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R&D Investment in the Global Paper Products Industry: A Behavioral Theory of the Firm and National Culture Perspective

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ABSTRACT

Investing in R&D is particularly relevant for firms competing in today's globalized knowledge-based economy. This multilevel study offers a national culture perspective integrated with the behavioral theory of the firm to test whether outperforming industry peers motivates subsequent R&D investment in a sample of paper products industry firms from 13 countries. We also hypothesize and find that home country cultural dimensions (institutional collectivism, power distance, and uncertainty avoidance) create a context that either encourages or discourages firm-level R&D investment. Additionally, we evaluate the cross-level moderating effects of culture to explore how the strength of the firm-level relationship between outperforming industry peers and R&D investment changes as a function of cultural context. Our multilevel analysis demonstrates outperforming industry peers and national culture are both important for explaining variance in firm-level R&D investment in the global paper industry.

1. Introduction

> "…*whether research be originally undertaken merely because the firm is convinced that profitable new opportunities will come out of it, or because it is considered necessary for survival in a competitive world, it enables…firms to turn aside the process of 'creative destruction' and to thrive on the novelty which might otherwise have destroyed them.* (Penrose, 1959, p. 115).

Edith Penrose's (1959) insights from over 50 years ago, of the importance of research and development (R&D) investment for firm success and survival seem particularly relevant in today's globalized knowledge-based economy. The R&D process involves creating, disseminating and applying knowledge to generate and keep up with innovations in technologies, products, and management systems (Greve, 2003a; Li and Kozhikode, 2009; O'Brien, 2003; Vincente-Lorente, 2001; Wang, 2010). Investing in R&D differs from other corporate investments in that the outcomes often have long-term future oriented profit horizons, require input and coordinated effort from multiple hierarchical levels in the firm, and have payoffs that are often ambiguous and highly uncertain. (Bernardo, Cai and Luo, 2001; Lee and O'Neill, 2003; Shi, 2003). For these reasons, R&D investment is often used as a proxy for organizational search activities (Katila and Ahuja, 2002; O'Brien and David, 2014). As noted, by O'Brien (2003) firm level R&D investments relative to industry peers, represent the strategic importance of the firm's search activities.

Researchers exploring firm-level search activities often draw from Cyert and March's (1963) behavioral theory of the firm (BTOF), which posits that firms as goal-oriented and information-processing entities, compare their performance relative to their own past

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performance and that of competing firms, not just to an absolute value. These comparisons serve to motivate the firm to engage in search processes that either solve short-term problems or provide innovative new technologies and/or products (Cyert and March, 1963). With much of the research using a BTOF lens being conducted with single country samples (e.g., Chen, 2008; Chen and Miller, 2007; Greve, 2003; Iyer and Miller, 2008; Lin, Cheng, and Liu, 2009; O'Brien and David, 2014), little consideration has been given to how the values, beliefs and assumptions that constitute the culture within firms' home country boundaries may encourage and enable pursuing some types of goals associated with search activities while discouraging and hindering others. Indeed, in a 2012 literature review of BTOF literature specifically associated with firms' responses to performance feedback, Shinkle (2012, p. 442) suggests that firms' responses to performance feedback are likely to vary across cultures, and that "given the importance of cross-border activities, understanding institutional influence on aspirations is an urgent matter that represents a major gap in the literature." This study begins to address this gap.

National culture reflects behavioral norms, attitudes and cognitive processes that affect actions of firm decision makers (Allred and Swan, 2004; Nam, Parboteeah, Cullen, and Johnson, 2014). Therefore, a country's culture is likely to influence their beliefs about the legitimacy and appropriateness of investing in R&D. Given this, our study focuses on understanding the multilevel, both firm and country, sources of variance related to firm level R&D investments.

