Abstract

**Purpose** – The aim of this study is to focus on manufacturing small to medium-sized enterprises (SMEs) that are simultaneously pursuing quality and environmental objectives. Specifically, the paper examines: the specific motivations and resources of SMEs that have chosen to pursue both priorities, the types of initiatives these SMEs have implemented, and whether pursuing both priorities is correlated with various facets of organizational performance.

**Design/methodology/approach** – This study gathered data from a sample of 254 ISO 9000 and ISO 14000 certified Canadian SMEs. Data collection was based on a survey questionnaire sent to a random sample of 1,514 companies.

**Findings** – The results highlighted significant differences between the SMEs holding both the ISO 9000 and 14000 certifications and those holding only the 9000 ISO certification. Each group was shown to have distinct motivations and resources and to have implemented different types of initiatives to address environmental concerns. Each group was positively correlated with different facets of organizational performance.

**Research limitations/implications** – This study’s findings contribute to the environmental and SME literature on this very complex topic by providing relevant empirical evidence based on primary data.

**Practical implications** – The results should provide guidance to manufacturing SMEs currently examining how to address environmental issues. SMEs need to address these issues carefully and understand the potential trade-offs and consequences associated with their decisions.

**Originality/value** – An important contribution of this study is its detailed characterization of environmental initiatives, drawing on insights derived from the environmental, accounting and management literature. By using the analytical framework of organizational citizenship behaviours, the characterization also included informal and behavioural aspects often neglected in environmental management studies.

**Keywords** ISO 14000, ISO 9000 series, Environmental strategy, Organizational citizenship behaviors for the environment, SME, Small to medium-sized enterprises, Canada

1. Introduction

With growing pressure to improve environmental performance, large and small companies alike are increasingly confronted by environmental issues. Much has been written about how best to integrate these new factors into decision-making processes, however environmental management programs and systems are often developed by large corporations and reflect their experiences and strategies (Battisti and Perry, 2011; Fassin et al., 2011). The applicability of these tools, techniques and programs to small and medium enterprises (SMEs), which represent the vast majority of businesses, must be examined, as these companies evaluate how best to respond to environmental pressures, the long term implications of the available options, and how to efficiently...
integrate those options into their corporate strategy (Hillary, 2003; Miles et al., 1999).
However, this type of examination can be a challenging task. Environmental initiatives are often embedded in a complex and indivisible whole which comprises processes, values and behaviours. Furthermore, because there are similarities between waste reduction objectives and quality control goals, environmental initiatives are often an integral part of quality programs (Karapetrovic and Willborn, 1998; Molina-Azorin et al., 2009a; Roy et al., 2001).

Some small and medium manufacturers have chosen to examine the environmental impacts of their decisions about product design, process design and operational procedures as part of their efforts toward quality improvement. Others have decided to build on these capabilities and implement formal programs such as the ISO 14001 standard to explicitly address environmental concerns. While both approaches could prove useful in addressing environmental issues, little is known about the characteristics of the SMEs who are pursuing quality and environmental performance goals simultaneously, and the consequences of this particular option for organizational performance (Karapetrovic, 2002; Karapetrovic and Willborn, 1998; Husband and Mandal, 1999). Indeed, although there are similarities and synergies between quality assurance and environmental programs, environmental performance is increasingly being considered as a separate and distinct competitive priority in the manufacturing strategy literature (Ambec and Lanoie, 2008; de Burgos-Jiménez and Cespedes Lorente, 2001). In addition, because competitive priorities guide the pattern of strategic decisions and choices in specific directions, attempting to address multiple priorities simultaneously may involve trade-offs and compromises, potentially affecting performance (Skinner, 1969; Wheelwright, 1984). Bureaucratic problems potentially impacting organizational efficiency and effectiveness may also arise in companies who choose to seek certification for both quality and environmental management systems (EMS) (Molina-Azorin et al., 2009a; Zeng et al., 2005, 2007).

This study focuses on SMEs that are simultaneously pursuing quality and environmental objectives. The study sample was comprised of 254 Canadian SMEs with ISO 9000 certification only (182 SMEs) or with both ISO 9000 and 14000 certifications (72 SMEs). Specifically, we examined whether there were significant differences between both groups in terms of:
• specific motivations and resources;
• the types of initiatives implemented; and
• elements of organizational performance.

In order to get more insight into potential differences between both groups, we also performed correlation and regression analyses to examine relationships between variables for each group. Main results highlighted significant differences between SMEs holding both the ISO 9000 and 14000 certifications and those holding only the 9000 ISO certification. Each group was shown to have distinct motivations and resources and to have implemented different types of initiatives to address environmental concerns. The results also demonstrated that each group was positively correlated with different facets of organizational performance.

An examination of these issues should provide guidance to managers as they try to integrate environmental issues into their decision-making processes. With many studies suggesting that there are significant benefits to being proactive on these issues (Clemens, 2006; Lefebvre et al., 2003; Simpson et al., 2004), it is essential for SMEs
to leverage or develop the appropriate capabilities, initiatives, and behaviours to address environmental concerns. Although there is a growing body of literature on SMEs and environmental management (del Brio and Junquera, 2003; Hillary, 2000, 2003; Miles et al., 1999; Hitchens et al., 2003; McKeiver and Gadenne, 2005), our knowledge about these specific issues is still fragmented. Also, studies on the ISO 9000 and ISO 14000 standards typically focus on the integration process of these management systems and comparisons between the two standards in terms of potential motivation factors, benefits, or international diffusion (Karapetrovic and Willborn, 1998; Poksinska et al., 2003; Casadesús et al., 2008; Albuquerque et al., 2007). The motivations, resources, initiatives and impacts on performances of SMEs holding both the ISO 9000 and 14000 standards have clearly remained under explored. This study thus contributes to the literature by shedding light on the motivations and consequences of integrating both the ISO 9000 and ISO 14000 standards. Furthermore, few studies have focused explicitly on the type of environmental initiatives certified SMEs have implemented. In this study, we characterized environmental initiatives both broadly and explicitly, including those associated with product and process modifications and the supporting managerial activities, as well as individual, voluntary and informal activities associated with organizational citizenship behaviors (OCBs). Defined as actions that are “discretionary, not directly or explicitly recognized by the formal reward system” (Organ et al., 2006, p. 3), OCBs are particularly relevant to discussions of environmental initiatives. Studies of environmental management have been essentially focused on decisions from managers and formal management systems: policy, objectives, pollution prevention programs, strategies, sustainability reports, etc. As a result, the role of unplanned, discretionary and informal initiatives in the workplace has been largely overlooked. However, such can play an essential role in the greening process of organizations (Daily et al., 2009; Ramus and Killmer, 2007; Boiral, 2009), particularly in the small business context, where the influence of the company’s owner/manager is crucial and present throughout the entire organization (Nañez et al., 2003; Schaper, 2002).

