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Which "green" is better? An empirical study of the impact of green activities on firm performance

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ABSTRACT

This study aims to distinguish an array of green activities (ISO 14000, green processes, pollution prevention, and green certifications) and analyze their relationships with firm performance. Employing data from the sampled publicly listed firms in Taiwan and regressions to examine the hypotheses, we find that the degree of a firm's R&D investment fails to affect companies' choice of green activities; however, the degree of firm internationalization can. That is, more internationalized firms are also more likely to employ green certifications among these activities. In terms of the impacts of these green activities on firm performance, a company employing green processes can perform better, followed by ISO 14000, pollution prevention, and lastly, green certifications.

1. Introduction

Green activities have received growing attention in the wake of climate change (Bhuian, Joonas, & Ruiz, 2007). Eco-friendly products may reduce a customer's price consciousness (Hunt & Auster, 1990; Hur, Kim, & Park, 2013), while green strategies may improve a firm's competitive advantage (Hart, 1995; Marti, Rovira-Val, & Drescher, 2013). Environmental awareness is on the rise and firms that opt for green solutions can not only respond to customer demands, but also improve their profitability. McWilliams and Siegel (2001) supported this argument, outlined environmental social responsibility, and highlighted that companies going beyond environmental regulatory compliance should earn more returns.

Prior research on green activities has emphasized various subjects such as product and market strategies (Menon & Menon, 1997), firms' motivation to conduct green activities (Buysse & Verbeke, 2003; Sully de Luque, Washburn, Waldman, & House, 2008; Waldman, Siegel, & Javidan, 2006), sources of competitive advantages (Hart, 1995; Jennings & Zandbergen, 1995; McWilliams, Van Fleet, & Cory, 2002) or supply chain management (Lee, 2008). Although discussions on green activities have been provocative, their heterogeneity receives less attention.

In particular, research on green studies has been popularly associated with competitive advantage (Hart, 1995; Jennings & Zandbergen, 1995; McWilliams et al., 2002). Hart (1995) used a resource-based view to explain the relationship between environmental opportunities and competitive advantage, and Russo and Fouts (1997) analyzed 243 firms to prove that high-level environmental performance will enhance firm profitability. However, different green activities produce different kinds of competitive advantage, which bears investigation (Porter & Linde, 1995; Siegel, 2009; Sully de Luque et al., 2008). Olson (2008) advanced an enterprise-level green activity that leads to cost-down effectively. Siegel (2009) observed that green activity can promote a company's image to increase profitability.

Companies with competitive advantage should be able to outperform their competitors (Porter, 1985). That is, competitive advantage is important for a firm to perform better, and green strategies should improve a firm's competitive advantage, but different strategies create different competitive advantages for the company (Porter & Linde, 1995). Hence, firms with different competitive advantage should perform well but differently.

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However, empirical evidence in this regard is scarce, and this article attempts to fill this void.

Hart (1995) developed a resource-based view with the nature of firms, and considered that green activities could form competitive advantage for companies. McWilliams et al. (2002) and Siegel (2009) found that green activities could improve intangible resources to increase competitive advantage to thereby increase performance; that said, less attention has been paid to issues concerning which green activities can lead to better firm performance. In short, there is a need for research about the strength of performance produced from different green activities. This article aims to classify green activities and find the relationships between firm characteristics and the types of green activities. Further, this article aims to discover what green activity can cause better firm performance. Hence, the main research objectives of this study include the following two main research questions: Does a firm's characteristics affect its green strategy decisions? Does its green activities affect firm performance?

This study has multifold contributions. First, it emphasizes heterogeneity in green activities and analyzes how firm characteristics can react to different green strategies. Second, it fills the gap in the relationships between green activities and firm performance. It makes an early attempt to define the relationships between each of different green activities and firm performance. Third, this study provides empirical evidence concerning whether firms employing green activities should correct those activities' defects and implement green processes to improve their performance. The findings provide the top management team with evidence regarding its efforts to depend on green activities for better performance and provide the boards of directors with evidence regarding their knowledge and practices in strategizing a firm's green activities under different firm characteristics.

