Low carbon supply chain firm integration and firm performance in China

Zhaofang Mao, Shan Zhang, Xiaomei Li*

College of Management and Economics, Tianjin University, Tianjin, 300072, PR China

**A R T I C L E   I N   P R E S S**

**Article history:**
Received 6 April 2015
Received in revised form 21 May 2016
Accepted 14 July 2016
Available online xxx

**Keywords:**
Low carbon supply chain
Low carbon integration
Firm performance
Quality management

**A B S T R A C T**

Based on the natural resource-based view (NRBV), this paper analyzes the relationship between internal low carbon integration and external low carbon integration and firm performance, as well as the moderating role of quality management within low carbon supply chain, by researching 12 business departments of machinery, electronic, and transportation components industries in China. The results of this empirical study show that internal low carbon integration helps to improve firm’s environmental performance, while hinder firm’s financial performance. External low carbon integration improves both environmental performance and financial performance. In the meanwhile, quality management strengthens positive relationships that found in this study and weakens the negative relationship between internal low carbon integration and financial performance.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

As pollution becomes increasingly severe, sustainable development that focuses on the balance of economic, environmental, and social performance has attracted much more attention than ever before (Elkington, 1998; Gilbert, 2001; King and Lenox, 2002; Klassen and McLaughlin, 1996; Lun, 2011). An increasing number of firms have included environmental practices into their strategic plans and routine operations, such as Apple, Wal-Mart, IBM and so on. They conducted environmental protection projects from the perspective of supply chain, which resulted in energy conservation and carbon emission reduction, thus they won good reputations from customers and society. Therefore, low carbon supply chain management turns out to be an important way to realize environmentally sustainable development. However, firms should not only focus on internal low carbon management, but concern about supply chain integration with upstream suppliers and downstream customers, which improves efficiency and reduces carbon emission (Cespedes, 1996). Low carbon supply chain integration is the integration of internal and external companies on the basis of low carbon supply chain to achieve environmental and economic goals together.

Based on the resource-based view (RBV), resources and capabilities that firms possess can turn into competitive advantages, thus increasing firm performances (Barney, 1991). However, several studies on the impact of low carbon supply chain management on firm performance have yielded conflicting results, especially on financial performance (Yang et al., 2013; Vachon and Klassen, 2008; King and Lenox, 2001; Hart and Ahuja, 1996), which indicates the differences in the concept of low carbon supply chain management. Previous studies have paid large attention to the impacts that low carbon practices conducted within firms have on both environmental performance and financial performance. Only few studies that took suppliers and customers into consideration viewed low carbon supply chain as a whole, but they did not distinguish the impacts of internal practices and external collaboration with suppliers and customers on firm performance (Klassen and McLaughlin, 1996). In addition, the uniqueness of low carbon supply chain integration lies in the fact that low carbon supply chain focuses on carbon footprint and reducing carbon emission, which in turn causes extra efforts on environmental protection, such as purchasing environmentally-friendly facilities, conducting low carbon trainings to employees and so on, which may increase costs.

The relationship between low carbon supply chain integration and firm performance may be moderated by quality management. It is expected that the existence of quality management may enhance the effectiveness of low carbon supply chain management. Practices of quality management such as training, self-evaluation are similar to practices of low carbon supply chain management,
thus, increase chances for the transformation from practices to performances.

Therefore, this paper proposes to examine the relationship between low carbon supply chain firm integration and firm performance, including environmental performance and financial performance, as well as the moderating role of quality management. Based on this objective, this paper makes several contributions in distinct aspects. First, this study contributes to filling the gap by proposing and empirically testing the relationship between supply chain integration and firm performance in the low carbon context. Second, we explore the secret within the black box of the relationship between low carbon supply chain firm integration and firm performance. Previous studies did not distinguish the effects of internal low carbon integration and external low carbon integration, which, under different circumstances, may not be the same. As the results turn out, internal low carbon integration helps to improve firm’s environmental performance, while hinder firm’s financial performance. External low carbon integration improves both environmental performance and financial performance. Also, the moderation effect of quality management is tested to show higher quality management will strengthen the relation between low carbon supply chain integration and firm performance.

The remainder of this paper is organized as follows. After the introduction, literature review and hypotheses development are explained in section 2. Section 3 and section 4 demonstrates methods and results of hypotheses that are tested in this paper. Finally, discussions, practical implications and limitations are outlined in section 5 and section 6.