The article first presents a brief literature review and conceptual framework. Sections 2 and 3 present the methodological aspects and the main results, respectively. A discussion of the results and their implications for future research and managerial practices is presented in the last section.

2. Literature review and conceptual framework
Although often under less scrutiny from environmental groups than are larger corporations, SMEs are also under pressure to improve environmental performance. Yet, while the largest companies have begun integrating environmental management into their corporate strategy, studies show that small businesses are lagging behind in this respect (Darnall et al., 2010; Revell and Rutherford, 2003; Worthington and Patton, 2005). Significant differences exist among small businesses in terms of organizational culture, planning processes and resource availability (Darnall and Edwards, 2006; Darnall et al., 2010; Battisti and Perry, 2011). These differences may influence the underlying motivations to improve environmental performance and the type of environmental solutions considered, as well as their implementation (Masurel, 2007; Gadenne et al., 2009; Schaper, 2002; Dean et al., 1998). In order to examine these issues, and to provide guidance to companies examining whether and how to address environmental issues, we developed a conceptual framework that focuses on three elements:
the organizational context of the SMEs, their environmental initiatives and their performance. As shown in Figure 1, we examined whether SMEs that have decided to focus on both quality and environmental objectives differed significantly from those pursuing only quality objectives in terms of these three elements. Because of the similarities between quality and environmental objectives, and because environmental initiatives are becoming less and less separable from activities that target productivity and quality improvement (Karapetrovic, 2002; Husband and Mandal, 1999; Boiral, 2011), both types of companies should be examined to identify specific differences.

The impacts of pursuing quality and environmental performance can be analyzed through the ISO 9000 and ISO 14000 certification, which have been adopted by more than 1 million organizations around the world (International Organization for Standardization, 2009; Boiral, 2011). We compared the organizational characteristics (size, motivation and internationalization), environmental initiatives (operations, managerial, accounting and OCBs) and performance (financial, environmental and innovation) of SMEs with ISO 9000 certification to those with both ISO 9000 and 14000 certification.

2.1 Organizational context
Several aspects of the organizational context of SMEs can impact their level of environmental responsiveness. Because they are strong drivers of environmental performance, we examined the size, underlying motivations and level of internationalization of each company included in the study. As mentioned, it has been reported that larger corporations have made more progress in environmental management and that they are more likely to implement the technologies, programs and systems needed to improve environmental performance (Darnall et al., 2010; Hillary, 2000; Revell and Rutherford, 2003; Worthington and Patton, 2005). Larger firms appear to have greater access to the knowledge and resources that allow them to integrate environmental concerns into their corporate activities. Furthermore, environmental investments require long-term vision, but strategic management of SMEs is often oriented toward short-term profitability, creating potential barriers to this type of investment (Dean et al., 1998; Lepoutre and Heene, 2006). In addition, unlike larger corporations,
SMEs do not have planning personnel to contemplate strategic long-term issues like environmental management (Haksever, 1996). Finally, compared to large organizations, SMEs generally have less standardized and formalized management practices (Lee and Palmer, 1999; Mintzberg and Quinn, 1991). From this perspective, SMEs do not seem well equipped to take on the paperwork required by ISO certification (Boiral, 2003; Curkovic and Pagell, 1999).

While the efforts of SMEs to improve their environmental performance may be motivated by environmental concerns and willingness to demonstrate a commitment to environmental issues, they may also be motivated by strategic and business factors (Gadenne et al., 2009; Masurel, 2007; Dean et al., 1998). Several authors have suggested that environmental leadership can lead to competitive advantages through cost reduction, increased market share or greater access to capital (Ambec and Lanoie, 2008; Molina-Azorin et al., 2009b; Porter and van der Linde, 1995). Some SMEs have started to exploit this opportunity by developing more environmentally sensitive products and technologies that meet customer expectations, changes often facilitated by close client relations and increased customer focus (Preuss and Perschke, 2009; Dean et al., 1998). The globalization of markets has also helped promote greener manufacturing processes. Several studies have reported that increased international activities were positively associated with environmental performance (Kennelly and Lewis, 2002; González-Benito and Gonzalez-Benito, 2006). Specifically, the ISO 14000 certification can provide international firms with a competitive advantage among suppliers, creating an incentive to improve environmental performance (Bansal and Hunter, 2003; Bellesi et al., 2005; Kitazawa and Sarkis, 2000).

The arguments presented above suggest that the two groups we examined would be expected to differ significantly on organizational variables. Indeed, these studies reveal that size, motivations, and internationalization are powerful determinants of the decision to adopt the ISO 14000 standard (Bansal and Hunter, 2003; Bansal and Bogner, 2002; Bellesi et al., 2005; Casadesús et al., 2008; Yin and Schmeidler, 2009; Kitazawa and Sarkis, 2000). Hence, we propose that these elements are also associated with companies that hold both standards. Specifically, we expect that SMEs which are certified for both ISO 9000 and 14000 will be significantly and positively associated with greater size, stronger business and environmental motivation and higher levels of internationalization.

2.2 Environmental initiatives

The second component of our conceptual framework is environmental initiatives. As seen in Figure 1, we focused on four types of initiatives: modifications to the products/processes, managerial initiatives, environmental costing tools and OCBs. These types of initiatives were chosen because they provide the basis for a broad characterization of environmental initiatives that included specific modifications to products and processes and the supporting initiatives. They also allowed us to include informal individual initiatives. To improve their overall environmental performance, companies have implemented various measures and initiatives over the years. As many companies are moving away from end-of-pipe solutions toward pollution prevention, they are now examining the product’s life cycle including raw material acquisition, manufacturing and processing, use and reuse (Boiral, 2005; Darnall and Edwards, 2006; Oldenburg and Geiser, 1997). Other initiatives include the implementation of EMS.
to address environmental issues in a comprehensive manner (Biondi et al., 2000; Darnall and Edwards, 2006; McKeiver and Gadenne, 2005). An EMS generally includes the basic elements of an overall management system covering organizational structure, planning activities, responsibilities and procedures. Such comprehensive systems assist companies in coordinating activities and motivating employees to implement their environmental strategy (Melnyk et al., 2003; Yin and Schmeidler, 2009). Many have argued that without a systematic, formal implementation process, the quality of the strategy is likely to suffer and companies may not reap all the benefits associated with improved environmental performance (Chavan, 2005; Melnyk et al., 2003; Yin and Schmeidler, 2009).

