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Environmental standards and labor productivity: Understanding the mechanisms that sustain sustainability

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Summary In the last decade, a rising number of firms have adopted voluntary international environmental management and product standards, such as the international ISO 14001 management standard or organic certification. Although emerging research analyzes the impact of these standards on environmental and financial performance, there is to our knowledge no empirical research on how they affect the productivity of employees. In this paper, we investigate the direct relationship between environmental standards and labor productivity, as well as two mediating mechanisms through which environmental standards influence labor productivity: employee training and enhanced interpersonal contacts within the firm. Our empirical results, based on a French employer–employee survey from 5220 firms, reveal that firms that have adopted environmental standards enjoy a one standard deviation higher labor productivity than firms that have not adopted such standards. Copyright © 2012 John Wiley & Sons, Ltd.

Keywords: environmental standards; positive social identity; training; interpersonal contacts; labor productivity

Introduction

Environmental management and product standards have been proposed as an innovative governance mechanism for improving firms' environmental performance (Delmas & Young, 2009). These standards include the International Environmental Management System Standard ISO 14001 and organic certification, both of which are increasingly being adopted worldwide (Delmas & Grant, 2010; Delmas & Montes-Sancho, 2011). More than 150 000 ISO 14001 certificates have been issued around the world,[1] and as of 2007, organic certification reached a 3.9 per cent market share in the EU.[2]

Scholars have suggested that environmental standards could allow firms to profit from reducing their negative environmental impact by improving their labor productivity (Ambec & Lanoie, 2008). Although an emerging body of literature investigates the environmental and financial benefits derived from the adoption of environmental standards (e.g., Aerts, Cormier, & Magnan, 2008; Barla, 2007; Christmann, 2000; Darnall, Gallagher, Andrews, & Amaral, 2000; Delmas, 2001; Delmas & Montiel, 2009; King & Lenox, 2002; Nakamura, Takahashi, & Vertinsky, 2001), exactly how these standards impact organizational effectiveness and employee productivity remains unclear.

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[1]ISO website: www.iso.ch
[2]http://epp.eurostat.ec.europa.eu

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So far, only anecdotal evidence has been presented to support the argument of greater employee loyalty and productivity at environmentally or socially responsible firms (Brekke & Nyborg, 2008; Frank, 2003). For example, the multinational corporation, Dole Food Co., Inc. reported that "key benefits [of the adoption of environmental management systems] include strong employee motivation and loyalty that translate into reduced absenteeism and improved productivity."[3] Studying the effect of environmental standards on employees' productivity is important because employees are widely recognized as a major source of competitive advantage (Grant, 1996; Pfeffer, 1994; Schuler & Jackson, 1987).

In this paper, we develop and test hypotheses on the relationship between the adoption of environmental standards and labor productivity. First, we argue that the adoption of environmental standards might increase employee's social identification with their firm and result in enhanced labor productivity. Second, we make the case that the adoption of environmental standards is associated with organizational changes, which may result in increased productivity. These changes include implementation of employee training programs and higher levels of interpersonal interactions, or greater employee engagement, in standard business operations. Training can lead to more effective employees, and interpersonal contacts can help employees engage in knowledge transfer and lead to innovative ideas that improve productivity. Interpersonal contacts can also promote employee job satisfaction and motivation, which in turn lead to increased productivity. In other words, the adoption of environmental standards may also improve organizational effectiveness through adjustments in the firm's work systems.

We test our hypotheses with data obtained from a French survey, including responses with detailed employee characteristics from 5220 firms. Our results show that the adoption of environmental standards is associated with higher levels of labor productivity and that improved training and interpersonal contacts mediate this relationship.

This paper makes several contributions to the management literature as well as the business and the environment literature. First, by unveiling organizational mechanisms that link the adoption of environmental standards to corporate performance, our paper responds to the call made by some scholars to open the organizational black box in order to understand the organizational changes associated with "greening" a firm (Delmas & Toffel, 2008; Jackson, Renwick, Jabbour, & Muller-Camen, 2011). Second, we use data on employee and firm characteristics from a large, representative sample of French firms, each of which employs more than 20 individuals. This allows us to control for a very detailed set of workers and job characteristics in order to properly isolate the effect of environmental standards on labor productivity. Third, using a French database brings a new and potentially enlightening perspective to the debate on the relationship between corporate environmental performance and financial performance, as empirical studies on the subject are typically based on U.S. data.

This paper is organized as follows. In the second section, we review the literature on environmental standards and their impact on performance. In the third section, we develop hypotheses relating the adoption of environmental standards to labor productivity. In the fourth section, we describe our empirical strategy based on a novel employee database. In the fifth section, we describe our results. A concluding section follows.

Literature Review

Understanding the relationship between corporate environmental performance and financial performance has been the focus of considerable research since the 1970s (Orlitsky, Schmidt, & Rynes, 2003). Within this wider context, many scholars have focused on whether firms are financially rewarded for improving their environmental performance. The contention of neoclassical microeconomics is that firms accrue little or no gain from investing in environment performance, whereas "win–win" theorists claim that such investments can generate competitive advantage and other profit opportunities (Orsato, 2006). Scholars attempting to empirically test these conflicting

[3]Dole Reports Motivation, Health and Safety, and Productivity Benefits from ISO 14001. http://staratel.com/iso/ISO/ISO900014000/articles/pdf/casestudy_2-01.pdf. Accessed on 27 May 2011.

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theories empirically have generated an extensive body of literature, with the balance of studies suggesting a positive relationship between improved environmental and financial performance (Margolis & Walsh, 2003; Orlitsky et al., 2003).

Environmental standards aim to improve environmental performance and firms' relationships with both market and non-market actors (Delmas & Montiel, 2008). They require the adoption of management practices, which are not legally mandated and which may promote organizational commitment to improving the natural environment (Darnall, Henriques, & Sadorsky, 2010; Delmas, 2002). These practices include the implementation of environmental policies (Henriques & Sadorsky, 1996); the utilization of internal assessment tools, such as benchmarking and accounting procedures (Nash & Ehrenfeld, 1997); the establishment of environmental performance goals (Hart, 2005); internal and external environmental audits; the implementation of employee environmental training; and the establishment of employee incentive compensation plans based on the firm's environmental performance (Welford, 1998). Hence, adopting these standards requires significant organizational changes within the firm.

The literature has identified several mechanisms that can link the adoption of environmental management standards to corporate performance. These include cost reduction, improved internal efficiency, enhanced firm reputation, and access to green markets (Delmas & Montiel, 2009; Porter & Van Der Linde, 1995).

Environmental standards require the implementation of a set of environmental practices and procedures that ensure that risks, liabilities, and impacts are properly identified, minimized, and managed (Darnall et al., 2000). Such practices have the potential to reduce risks related to environmental compliance (Delmas, 2001; Grolleau, Mzoughi, & Thomas, 2007) and decrease insurance costs (Barla, 2007).

