

The Impact of Human Resource Management on Environmental Performance: An Employee-Level Study

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Abstract This field study investigated the relationship between strategic human resource management, internal environmental concern, organizational citizenship behavior for the environment, and environmental performance. The originality of the present research was to link human resource management and environmental management in the Chinese context. Data consisted of 151 matched questionnaires from top management team members, chief executive officers, and frontline workers. The main results indicate that organizational citizenship behavior for the environment fully mediates the relationship between strategic human resource management and environmental performance, and that internal environmental concern moderates the effect of strategic human resource management on organizational citizenship behavior for the environment.

Keywords Strategic human resource management · Internal environmental concern · Organizational citizenship behavior for the environment (OCBE) · Environmental performance · Green human resource management

Introduction

Contemporary firms are faced with many pressures from stakeholders and shareholders to develop environmentally responsible activities (Molina-Azorín et al. 2009). Environmental performance reflects an output demonstrating the degree to which firms are committed to protecting the natural environment (hereafter, “environment”). Environmental performance can be evaluated by a set of indicators such as low environmental releases, pollution prevention, waste minimization, and recycling activity (Lober 1996), and it may be increased by the implementation of environmental management system (EMS), such as ISO 14001 certification, a tool requiring high interactions between human resource management (HRM) and environmental management (EM) (del Brío et al. 2007). Some recent papers illustrate the cross-fertilization between EM and HRM for the achievement of environmental performance. For example, Jabbour and Santos (2008a, b) and Jabbour et al. (2008) examined four organizations all holding the ISO 14001 certification, and reported that the best results in terms of environmental performance were observed in the organization (among the four studied) where employees were the most stimulated by the use of appropriate HRM practices at each stage of the manufacturing processes.

By establishing the important role played by HRM in environmental performance issues, findings obtained by Jabbour and his colleagues reflect the efforts that have

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been made in this area since the middle of the 1990s. Over the last 15 years, scholars specialized in EM have directed their attention to HRM and have highlighted the importance of individual green initiatives in the workplace (e.g., Branzei et al. 2004; Daily et al. 2012; Fernández et al. 2003; Florida 1996; Hart 1995; Jabbour and Santos 2008a; b; Jabbour et al., in press; Jiang and Bansal 2003; King and Lenox 2001; Kitazawa and Sarkis 2000; Walley and Stubbs 2000). More recently, some HRM scholars have proposed a better integration of environmental issues (Jackson et al. 2011; Jackson and Seo 2010; Renwick et al. 2013; Wagner 2012). Despite calls for more research into the linkage between HRM and EM (Muller-Camen et al. 2010; Renwick et al. 2012), recent special issues on the relationship between human aspects and environmental management in Brazilian organizations published in the *International Journal of Environment and Sustainable Development* (2012) and on the HRM's role in sustainability in *Human Resource Management* (2012), a recent edited collective book (Jackson et al. 2012), and some existing studies showing how firms diminish their environmental influence when employees take initiatives in their job in favor of the environment (Ramus and Steger 2000), to date, few empirical works have explicitly addressed the extent to which strategic HRM (SHRM) stimulates frontline employees' friendly environmental behaviors, enabling firms to improve their environmental performance.

The purpose of this research is to examine the link between HRM and EM by highlighting how employees are involved at their own level in helping their companies become greener. The paper reports an investigation conducted in China. As the world's largest emerging country, China represents a critical area to which researchers should pay more attention (Peng 2004; Chow and Chen 2012). As environmental issues have become an urgent problem worldwide, Chinese firms today are facing more challenges than their Western counterparts on many issues of EM. For instance, environmental pollution in China is much more serious than in any other countries with advanced economies. To deal with such pollution, the Chinese government has implemented various legislative regulations. Thus, conducting a study for environmental protection should provide useful knowledge for firms to do better in EM. In so doing, the present study makes three main contributions. First, as stated above, there is a need to link EM and HRM in order to better understand how firms are able to achieve environmental performance. Jackson and Seo (2010) have noted that "the topic of environmental sustainability is not reflected in the research agendas of most areas of management scholarship. The field of [HRM] is one of the minimally engaged areas of specialization" (p. 278). By providing