Environmental costing methodologies are also valuable supporting tools during both the resource allocation process and tracking of the costs and benefits of environmental activities. Managers who comprehend the full scope of a product’s environmental impacts are often better equipped to make investments in pollution prevention, rather than looking only at the end of the pipe for solutions (Darnall and Edwards, 2006; Boiral, 2005). Unfortunately, most companies acknowledge that they do not have a system that adequately identifies and tracks past, current or future environmental costs (Darnall and Edwards, 2006; Epstein, 2008; Henri and Journeault, 2010). Thus, many environmental costs are hidden in overhead and general administrative accounts, and no assignment is made to the activities or products that engendered those costs (Henri and Journeault, 2010). Some larger corporations have been experimenting with a number of techniques that can help both with monetizing environmental externalities and with accounting for uncertainty and risk, however few SMEs use such sophisticated capital budgeting techniques to analyze potential investments. Danielson and Scott (2006) report that the payback method is still the most popular budgeting approach and that decisions are often driven by an act of faith in a new technology or the perception of an opportunity. The choice of this method can be explained in part by factors such as lack of financial expertise, short-term vision and shortage of capital. However, the use of such methods can create significant barriers to environmental investments, as they typically ignore the time value of money (Epstein and Roy, 2000).

The last element we examined to characterize environmental initiatives relates to the behaviour of the owner/manager. In the small business context, the influence of the company’s owner/manager is crucial and felt throughout the organization. Further, in the specific context of environmental management, study results confirm that owner/managers play a predominant role in related decisions (Battisti and Perry, 2011; Darnall and Edwards, 2006; Perez-Sanchez et al., 2003). Accordingly, it is essential to examine their attitudes and values toward environmental issues, and the behaviours they exhibit or foster (Fassin et al., 2011; Gadenne et al., 2009; Lepoutre and Heene, 2006; Schaper, 2002). In order to measure some of these factors, we used the analytical framework of OCBs, which is being increasingly used to study how motivations and behaviours can impact organizational development. A number of such studies – focusing on individual behaviours that are discretionary and not explicitly recognized by the formal reward system – have demonstrated that citizenship initiatives can play a key role in improving organizational operations and effectiveness (MacKenzie et al., 1998; Organ et al., 2006; Podsakoff et al., 2000; Van Dyne et al., 1994). In a recent article, Boiral (2009) examined how this framework can be applied to the environmental practices of organizations. Drawing attention to the fact that most studies in the environmental
management literature center on formal, explicit and managerial responses to pressures for improved environmental performance, Boiral has suggested that the OCB framework may be relevant to examining the role of individual and voluntary environmental behaviours in the workplace. Arguing that the development of preventive approaches requires employee participation and voluntary pro-environmental behaviours in the workplace, he proposed that these behaviours can play an essential role in organizational greening. He also suggested that OCBs can facilitate the implementation of formal management systems requiring the active participation of all employees.

The arguments presented above suggest that the two groups of companies we examined would be expected to differ significantly in terms of the environmental initiatives they have implemented. Indeed, these studies reveal that those types of initiatives are more likely to be associated with ISO 14000 certified companies, which is supposed to promote various environmental management practices (Melnyk et al., 2003; Futoski and Prakash, 2005; Hanna et al., 2000; Fielding, 1999; Shin and Chen, 2000). Hence, we propose that these initiatives are more likely to be associated with companies that hold both standards. Specifically, we expect that SMEs which are certified for both ISO 9000 and 14000 will be significantly and positively associated with each type of environmental initiative (operations, managerial, accounting, and OCB) when compared to those which hold ISO 9000 certification only.

2.3 Organizational performance

Finally, we examined whether there are significant differences in performance between the two groups. The links between financial and environmental performance have been closely examined in the literature. While some have focused on the impact of a proactive environmental strategy on financial performance in order to examine the possibilities for win-win approaches (Ambec and Lanoie, 2008; Molina-Azorin et al., 2009b; Porter and van der Linde, 1995; Christmann, 2000), others have examined financial performance as a potential barrier to environmental investments (Drake et al., 2004; Boyd and McClelland, 1999; Lepoutre and Heene, 2006; Sharma, 2000).

There is much empirical evidence from both larger companies and SMEs that tends to demonstrate that, beyond reducing the environmental impacts of their activities, environmental initiatives often result in increased productivity and innovation, which in turn lead to competitive advantages and improved financial performance (Ambec and Lanoie, 2008; Clemens, 2006; Lefebvre et al., 2003; Molina-Azorin et al., 2009b). However, although these studies have underscored a significant relationship between environmental performance and financial performance, the precise nature and the implications of this relationship still remain somewhat unclear (Roy et al., 2001; Aragón-Correa and Rubio-López, 2007). Indeed, an alternative explanation could reside with the limitations that a company’s financial situation may impose on strategy formulation. A precarious financial situation may orient a company’s investments toward short-term profitability, while solid financials may offer a greater capacity to absorb the risks and uncertainty related to proactive environmental strategies (Sharma, 2000). Furthermore, in the case of SMEs, the lack of financial resources has been identified as one of the main barriers to engaging in social and environmental initiatives (Lepoutre and Heene, 2006; Miles et al., 1999).