In conceptualizing our framework, we draw from BTOF, to examine how firm level performance relative to industry peers around the world explains variance of firm R&D investment. We theorize that firm level R&D investments are significantly constrained or enabled by what constitutes legitimate actions with respect to pertinent cultural dimensions in the country in which a firm was founded and remains embedded in. While, national culture is a multidimensional construct (Hofstede, 2001; Schwartz, 1994; Trompenaars and Hampden-Turner, 1998) with some scholars identifying as many as nine cultural dimensions (e.g., House et al., 2004) we follow the example of previous culture research (e.g., e.g., Kostova, 1997; Li, Griffin, Yue and Zhao, 2013; Nam, Parboteeah, Cullen, and Johnson, 2014; Parboteeah, Addae, and Cullen, 2012) and examine only those that have a theoretical basis and previous empirical support for being associated with organizational search activities, such as R&D investment.

Specifically, we assess whether the cultural dimensions that stress the importance of investing in the future (future orientation), collective coordination and decision making (institutional collectivism), maintenance of hierarchy (power distance), and dealing with ambiguous and uncertain situations (uncertainty avoidance), have direct effects on firm level R&D investments. We integrate the theoretical perspectives to evaluate cross-level interaction effects in order to explore how the strength of the relationship between outperforming industry peers and R&D investment may not be universal across countries, but may change as a function of national cultural dimensions.

The study seeks to contribute to theory and practice in several specific ways. First, by explicitly adopting a BTOF perspective, we acknowledge the important role of managers' heuristics and cognitive biases in explaining variation with respect to strategic decisions being made in an international context. This addresses concerns put forth by Aharoni and Brock (2010) that international business (IB) research has largely ignored behavioral research and in particular the importance of managerial decision making processes in explaining IB phenomena.

Second, while arguments from BTOF have been applied in studies of R&D search in several countries such as the USA (Chen, 2008; Chen and Miller, 2007), India (Vissa, Greve, and Chen, 2010), Italy (Antonelli, 1989) and Japan (Greve, 2003a; O'Brien and David, 2014), they "have posited a universal model" neglecting to consider how the predictive strength of the models may vary across national cultural contexts (O'Brien and David, 2014: 550; Shinkle, 2012). Our multi-level analysis using data from firms operating in a single industry in 13 countries allows a more in-depth exploration of the relative importance of various firm- and national-level variables. This is important, as previous studies have shown that industry factors account for significant levels of variation in firm R&D spending (Erken and Gilsing, 2005; Mauri and Michaels, 1998; Raymond and St-Pierre, 2010; Scott, 1984). Also, it allows us to more adequately address concerns about the lack of attention given to contextual influences in management research (Johns, 2006; Rousseau and Fried, 2001; Tsui, 2007).

Third, by accounting for the cultural context in which firms are embedded in, empirical support is generated for the prediction that when firm performance relative to industry peers is higher firms are motivated to seek out experimental and innovative activities through investment in R&D activities. As noted by Ahuja, Lampert, and Tandon (2008) in a literature review of what drives the decision to engage in R&D, scholars disagree whether previous firm performance affects the decision positively or negatively. Thus, we offer evidence of additional determinants of R&D investment, which may help explain the inconsistent findings concerning this prediction in single country studies (e.g., Chen and Miller, 2007; Greve, 2003a; Wu and Tu, 2007).

In addition by demonstrating the saliency of the BTOF in a cross-national sample, the boundary conditions for the theory are extended suggesting, as others have in recent work (e.g., Lin, Liu, and Cheng, 2011; Tang and Rowe, 2012) that it may be an appropriate organizing theoretical framework for exploring international management phenomena. Finally, by presenting evidence of how a firm's home country cultural dimensions, an informal institution can motivate and inhibit investment in firm-level R&D, we address concerns raised by IB scholars that studies of firm level strategic decisions have primarily examined the role of formal institutions while neglecting how informal institutions may also influence managerial decisions (Hart, 2001; Zenger, Lazzarini, and Poppo, 2002).

The theoretical framework is tested with a sample of firms from 13 countries, operating between 2002 and 2010 in the global paper products industry. In the past decade due to the rise of digital media and increasing pressures for environmental sustainability, firms competing in this industry have arguably been engaged in combating what could be aptly described as Schumpeter's (1942, p. 83) "gale of creative destruction", making it a particularly interesting context for our study.

2. Theory and hypotheses

Managers invest in R&D search activities to explore long-term creation of genuinely new innovations and to enhance capabilities to exploit current knowledge to respond to threats and opportunities present in the external environment (Cohen and Levinthal,