



The impact of environmental management systems on financial performance in fashion and textiles industries

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ABSTRACT

With rising environmental concerns from consumers and stakeholder groups, environmental management has become an important responsibility for today's fashion and textiles manufacturers. The production of fashion and textiles related products often requires high levels of energy and water consumption, and emits large quantities of pollutants to the environment. Therefore, the adoption of environmental management systems (EMSs) is important and could have a significant impact on these firms' operational performance. This study presents empirical evidence on the performance impact of EMS adoption in the fashion and textiles related industries (FTIs). Although EMSs have emerged as a passport to business in the FTIs, their actual impacts on firms' financial performance have not been explored. We reveal that the adoption of ISO 14000, the most popular EMS, improves manufacturers' profitability in the FTIs over a three-year period as measured by return-on-assets (ROA). Based on our sample, we find that profitability improvement started during the implementation stage and continued at least one year after the firm obtained ISO 14000 certification. We also find that profitability improvement is mainly due to improvement in cost efficiency, measured by return-on-sales (ROS). Specifically, certified firms improved up to 2.9% in ROA and 3.3% in ROS over the three-year period since they implemented ISO 14000. We conclude that there is a positive impact of EMS adoption on firms' financial performance in the FTIs.

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1. Introduction

The market of eco-fashion is growing briskly in recent years. The retail sales of products using organic cotton increased by four times from 2006 to 2009, reaching US\$4.3 billion worldwide in 2009 (Organic Exchange, 2010). These figures show that customers have growing preferences for environmentally friendly fashion products. With rising concerns over product sustainability, buyers of major fashion brands have paid great attention to their suppliers' environmental performance. Suppliers' environmental management systems (EMSs) have become one of the criteria in buyers' green purchasing strategies (Boiral and Sala, 1998; Hamner, 2006; Meyer, 2001). Some firms of the U.S. apparel industry (e.g., Levi-Strauss, Nike, Gap, and Eddie Bauer) even develop their own standards for environmental compliance and conduct their own audits to determine the level of compliance of their suppliers (Hamner, 2006). However, not every fashion buyer is able to develop their own environmental standards. Instead, most of them rely on internationally recognized EMSs and third-party verifications to assess their suppliers' environmental performance.

A number of EMSs have been introduced to the manufacturing industry since the 1990s, e.g., the Green Dragon Environmental Management Standard developed by environmental groups in the U.K. and the Eco-Management and Audit Scheme (EMAS) developed by the European Union. There are industry-specific EMSs developed for the apparel and textiles industries, e.g., the Global Recycling Standard (GRS) for textiles and clothing developed by the Control Union. However, the above-mentioned EMSs lack international recognition and the level of customer acceptance varies across manufacturing sectors. Among the popular EMSs introduced to the manufacturing industry, ISO 14000, which is developed by International Organization of Standardization (ISO) in 1996, is the most popular and highly recognized EMS in the world (Corbett and Kirsch, 2001). ISO 14000 is a set of management processes and procedures requiring firms to identify, measure, and control their environmental impacts (Bansal and Hunter, 2003). With the aim of improving the environmental performance of a firm, compliance with the standard is audited and certified by an independent, third-party certification body (Jiang and Bansal, 2003). The number of ISO 14000 certified firms or business divisions has grown rapidly in recent years. From 2006 to 2008, the number of ISO 14000 certified firms or business divisions increased by 47% (ISO, 2009). In 2008, 188,815 firms or business divisions in 155 countries had adopted ISO 14000 (ISO, 2009).

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Despite the growing number of firms adopting EMSs, there are mixed results regarding their benefits in the literature. Previous studies on EMSs, which are mainly based on case studies or survey research, reveal contradicting results in the relationships between firms' environmental management practice and their financial performance. More importantly, the level of EMS adoption and its impact on the fashion and textiles industries (FTIs) have not been investigated. This study attempts to fill this research gap by estimating the impact of EMS adoption on fashion and textiles related firms' financial performance. The rest of the paper is organized as follows: in Section 2 we review research on the impact of EMSs and their adoption in the FTIs. In Sections 3 and 4 we discuss the development of the hypotheses, and present the research methodology and data collection procedure, respectively. We discuss the results in Section 5, and summarize the main findings, conclude the paper, and suggest future research topics in Section 6.

2. EMS adoption in the fashion supply chain

2.1. Empirical studies on EMSs and firm performance

There are two paradoxical views on the impact of EMSs on firm performance. Some critics argue that adopting EMSs is just a bureaucratic paper exercise that requires excessive documentation, as considerable effort is required in preparing and updating procedures and records (Boiral and Sala, 1998). Lee et al. (2008) find that profit margin, sales growth, return-on-equity, and earning per share of Taiwan manufacturing firms are negatively affected after EMS adoption. Based on a survey of 1510 supply chain and purchasing managers, Montabon et al. (2000) find that EMSs in general have a strong negative impact on the major strategic dimensions of firm performance (i.e., lead-time, costs, and quality), and the adoption does not enhance the firm's competitive position in the marketplace.