An alternate view of these issues is provided by the manufacturing strategy literature, where there is considerable debate about whether firms can efficiently focus
on multiple priorities simultaneously. Certain authors have argued that because environmental performance can lead to competitive advantage, it should be considered at the same level of strategic importance as other manufacturing objectives such as costs, quality, deliveries and flexibility (de Burgos-Jiménez and Cespedes Lorente, 2001). In addition, because competitive priorities guide the pattern of strategic decisions and choices in specific directions, emphasizing multiple priorities simultaneously could involve trade-offs and compromises which may potentially affect performance. However, some researchers have moved away from this model and have suggested that firms can achieve a balance among various priorities. This is in keeping with the cumulative or synergies theory of performance, which suggests that companies can perform well on several levels simultaneously (Ferdows and De Meyer, 1990; Rosenzweig and Roth, 2004). Cumulative performance theorists would argue that improvements in one area of performance can reinforce capabilities in other areas and that firms do not have to choose between competitive objectives. For example, the promotion of environmental best practices such as pollution prevention technologies can develop capabilities contributing to innovation, cost-reduction and improvement of organizational effectiveness (Christmann, 2000). Moreover, similarities and reported potential synergies between environmental and quality management could help ISO 14001 certified firms build on quality experience for overall improved performance (Boiral, 2011; Poksinska et al., 2003; Pun et al., 1999; Zeng et al., 2005, 2007). However, it has been reported that ISO certification is often accompanied by more paperwork (Boiral, 2003, 2011; Walgenbach, 2001). Bureaucratic problems could arise in companies that choose to seek certification for both quality and EMS. Implementing both ISO 9000 and ISO 14001 requires duplication of many management tasks, which could impact the efficiency and effectiveness of the organization (Molina-Azorin et al., 2009a; Zeng et al., 2005).

However, generally speaking, the implementation of ISO 14001 has been associated in the literature with improvements of environmental, innovation, and economic performance (Standards Council of Canada, 2000; Melnyk et al., 2003; Potoski and Prakash, 2005; Pun and Hui, 2001). Consequently, we expect that SMEs that are certified for both management systems will be significantly associated with greater levels of environmental, financial and innovation performance.

3. Methodology
3.1 Sample and data collection
Given the growing number of companies certifying to either or both ISO 9000 and ISO 14000 standards, we were able to proceed with an empirical study that focuses on these companies. This study gathered data from a sample of 254 ISO 9000 and ISO 14000 certified Canadian SMEs, to characterize differences between SMEs that are certified for both management systems and those that hold ISO 9000 certification. Data collection was based on a survey questionnaire sent to a random sample of 1,514 companies listed in the Scott’s Directory database. Only ISO certified (either ISO 9000 or ISO 14000) manufacturing facilities with 20 employees or more were selected from the original list. The pre-tested questionnaire was sent to the highest member of the management team. A total of 319 usable questionnaires were received, for a response rate of 21.1 percent. However, because the focus of this study was on SMEs, companies with more than 500 employees (65 companies) were not considered for further analysis, giving a final sample size of 254 responding SMEs.
3.2 Research variables

Organizational context

(1) **Size.** The company size was measured based on the number of employees.

(2) **Motivation.** A list of seven possible motivations found in the literature was presented to the respondents. Using Likert-type scales (where 1 – no influence at all and 5 – very strong influence), the respondents were asked to indicate the extent to which each possible motivation influenced their environmental commitment. Principal-components factor analyses were conducted to assess the unidimensionality on construct scales. These analyses resulted in two distinct constructs:

- environmental motivation, including items related to environmental concerns and public demonstration of commitment; and
- business motivation, including items related to business imperatives.

Table I presents a complete list of items included in each construct and the associated reliability measures.

(3) **Internationalization.** Respondents were asked to indicate the percentage of their foreign sales.

Environmental initiatives

- **Operations.** Using a list adapted from Melnyk et al. (2003), respondents were asked to indicate to what extent each environmental initiative had been implemented (Likert-type scales, where 1 – not at all and 5 – to a great extent).

- **Managerial.** A list of statements related to typical requirements for an EMS was presented to respondents and they were asked to indicate to what extent each environmental initiative had been implemented (Likert-type scales, where 1 – not at all implemented and 5 – fully implemented).

- **Environmental cost tracking (accounting).** A list of items adapted from the International Guidance Document of Environmental Management Accounting (IFAC, 2005) and the work of Parker (1999) was presented to the respondents and they were asked to indicate the extent to which each listed environmental cost was explicitly tracked by their organization (Likert-type scales, where 1 – not at all to 5 – to a great extent).

- **Environmental OCB.** A list of statements adapted from Boiral (2009) was presented and respondents were asked to indicate whether these statements accurately described their conduct with respect to environmental issues inside their organization (Likert-type scales, where 1 – totally disagree to 5 – totally agree).

Performance variables

- **Environmental.** Using a Likert-type scale (1 – much worse, 5 – much better), respondents were asked to rate their environmental performance (over the past three years) relative to others in their industry on items adapted from Judge and Douglas (1998).

- **Financial.** Using a Likert-type scale (1 – much worse, 5 – much better), respondents were asked to rate their financial performance (over the past three years) relative to others in their industry on items adapted from Judge and Douglas (1998).
<table>
<thead>
<tr>
<th>Variables</th>
<th>Items</th>
<th>$\alpha$</th>
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<tbody>
<tr>
<td>Environmental motivation</td>
<td>Public demonstration of environmental stewardship</td>
<td>0.77</td>
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<td></td>
<td>Reducing environmental impacts and pollution</td>
<td></td>
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<td></td>
<td>Top managers’ social responsibility and ethical concerns</td>
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<td></td>
<td>Demonstrating environmental leadership in our industry</td>
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<td>Business motivation</td>
<td>Increasing shareholder value</td>
<td>0.72</td>
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<td></td>
<td>Customer requirement</td>
<td></td>
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<td></td>
<td>Greater access to capital</td>
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<tr>
<td>Operation activities</td>
<td>Redesigning product/process to eliminate potential environmental</td>
<td>0.77</td>
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<tr>
<td></td>
<td>problems</td>
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<td></td>
<td>Replacing a material that may cause environmental problems with a</td>
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<td></td>
<td>more ecological material</td>
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<td></td>
<td>Reducing the use of environmentally sensitive materials/components</td>
<td></td>
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<td></td>
<td>within your processes/products</td>
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<td>Managerial activities</td>
<td>Publishing an environmental policy</td>
<td>0.81</td>
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<td></td>
<td>Determining specific targets for environmental performance</td>
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<td>Publishing an annual environmental report</td>
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<td>Using an environmental management system</td>
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<td>Determining environmental criteria for purchasing decisions</td>
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<td></td>
<td>Making employees more responsible for the environmental performance</td>
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<td></td>
<td>Monitoring environmental performance</td>
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<td>OCB</td>
<td>I help employees understand our environmental problems</td>
<td>0.89</td>
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<td></td>
<td>I am volunteer for projects, initiatives or events related to our</td>
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<td></td>
<td>environmental issues</td>
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<td>I propose new practices that improve our environmental performance</td>
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<td></td>
<td>I undertake environmental initiatives that enhance our image</td>
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<td></td>
<td>I participate actively in environmental events</td>
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<td></td>
<td>I perform voluntary environmental actions and initiatives in my daily</td>
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<td></td>
<td>activities</td>
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<td>Environmental costing</td>
<td>Regulatory costs</td>
<td>0.82</td>
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<td>(permits, fines, consultant fees, legal costs)</td>
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<td>Recycling and waste disposal costs</td>
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<td>Remediation costs</td>
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<td>Efficiency control costs</td>
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<td>Environmental management and control system costs</td>
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<td></td>
<td>Less tangible costs (e.g. potential future liability, company image)</td>
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<tr>
<td>Environmental performance</td>
<td>Regulatory compliance</td>
<td>0.87</td>
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<td>Environmental impacts</td>
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<td>Management environmental risk</td>
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<td>Water pollution</td>
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<td>Air emission levels</td>
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<td>Greenhouse gas (GHG) emissions</td>
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<td>Overall environmental performance</td>
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<td>Financial performance</td>
<td>Sales growth</td>
<td>0.88</td>
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<td>Profits</td>
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<td></td>
<td>Return on sales</td>
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**Notes:** Statistical reliability was assessed by computing the Cronbach’s $\alpha$; Ahire and Devaraj (2001) recommend a threshold of 0.50 for emerging construct scales and 0.70 for maturing constructs; principal-components factor analyses were conducted to assess unidimensionality on construct scales; for each cases, only one factor explained variance.