Environmental standards can also help the firm improve efficiency, as the adoption of environmental practices establishes new systems for gathering information and monitoring environmental performance (Khanna & Anton, 2002), which can induce the redesign of production processes (Christmann, 2000), trigger innovation, and improve technologies that will positively affect a firm's efficiency (Shrivastava, 1995).

Additionally, environmental standards can enhance corporate reputation (e.g., Konar & Cohen, 2001) and provide access to environmentally oriented consumers (Anton, Deltas, & Khanna, 2004; Delmas & Montiel, 2009; Khanna & Damon, 1999; Nakamura et al., 2001).

Research has also shown that employee involvement in the adoption and implementation of the environmental management system ISO 14001 can lead to a competitive advantage (Delmas, 2001). However, there is very little empirical evidence to support the hypothesis that environmental practices influence employee performance outcomes. The goals of this paper are to develop and test hypotheses on the mechanisms that link environmental certification to labor productivity. By identifying and testing such mechanisms, we hope to fill a void in the literature and to enhance knowledge of the organizational changes associated with the adoption of green practices.

Hypotheses

Through the adoption of an environmental standard, a firm sends a signal to both its internal and external stakeholders about its commitment to improve environmental performance (Delmas, 2002; Delmas & Montiel, 2009). Hence, it would seem likely that an organization's commitment to social and environmental issues would lead to a positive organizational reputation and have a positive impact on employees' work attitudes. As Ambec and Lanoie (2008, p. 57) noted:

> *people who feel proud of the company for which they work not only perform better on the job, but also become ambassadors for the company with their friends and relatives, enhancing goodwill and leading to a virtuous circle of good reputation.*

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One mechanism that we argue links the adoption of environmental standards to labor productivity is the positive social identity that can be derived from working in a "greener" firm. Employees can identify more strongly with ethical and responsible firms, and such identification may be translated into cooperative and citizenship-type behaviors (Dutton, Dukerich, & Harquail, 1994; Frank, 2003; Jones & Hamilton Volpe, 2011) and increased employee organizational commitment (Brammer, Millington, & Rayton, 2010; Peterson, 2004). Such positive corporate social identity may create a stronger emotional association between employees and their firm, resulting in enhanced labor productivity (Hess, Rogovsky, & Dunfee, 2002; Koh & Boo, 2001; Viswesvaran, Deshpande, & Joseph, 1998).

Social and environmental responsibility may also make the firm more attractive to prospective employees (Greening & Turban, 2000; Grolleau, Mzoughi, & Pekovic, 2012; Turban & Greening, 1997), and individuals who choose to work for "greener firms" may work harder (Brekke & Nyborg, 2008).

As we will discuss in more details later, there are additional tangible organizational changes, such as training, that result from the adoption of environmental standards that may also lead to high-performance work systems and increased productivity. In other words, the implementation of environmental standards can create a virtuous circle of reciprocal interactions between the firm structure and its workforce (Perez, Amichai-Hamburger, & Shterental, 2009).

We therefore hypothesize that the adoption of environmental standards is associated with greater labor productivity.

Hypothesis 1: The adoption of environmental standards is associated with greater labor productivity.

We develop two additional hypotheses focusing on the main organizational changes associated with the adoption of environmental standards—namely training and on interpersonal communication and contacts within the organization—that we argue can lead to greater labor productivity. Such organizational changes have been recognized as central to the adoption of environmental standards. Indeed, most environmental standards such as ISO 14001 require the firm to implement an environmental management system in order to document and communicate environmental information more effectively and to allow continuous improvement (Delmas, 2000). A substantial number of ISO 14001 requirements relate to the internal structure of the organization, record keeping procedures, internal communication methods, definition of responsibilities, and training programs (Delmas, 2001). As such, "training and communication are essential elements in the implementation of ISO 14001" (Sammalisto & Brorson, 2008, p. 299).

Environmental standards, employee training, and labor productivity

The adoption of an environmental standard requires investment in employee training (Khanna & Anton, 2002). For example, one of the basic requirements to become ISO 14000 certified is to provide job-appropriate employee training (ISO, 1996), and several authors have shown that ISO certification is an important determinant of training efforts within the organization (Blunch & Castro, 2007; Ramus & Steger, 2000). Training is typically provided to over half of the firm's employees, with some firms training over 95 per cent of their staff (Corbett & Luca, 2002). For example, Honda's environmental certification resulted in the development of a contractor-training program (McManus & Sanders, 2001). This type of training enables employees to better identify pollution prevention opportunities and empowers them to offer recommendations (Morrow & Rondinelli, 2002; Rondinelli & Vastag, 2000; Toffel, 2000).

Human capital stock, accumulated through training activities, is one of the main factors of production (e.g., Lynch, 1994). Investment in human resources has been recognized as a significant source of competitive advantage, as such investments can lead to more effective employees (Porter, 1985), and one of the key tools for investing in human resources is training (Jennings, Cyr, & Moore, 1995). Scholars have also argued that training is profitable through an increase in the specificity of human capital, which is difficult to imitate (Koch & McGrath, 1996).

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Empirical evidence corroborates this conclusion and shows that training is positively associated with labor productivity improvement (Conti, 2005; Dearden, Reed, & Van Reenen, 2006; Koch & McGrath, 1996; Rennison & Turcotte, 2004; Zwick, 2004).

On the basis of this reasoning, we formulate the following hypothesis on the mediating role of employee training on the relationship between environmental standards and labor productivity:

Hypothesis 2: Training mediates the relationship between the adoption of environmental standards and greater labor productivity.

Environmental standards, interpersonal contacts, and labor productivity

Scholars have shown that the adoption of environmental standards alters the organization of the firm by requiring changes in employee attitudes, roles, and responsibilities (Florida & Davidson, 2001; Hart, 1995) that might indirectly influence employee performance outcomes (Lanfranchi & Pekovic, 2010). More specifically, we argue that environmental standards are associated with improved interpersonal contacts within the firm, which may increase labor productivity.

The majority of environmental management projects require a combination of different types of competencies that can be obtained by establishing cross-functional teams (Denton, 1999; Rothenberg, 2003) and promoting collaborative work from employees of different hierarchical levels and functions (Oh'Eocha, 2000). Environmental standards, such as ISO 14001, have demonstrated the potential to transcend functional areas of the organization and integrate environmental considerations throughout the entire organization (Delmas, 2001), and to additionally encourage employees to work together in teams regardless of their placement within the organization (Arimura, Darnall, & Katayama, 2011). Consequently, interpersonal contacts and teamwork are considered as a fundamental element of environmental management standards.