original data, the present study helps to fill this gap. Second, although environmental literature acknowledges the role played by frontline employees in preventing the negative impact of their actions toward the environment in their job (Hanna et al. 2000), or in supporting the implementation of environmental system (Ramus and Steger 2000), the specific relationship with environmental performance remains unclear. The present study extends prior research by examining the extent to which pro-environmental behaviors at work act as a key explanatory mechanism in the relationship between SHRM practices and environmental performance. Third, whereas previous findings have highlighted that the lack of managers' tendency to support environmental issues may be a serious source of disruption (Govindarajulu and Daily 2004; Ramus 2001), very little has been said about the influence of managers who are convinced of the necessity to act in favor of the environment. In this study, it is assumed that managers can play an active role. In particular, we focus on internal environmental concern as a possible moderating variable in the relationship between SHRM and pro-environmental behavior at work.

The present paper begins with a brief review of the literature, followed by a presentation of the method and results. The findings are discussed in light of the relevant literature.

Theoretical Background and Hypotheses Development

This paper proposes to test a research model (see Fig. 1) in which SHRM, organizational citizenship behaviors for the environment, and internal environmental orientation are identified as important antecedent variables for achieving environmental performance.

Current literature on EM recognizes that in order to achieve environmental sustainability objectives, organizations can use appropriate HRM practices to stimulate their employees. To this end, great efforts have been made to explore what drives employees to engage in pro-environmental behaviors that help their organization to become greener. Fifteen years ago, Wehrmeyer (1996) edited one of the first books attempting to connect the two fields of EM and HRM. Wehrmeyer (1996) indicated that the lack of integration between EM and HRM:

demonstrates the somewhat naïve belief that current managerial approaches and uses of technology to solve environmental problems are doing enough to address the issue of environmental protection. This approach reinforces, and is a product of, a technological optimism that may assist organisations in their economic performance, but does not create a path

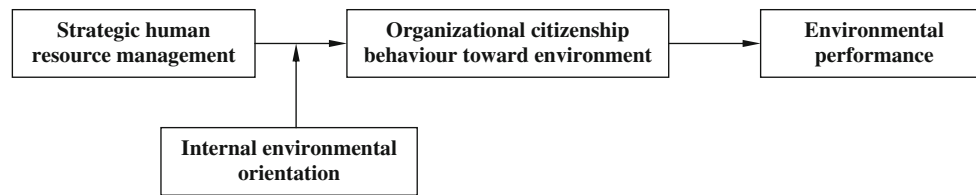


Fig. 1 The conceptual model of the study

towards sustainable development as it does not address ethical and attitudinal change. This lack of integration is, curiously, also detrimental to the economic success of organisations, as it negates the opportunities that can be gained from a more ethical and participative approach to environmental and staff management. The greatest benefits—namely, higher staff motivation, lower turnover, a greater degree of job satisfaction, more innovations and improved customer services—are due not to improved technology but people. (p. 28)

This paragraph by Wehrmeyer (1996) sounds like a call to better integrate EM and HRM and highlights some possible issues that could be investigated by future research. What has been done since the publication of this handbook? While theoretical answers to this question may be found in two recent papers that propose a research agenda (Jackson and Seo 2010; Renwick et al. 2013), some preliminary data have been reported recently (Jabbour and Santos 2008b; Wagner 2012). Wagner (2012) suggested elevating environmental management considerations to a strategic HR level.

Although early studies in the field of SHRM can be localized in the 1920s (Lengnick-Hall et al. 2009), reflecting a long tradition of research, Jackson and Seo (2010) indicate that the contribution of SHRM to the field of environmental sustainability is a new topic. SHRM places the highest priority on linking HRM with the strategic goals and objectives of a firm in order to achieve its success (Truss and Gratton 1994). In this way, SHRM regards employees as a source of competitive advantage (Huselid 1995; Lengnick-Hall et al. 2009; Swailes 2002). Even so, attempting to connect SHRM and EM reflects a somewhat new topic; previous works can be found that have focused on the implementation of practices to help the workforce to become greener by adopting appropriate actions in their job (Daily and Huang 2001; Milliman and Clair 1996; Wood 1993).