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Table I. Construct items and reliability

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Innovation. Respondents were asked whether or not, during the last three years, they introduced any new or significantly improved products (goods or services) on the market.

4. Results

4.1 t-tests analyses

Using the statistical program SPSS, analyses were performed on a sample consisting of 254 SMEs, which ranged from 25 to 500 employees (mean = 208.2; standard deviation = 118.2). The sample was first divided into two groups according to their type of ISO certification. The first group consisted of SMEs that were ISO 9000 certified only \((n = 182)\) and the second group included SMEs that held both ISO 9000 and ISO 14000 certification \((n = 72)\). Independent samples \(t\)-tests and cross tabulations were then conducted to examine potential significant differences between the two groups.

4.1.1 Organizational context. As shown in Table II, the two groups differed significantly on several variables related to the firm’s organizational context. The results concerning the level of internationalization and the number of employees are certainly consistent with our expectations and confirm that these factors are positive forces toward a greener process. SMEs with both ISO certifications were indeed larger firms (average number of employees, 242.92) and their percentage of foreign sales was also much higher (65.68 percent). However, the results about underlying motivations for reducing the environmental impacts of business activities were not completely consistent with our expectations. While the companies with both ISO certifications did report higher levels of environmental motivation (4.00 vs 3.56), surprisingly, they did not report significantly higher levels of business motivation.

4.1.2 Environmental initiatives. The results concerning the environmental initiatives implemented by the SMEs are presented in Table III. While the results for implementation

### Table II.
Independent samples \(t\)-tests: organizational context

<table>
<thead>
<tr>
<th>Construct/variable</th>
<th>ISO 9000</th>
<th></th>
<th>ISO 9000 + ISO 14000</th>
<th></th>
<th>(t)-value(^{a})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Business motivations</td>
<td>2.97</td>
<td>1.02</td>
<td>2.99</td>
<td>0.98</td>
<td>-0.010</td>
</tr>
<tr>
<td>Environmental motivations</td>
<td>3.56</td>
<td>0.87</td>
<td>4.00</td>
<td>0.58</td>
<td>-4.60***</td>
</tr>
<tr>
<td>Percentage of foreign sales</td>
<td>44.89</td>
<td>30.84</td>
<td>65.68</td>
<td>30.37</td>
<td>-4.26***</td>
</tr>
<tr>
<td>Number of employees</td>
<td>195.02</td>
<td>116.02</td>
<td>241.92</td>
<td>117.99</td>
<td>-2.89***</td>
</tr>
</tbody>
</table>

**Notes:** \(^{a}\)Significance level established by student’s test \((t\)-test\): * \(p < 0.10\), ** \(p < 0.05\), *** \(p < 0.01\), and **** \(p < 0.001\); bi-lateral test

### Table III.
Independent samples \(t\)-tests: environmental initiatives

<table>
<thead>
<tr>
<th>Construct</th>
<th>ISO 9000</th>
<th></th>
<th>ISO 9000 + ISO 14000</th>
<th></th>
<th>(t)-value(^{a})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operations activities</td>
<td>3.35</td>
<td>0.95</td>
<td>3.47</td>
<td>0.71</td>
<td>-1.22</td>
</tr>
<tr>
<td>Managerial activities</td>
<td>2.64</td>
<td>1.01</td>
<td>4.20</td>
<td>0.53</td>
<td>-16.07***</td>
</tr>
<tr>
<td>Environmental accounting</td>
<td>2.92</td>
<td>0.94</td>
<td>3.41</td>
<td>0.76</td>
<td>-4.67***</td>
</tr>
<tr>
<td>OCB</td>
<td>3.31</td>
<td>0.97</td>
<td>3.92</td>
<td>0.59</td>
<td>-5.94***</td>
</tr>
</tbody>
</table>

**Notes:** \(^{a}\)Significance level established by student’s test \((t\)-test\): * \(p < 0.10\), ** \(p < 0.05\), *** \(p < 0.01\), and **** \(p < 0.001\); bi-lateral test
of managerial activities were not surprising, as each item in the construct is consistent
with ISO 14000 requirements (4.20 vs 2.64), those for production activities were. Because
of their formal commitment to environmental issues, we expected that the ISO 14000
certified SMEs would make more design and process changes to reduce the
environmental impacts of their activities. However, the results suggest that the SMEs
with ISO certification only, through their quality management systems, were also making
equivalent efforts toward that end (3.35 vs 3.47). The results for tracking environmental
costs were consistent with our expectations. While the relatively low score on this
construct was expected (2.92 and 3.41), the ISO 14000 certified SMEs were using
significantly more environmental costing methodologies. Clearly, these techniques
are relatively new and their use is not yet widespread. However, ISO 14000 SMEs are
probably faced with decisions about environmental investments more often and these
tools could prove useful in their decision-making process. Finally, the results for OCBs
were consistent with our expectations, as the ISO 14000 SMEs had a significantly higher
score on that construct (3.92 vs 3.31).

4.1.3 Organizational performance. The results concerning organizational
performance are presented in Tables IV and V. As expected, the results for
environmental performance indicated that ISO 14000 SMEs perform better on key
aspects of environmental performance. However, the results for financial performance
revealed that SMEs with only ISO 9000 certification had better financial performance.