There are two main reasons proposed in the literature to explain why increased interpersonal contacts in an organization can lead to improved labor productivity. First, interpersonal contacts and communication among workers with heterogeneous abilities can help employees engage in knowledge transfer and lead to innovative ideas that improve productivity (Hamilton, Nickerson, & Hideo, 2003; Mohrman & Novelli, 1985). Second, interpersonal contacts can promote employee job satisfaction and motivation, which in turn lead to increased productivity. Work is a social activity that engages the same social needs and responses as any other part of life, such as the need for connection, cooperation, support, and trust (Cohen & Prusak, 2001). Organizations that facilitate interpersonal contacts among their employee provide an enhanced working environment that might lead employees to give more to the firm and increase their productivity, which results in overall improved organizational productivity (Banker, Field, Schroeder, & Sinha, 1996; Batt, 2004; Huselid, 1995). We therefore hypothesize the following:

Hypothesis 3: Interpersonal contacts mediate the relationship between the adoption of environmental standards and greater labor productivity.

In summary, several mechanisms explain a positive relationship between environmental standards and labor productivity. We argue that employees can derive a positive social identity from being associated with a firm adopting environmental standards and may be willing to work harder for such a firm. We also contend that the adoption of environmental standards is associated with higher performance work systems, which we hypothesize lead to improved employee productivity. These mediating mechanisms include employee training and improved interpersonal contacts. We illustrate these relationships in Figure 1.

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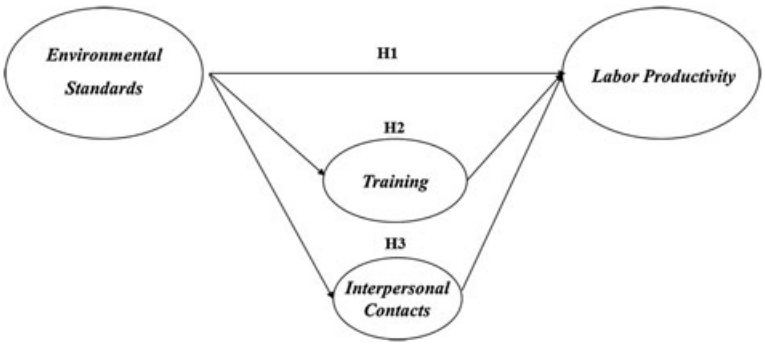

Figure 1. Environmental standards, training, interpersonal contacts, and labor productivity

Method

Data

To test our hypotheses, we used data from the French Organizational Changes and Computerization's (COI) 2006 survey.[4] The COI survey is a matched employer–employee dataset on organizational change and computerization from the National Institute for Statistics and Economic Studies (INSEE), the Ministry of Labor, and the Center for Labor Studies (CEE). The survey contains 7700 firms, with at least 20 employees belonging to the private sector. It is a representative population of French firms from all industries except agriculture, forestry, and fishing. Each firm fills in a self-administered questionnaire concerning the utilization of information technologies and work organizational practices in 2006, and changes that have occurred in those areas since 2003.[5] Firms were also interviewed on the economic goals driving the decision to implement organizational changes and the economic context in which those decisions were made.

Within each surveyed firm, employees were randomly selected and asked about their personal socio-economic characteristics, as well as information about their job and position within the organization. The labor force survey defines the employee's job duties and responsibilities at the time of the survey and provides only a few elements dealing with actual changes. In our sample, the respondents are associated with the following departments: 46 per cent to general management; 32 per cent to finance and accounting; 7 per cent to human resources; 2 per cent to manufacturing, logistics, and quality; 7 per cent to information technology; and 6 per cent are classified as others.

The original dataset includes 14 369 employees. In order to obtain information on business export volumes, employee value-added activities, and earnings and wage information, the COI survey was merged with two other databases: the Annual Enterprise Survey (EAE) and the Annual Statement of Social Data (DADS). As a result of these merges, our sample includes 10 663 employees from 5220 firms.

These databases offer a propitious opportunity to examine three relationships: (i) between the firm's environmental orientation, employee training, and interpersonal contacts; (ii) between employee training and interpersonal contacts and labor productivity; and (iii) between environmental standards and labor productivity. By controlling for the organizational changes associated with the adoption of environmental standards, we sought to isolate the

[4]More details about the design and scope of this survey are available on www.enquetecoi.net: Survey COI-TIC 2006-INSEE-CEE/Treatments CEE.
[5]We present information on questionnaire respondents in Appendix 1.

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positive social identity effect, which implementation of environmental standards may bring about and which might lead to improved labor productivity.

Dependent and independent variables

Green

To test the main hypothesis of the paper, namely, that firms that have adopted environmental standards enjoy higher labor productivity than firms that have not adopted such standards, we used the variable denoted *Green*, which is a binary variable, coded 1 if the firm was registered according to one of the following standards in 2006: ISO 14001 standard, organic labeling, fair trade, and other types of environmental-related standards. Unfortunately, the database does not distinguish between those standards; however, as these standards include similar components, it is expected that their impact will be comparable. At the time of the survey, the majority of the adoption of environmental standards consisted of the ISO 14001 standard with 3476 ISO 14000 certified firms in 2006.[6]

Labor productivity

Drawing on prior research (e.g., Salis & Williams, 2010), we measured labor productivity as the logarithm of the firm's value added by the number of employees. We used the Annual Enterprise Survey (EAE) to obtain information on the firm value added. We obtained number of employees from the Organizational Changes and Computerization (COI) database.

Training

In order to estimate the mediating role of training on the relationship between environmental standards and labor productivity, we constructed a training indicator that consists of the following five components: (i) general training provided; (ii) employee received training in the last three years; (iii) duration of the last training received; (iv) training led to a certificate; and (v) employee obtained training certificate. Because these variables were dummy or categorical variables, we added them to construct the training variable. We tested the reliability of the training scale using the mean standardized Cronbach's alpha. We obtained a Cronbach's α of .77, which is considered satisfactory (e.g., Churchill, 1979).

Interpersonal contacts

In order to analyze if improvement in employee's interpersonal contacts could mediate the relationship between environmental standards and labor productivity, we created an indicator for interpersonal contacts that includes the following components: (i) employee works regularly with his or her subordinates; (ii) employee works regularly with colleagues from the same or different departments; (iii) employee works regularly with people outside the firm; (iv) employee shows his or her colleagues how to conduct specific tasks: often (at least two or three times a month), sometimes (at least two or three times a year), never, or almost never; (v) employee shares work or takes part in work distribution with his or her colleagues: often (at least two or three times a month), sometimes (at least two or three times a year), never, or almost never; (vi) employee is consulted over difficulties with the team, clients, or other persons: often (at least two or three times a month), sometimes (at least two or three times a year), never, or almost never; (vii) employee is part of a work group, such as a project, problem-solving, pilot, or brainstorming group; (viii) the employee works with: one colleague, two to five colleagues, six to 10 colleagues, or more than 10 colleagues; and (ix) employee attends meetings. The interpersonal contact scale proved to be reliable with a mean standardized Cronbach's α coefficient of .72, which is considered satisfactory (e.g., Churchill, 1979).