2. Literature review and hypotheses development

2.1. Natural resource-based view

Resource based view thinks that different resource portfolios and management styles will influence firm’s competitiveness, and in turn bring competitive advantages when these resources are valuable, inimitable, rare and irreplaceable (Barney, 1991). As awareness of environmental protection has been raised, natural resource-based view (NRBV) was put forward on the basis of RBV. NRBV considers firms development relies on natural environment, and firms future competitive advantages are embedded in economic capabilities that are helpful for sustainable development (Hart, 1995). NRBV puts forward three strategic capabilities; pollution prevention, product stewardship and sustainable development. These three strategic capabilities are successive rather than parallel. Pollution prevention focuses on waste and emissions prevention, product stewardship expands the scope of pollution prevention to include the entire life cycle into consideration, such as design, development and so on in order to create competitive advantages from sources of products. Sustainable development is the ultimate goal that not merely seeks to reduce environmental impacts, but provides a management pattern for long-term development. Besides, it concerns not only environmental impacts, but also economic and social influences (Elkington, 1998; Russo and Fouts, 1997). Pollution prevention and product stewardship are essential ways to sustainable development (Grzebyk and Stec, 2015).

Not only NRBV provides a more systematic theoretical support on testing the relationship between resources, capabilities and environmental performance and financial performance, but also studies that confirm the promotion effects of environmental practices on firm performances have provided validation for NRBV. Therefore, NRBV argues that environmental management helps improve capabilities, thus promotes firm performances.

2.2. Low carbon supply chain

Low carbon supply chain is the combination of firm low carbon management and supply chain management (Zhu and Sarkis, 2004). As the importance of low carbon supply chain becomes increasingly aware to the public, literature on low carbon supply chain has been growing to a large extent. However, definitions on low carbon supply chain have never been unified. Low carbon supply chain can be defined as a management model that runs through product design, procurement, manufacturing, selling and consumption regarding environmental protection as its main goal (Zsidisin and Siferd, 2001). In addition, others argue that low carbon supply chain should not only concern about environmental protection, but also take resources utilization into consideration (Perron et al., 2006). Low carbon supply chain takes environmental thinking into supply chain management concerning the whole life cycle of products from design, raw material selection, manufacturing, transportation, final products delivery to disposal (Srivastava, 2007). The difference between low carbon supply chain and traditional supply chain lies in the fact that low carbon supply chain targets on reducing negative environmental impacts and increasing resource utilization rates, and it adds recycling into its process to achieve the transformation to closed-loop operations (Molina-Azorín et al., 2009).

Some scholars have studied the relationship between low carbon supply chain and firm performance, and results turn out that low carbon supply chain can improve firms’ environmental performance, while the relationship with financial performance is inconsistent. Some found that low carbon supply chain management could improve firms’ financial performance (King and Lenox, 2002), while others argued that it would hinder financial performance (Gilley et al., 2000). The reason for the inconsistency may be the different definitions they applied. Most of scholars focus low carbon supply chain on the internal environmental practices of firms, such as raw material selection, packaging, transporting, and disposal and so on to reduce negative effects on environment, while only a few researchers considered the effects of information sharing and co-development with suppliers and customers, i.e., supplier integration and customer integration. Above all, this paper defines low carbon supply chain as a management mode that runs through the whole product life cycle including product design, procurement, manufacturing, selling, consumption and recycling to consider environmental impacts and resource utilization comprehensively, meanwhile taking suppliers and customers into consideration.

2.3. Low carbon supply chain integration and firm performance

Low carbon supply chain integration, namely, is to realize unified control of a number of independent production processes on the basis of low carbon supply chain. Supply chain integration is defined as “the degree to which a manufacturer strategically collaborates with its supply chain partners and collaboratively manages intra- and inter-organization processes”, and it is found to be positively related with firm performance (Flynn et al., 2010). According to this, low carbon supply chain integration is viewed as the extent to which a firm integrates with its suppliers and customers as well as internal sources and capabilities in order to “green” production processes and reduce environmental impacts. Low carbon supply chain integration involves customers and suppliers directly to plan for low carbon management and low carbon solutions together (Vachon and Klassen, 2008). Same as supply chain integration, low carbon supply chain integration is also collapsed into three dimensions: internal low carbon integration, supplier low carbon integration and customer low carbon integration, while
دریافت فوری متن کامل مقاله

امکان دانلود نسخه تمام متن مقالات انگلیسی
امکان دانلود نسخه ترجمه شده مقالات
پذیرش سفارش ترجمه تخصصی
امکان جستجو در آرشیو جامعی از صدها موضوع و هزاران مقاله
امکان دانلود رایگان ۲ صفحه اول هر مقاله
امکان پرداخت اینترنتی با کلیه کارت های عضو شتاب
دانلود فوری مقاله پس از پرداخت آنلاین
پشتیبانی کامل خرید با بهره مندی از سیستم هوشمند رهگیری سفارشات