Furthermore, firms with only ISO 9000 certification also appear to perform better on
innovation (Table V). The results from the cross tabulations indicate that 70.6 percent
of ISO 9000 certified firms had introduced a new product, while only 52.8 percent of firms
with double ISO 14000/9000 certification had done so. These last two findings were
contrary to our expectations and they require a nuanced interpretation. On the one
hand, the results for financial performance could indicate that the financial situation of
an SMM does not necessarily act as a barrier to a superior environmental commitment.
However, these results could also indicate that the SMEs that have committed to both
management systems may have overextended themselves, as these firms have both
significantly lower financial performance and a lower rate of innovation.

<table>
<thead>
<tr>
<th>Construct</th>
<th>ISO 9000</th>
<th>ISO 9000 + ISO 14000</th>
<th>t-valuea</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental performance</td>
<td>3.72 0.59</td>
<td>4.02 0.54</td>
<td>−3.65 ****</td>
</tr>
<tr>
<td>Financial performance</td>
<td>3.33 0.81</td>
<td>3.13 0.68</td>
<td>1.79 *</td>
</tr>
</tbody>
</table>

Notes: aSignificance level established by student’s test (t-test): * p < 0.10, ** p < 0.05, *** p < 0.01,
and **** p < 0.001; bi-lateral test

Table IV. Independent samples t-tests: organizational performance

<table>
<thead>
<tr>
<th>Certification</th>
<th>No (%)</th>
<th>Yes (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO 9000</td>
<td>29.4</td>
<td>70.6</td>
<td>100</td>
</tr>
<tr>
<td>ISO 9000 + ISO 14000</td>
<td>47.2</td>
<td>52.8</td>
<td>100</td>
</tr>
</tbody>
</table>

Note: Pearson χ²: p < 0.007, Phi: 0.007, Cramer’s V: 0.007

Table V. Cross tabulation: innovation performance
Clearly, these results may add to the debate over the existence of trade-offs between environmental protection and corporate competitiveness. Indeed, they do not support the win-win rationale, in which a commitment to environmental protection could also translate into superior financial performance or greater innovation. However, our findings could also reflect the increased bureaucracy and reduced flexibility often associated with ISO management systems. Hence, the double certification may have proven problematic for those SMEs.

4.2 Correlation and regression analyses
In order to gain more insight into potential differences between both groups, we also examined relationships among variables for each group by performing correlation and regression analyses (business motivations and operations activities were not included in these analyses, as $t$-tests revealed that they were not statistically significant).

Table VI provides correlations among the variables (means and standard deviations are provided in Tables II-IV). Of the 28 correlations, 13 are significant for the ISO 9000 group, only five are significant for the ISO 9000 + ISO 14000 group. Significant correlations range from $r = 0.17, p < 0.05$ to $r = 0.54, p < 0.01$ for the ISO 9000 group, and from $r = 0.24, p < 0.05$ to $r = 0.37, p < 0.01$ for the ISO 9000 + ISO 14000 group. These results suggest a stronger association between all environmental initiatives (managerial, environmental accounting, and environmental OCB) in the case of SMEs that have a single certification. In the case of this particular group, results also indicate that environmental motivation is strongly correlated with these environmental initiatives.

The variance inflation factor (VIF) test was used to detect possible multicollinearity among variables. Data indicate the absence of multicollinearity if the VIF value ranges between 0.10 and 10 (Neter et al., 1989). In our study, the VIF value ranges, for the

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
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<tbody>
<tr>
<td><strong>ISO 9000 group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Env. motivation</td>
<td>0.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Internalization</td>
<td>0.10</td>
<td>0.11</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Accounting</td>
<td></td>
<td>0.42**</td>
<td>0.12</td>
<td>0.54**</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. OCB</td>
<td>0.08</td>
<td>0.21**</td>
<td>0.06</td>
<td>0.36**</td>
<td>0.45**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. EP</td>
<td>0.17*</td>
<td>0.07</td>
<td>0.10</td>
<td>0.29**</td>
<td>0.36**</td>
<td>0.46**</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. FP</td>
<td>-0.03</td>
<td>-0.07</td>
<td>0.03</td>
<td>0.09</td>
<td>0.23**</td>
<td>0.18*</td>
<td>0.17*</td>
<td>-</td>
</tr>
<tr>
<td><strong>ISO 9000 + 14000 group</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Env. motivation</td>
<td>-0.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Internalization</td>
<td>0.37**</td>
<td>0.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Accounting</td>
<td></td>
<td>0.10</td>
<td>-0.05</td>
<td>0.28*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. OCB</td>
<td>-0.08</td>
<td>0.07</td>
<td>0.26</td>
<td>0.09</td>
<td>0.09</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. EP</td>
<td>-0.31**</td>
<td>-0.10</td>
<td>0.02</td>
<td>0.30**</td>
<td>0.24*</td>
<td>0.10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. FP</td>
<td>0.07</td>
<td>-0.17</td>
<td>-0.03</td>
<td>0.02</td>
<td>0.19</td>
<td>0.18</td>
<td>0.17</td>
<td>-</td>
</tr>
</tbody>
</table>

Table VI. Correlation matrix
Notes: Significant at: * $p < 0.05$ and ** $p < 0.01$; EP – environmental performance; FP – financial performance
ISO 9000 group, from 1.22 (environmental motivation) to 1.72 (environmental performance), and for the ISO 9000 + ISO 14000 group from 1.04 (internalization) to 1.92 (accounting).

Hierarchical regressions were performed to analyze relative contributions of organizational elements and environmental initiatives to both environmental and financial performance. While in Step 1, size, motivation, and internalization were introduced as SME characteristics, in Step 2, managerial, accounting, and OCB were introduced as environmental initiatives.