Milliman and Clair (1996) were among the first to propose an exploration of the role of HRM in environmental management. They built a “Model of Environmental HRM practices” involving four main steps. First, a

firm needs an environmental vision as a guideline for shaping its strategy. Second, employees must be trained to understand the firm’s philosophy of environmental vision through its goals and strategy. Third, employee environmental performance needs to be evaluated using an appropriate appraisal system in line with these goals. Fourth, reward programs should be defined, recognizing pro-environmental activities carried out in the workplace. Milliman and Clair’s (1996) model of environmental HRM practices points to the importance of human resources in enabling the implementation of a firm-specific strategy toward the environment.

Training, appraisal, and rewards contribute to develop employees’ motivation to endorse the firm’s environmental concerns, enabling it to be more competitive and to reach environmental standards (Govindarajulu and Daily 2004). Training, appraisal, and rewards are often reused in subsequent works (e.g., Daily and Huang 2001; Jabbour et al. 2012; Jabbour 2011; Teixeira et al. 2012). Over the years, several other HRM practices have been progressively added. A recent literature review by Renwick et al. (2013) provides valuable insight into the evolution of this field. Renwick et al. (2013) summarized three core components of the HR aspects of EM. The first core component is related to the development of green abilities and implies practices such as selecting, recruiting, training and developing environmental knowledge, and encouraging EM leadership. The second core component is related to the motivation of green employees and implies appraisal and rewards. The third core component is related to the stimulation of employee involvement and implies valorizing tacit knowledge, empowering employees, and creating a green organizational culture. Neglected by Renwick et al. (2013), further works have examined teamwork (Hanna et al. 2000; Jabbour et al., in press; May and Flannery 1995) and work–life balance (Muster and Schrader 2011) as two interesting additional practices for achieving sustainability. Teamwork presents several advantages. It can promote friendly competition among members, as well as sharing of tacit knowledge (Boiral 2002). In addition, Hanna et al. (2000) argued that “worker concern for the environment is often a factor in employee morale and can be highlighted by participation in team projects that have

environmental goals” (p. 154). Finally, Muster and Schrader (2011) have called attention to the potential of work–life balance as HRM practices. Their main argument is that “it is important to acknowledge that environmentally relevant attitudes and behavior are not learned exclusively at the workplace, but also in private life” (p. 141). Taking account of green work–life balance offers a set of advantages for firms. From our point of view, among other advantages (see the developments on pages 148–152), by transferring their environmental concerns from the private domain to the organizational domain, people are more prone to develop pro-environmental behavior in the workplace. As reported earlier, since Milliman and Clair (1996), HRM practices dedicated to environmental issues have been refined. However, it is surprising to note the scarcity of research attempting to link HRM practices to environmental issues.

Whereas HRM scholars seek to identify which HRM practices at the functional or strategic level can be selected to foster environmental performance, to date, little attention has been given to explaining the individual process by which HRM practices trigger employees’ willingness to adopt green behaviors at work. However, while identifying and selecting the appropriate approach for achieving sustainability are one thing, implementing this approach successfully is another. Jackson and Seo (2010) have argued that “employers need to understand how employees make decisions about whether to participate in organizational roles and activities” (pp. 285–286), and have suggested that employers should better take account of discretionary behaviors that contribute to the achievement of strategic targets toward the environment.

