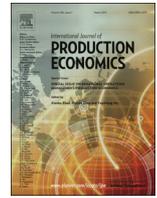




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Contents lists available at ScienceDirect

Int. J. Production Economics

journal homepage: www.elsevier.com/locate/ijpe

Environmental management practices and firm financial performance: The moderating effect of industry pollution-related factors

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ARTICLE INFO

Article history:

Received 24 July 2015

Accepted 5 February 2016

Available online 13 February 2016

Keywords:

Environmental management

Financial performance

Industry context

Hierarchical model

Resource based view (RBV)

Institutional theory

ABSTRACT

Is the relationship between a firm's environmental management practices (EMPs) and its financial performance (FP) dependent on industry pollution-related ("context") characteristics? If so, how? Drawing upon Scott's (2004) "dualist" theory of organizations, we propose and test a model that examines the effect of EMPs on firm financial performance both within- and between-industry contexts. In essence, instead of asking "does it pay to be green?" we inquire "what are the circumstances under which it might pay to be green?" Data used to test the hypothesis that industry context matters to the EMP-FP relationship consist of 941 publicly-traded manufacturing U.S. firms, spanning 52 four-digit NAICS codes. The cross-sectional data set includes environmental ratings of firms assigned by Kinder, Lydenberg, Domini Research and Analytics (KLD), firm-level financial data from Standard & Poor's COMPUSTAT database, and industry-level information from the U.S. Census Bureau and the Environmental Protection Agency. Industry "context" is operationalized using measures of industry dirtiness and industry proactiveness. To investigate the influence of both firm- and industry-level variables on firm-level financial performance, we specify a hierarchical (i.e., multilevel) model to test our hypothesis. Among the results, we find that within dirty and non-proactive industries there is a positive marginal effect on firm performance as a result of engaging in EMPs. Moreover, the effect on financial performance of implementing EMPs is greater in relatively dirty and non-proactive industry contexts than in relatively clean and proactive contexts.

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1. Introduction

A large number of empirical studies published over the past 40 years have examined the relationship between the firm's environmental management practices (EMPs) and financial performance (FP). Despite these efforts, research findings have been mixed, and firms all-too-frequently implement EMPs in an *ad hoc* manner, unsure how these practices affect the firm's financial performance and competitive standing.

Broadly defined as any initiative undertaken by the firm to minimize the adverse impact of its economic activities on the natural environment (Christmann, 2000), EMPs consist of investments in "end-of-pipe" and/or pollution prevention technologies (Christmann, 2000; Hart, 1995; Klassen, 2000; Klassen and Whybark, 1999),

environmental education and training programs (Klassen and Whybark, 1999), eco-design and green supply chain initiatives (Handfield, et al., 2001; Sroufe, et al., 2000, Vachon and Klassen, 2006; Zhu and Sarkis, 2004), environmental management systems (Sroufe, 2003), and internal and external communication of environmental activities (Sroufe, et al., 2002), among other physical, human, social and organizational capital investments (Barney, 1991; Youndt, et al., 2004; Lucas, 2010).

Avenues researchers have taken to draw inferences about the EMP-FP relationship (see Orlitzky et al., 2003; Margolis et al., 2007; Horváthová, 2010 for reviews) range from event studies to regression analyses. Measures of environmental efforts have varied, encompassing levels of emissions of toxic chemicals (Hart and Ahuja, 1996; King and Lenox, 2001), numbers of lawsuits (Konar and Cohen, 2001), the incidence of environmental awards and mishaps (Klassen and McLaughlin, 1996), third-party ratings (Waddock and Graves, 1997), and numerous other metrics. Results from these studies have not yielded a clear picture; some studies show that financial performance improves with higher levels of environmental performance (Klassen and McLaughlin, 1996; Russo and Fouts, 1997; Montabon, et al., 2007,

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Menguc et al., 2010), others show a negative relationship (Sarkis and Cordeiro, 2001), while yet others fail to establish any relationship.³

A potentially productive – though largely unexplored – approach to illuminating the EMP-FP relationship is that offered by Reinhardt (1998), who argues that the core business question is not “whether it pays to be green,” but rather “what are the circumstances” under which environmental practices might pay? This view arguably straddles a middle ground between the view that the EMP-FP relationship entails a stark trade-off and Porter and van der Linde’s (1995) perspective that the economy-ecology trade-off is not “inherent and fixed.” It explicitly acknowledges the possibility that a firm’s proactive EMPs may or may not produce above-average returns depending on the circumstances, and that it is critical to consider how the effect of a firm’s EMPs on its financial performance may differ across “contexts” in which the firm operates and competes.