The results of the regression analysis for environmental performance are reported in Table VII. Whereas organizational context elements (size, motivation, and internalization) entered together at Step 1 failed to explain a significant amount of variance for the ISO 9000 group, $R^2 = 0.04$, $F(3,122) = 1.75$, ns, organizational context elements explain a significant amount of variance for the ISO 9000 + ISO 14000 group, $R^2 = 0.18$, $F(3,119) = 3.29$, $p < 0.05$. Environmental initiatives entered at Step 2 produced a significant change in explained variance for the ISO 9000 group, $\Delta R^2 = 0.24$, $F(3,122) = 7.96$, $p < 0.00$, and for the ISO 9000 + ISO 14000 group, $\Delta R^2 = 0.11$, $F(3,119) = 2.86$, $p < 0.05$. In addition, while size and motivation are related negatively ($\beta = -0.39, p = 0.009$) and positively ($\beta = 0.30, p = 0.04$) to environmental performance only for the ISO 9000 + ISO 14000 group, no relationship was found for internalization. Finally, while managerial is not related to environmental performance for neither groups, accounting ($\beta = 0.21, p = 0.04$) and OCB ($\beta = 0.33, p = 0.000$) are related to environmental performance only for the ISO 9000 group. Hence, among these environmental initiatives, these last two seem to be powerful drivers of environmental performance for the ISO 9000 group.

The results of the regression analysis for financial performance are reported in Table VIII. Whereas organizational context elements (size, motivation, and internalization) entered together at Step 1 failed to explain a significant amount of variance for the ISO 9000 group, $R^2 = 0.00$, $F(3,43) = 0.38$, ns, and for the ISO 9000 + ISO 14000 group, $R^2 = 0.06$, $F(3,40) = 1.05$, ns. Environmental initiatives entered at Step 2 produced increased explained variance for both groups, with $\Delta R^2 = 0.28$ for the ISO 9000 group, $F(3,122) = 7.96$, $p < 0.001$, and for the ISO 9000 + ISO 14000 group, $\Delta R^2 = 0.11$, $F(3,119) = 2.86$, $p < 0.05$. The $t$-values for the significant coefficients are reported in Table VII.
a significant change in explained variance only for the ISO 9000 group, $\Delta R^2 = 0.11$, $F(3,40) = 4.99$, $p = 0.02$, and failed to explain a significant change for the ISO 9000 + ISO 14000 group. In addition, for the ISO 9000 group, and the ISO 9000 sample + ISO 14000 group size ($\beta = -0.08$, ns; $\beta = -0.08$, ns), motivation ($\beta = 0.05$, ns; $\beta = -0.04$, ns) and internalization ($\beta = -0.02$, ns; $\beta = -0.22$, ns) are not related to organizational performance. Finally, while managerial ($\beta = -0.12$, ns; $\beta = -0.00$, ns) and OCB ($\beta = 0.10$, ns; $\beta = 0.25$, ns) are not related to organizational performance for either groups, accounting ($\beta = 0.35$, $p = 0.003$) is related to financial performance for the ISO 9000 group only.

5. Discussion and conclusion
Although pressures for improved environmental performance continue to intensify, our knowledge of the resources and initiatives that could prove beneficial for SMEs in their efforts to develop and implement appropriate environmental strategies remains somewhat limited. Companies now need to develop appropriate skills and other resources to address these new challenges and reap the potential benefits associated with a proactive environmental strategy. Attempts to gain a better understanding of these issues are thus helpful for both researchers and practitioners. This study demonstrates that SMEs that have decided to pursue both quality and EMS are correlated with specific context and performance variables and have implemented different types of initiatives when compared to SMEs that have implemented a quality management system only. However, the results of our analysis were not consistent with all of our expectations.

First, with respect to context variables, the results confirm that size and internationalization are indeed positive forces toward environmental responsiveness. Nonetheless, the results indicate that ISO 14000 certification was not associated with higher levels of business motivation, raising questions about potential missed opportunities. There is evidence in the literature suggesting that formal EMS are correlated with many facets of operational efficiency and increased profitability
Hence, the ISO 14001 standard could bring about improvements that extend far beyond the management of a firm’s environmental impacts and the public demonstration of environmental stewardship (Standards Council of Canada, 2000; Potoski and Prakash, 2005; Bansal and Bogner, 2002; Boiral, 2011). Second, the results concerning environmental initiatives and behaviours reveal that SMEs that were also certified for the environmental standard scored significantly higher on most types of initiatives. However, similar scores for production activities raise questions about these SMEs’ actual commitment to environmental issues. These results could also indicate that quality management systems are indeed a good vehicle for the integration of environmental issues. Our results certainly confirm the strong similarities and possible synergies between both types of management systems (Karapetrovic and Willborn, 1998; Poksinska et al., 2003; Boiral, 2011). The results for supporting managerial activities, environmental costing tools and OCBs were consistent with our expectations. The specific results for OCBs demonstrate that environmental OCBs should not be regarded as simply an alternative to explicit management practices, as they can coexist with more formal systems such as the ISO 14001 standard. Moreover, our results indicate that the explicit management practices associated with the ISO 14001 standard can encourage the emergence of voluntary and non-rewarded initiatives.

Generally speaking, our results are consistent with initial expectations and the emerging literature on the importance of OCB for improving environmental practices (Daily et al., 2009; Ramus and Killmer, 2007; Boiral, 2009; Boiral and Paillé, 2012). In addition, our results suggest that the ISO 14001 standard also encourages tracking of environmental costs, as this certification was correlated with a significantly higher score on that construct. Further, for those SMEs that were certified to the ISO 9000 standard only, correlation analyses certainly highlighted a strong association between three of the four environmental initiatives (OCB, environmental accounting, managerial activities). These results suggest that these SMEs are also committed to the implementation of key processes and activities to support their efforts.

Finally, the results for the performance variables were not all consistent with our expectations. In the case of environmental performance, our t-tests revealed a positive and significant correlation between SMEs with the double certification and environmental performance. Furthermore, when examining what specific environmental initiatives were positively associated with environmental performance, regression analysis results pointed to two specific ones in the case of ISO 9000 SMEs (environmental accounting and environmental OCB). As for the ISO 14000 + ISO 9000 group, we were not able to identify specific initiatives, as results were not statistically significant.

Regarding results about innovation and financial performance, we found that only ISO 9000 SMEs had superior financial and innovation performance. The surprising results regarding a possible link to financial performance certainly add to the debate about whether and how environmental management can contribute to corporate performance (Ambec and Lanoie, 2008; Porter and van der Linde, 1995; Christmann, 2000; Drake et al., 2004). Regressions analyses have shed some light into these results by highlighting, in the case of the ISO 9000 group, a strong association between environmental accounting initiatives and financial performance. Again, our results underscore the importance of these particular initiatives as part of an overall environmental strategy.
Although our analysis does not allow us to identify the precise nature of the links between environmental initiatives and financial performance, it raises questions about the ability of SMEs to pursue both quality and environmental objectives simultaneously. However, these results must undoubtedly be interpreted in the context of this study, which deals with SMEs that have decided to pursue these objectives by certification for both standards. As such, our results point to the potential difficulties associated with the integration of both standards. Obviously, the increased bureaucracy and lack of flexibility often denounced by certain studies on ISO certification (Boiral, 2003, 2011; Walgenbach, 2001) could partly explain our results.