Jackson and Seo (2010) have attributed a key role to discretionary behaviors. What are the discretionary behaviors crucial to environmental performance? These last years, some developments have focused on a form of voluntary cooperation through which employees demonstrate extra efforts that help their organization to become greener. Clearly rooted in organizational citizenship behavior’s framework (Boiral 2009; Boiral and Paillé 2012; Daily et al. 2009), the topic of organizational citizenship behaviors for the environment (OCBE) has emerged recently in the environmental literature, and seems to be a promising approach to capturing pro-environmental behaviors in the workplace. As such, OCBE has been defined by Daily et al. (2009) as “discretionary acts by employees within the organization not rewarded or required that are directed toward environmental improvement” (p. 246). The core essence of this kind of behavior is to be discrete. What do we mean by “discretionary behaviors (or acts)” in the particular environmental management context? Following the classic proposition by

Organ (1988), discretionary acts suggest that individuals are free to act or not to act. Discretionary actions cannot be obtained, for example, through the elements of a contractual employment or the threat of punishment. In the particular context of green behavior, the term “discretionary acts” suggests that employees are able to make decisions at their own level. Boiral and Paillé (2012) have reported three particular discretionary acts labeled eco-initiatives, eco-helping, and eco-civic, reflecting that OCBE may be directed toward the job held by the employee in the form of personal initiatives, toward other people in the workplace in the form of mutual support among employees, and toward the organization in the form of support for the organization’s commitments, respectively. Therefore, for a given employee, OCBE reflects his/her willingness to cooperate with his/her company and its members by performing behaviors beyond his/her job duties that benefit the natural environment. Why is OCBE useful? What purpose does it serve? OCBE is useful for environmental management due to two main reasons. First, with the development of preventive approaches, pro-environmental behaviors in the workplace have become essential to reduce pollution at the source (Hanna et al. 2000; Hart 1995). Second, given both the complexity and diversity of environmental aspects, formal management systems may not take into account all possible desirable behaviors that could minimize environmental impacts (Jiang and Bansal 2003). Thus, the employee’s willingness to engage in pro-environmental behaviors such as OCBE is often identified as an important factor that supports environmental management activities (Ramus and Steger 2000).

OCBE can also be viewed as a means to reach an environmental objective. Individual initiatives for the environment within the workplace cannot be reduced to repetitive behaviors. By demonstrating spontaneous behaviors, employees can also play an important part in the development of environmental innovations within the workplace (Branzei et al. 2004; Daily et al. 2009; Fernández et al. 2003; Hart 1995; Walley and Stubbs 2000). It has been suggested that in order to contribute effectively to environmental action, organizations’ employees must be able to operate freely (Daily et al. 2007) and independently in the course of their work activities without suffering undue influence from their management (Daily and Huang 2001). This autonomy is necessary to correct the imperfections of industrial processes and to share tacit knowledge for the implementation of environmental initiatives in the workplace. This ability is demonstrated by individual pro-environmental actions in the workplace. For example, because of their proximity to production processes, employees are able to share critical information about the emission of toxic substances or materials and to offer practical solutions that

are often less expensive than the implementation of end-of-pipe technologies (Hart 1995). This type of initiative within the workplace often has an impact that goes beyond environmental issues. Employees are generally key players in the development of lean and green practices that help improve both production operations and environmental performance (Florida 1996; Roy et al. 2001). Environmental actions such as waste reduction are thus closely related to lean production and quality management, which are also largely dependent on employee initiatives (King and Lenox 2001; Kitazawa and Sarkis 2000).

Daily et al. (2009) constructed a theoretical model illustrating the plausible sources and consequences of OCBE. After reviewing the relevant literature, they proposed that “OCBE is positively related to environmental performance” (p. 251). This proposition derives from literature, evidencing an improvement of organizational effectiveness when employees demonstrate OCB. Unfortunately, since Daily et al.’s paper (2009), only few empirical studies have demonstrated a positive relationship between OCBE and environmental performance (Roy et al. 2013). Despite this lack of evidence, some existing research gives weight to such a positive relationship. Environmental performance has been defined by Judge and Douglas (1998) “as a firm’s effectiveness in meeting and exceeding society’s expectations with respect to concern for the natural environment” (p. 245), and following Lober (1996), environmental performance can be evaluated with a set of indicators such as pollution prevention, waste minimization, recycling activity, and so on (see Table 1 on page 187 for a more complete list). Environmental performance can be achieved through the implementation of an environmental management system. Jabbour et al. (2010) have stated that the ISO 14001 certification is probably the most recognized system used by firms for improving environmental management. The principle of “we say what we do, we do what we say” at the heart of the ISO certification process is assumed to reinforce environmental procedures and to turn voluntary green initiatives into more prescribed and less discretionary behavior. However, organizational statements on environmental issues are not necessarily in line with workplace practices. For example, the ISO 14001 environmental management standard is not necessarily well integrated into organizations, and employees may only be able to pay lip-service to this environmental management system (Christmann and Taylor 2006). As a result, OCBEs have generally been viewed as one of the success factors facilitating the implementation of formal management systems such as ISO14001 certification (Roy et al. 2013).