Unfortunately, despite the potential insight available from Reinhardt’s contingent perspective of the EMP-FP relationship, the EMP literature provides little guidance on how to think about the specific circumstances (or “contexts”) under which it actually pays to be green (Albertini, 2013; Dixon-Fowler et al., 2013). In this paper, we empirically investigate the effect of EMPs on firm financial performance, both within- and between – (or across) industry contexts, asking when firm-level environmental practices “pay,” and probing how they might pay differently under different circumstances. We contribute to the EMP literature by showing that context matters, utilizing a theoretically derived operationalization of the construct, defined in terms of high versus low levels of industry dirtiness and industry pollution prevention proactiveness. However, we emphasize that this operationalization is only one of the many possible ways in which context can be described and suggest that future research expand upon it to include additional environmental factors (e.g., environmental innovation, regulatory pressure, etc.) as potentially relevant moderating influences.

In the remainder of the paper, we review the relevant literature on EMPs and performance, and offer a typology of industry environmental contexts. We then describe the firm- and industry-level data available for purposes of testing the proposed hypotheses. These data, which are nested in nature, require the use of multi-level modeling, the details of which are outlined in the method section. Finally, we discuss the findings, address limitations of the study, and suggest avenues for future research.

2. Literature review and hypotheses

We draw upon existing theories from the strategic management and organizational sociology literatures to develop a contingent perspective of the EMP-FP relationship. Specifically, we utilize the resource-based view (RBV) of the firm to understand how EMPs can contribute to a firm’s financial performance and competitive advantage, and further use Scott’s (2004) “dualist” perspective of organizations to develop hypotheses about how environmental characteristics of industry moderate this relationship.

2.1. An RBV perspective

The resource-based view (RBV) of the firm has strongly influenced empirical research on environmental management and competitive advantage in general (Sharma and Vredenburg, 1998; Christmann, 2000; Aragon-Correa and Sharma, 2003), and on the EMP-FP relationship in particular (Waddock and Graves, 1997;

Russo and Fouts 1997). Central to the RBV is the idea that the firm’s *internal* resources and capabilities are critical determinants of superior performance. The theory asserts that superior performance can be achieved through the development and exploitation of unique “bundles” of resources and capabilities that are rare, valuable and imperfectly imitable (Wernerfelt, 1984; Barney, 1991; Peteraf, 1993). Hart (1995) further extends this perspective by identifying, as a source of challenges and opportunities to the firm, the constraints imposed by the natural environment:

In the future, it appears inevitable that businesses (markets) will be constrained by and dependent upon ecosystems (nature). In other words, it is likely that strategy and competitive advantage in the coming years will be rooted in capabilities that facilitate environmentally sustainable economic activity (1995: 996).

A firm’s environmental initiatives, or EMPs, represent a potentially critical source of competitive advantage in an ecosystem-interdependent, resource-constrained world. EMPs can be deployed to produce market-place environmental differentiation and boost a firm’s margins and revenues. Environmental practices may also enable a firm to mitigate future regulatory costs, conserve resources, and enhance the efficiency of its manufacturing processes (Hart and Milstein, 2003; Ambec and Lanoie, 2008). Unfortunately, while it spotlights how internal firm resources and capabilities have the potential to produce superior performance, the RBV framework does not *specify* the *circumstances* under which such deployed resources can be exploited to their fullest and thus have the greatest effect.⁴ This lack of specificity in RBV theory poses a serious problem. As Collis and Montgomery (1995: 119) observe, “a resource that is valuable in a particular industry or at a particular time might fail to have the same value in a different industry or chronological context.” In other words, context matters.

Is there empirical evidence indicating how, or even whether, industry context moderates the EMP-FP relationship? In recent meta-analyses, Albertini (2013) rejects the hypothesis that activity sector moderates the relationship, and Dixon-Fowler et al. (2013) find only limited empirical evidence of moderating or contingent influences. Both authors warn of the need to interpret their findings with caution, pointing out that meta-analyses are based on available studies that differ significantly in terms of research methods and measures employed. Dixon-Fowler et al. conclude that there remains a critical need to better account for moderating influences, to “help guide managers in understanding the conditions that lead to the greatest performance benefits when supporting the environment.” Overall, it is clear that work examining moderating influences is in its infancy, with much additional guidance needed to better understand and operationalize industry context.

2.2. Dimensions of industry environmental context

Scott’s (2004) “dualist” perspective, based on half a century’s worth of research on organizations, offers a highly promising avenue for understanding the impact of industry context on the EMP-FP relationship. Since the 1960s, studies have supported a “dualist” perspective of organizations – a perspective in which organizations are viewed not only as “technical production systems” in search of organizational efficiency, but also as “adaptive social systems” in search of organizational legitimacy. As such, organizations are shaped by (a) “material-resource forces,” on the one hand, as organizational efficiency depends on the “technical” environment for resources, technology, and information, and (b) forces from “social and cultural

³ In a recent meta-analysis of 64 outcomes from 34 empirical studies, Horváthová (2010) finds that, while more than half of the studies examined exhibited a positive relationship between environmental and financial performance, a substantial percentage (about 30%) remained inconclusive.

⁴ This is a criticism of RBV generally. In this paper our focus is on the financial consequences of using, or “deploying,” EMPs to achieve financial goals.

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