[6]The ISO Survey of Certifications 2007 (17th Cycle).

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Controls

In order to control for firm-level heterogeneity, our analysis includes variables representing firm characteristics based on previous studies, specifically those relating environmental performance, training, interpersonal contacts, and labor productivity (e.g., Delmas & Montes-Sancho, 2011; Delmas & Montiel, 2009; Grolleau, Mzoughi, & Pekovic, 2007; Pfeffer & Langton, 1993; Zwick, 2004).

ISO 9000
Previous studies have shown that the adoption of the international quality management standard ISO 9000 can facilitate the successful implementation of environmental standards through the utilization of related information, resources, and skills (Delmas, 2002; Delmas & Montes-Sancho, 2011; Grolleau, Mzoughi, & Pekovic, 2007; King & Lenox, 2002). Moreover, the adoption of management practices such as ISO 9000 is found to increase labor productivity through improvement of employee skills (Huselid, 1995). We therefore included a binary variable representing the adoption of ISO 9000 by the firm.

Export
Several empirical studies have confirmed the significant role played by exports in firms' decisions to adopt environmental standards (Corbett & Kirsch, 2001; Delmas & Montiel, 2009; Grolleau, Mzoughi, & Pekovic, 2007). Furthermore, export-oriented firms tend to have higher labor productivity in order to compete internationally (Zwick, 2004). We used a variable representing the firm's volume of exports divided by the firm's sales.

Earnings
The implementation of environmental standards requires the investment of significant financial and other resources; hence, firms with more financial resources might be more likely to adopt an environmental standard (Grolleau, Mzoughi, & Pekovic, 2007; Welch, Mori, & Aoyagi-Usui, 2002). In addition, the financial strength of the firm leads to productivity improvement (Dearden et al., 2006). To control for this issue, we used information on firms' earnings before interest, taxes, and depreciation.

Holding
Being part of a holding company could play a substantial role in the adoption of environmental management standards (Abrahamson & Rosenkopf, 1997; Darnall et al., 2010). This might be because firms with holding company associations have more financial resources available to them for investment in new practices (Pekovic, 2010; Zyglidopoulos, 2002). Additionally, being part of a holding company could improve labor productivity through economies of scope (Eriksson & Jacoby, 2003). Hence, we included a dummy variable that takes a value of 1 when the firm belongs to a holding company.

Size
Most empirical studies have found that the probability of implementing environmental standards increases with firm size (e.g., Darnall et al., 2010; Delmas & Montiel, 2009; Grolleau, Mzoughi, & Pekovic, 2007). Firm size has also been seen as a significant determinant of labor productivity (e.g., Pfeffer & Langton, 1993; Zwick, 2004). Firm size is measured by the number of employees within the firm.

Sector of activity
In order to control for sector differences, we included sector dummy variables on the basis of the N36 sector classification, created by the French National Institute for Statistics and Economic Studies: agri-food; consumption goods; cars and equipment; intermediate goods; energy; construction; commercial; transport; financial and real-estate activities; and business services and individual services.

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In addition, we control for employee characteristics that have been found to be related to green performance or labor productivity in previous research (Burks, Carpenter, & Goette, 2009; Krueger & Schkade, 2008; Pfeffer & Langton, 1993; Torgler & Garcia-Valinas, 2007; Zwick, 2004).

Gender

Gender has been identified as a predictor of environmental behavior. The findings show that women tend to have greater environmental concerns than men (Torgler & Garcia-Valinas, 2007). There is also some evidence that men are more likely to receive employer sponsored training (Veum, 1993). Research has also shown that women are more likely to invest in interpersonal relationships than men (Liebler & Sandefur, 2002). Furthermore, it is argued that women are less productive than men (Pfeffer & Langton, 1993). We therefore include a binary variable that takes a value of 1 if the employee is a woman.

Age

Previous studies consider age to be negatively correlated with decisions to adopt environmental practices (Torgler & Garcia-Valinas, 2007). As indicated by Frazis, Gittleman, and Joyce (2000), age decreases the probability of being trained, as well. Moreover, interpersonal contacts at work tend to decrease with age (Krueger & Schkade, 2008). The impact of employees' age on labor productivity depends on specific age groups (Conti, 2005). We therefore introduce a variable that represent employees' age.

Education

It has been argued that employees with higher educational levels will be more interested in contributing environmental initiatives (e.g., Torgler & Garcia-Valinas, 2007) and in receiving training courses (Lynch & Black, 1998). The productivity of highly educated employees should be greater than those of less educated employees. In order to control for the level of education, we use 10 categories of education numbered from 1 to 10 from primary school to Grande Ecole, PhD.

Wage

Wages offered by firms may have an impact on labor productivity. We therefore include a continuous variable representing the firm average wage.

Seniority

Referencing previous literature, we may presume that seniority within the firm will positively influence labor productivity (Medoff & Abraham, 1980; Pfeffer & Langton, 1993). Seniority is found to be negatively correlated with training (Barth, 1997), as well as with employees' interpersonal contacts (Krueger & Schkade, 2008). Hence, we include a variable that measures the number of years the employee has worked for the firm.

Occupation

Occupation has been shown to be closely related to employees' education and skills (Becker, 1964; Schultz, 1961). The data comprise four categories: management, middle management, white-collar work, and blue-collar worker. We include the management and blue-collar worker categories in the analysis, which are contrasted to the other categories.

Working hours

Previous research has shown a positive correlation between productivity and working hours (Sousa-Poza & Ziegler, 2003). We included a variable that indicates employee working hours.

We present the variables used in estimation, their definitions, and sample statistics in Table 1. We detected no problem of multi-colinearity (Appendix 1).

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Table 1. Definition of variables and sample statistics.