In short, it is often postulated that HRM contributes to the creation of an organizational setting that supports

environmental performance. Unfortunately, despite the studies mentioned above, data that support this contention remain scarce. Our review of pertinent literature provides some useful insights. Firms concerned with the protection of the natural environment cannot act without the support of their staff. According to Wright et al. (2001), the SHRM finality is, first, to manage competence in terms of knowledge, skills, and abilities, among others things, and second, to direct behaviors by encouraging certain desirable behaviors on the job. In addition, each gesture, however insignificant in appearance (e.g., turning off the light before leaving a room), each individual on-the-job decision contributes to the achievement of environmental performance. Often, these decisions concern discretionary behaviors outside the control of the HRM system. It has been argued that pro-environmental behaviors (i.e., OCBE) may be stimulated by employers using SHRM practices (Jabbour and Santos 2008a; Jackson and Seo 2010), and that these behaviors lead to environmental performance (Daily et al. 2009). The above propositions have not yet been empirically tested. Thus, we put forward the following hypotheses:

Hypothesis 1 SHRM has a positive impact on OCBE.

Hypothesis 2 OCBE has a positive impact on environmental performance.

Hypothesis 3 OCBE mediates the relationship between SHRM and environmental performance.

The foregoing discussion concerning H1 suggests that SHRM positively influences OCBE. On the basis of our research model, we further propose environmental orientation as a moderator of the relationship between SHRM and employees’ pro-environmental behaviors. Environmental orientation reflects the degree to which firms are committed to protecting the natural environment, and derives from their willingness to recognize and to integrate environmental concerns into the business strategy (Banerjee et al. 2003). Based on empirical work, Banerjee (2002) reported that environmental orientation may be focused internally or externally. Whereas external environmental orientation reflects how external community such as customers, commercial partners, or citizens can be affected by a firm’s decisions; internal environmental orientation reflects the degree of importance given by the firm to environmental issues, as evidenced by the firm defining a clear policy statement, shaping values about the importance of preserving the environment, or efforts made by managerial staff toward employees to help them to protect the environment. Banerjee et al. (2003) found that internal environmental orientation and external environmental orientation are related only to environmental corporate

Table 1 Descriptive statistics

Variables	1	2	3	4	5	6	7	8
1. SHRM	0.85							
2. OCBE	0.28**	0.81						
3. Internal environmental orientation	0.48**	0.37**	0.85					
4. Environmental performance	0.23**	0.32**	0.06	0.92				
5. Firm age	-0.07	-0.01	-0.08	0.04	-			
6. Firm size ^a	0.11	-0.07	0.16	0.05	0.05	-		
7. Ownership structure ^b	0.07	-0.12	-0.08	-0.03	0.23**	0.14	-	
8. Internationalization ^c	0.08	0.18*	0.22**	-0.06	-0.18*	-0.18*	0.01	-
Mean	3.93	3.84	3.82	3.88	8.58	1.70	0.64	0.47
SD	0.63	0.33	0.60	0.64	4.98	0.69	0.48	0.50

Diagonal elements are the square roots of average variance extracted

^a Coding: “small-sized” = 1; “medium-sized” = 2; “large-sized” = 3

^b Coding: “state owned” = 1; “non-state owned” = 0

^c Coding: “Internationalization” = 1; “Non-Internationalization” = 0

** $p \leq 0.01$; * $p \leq 0.05$ (two-tailed)

strategy and to environmental marketing strategy, respectively. Given that the purpose of the present paper focuses on corporate strategy rather than on marketing strategy, we will only look at internal environmental orientation.

