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The impact of legitimacy pressure and corporate profitability on green innovation: Evidence from China top 100

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ABSTRACT

Green innovation is an important approach for achieving sustainable development. Most research on determinants of corporate green innovation has focused on either external or internal drivers. Combining institutional theory and resource-based view, the scientific value of this study lies in simultaneously exploring the influence of external legitimacy pressure and internal corporate profitability, and their interaction on green innovation. Samples of the top 100 listed companies in China, from 2008 to 2012, were used and the results demonstrated that legitimacy pressure from stakeholders has a significantly positive influence on both corporate green product innovation and process innovation. The results also revealed that corporate profitability positively affects green product innovation, while there was found to be no significant influence on green process innovation. Moreover, corporate profitability positively moderates the relationship between legitimacy pressure and green product innovation. The results show that not only the single factor of external legitimacy pressure and internal profitability, but also their interaction, affects corporate green innovation practices. This offers an integrating perspective on how corporations can be more innovative in sustainability.

1. Introduction

The world has witnessed extreme environmental deterioration over the last few decades and in China, the extensive-growth mode has resulted in severe environmental pollution and ecological devastation, which has overwhelmingly affected people's normal lives. Firms are widely regarded as the main cause of environmental problems and are facing tremendous pressure of environmental legitimacy from various stakeholders (Bansal and Clelland, 2004). Pressure from the media, consumers and other stakeholders pushes corporations to adopt innovative measures to improve their environmental performance. Green innovation lays a foundation for a firm to balance profitability and environmental responsibility whilst at the same time achieving an economic-social-environmentally harmonious development model, which has been extensively advocated by researchers and practitioners.

Green innovation refers to the generation of new ideas, goods, services, processes, or management systems that can be used to cope with environmental problems (Rennings, 2000). Green innovation can effectively reduce environmental pollution and the negative impacts of resource (and energy) use processes, and thus can create sustainable development (Kemp and Pearson, 2007). Lai et al. (2003) found that green innovation can contribute to environmental performance by meeting stakeholders' environmental requirements. In this way, green innovation is not only an important way for enterprises to gain a competitive advantage in the future, but also it will become the basic requirement to obtain legitimacy.

Research of corporate green innovation is mainly concentrated in two specific aspects. The first is that research focuses on the driving factors of green innovation, including stakeholder pressures, government regulations, redundant resources, expected economic benefits and environmental consciousness of managers and employees (Caputo, 2014; Delgado - Ceballos et al., 2012; Murillo - Luna, 2008). The other aspect of the research focuses on the consequences of green innovation; i.e., the relationship or mechanism between green innovation and corporate performance (Amores-Salvadó et al., 2014; Eiadat et al., 2008). Even though there

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is no unanimous conclusion at present, existing empirical studies show the positive role of corporate green innovation on business performance calls for configurable conditions (Horváthová, 2012; Sarkis and Cordeiro, 2001). The academic interest in green innovation is increasing but few studies have explored its driving forces by integrating external and internal factors (Lozano, 2015), and seldom any combine a legitimacy perspective with a resource-based view (Berrone et al., 2013; De Marchi, 2012).

Legitimacy, a core concept of institutional theory, is defined from various perspectives, among which Suchman (1995)'s definition is widely accepted: legitimacy refers to the state where "the actions of an entity are appropriate within some socially constructed system of norms, values, beliefs, and definitions" (p. 574). Such systems can be explicit or implicit, so it is not enough for firms to just obtain the legal requirements or market demands, but they should also be consistent with the prevailing norms and values of the society (Alrazi et al., 2015). Stakeholders often assess an entity's legitimacy level according to their own perceptions, and these stakeholders usually include investors, customers, the community, the public and regulators (Bansal and Clelland, 2004). Lack of legitimacy will result in negative cognitions and actions of various stakeholders. When a company engages in environmental violations such as water contamination, investors may sell off its stocks, creditors may impose higher interest rates, consumers may refuse to purchase its products or services, the government may increase sewage charges or even compel it to stop operation, and the public may engage in the media to create legitimacy pressure on the firm (Alrazi et al., 2015), which will put the firm at great risk (Bansal and Clelland, 2004; Sass, 2008), and even impact its survival, especially for those environmentally-sensitive firms (Pellegrino and Lodhia, 2012). For example, Harbin Pharmaceutical Group, a large drug producer in northeast China, was involved in a pollution scandal for exceeding legal waste gases and water release in 2011, which drew severe criticism from the public and the company was eventually fined 1.23 million yuan ($191,626) by the government and was forced to build a new cleaner production plant. As a result, its revenue and profit dropped by 47.15% and 46.62%, respectively, and it was expelled out of the Top 100 list in 2012.