Variable	Description	Mean	*SD*	Min	Max
Dependent and independent variables					
Green*	Registered for ISO 14001, organic labeling or fair trade (=1 if registered in 2006)	0.22	0.42	0.00	1.00
Labor productivity**	Logarithm of valued added per employee	3.90	0.64	−1.16	7.92
Training*	General training provided, employee received training in the last 3 years, duration of the last training, training lead to certificate, employee obtained training certificate	4.84	3.82	0.00	13.00
Interpersonal contacts*	Employee works with subordinates, colleagues from the same or different departments; employee works regularly with people outside the firm; employee shows to his or her colleagues how to conduct specific tasks: often (at least 2 or 3 times a month), sometimes (at least 2 or 3 times a year), never or almost never; employee shares work or takes part in work distribution with his or her colleagues: often (at least 2 or 3 times a month), sometimes (at least 2 or 3 times a year), never or almost never; employee is consulted over difficulties with the team, clients, or other persons often (at least 2 or 3 times a month), sometimes (at least 2 or 3 times a year), never or almost never; employee is part of a working group such as a project, problem-solving, pilot, or brainstorming group; employee works with 1 colleague, with 2 to 5 colleagues, with 6 to 10 colleagues, with more than 10 colleagues; employee attends meetings	8.27	3.11	1.00	15.00
Control variables					
Client supply center*	Under customer policy firm uses contract to assure delivery timeless in 2003 Dummy variable (=1 if yes)	0.67	0.47	0.00	1.00
Client call center*	Under customer policy firm has contact or call client center in 2003 Dummy variable (=1 if yes)	0.35	0.48	0.00	1.00
Informal pronoun usage*	The employee uses the between the informal subject pronoun "tu" when speaking to his or her superior (=1 if yes)	0.62	0.49	0.00	1.00
ISO 9000*	Certified with ISO 9000 Dummy variable (=1 if certified in 2006)	0.54	0.50	0.00	1.00
Export**	Share of exports of total sales (€)	0.12	0.23	0.00	1.01
Earnings**	Earnings before interest, taxes, and depreciation (€)	15 234.89	177 338.9	−198 916	8 433 584
Size*	Number of employees	655.26	3426.30	20.00	111 956.00
Holding*	Belongs to a holding group (=1 if yes)	0.67	0.47	0	1.00
Sector*	Agri-food, consumption goods, cars and equipment, intermediate goods, energy, construction, commercial, transport, financial and real-estate activities, business services, and individual services				

(*Continues*)

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Table 1. (Continued)

Variable	Description	Mean	*SD*	Min	Max
Wage***	Logarithm of average wage within a firm per hour	12.35	8.06	1.26	68.03
Gender*	The employee is a women (=1 if yes)	0.37	0.48	0.00	1.00
Age*	Age	40.32	10.01	17.00	77.00
Education*	Employee highest academic diploma is from: (1) primary school; (2) middle school; (3) short technical course: CAP (vocational certificate), BEP (technical school certificate), in apprenticeship; (4) short technical course: CAP, BEP, etc. without apprenticeship; (5) general secondary school (full 3 years); (6) technological or professional secondary school (full course); (7) 3-year university degree; (8) 4-year university degree; (9) 5-year university degree; (10) *grande école*, engineering school, business school	5.00	2.32	1.00	10.00
Seniority*	Seniority	11.78	9.49	0.00	42.00
Occupation*	Employee works as:				
	Management (included)	0.14	0.35	0.00	1.00
	Middle management (not included)	0.23	0.42	0.00	1.00
	White-collar worker (not included)	0.20	0.40	0.00	1.00
	Blue-collar worker (included)	0.43	0.50	0.00	1.00
Working hours*	Number of working hours per week	37.78	6.93	1.00	90.00

Because of the table's length, we do not report sample statistics for these variables.
*Variables were retrieved from the COI.
**Variables retrieved from the EAE database.
***Variables retrieved from the DADS databases.

Estimation strategy

We hypothesize a direct effect of the adoption of environmental standards on labor productivity, as well as mediating effects of training and interpersonal contacts. Hence, in our model, employee training and interpersonal contacts are determined by the adoption of environmental standards. We further argue that the adoption of environmental standards and the degree of training and interpersonal contact within an organization determine labor productivity.

However, the adoption of environmental standards, training, interpersonal contacts, and labor productivity can be influenced by the same variables (e.g., size, sector of activity, firm's strategy), and this may cause a spurious relationship. Thus, an OLS regression is inappropriate because it considers environmental standards adoption, training, and interpersonal contacts as exogenous.

In light of such endogeneity, we used a three-stage least square (3SLS) model (Aerts et al., 2008; Anton et al., 2004) that considers environmental standards, training, and interpersonal contacts as endogenous variables. The model relies on a simultaneous estimation approach (Pindyck & Rubinfeld, 1991), in which (i) the factors that determine environmental standards are estimated simultaneously with (ii) the factors that explain employee training or interpersonal contacts, and (iii) the factors that define labor productivity. We estimated jointly the three equations for each explanatory variable using maximum likelihood.

Y_1^*, Y_2^*, and Y_3^* are latent variables influencing the probability that the firm implements environmental standards; improves employee training or interpersonal contacts; and improves labor productivity, respectively. We consider the following 3SLS model:

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$$\begin{cases} Y_1^* = \alpha_1 + \beta_1 X_1 + \delta_1 Z_1 + \mu_1 \\ Y_2^* = \alpha_2 + \beta_2 X_2 + \gamma_1 Y_1 + \delta_2 Z_2 + \mu_2 \\ Y_3^* = \alpha_3 + \beta_3 X_3 + \gamma_1 Y_1 + \gamma_2 Y_2 + \mu_3 \end{cases} \quad (1)$$

where X_1 are the vectors of exogenous variables including firm characteristics, such as export level, being a part of a holding company, size, and sector activity. In addition, we control for employee characteristics, including gender, age, education, and wage.

The vector of variable Z_1 represents the vectors of instrumental variables that guarantee the identification of the model and help estimate correlation coefficients (Maddala, 1983). Hence, in order to identify the three-stage least square model, we needed additional variables that explain the probability of adopting environmental standards, but are not correlated to the error term of the labor productivity equation. In our case, Z_1 indicates that the firm assured timely delivery to its customers and had a client call center in 2003.

Several rationales can explain why the client supply center and client call center variables affect environmental practices. With environmental standards, it is essential to maintain close links with customers in order to identify their needs, to receive feedback necessary for understanding if customer requirements are successfully met, and to determine whether to initiate relevant improvement activities. Hence, firms that have a close link with their customers also have strong incentives to demonstrate goodwill to their customers by implementing successful environmental management systems (Nishitani, 2009). Moreover, the literature argues that a firm that wants to deliver their products or services on time should adopt management practices, because the implementation of such practices improves delivery performance, mainly through reduction in time spent on non-value-added activities (Pekovic, 2010). We presumed that a firm's relationships with clients would not positively influence labor productivity, because scholars have identified potential tradeoffs between customer satisfaction and productivity (Anderson, Fornell, & Rust, 1997). It is worth noting that our proposed instrumental variables do not appear to be a significant determinant of training, interpersonal contacts, and labor productivity in a single equation logit or probit model.

X_2 includes two sets of variables: (i) firm characteristics (export level, being a part of a holding, size, and sector activity) and (ii) socio-demographic characteristics (gender, age, age square, education, wage, seniority, occupation, and working hours).