The overall results of this study demonstrate that significant differences exist between SMEs with single or double certification, and that context variables and performance variables can shape decisions about environmental management. Consequently, this study’s findings contribute to the environmental and SME literature on this very complex topic by providing relevant empirical evidence based on primary data. We make the following contributions to the literature. First, this study provides a detailed characterization of environmental initiatives, drawing on insights derived from the environmental, accounting and management literature. By using the analytical framework of organizational citizenship behaviours, our characterization also included informal and behavioural aspects often neglected in environmental management studies. While formal and explicit measures are indispensable in dealing with environmental issues, they tend to overlook the human aspects of environmental actions (Boiral, 2009). Second, by focusing on these two groups, we were able to draw attention to the specific case of manufacturing SMEs that hold both certifications and how they compare to those that only hold the ISO 9000 certification. Although more and more organizations across the world adopt both ISO 14000 and ISO 9000 standards (Standards Council of Canada, 2000), the implications of integrating simultaneously these two standards have remained largely unexplored. The few studies focused on both ISO 9000 and ISO 14000 have explored the technical similarities between these two standards (Karapetrovic and Willborn, 1998), the comparison of their benefits and key success factors (Pokinsinska et al., 2003; Boiral, 2011) and their international diffusion process (Casadesus et al., 2008; Albuquerque et al., 2007). Nevertheless, the ins and outs of adopting both ISO 14000 and ISO 9000 standards have clearly been ignored in the literature. This study makes a contribution to this emerging literature by providing much needed empirical evidence about specific elements that characterize the organizational context, the environmental initiatives, and organizational performance of these manufacturing SMEs that hold both standards and have highlighted potential avenues leading to improved environmental and financial performance.

The results of this study will also have implications for management and should help provide guidance to SMEs currently examining how to address environmental issues. SMEs need to address these issues carefully and understand the potential trade-offs and consequences associated with their decisions. First, it would seem appropriate for firms to take better advantage of the synergies between quality management systems and environmental management. Our results suggest that quality management systems seem to be a good vehicle for profiting from such synergies. Within their existing management systems, ISO 9000 certified SMEs have indeed made comparable changes to their products and processes in order to reduce the environmental impacts of their manufacturing activities. This similarity can be explained by the evolution in the
approaches to environmental management. While in the past these approaches focused on palliative measures, currently initiatives increasingly tend to try to minimize environmental impacts before production is completed and are progressively less separable from activities targeting improved productivity and competitiveness, such as total quality management (Darnall and Edwards, 2006; Oldenburg and Geiser, 1997; Christmann, 2000; Boiral, 2005).

Second, the overall low mean scores on environmental accounting suggest that some thought should be devoted to implementing appropriate systems to track environmental costs. Indeed, our results have shown strong links between environmental accounting and both financial and environmental performance for the ISO 9000 group. Improving investment decisions for environmental projects is becoming increasingly important for all companies, as improved environmental performance may require major investments in newer and cleaner technologies. In the case of SMEs, the limited use of environmental costing tools may create significant barriers to a better understanding of environmental issues and their long-term impacts on profitability. While some of the more complex techniques used to assess environmental costs may be inappropriate, considering the likely benefits of the analysis compared to the likely cost of accumulating and analyzing necessary data, SMEs should strive to improve their current decision-making processes to more effectively incorporate the long-term costs and benefits of their decisions. Third, consideration should be given to the various ways environmental OCBs can be promoted within organizations. Our results reveal that top managers/owners of the ISO 14000 + ISO 9000 certified SMEs exhibited more of these behaviours within their organization. Since the behaviour of the leadership further encourages environmental initiatives throughout the entire organization, they are important to mobilizing employees toward reducing the company’s environmental impact. Also, results from regression analyses revealed that OCBs were positively associated with environmental performance in the case of the ISO 9000 group. These results indicate that formal EMS such as the ISO 14000 system are not a prerequisite for OCBs, as various factors can favour their development (Boiral, 2009; Daily et al., 2009; Ramus and Killmer, 2007). Indeed, the development of a pro-environmental culture, implementation of voluntary programs, and appropriate training and information can all contribute to a favourable context for OCBs and should be considered by SMEs as relevant means to improve environmental performance (Boiral, 2009).

Although this study enhances our knowledge of the challenges and consequences associated with decisions regarding environmental issues, the results obtained must be interpreted in the context of the study’s limitations. First, the study relies heavily on perceptual measures. Although perceptual measures are often used in the management literature (Ketokivi and Schroeder, 2004), perceptions may also lead to bias. Second, this study focuses on Canadian SMEs. Given the importance of the regulatory environment in environmental decisions, caution should be exercised when generalizing to non-Canadians firms; cross-country comparative analyses could help identify potential differences. Third, because there are fewer companies that hold both certifications, analyses were done using different sample sizes. Clearly, as the number of companies that hold both certifications increases (Standards Council of Canada, 2000; Boiral, 2011), it would be important to examine this topic while using comparable samples. Lastly, our analysis does not take into account the level of integration of the
management systems when companies were certified for two standards. The nature of such integration could prove critical to the effective both objectives.

This study’s findings and limitations point to several interesting avenues for future research. Clearly, the examination of the nature of the integration of both management systems still requires much investigation. Studies about the specific impacts of the integration of management systems on environmental, quality and financial performance would be valuable. Such studies would allow us to identify specific areas of improvement for the SMEs. Undoubtedly, with both ISO standards becoming business requirements for many organizations, there may be a temptation to implement the standard without consideration to the broader, strategic perspective. Some SMEs may implement the standard simply to be certified by a potential third party and meet a specific customer requirement or improve their public image. SMEs that implement the standard with such limited goals do so with minimum disruption to the organization. In this case, the management systems are not well integrated throughout the organization and any potential benefits could go unnoticed. Future research could explore this issue through qualitative studies in order to analyze in depth the challenges and success factors of adopting both ISO 9000 and ISO 14000 standards: internalization of these standards, employees mobilization, documentation management, impacts on quality and environmental management, risks of bureaucracy, possible contradictions between rhetoric and practices, etc.

References


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