On the other hand, a number of case studies or surveys using subjective data have found positive relationships between EMS adoption and firm performance. For example, Delmas (2001) finds that EMS certified firms attain better financial performance than non-certified firms. Melnyk et al. (2003) reveal that EMS adoption improves leads to cost reduction, quality improvement, waste reduction in design and equipment selection, and lead-time reduction for manufacturers. All these are cross-sectional studies using subjective measurements of firm performance, so they cannot ascertain the causality between EMS adoption and firm performance.

2.2. EMSs in fashion and textiles industries

The dyeing process in textiles processing could produce huge amount of toxic emissions that would lead to fines and high restoration costs. Especially for the wet processing of natural fabrics, the production processes are water-, energy-, and pollution-intensive (Ren, 2000). Therefore, managing the environmental impacts of their production processes is particularly important to fashion and textiles related firms. Surprisingly, the environmental issue in the textiles industry has received only little attention from both academics and practitioners. Most environmental researches in the context of the FTIs are technology-oriented. There are very limited studies that investigate the environmental management aspects in FTIs industries. Although EMSs are commonly adopted in manufacturing industries, their adoption in the FTIs is still in an early stage. The Europe State Council has started enforcing green practices by legislation in hopes of motivating textile factories to adopt EMSs, such as ISO 14000 (Brito et al., 2008). In short, the number of EMS adoptions in the global FTIs is unclear. There is also

a lack of empirical work that objectively measures the impact of EMS adoption in the FTIs.

In the fashion and textiles supply chain literature, the major focus is on how firms make use of EMSs in the supplier selection process. Major fashion brand owners regard EMS adoption as an instrument to determine suppliers' capability in following the industry's environmental standards (Motwani et al., 1999; Teng and Jaramillo, 2005; Thaver and Wilcock, 2006). Jørgensen et al. (2010) find that ISO 14000 is one of the major types of environmental initiatives in Danish textiles industry, which allows Danish textiles firms to control and monitor their suppliers' environmental performance in developing countries. Fashion and textiles manufacturers in developing countries are thus under strong pressure to adopt internationally recognized EMS certifications, such as ISO 14000, in order to gain legitimacy from buyers that are multinational enterprises (MNEs) in developed countries (Christmann and Taylor, 2001).

There are a few case studies that explore how EMS adoption could improve textiles firms' performance. For example, Fresner (1998) analyzes an Austrian textile mill and finds that the adoption of ISO 14000 helps the firm to reduce solid waste production and thus its overall productivity. Brito et al. (2008) find that firms in Europe's FTIs that adopt ISO 14000 improve their customer services and reduce costs, leading to eventual improvement in the overall performance of their supply chains. Nevertheless, these studies do not investigate whether the adoption of EMSs could improve firms' profitability, which is often the major concern for practitioners. Moreover, these studies do not provide objective data to verify the perceived benefits of EMS adoption in the FTIs. Therefore, there is an obvious research gap regarding the actual impact of EMS adoption on firms' performance (based on objective data) in the FTIs.

3. Hypothesis development

Previous studies have found a positive relationship between environmental performance and stock returns in the general manufacturing industry (e.g., Klassen and McLaughlin, 1996; Jacob et al., 2010). However, these studies also acknowledge that their findings only represent short-term responses based on the assumption of Efficient Market Theory. The actual impact of EMS adoption should be corroborated by long-term accounting-based performance measures, to advance the understanding of the mechanisms by which environmental management efforts affect financial performance (Klassen and McLaughlin, 1996; Jacob et al., 2010). Therefore, to estimate the impacts of EMSs on the financial performance of firms in the FTIs in the current study, we focus on firms' operating income, which is sales revenue minus the cost of goods sold (COGS), and selling general and administration expenses (SGA). We prefer operating income over net income because it is not affected by changes in interest rates, tax considerations etc. Operating income divided by total assets is equal to return on assets (ROA), which is the most commonly used financial measure of firms' profitability.

Klassen and McLaughlin (1996) suggest that improve environmental performance could improve firms' profitability through improving cost efficiency and sales performance. To measure cost efficiency, we divide operating income by sales, which is equal to return on sales (ROS). To measure sales performance, we divide sales by total assets (SOA). We use SOA instead of actual sales revenue for sales performance because SOA is more representative of a firm's efficiency in generating revenue from its total assets. To have a better understanding of the effects of EMS adoption in fashion supply chains, we develop hypotheses on the relationships between EMSs and firms' profitability (measured by ROA), cost efficiency (measured by ROS), and sales performance (measured by SOA), respectively.

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