As in the previous case, the vector of variable Z_2 represents the vector of the instrumental variable that explains the probability of employee training improvement or interpersonal contacts, but is not correlated to the error term of the labor productivity equation. For employee training and interpersonal contacts, the vector Z_2 includes whether the employee uses the informal pronoun "tu" when speaking to his or her superior. The choice of this variable as an instrument seems to be reasonable, because supervisors play a central role in employee work empowerment and integration (Hopkins, 2005) and in developing opportunities for employees to practice their skills (Noe, 1986).

X_3 also includes two sets of variables: (i) firm characteristics (export level, being a part of a holding, size, and sector activity) and (ii) socio-demographic characteristics (gender, age, age square, education, wage, seniority, occupation, and working hours).

β_1, β_2, β_3, γ_1, γ_2, γ_3, δ_1, δ_2, and δ_3 are slope coefficients to be estimated.

Finally, α_1, α_2, α_3, μ_1, μ_2, and μ_3 are the intercepts and the disturbance terms for the three equations, respectively.

Because our data provide information on multiple individuals within each organization, there is the potential for correlation of errors across individuals within each organization. We therefore trimmed our sample and used only a single individual respondent per firm in our estimations. As a robustness test, we conducted the analysis with all the 10 663 observations. There is no significant difference in the results between the two samples.[7]

[7]Results available from the authors.

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Table 2. 3SLS estimates of the effect of environmental standards and training on labor productivity.

Variables	Green (1)	Training (2)	Productivity (3)
Green		4.04*	0.61**
		(1.56)	(0.36)
Training	−0.04		0.16*
	(0.03)		(0.05)
ISO 9000	0.27*	−0.31	−0.21*
	(0.02)	(0.42)	(0.08)
Export	0.26*	−0.19	0.15
	(0.04)	(0.47)	(0.09)
Earnings	−0.00	0.00	0.00*
	(0.00)	(0.00)	(0.00)
Size	0.00*	−0.00	−0.00*
	(0.00)	(0.00)	(0.00)
Holding	0.06*	0.58*	−0.02
	(0.03)	(0.15)	(0.04)
Wage	0.00**	0.01	0.01*
	(0.00)	(0.01)	(0.00)
Gender	−0.01	−1.04*	0.13***
	(0.03)	(0.14)	(0.06)
Age	−0.00**	−0.03*	0.00
	(0.00)	(0.01)	(0.00)
Education	0.00	0.11*	0.01
	(0.00)	(0.04)	(0.01)
Management position	−0.06*	−0.22	0.04
	(0.03)	(0.24)	(0.05)
Blue-collar worker	0.00	0.10	−0.03
	(0.04)	(0.15)	(0.03)
Seniority	0.00*	0.05*	−0.01**
	(0.00)	(0.001)	(0.00)
Working hours	0.00	0.02**	0.00
	(0.00)	(0.01)	(0.00)
Client supply center	0.03*		
	(0.01)		
Client call center	0.08*		
	(0.02)		
Informal		0.43*	
		(0.12)	
Agri-food	−0.01	0.72*	−0.07
	(0.03)	(0.25)	(0.06)
Consumption goods	−0.09*	−0.02	0.13*
	(0.03)	(0.28)	(0.06)
Cars and equipment	0.00	0.23	−0.08**
	(0.02)	(0.23)	(0.05)
Energy	0.33*	−0.17	0.15
	(0.07)	(0.82)	(0.17)
Construction	−0.02	0.21	−0.03
	(0.03)	(0.25)	(0.05)
Commercial	−0.03	0.27	−0.03
	(0.02)	(0.21)	(0.04)
Transport	−0.09*	0.84*	−0.08
	(0.03)	(0.29)	(0.07)
Financial and real estate	−0.01	1.53*	0.84*
	(0.06)	(0.45)	(0.12)

(*Continues*)

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Table 2. (Continued)

Variables	Green (1)	Training (2)	Productivity (3)
Business services	−0.11*	0.62*	0.05
	(0.02)	(0.27)	(0.06)
Individual services	0.03	0.74*	−0.26*
	(0.04)	(0.31)	(0.07)
Constant	0.11	2.94*	2.79***
	(0.11)	(0.54)	(0.20)
F statistic	43.14	16.92	30.65
p	0.00	0.00	0.00
Observations	4929	4929	4929

*Parameter significance at the 1 per cent level.
**Parameter significance at the 10 per cent level.
***Parameter significance at the 5 per cent level.

Results

We present the results of the 3SLS estimation in Tables 2 and 3. In the first column, we present the model of the determinants of environmental standards adoption; in the second column, the determinants of employee training or interpersonal contacts; and in the third column, the determinants of labor productivity.

Adoption of environmental standards

We first present the estimation results regarding the factors that may influence firms to adopt environmental standards (column 1 of Tables 2 and 3). As expected, the variables representing the adoption of ISO 9000—*export level*, *size* and *holding*—are significant predictors for the adoption of environmental standards, and these results confirm the findings of previous studies (e.g., Delmas & Montes-Sancho, 2011; Delmas & Montiel, 2009; Grolleau, Mzoughi, & Pekovic, 2007).

The variables *training* and *interpersonal contacts* are not significant in this first stage. As expected, our instrumental variables are positive and significant determinants of the adoption of environmental standards. Firms in the energy and consumption goods sectors are also more likely to adopt environmental standards.

Regarding employee characteristics, as expected, *wage* is positively associated with the adoption of environmental standards.

Training and interpersonal contacts

We present the results of the determinants of training in the second column of Table 2 and of interpersonal contacts in the second column of Table 3. Our results indicate that the adoption of environmental standards improves employee training, because the coefficient of environmental standards on training is positive and significant ($p < .10$). Similarly, the implementation of environmental standards is found to be positively and significantly associated with interpersonal contacts improvement ($p < .10$).

Concerning the effect of the control variables on training, the variables *holding*, *education*, *seniority*, and *working hours* have a positive and significant effect on training, whereas *management position* and *age* have a negative association with training. Furthermore, women tend to obtain less training than men.

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Table 3. 3SLS estimates of the effect of environmental standards and interpersonal contacts on labor productivity.