From a resource-based view, pursuing green innovation requires substantial financial resources, and a corporation's response to external legitimacy pressures depends on its internal resources, among which profitability is of vital importance to green innovation (Li and Tang, 2010). Higher profitability would enable a firm to invest in more eco-friendly technologies and management systems (Dean and Brown, 1995).

Legitimacy pressure and corporate profitability are significant external and internal drivers of green innovation (Jennings and Zandbergen, 1995), but few studies have researched their roles simultaneously. Therefore, drawing on insights from institutional theory, resource-based view and innovation literature, this study intends to explore in what ways and how legitimacy pressure and corporate profitability could promote green innovation. Specifically, we argue that green innovation is driven by both external legitimacy pressure and internal corporate profitability, and that profitability positively moderates the relationship between legitimacy pressure and green innovation.

The main contributions of this paper are as follows. Firstly, we bridge institutional theory and resource-based view to explore the driving mechanism of green innovation, which is currently under-researched (Berrone et al., 2013). Secondly, we apply a novel method to measure corporate green innovation through a green patent and ISO14001. We measure green patents with Chinese characters containing "environmental", "green", "sustainable", "ecology", "clean", "cycling", "saving", "low carbon", "emission reduction", "energy saving", "environmental protection", and "environmental pollution" (Cormier and Magnan, 2015). Lastly, we focus on the Chinese context, which is different from most of the research that has come before our study which has been based on the more developed Western countries, and this in turn adds value to theoretical completeness since there are huge differences between developed countries and emerging economies (Li and Liu, 2014).

The remainder of the paper is organized as follows. The next section is the literature review and hypotheses development, followed by sections that outline the research design, methodology, and empirical results. The last section provides a discussion and final conclusion.

2. Literature review and research hypothesis

2.1. Legitimacy pressure and green innovation

Legitimacy, first introduced by Weber in 1978, refers to whether an organization's behavior is appropriate within certain social systems (Meyer and Rowan, 1977; Ruef and Scott, 1998; Suchman, 1995). If stakeholders do not approve the activities of an organization, then the organization faces legitimacy pressure. Legitimacy pressure is generally divided into regulatory pressure, normative pressure, and cognitive pressure (DiMaggio and Powell, 2000). For firms, regulatory pressure mainly stems from governmental agencies, while normative pressure is generally from customers and non-governmental organizations, and cognitive pressure is mostly from competitors (Berrone et al., 2013; Li and Ding, 2013).

The choice for opting for cleaner production and green innovation has, at its heart, always been a public goods game[1] (Perc et al., 2013). There are short-term gains to be made in profit by neglecting the environment, but in the long term, looking specifically at public goods, most notably the environment and natural resources are likely to be lost due to selfish incentives. Such a social dilemma is very common in an agent-based setting where information asymmetry and the selfish incentives of agents lead to the tragedy of the commons (Perc and Szolnoki, 2010). Evolutionary game theory proposes that coevolution with other agents (stakeholders) and the context could help to solve social dilemmas such as climate change (Perc and Szolnoki, 2010). Previous research concluded that an important motivation for corporations adopting green innovative behavior is to get recognized by various stakeholders (Berrone et al., 2013). Delgado-Ceballos et al. (2012) found that stakeholders can affect a company's environmental practices through a variety of channels, including environmental regulations, NGOs' environmental reports, social media supervision, and customers' and suppliers' boycott of non-environmental products. Generally, green innovation becomes an important way for enterprises to cope with external pressures (Berrone et al., 2013). Huang et al. (2016) demonstrated regulatory and customer pressure promotes organizational green innovation performance. The more legitimacy pressure companies receive from stakeholders, the more likely it is they will adopt a green innovation strategy (Murillo-Luna et al., 2008).

Green innovation can be divided into different dimensions or types, among which green process innovation and green product innovation are widely accepted (Chang, 2011; Lin et al., 2014; Rennings and Rammer, 2011; Schiederig et al., 2012).

Green process innovation refers to improvement in the manufacturing processes and systems to reduce the adverse impact on the environment, such as energy saving, pollution prevention, waste recycling, etc. (Qi et al., 2012). With the elevation of

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