991; Wernerfelt, 1984). Furthermore, to the extent that an innovation is itself inimitable and valuable in a firm's market, an innovative capability can be an intangible knowledge-based resource (Cho and Pucik, 2005). More indirectly, innovation is likely to be built on similar foundations as other competitively valuable capabilities such as patents protected by law, technological knowledge or proprietary production processes (e.g. Ritter and Gemunden, 2004). Even in contexts where innovation is not directly rewarded by the market, innovation can be used to generate dynamic capabilities to negotiate changes in the organization's environment (Teece et al., 1997), to develop first-mover advantages (Lieberman and Montgomery, 1998), or respond rapidly to market changes (Cohen and Levinthal, 1990). Numerous resource-based studies have hypothesized that innovation leads to the enrichment of a firm's strategic resources and to sustainable competitive advantage (e.g. Cho and Pucik, 2005).

The entrepreneurial risk taking perspective also suggests a positive relationship between innovation and future performance as entrepreneurs reap economic rents from developing new products and business models (e.g. Covin and Miles, 1999). Furthermore, firms can seek rents through market positioning advantage (e.g. Nakata et al., 2006; Porter, 1980), and particularly through innovating to create unique market positions (Geroski et al., 1993).

The economic rent-seeking perspective does recognize that innovation may not always pay. First, firms must successfully negotiate the strategic challenges of both matching a firm's strategy to the opportunities in its environment (Brush and Artz, 1999), and to ensuring an appropriate balance between exploiting existing resources and developing new ones (Daneels, 2002). Second, even when competitive advantage might be gained through innovative activity, these gains may be appropriated by stakeholders other than shareholders within the organization (Blyler and Coff, 2003).

While arguments exist within the economic rent-seeking perspective for both positive and negative relationships between innovation and future performance, the dominant logic is that managers pursue new ideas and activities in an attempt to gain favourable market or resource position, and ultimately competitive advantage. We base our hypothesis on the dominant economic rent-seeking logic:

Hypothesis 1. Innovation relates positively with future performance.

2.2. The past performance and innovation relationship

The managerial cognition literature posits inconsistent managerial behaviors in firms with declining performance. While some research has found that firms experiencing low performance are more likely to initiate new strategic options (e.g., Gooding et al., 1996), others have observed that declining performance prevents innovation (e.g., Wiseman and Bromiley, 1996). A meta-analytic approach can aggregate across cumulative results, answering whether the past performance to innovation relationship is overall positive or negative.

Three arguments based on issues interpretation, organizational slack and threat rigidity predict a positive relationship between past performance and innovation. First, the issues interpretation view argues that managers may frame innovations as opportunities, and develop a willingness to adopt risky innovations (Dutton and Jackson, 1987), encouraged by strong past performance. Second, strong performance may generate future organizational slack that is used for exploration of new alternatives (Cyert and March, 1963; Daniel et al., 2004). Third, at very low levels of performance managers' ability to innovate may be inhibited by insufficient available resources, motivation or cognitive capacity (e.g. Staw et al., 1981). Taking these three arguments together suggests that:

Hypothesis 2a. Past performance relates positively with innovation.

In contrast, prospect theory and the behavioral theory of the firm usually hypothesize a negative relationship between past performance and innovation based on search processes and/or managerial risk propensity (Greve, 2003a). Managers in organizations with good performance compared with their historical performance, or compared with other similar organizations, are less likely to search for new activities because they are satisfied with their aspiration-level performance targets and find it unnecessary to innovate (Cyert and March, 1963; Greve, 2003b). Managers in organizations with lower performance (below the aspiration level) are motivated to find a solution to improve their performance (Cyert and March, 1963). The complementary managerial risk propensity view suggests that as organizational performance decreases below the aspiration level, managers' risk tolerance increases, and they are more willing to initiate risky innovation because the way they cognitively frame gains and losses above and below the performance-aspiration level (Kahneman and Tversky, 1979). Managers in poorly performing firms may take more risks to avoid further organizational decline (e.g. Miller and Chen, 2004). The lower a firm's performance, the more managers will accept the risk of new, innovative activities, thus:

Hypothesis 2b. Past performance relates negatively with innovation.

3. Method

Meta-analysis statistically aggregates findings across empirical studies. We used the Pearson product-moment correlation as the most relevant and accessible effect size. We employed multiple research sources to identify effect sizes measuring the relationship between innovation and organizational performance. Included studies provided the correlation (r) or its equivalent between some type of innovation and a performance measure. To find studies we: (1) searched the ABI, Econlit, ERIC, and Proquest Digital Dissertations databases using terms composed of combinations of innovation and organizational performance; (2) searched the Web of Science for cited articles on innovation and performance; (3) conducted an Internet search (e.g., Google); and (4) followed "ancestry" (i.e., backward search) by searching the references of the potential articles. In total, we identified over 800 research sources. After excluding the duplicates and the articles without the necessary effect size, we identified 55 empirical studies, including 63