Variables	Green (1)	Interpersonal contacts (2)	Productivity (3)
Green		1.98*	0.82**
		(1.12)	(0.37)
Interpersonal contacts	−0.05		0.21**
	(0.04)		(0.09)
ISO 9000	0.25**	−0.23	−0.21**
	(0.02)	(0.30)	(0.09)
Export	0.24**	−0.24	0.17
	(0.03)	(0.33)	(0.10)
Earnings	−0.00	0.00	0.00**
	(0.00)	(0.00)	(0.00)
Size	0.00**	−0.00*	−0.00**
	(0.00)	(0.00)	(0.00)
Holding	0.05**	0.15	0.04
	(0.02)	(0.10)	(0.04)
Wage	0.01*	0.06**	−0.00
	(0.00)	(0.01)	(0.01)
Gender	−0.02	−0.85**	0.15*
	(0.04)	(0.10)	(0.08)
Age	−0.00*	−0.01**	−0.00
	(0.00)	(0.01)	(0.00)
Education	0.01	0.14**	−0.00
	(0.01)	(0.02)	(0.01)
Management	−0.02	0.70**	−0.14*
	(0.03)	(0.17)	(0.08)
Blue-collar worker	−0.05	−1.13**	0.23**
	(0.05)	(0.11)	(0.10)
Seniority	0.00**	0.02**	−0.00
	(0.00)	(0.01)	(0.00)
Working hours	0.00	0.06**	−0.01
	(0.00)	(0.01)	(0.00)
Client supply center	0.03**		
	(0.01)		
Client call center	0.07**		
	(0.01)		
Informal		0.31**	
		(0.08)	
Agri-food	−0.03	−0.02	0.05
	(0.02)	(0.18)	(0.05)
Consumption goods	−0.08**	0.07	0.12*
	(0.03)	(0.20)	(0.06)
Cars and equipment	−0.00	0.14	−0.08
	(0.02)	(0.16)	(0.05)
Energy	0.30**	−0.42	0.21
	(0.07)	(0.58)	(0.18)
Construction	0.00	0.53**	−0.11
	(0.03)	(0.18)	(0.07)
Commercial	−0.02	0.27*	−0.04
	(0.02)	(0.15)	(0.05)
Transport	−0.11**	0.13	0.02
	(0.03)	(0.21)	(0.06)
Financial and real estate	−0.05	0.45	0.98**
	(0.05)	(0.32)	(0.10)

(*Continues*)

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Table 3. (Continued)

Variables	Green (1)	Interpersonal contacts (2)	Productivity (3)
Business services	−0.12**	0.19	0.11*
	(0.02)	(0.19)	(0.06)
Individual services	0.03	0.63**	−0.28**
	(0.04)	(0.22)	(0.09)
Constant	0.23	4.80***	2.24**
	(0.22)	(0.39)	(0.45)
F statistic	44.53	64.34	26.09
p	0.00	0.00	0.00
Observations	4929	4929	4929

*Parameter significance at the 10 per cent level.
**Parameter significance at the 1 per cent level.
***Parameter significance at the 5 per cent level.

Regarding the impact of the control variables on interpersonal contacts, the variables education, wage, management position, seniority, and working hours are positively and significantly associated with interpersonal contacts, whereas size and age as well as blue-collar workers and women are associated with less interpersonal contacts.

The results reveal that some sectors are more sensitive to training or interpersonal contacts. More precisely, being a part of agri-food; transport; financial and real estate; and services sectors increases the probability of training. Being a part of consumption goods; financial and real estate; and business service sectors increases the probability of interpersonal contacts improvement. Finally, our instrumental variable informal has a positive and statistically significant effect on training and interpersonal contacts.

Labor productivity

Third, we analyze the effect of the adoption of environmental standards on labor productivity (column 3 of Tables 2 and 3). The coefficient of the variable green on labor productivity is positive and statistically significant ($p < .05$ and $p < .001$, respectively) in Tables 2 and 3. The effect is quite large because the adoption of environmental standards is associated with a change in almost one standard deviation of the labor productivity variable in Table 2 and 1.28 standard deviation in Table 3. This corresponds to a 16% increase above the average labor productivity in Table 2 and a 21% increase in Table 3. Hence, the main hypothesis of the paper—which is firms that have adopted environmental standards are associated with higher labor productivity than firms that have not adopted environmental standards—is confirmed by our results. Moreover, we obtained similar results concerning the effect of employee training and interpersonal contacts on labor productivity.

The estimated coefficients of training and interpersonal contacts are positive and significant; we may conclude that training and interpersonal contacts are positively associated to labor productivity improvement. As we also find that environmental standards predict the adoption of training and interpersonal contacts, our results confirm Hypotheses 2 and 3 on the mediating effect of training and interpersonal contacts on the relationship between environmental standards and labor productivity.

Turning to the control variables, our findings are in line with those of the previous literature regarding *earnings* and *wages*, which we found, generally, to have a positive influence on labor productivity, whereas *size* decreases labor productivity (e.g., Conti, 2005; Pfeffer & Langton, 1993; Zwick, 2004). Interestingly, we find a negative relationship between ISO 9000 standard and labor productivity. This is consistent with other studies that found that ISO 9000 certification has no explanatory power on productivity and that this standard could potentially reduce employees' flexibility and impede creativity because of its formal procedures (Levine & Toffel, 2010; Martinez-Costa, Martinez-Lorente, & Choi, 2008).

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We conducted several robustness tests. As we mentioned earlier, the estimation was performed on the 10 663 observations and yielded similar results. We also ran a simpler model including only firm-level variables. The effect of the variable *green* on *labor productivity* was also positive and significant ($p < .01$) but with a larger coefficient. The results that we presented in this paper are therefore more conservative.[8]

Discussion and Conclusion

Although the literature has focused on the impact of environmental practices on firm financial performance, little is known about the impact of environmental practices on employees' outcomes, especially on labor productivity. The subject is of great importance, especially if we consider that labor productivity is a crucial organizational outcome that indicates the extent to which a firm's labor force is efficiently creating output (Huselid, 1995).

The purpose of this study was to propose a richer conceptualization of the links between the firm's commitment to the environment—witnessed through the implementation of voluntary environmental standards—and employee behavior. We propose several mechanisms that link the adoption of environmental standards to labor productivity. We argue that employees may be more committed to firms that have adopted environmental standards, but that such standards might also result in organizational changes, such as more training and better interpersonal contacts, that may also contribute to labor productivity.

The main hypothesis of the paper, namely, that greener firms are associated with higher labor productivity, is confirmed by our results. These findings are consistent with studies that have argued that a firm's involvement in social causes (such as improvement of environmental reputation) generally enhances a firm's reputation, which leads to a positive impact on employee work attitudes (e.g., Brekke & Nyborg, 2008; Hess et al., 2002; Peterson, 2004). Furthermore, our study demonstrates that the adoption of environmental standards is associated with increased employee training and interpersonal contacts, which in turn contribute to improved labor productivity. We argue that increased communication among workers with diverse capabilities can lead to knowledge transfer and innovation. This is consistent with the innovation literature, which shows that the integration of divergent thoughts and perspectives enables teams to solve problems and leverage opportunities, and is a critical antecedent of innovation and productivity (Barczak, Lassk, & Mulki, 2010; Hamilton et al., 2003). We also argued that enhanced interpersonal contacts can lead to an improved work environment and increased productivity. This is also in line with the literature showing how group characteristics, and social interactions impact organizational outcomes (Liden, Wayne, & Sparrowe, 2000; Parker & Wall, 1998).