This article's first section introduces the main research agenda and contributions. The second section addresses related theories to further develop the hypotheses. The third addresses the methodology used and data analyzed from Taiwanese firms. The fourth explains the results. The fifth addresses the conclusion and implications based on the empirical findings. The final section addresses limitations for future research.

2. Literature and hypotheses

Prior research has investigated what motivates a firm's green activities. Bansal and Roth (2000) found that competitiveness, legitimization, and ecological responsibility are the main three drivers of corporate ecological responses. Buysse and Verbeke (2003) found a strong association between stakeholders and proactive green activities. Furthermore, other researchers also discovered CEO leadership's influence on green activities (Sully de Luque et al., 2008; Waldman et al., 2006). That is, various reasons can motivate a firm to conduct green activities.

2.1. Environmental awareness and green activities

Among various motivations for green activities, the rise of environmental awareness can be critical to the development of a firm's green strategies. For example, pollution has been a major concern to the public, and many governments have passed a series of bills with unprecedented regulations of air and water quality. King (1994) and Porter and Linde (1995) further argued that pollution hid wasted resources and effort, and could lead to inefficiency. Thus, in the 1990s, the International Organization of Standardization (ISO) developed ISO 14000 standards relating to environmental management. More and more firms and supply chains have adopted the ISO 14001 certification, which sets the basic standards of firms' environment (Castka & Balzarova, 2006). There are two kinds of technical structures in ISO 14000: One is environmental management systems (EMSs) and the other is life-cycle assessments. ISO 14000 family certifications reveals that "a firm has a well-documented consistent EMS," but "does not in itself say anything about a firm's environmental impact" (Albuquerque, Bronnenberg, & Corbett, 2007, p. 452), and firms have to submit to reinspection every three years to maintain their certification (Albuquerque et al., 2007). A firm pursues ISO 14000 certifications for various reasons including company image, environmental protection, and marketing advantage (Pan, 2005). That is, ISO 14000 certifications respond to society's expectations. In the international market, price and quality are the important factors in the selection of suppliers, but an EMS is often considered (Bellesi, Lehrer, & Tal, 2005). Hence, using EMSs increases a firm's competitiveness (Leal, Casadesús, & Pasola, 2003). Next, through life-cycle assessments, Braungart, McDonough, and Bollinger (2007) developed the idea further with the "Cradle to Cradle" concept, arguing that any product design must begin with means to naturally and constantly recycle products and retain value. This new design framework for product and process promotes environmental health and economic growth.

Menon and Menon (1997) responded to the rise of environmental awareness and stated that environmental concerns had changed global competence, and environmental regulations had impacted firms' strategies, which should reflect the confluence of environmental concerns for the benefit of the ecosystem. Olson (2008) further argued that green activity should influence a firm's strategic formulation and operations, and firms should build a culture of awareness about greenness and actions to facilitate environmental decisions and transformation initiatives for better performance.

Hence, *green activity* can be defined as a company's environmental behavior, including extensively environmental activities, which can assist a firm in its decision-making process and can benefit the environment. Accordingly, we can use two important dimensions to further identify types of green activities: products and supporting infrastructure. In terms of the first dimension on product, scholars have suggested different strategies about products; for example, developing new green products (Menon & Menon, 1997; Braungart et al., 2007; Olson, 2008; Siegel, 2009), or renewing the efficiency process to manufacture original products (Nehrt, 1996; Olson, 2008; Porter & Linde, 1995; Siegel, 2009). In terms of the second dimension on supporting infrastructure, Porter (1985) considered that any changes of strategies need fundamental infrastructure to support these changes, such as developing new products needing renewable equipment. Based these two dimensions, we identify four different types of green activities as follows:

Type 1: ISO 14000. When a corporation seeks ISO 14000 certifications, it needs to upgrade its software. Because ISO 14001 concerns the execution of an EMS, the company will need to buy software to adapt to the EMS. Moreover, ISO argues that the EMS can reduce costs and waste. The ISO 14000 certifications emphasize that companies should establish an environmental mission to improve products by changing the processes or innovating new green products.

Type 2: green processes. This type of green activities includes a whole new green product and renewal process. Hart (1995) and Braungart et al. (2007) claimed that a company's product development should include a life-cycle assessment. The company should consider its products from the materials used to a nonpolluting recycling process. Therefore, when companies decide to develop and manufacture a new green product, they