These results are also consistent with the literature on high-performance work systems, which have been shown to increase labor productivity (Guthrie, 2001; Way, 2002). The adoption of environmental standards enhances work practices and can create a virtuous circle of positive interactions between the organization and its employees.

Policymakers and supporters of voluntary standards can emphasize these benefits in order to encourage firms to adopt environmental standards. Our findings suggest new ways of achieving the Porter hypothesis' promise of a positive relationship between environmental practices and financial performance. They indicate that a firm's social orientation may not only lead to environmental improvements but can also act as an enhancement tool designed to improve work systems.

This study makes several contributions. First, we tested the effect of environmental standards on labor productivity and provided a much-needed analysis in an area of inquiry where there is limited empirical work. We used a rich and large database that allowed us to control for both firm and employee characteristics in order to provide a robust test of our hypotheses. Second, we described and tested several mechanisms by which the adoption of environmental

[8]Results available from the authors.

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standards may be related to labor productivity. Third, we integrated concepts from both the organizational behavior and the business and environment literatures, potentially enriching both areas of inquiry.

This paper is, or course, not without limitations. First, our analysis was limited to the French context, and future research should explore similar questions in an international setting, because scholars have identified international institutional differences regarding the implementation of environmental practices (Delmas & Montes-Sancho, 2011; Delmas & Montiel, 2008). Second, scholars should examine whether the effects identified in this study persist over time. Although our database included a rich set of variables that allowed us to control for many organizational and individual characteristics, its cross-sectional nature hindered the completion of such an analysis. Our database allowed us to identify important associations between variables, but a longitudinal analysis would be better suited to tease out long-term causal effects. Third, because the survey instrument was not designed specifically for our study, further research could add variables that more clearly isolate our constructs. For example, the training variable included general training as well as environmental training, and further research could separate both to test their relationship. We introduced a comprehensive indicator for interpersonal contact that includes nine different items ranging from the amount of contact and number of colleagues involved to the type of interactions. However, further research could include perceptions of conflicts between individuals or among teams in such an indicator.

Fourth, whereas we focused primarily on training and interpersonal contacts, future research should test whether additional mechanisms might affect employees' outcomes. The literature so far has focused mostly on the impact of the adoption of corporate social responsibility practices at the macro-level, and our research opens the path to investigate the more micro-organizational impacts of the adoption of such practices. Scholars could, for example, test the effect of environmental standards on safety, stress, or employee absenteeism. Future research could also better evaluate organizational commitment such as organizational citizenship behavior and organizational identification (Evans, Davis, & Frink, 2011). In our research, we hypothesized a positive relationship between interpersonal contacts and organizational commitment. However, research has shown that an overload of interpersonal contacts could lead to stress and lower organizational commitment (Leiter & Maslach, 1988). Additional research could test the relationship between environmental standards, interpersonal contacts, and job burnout or stress in the organization.

Finally, the literature argues that corporate social performance consists of many dimensions, including environmental impact, and also community investment and outreach, support for diversity in the workplace, employee involvement, and benefits (Chen & Delmas, 2011). Hence, it would be interesting to examine the impact of various environmental and social dimensions on these employee indicators.

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APPENDIX 1

PEARSON CORRELATION COEFFICIENTS

	Labor productivity	Green	Training	Interpersonal contacts	Client call center	Client supply center	Informal	ISO 9000	Export	Earnings	Size	Holding	Gender	Age	Education	Wage	Seniority	Management	Blue-collar worker	Working hours
Labor productivity	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Green	0.10*	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Training	0.12*	0.12*	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Interpersonal contacts	0.13*	0.03	0.23*	1.00	—	—	—	—	—	—	—	—	—	——	—	—	—	—	—	—
Client call center	0.09*	0.17*	0.07*	0.06*	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Client supply center	0.12*	0.13*	0.08*	0.08*	0.21*	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Informal	0.09*	0.04	0.11*	0.10*	0.08*	0.05*	1.00	—	—	—	—	—	—	—	—	—	—	—	—	—
ISO 9000	0.11*	0.38*	0.16*	0.07*	0.30*	0.11*	0.08*	1.00	—	—	—	—	—	—	—	—	—	—	—	—
Export	0.20*	0.24*	0.11*	0.05*	0.16*	0.04*	0.08*	0.24*	1.00	—	—	—	—	—	—	—	—	—	—	—
Earnings	0.15*	0.09*	0.03	0.05*	0.03	0.07	0.02	0.04*	0.03	1.00	—	—	—	—	—	—	—	—	—	—
Size	0.04*	0.13*	0.05*	0.04*	0.05*	0.09*	0.03	0.08*	0.05*	0.75*	1.00	—	—	—	—	—	—	—	—	—
Holding	0.17*	0.17*	0.15*	0.11*	0.18*	0.17*	0.11*	0.24*	0.20*	0.04*	0.08*	1.00	—	—	—	—	—	—	—	—
Gender	−0.04*	−0.03*	−0.15*	−0.14*	−0.08*	0.04*	−0.20*	−0.13*	−0.05*	0.00	−0.01	−0.02	1.00	—	—	—	—	—	—	—
Age	0.02	0.05*	−0.00	0.02	0.03	−0.02	−0.00	0.07*	0.07*	0.01	0.01	0.04	−0.03	1.00	—	—	—	—	—	—
Education	0.22*	−0.00	0.07*	0.32	0.02	0.10*	0.08*	−0.01	0.04*	0.07*	0.05	0.09*	0.07*	−0.32*	1.00	—	—	—	—	—
Wage	0.30*	0.08*	0.11*	0.41*	0.07*	0.11*	0.09*	0.08*	0.13*	0.07*	0.06*	0.15*	−0.14*	0.22*	0.41*	1.00	—	—	—	—
Seniority	0.06*	0.12*	0.09*	0.04*	0.05*	−0.01	0.05*	0.11*	0.14*	0.00	0.01	0.08*	−0.03	0.63*	−0.28*	0.14*	1.00	—	—	—
Management	0.20*	0.00	0.06*	0.36*	0.05*	0.07*	0.08*	0.02	0.05*	0.08*	0.08*	0.11*	−0.09*	0.09*	0.47*	0.66*	0.01	1.00	—	—
Blue-collar worker	−0.12*	0.04*	0.02	−0.29*	0.09*	−0.11*	0.05*	0.13*	0.08*	−0.04*	−0.04*	−0.04*	−0.30*	0.04	−0.50*	−0.33*	0.06*	−0.35*	1.00	—
Working hours	0.16*	0.02	0.08*	0.30*	0.07*	0.02	0.06*	0.03	0.02	0.04	0.03	0.04*	−0.24*	0.09*	0.19*	0.40*	0.01	0.38*	−0.12*	1.00

*$p < .01$.

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