Research suggests that top management develops concern about the environment when they perceive market pressures to do so (Buil-Carrasco et al. 2008). Adopting an environmental orientation is an appropriate way of dealing with these pressures. For example, it has been found that internal environmental orientation drives firm performance via both environmental corporate strategy practices and environmental marketing strategy practices (Chan 2010). Less attention has been paid to how HRM practices may be influenced by internal environmental orientation. Managers’ beliefs about environmental issues seem to be crucial in the process of implementing HRM practices. Since they hold the discretionary authority allowing them to act with great autonomy, managers are able to push (or not) HRM practices to improve employee efficiency (Paillé et al. 2011). Empirical evidence supports this contention (Jackson et al. 2011). Banerjee (2002) suggested that environmental orientation is viewed as a strategic issue only when the managerial staff believe that the business strategy should take into account environmental concerns.

Lengnick-Hall et al. (2009) indicated that “many organizations have pay-for-performance systems that are sabotaged by managers in implementation” (p. 81). One explanation for this could be a lack of understanding of the importance of environmental issues, rather than the manager voluntarily trying to harm the organization. Nevertheless, without managerial staff support, internal environmental

orientation may provide less significant results than expected. In other words, the degree to which people in organizations are convinced by environmental issues is an important condition for implementing SHRM. Firms should be able to count on the support of managers. If managers have a lack of understanding or a lack of personal conviction regarding environmental issues, they may be less likely to make efforts to implement HRM practices. Govindarajulu and Daily (2004) have argued that “a company can devastate its efforts to become environmentally responsible if there is little or no support to train and encourage its employees to ‘do the right thing’” (p. 336). More often than not, a lack of support from management is explained by the tendency of managers to focus primarily on their core activities rather than peripheral activities (Ramus 2001). Whereas lack of support received from managers has been identified as the major impediment to eco-initiatives (Govindarajulu and Daily 2004; Ramus 2001), when employees feel encouraged and supported by managerial staff, they are willing to engage in pro-environmental behaviors in order to help their organization to achieve environmental performance (e.g., Hanna et al. 2000; Walley and Stubbs 2000). In addition, research by Banerjee et al. (2003) and Gil et al. (2007) has identified social concern (i.e., pressure coming from groups outside the organization), regulatory forces (i.e., pressure coming from legislation), competitive advantage (i.e., pressure coming from the market), and management commitment (i.e., senior management) as potential forces that encourage firms to adopt internal environmental orientation. Among these forces, the commitment of management was found to be the major force of internal environmental orientation. Consistent with Banerjee et al. (2003) and Gil et al. (2007), Dangelico

and Pujari (2010) reported that the origin of an internal environmental orientation derives from the personal commitment of top management. In view of these findings, it can be assumed that managers play an important role in the relationship between SRHM and OCBE.

More specifically, if managers are convinced of the necessity to act in order to protect the natural environment, they can be an excellent source of inspiration for their subordinates to become eco-innovators, motivated to develop and propose eco-innovations (Ramus 2001). In accordance with internal environmental orientation, this conviction should be the reflection of an ethical position toward the natural environment. Based on previous developments, it can be assumed that when people in organizations—especially top management and managers—are convinced by internal environmental orientation, they are prone to exert a stronger positive influence on the relationship between SHRM and OCBE. This leads to hypothesis 4:

Hypothesis 4 Internal environmental orientation positively moderates the impact of SHRM on OCBE.

Methods

A wide range of methods has been used for examining the relationship between HRM and EM. While some research

has employed case studies (e.g., Teixeira et al. 2012), others have conducted correlational or predictive research (e.g., Jabbour et al., in press-a; Paillé et al., in press; Wagner 2012). In accordance with the recent call by Renwick et al. (2013) to conduct quantitative research in nature (see Table 2 in their paper), the present study uses mediation and moderation techniques to test its hypotheses.

Sample and Procedure

Data were gathered through a large field study that collected responses from top management team (TMT) members (e.g., HR managers), chief executive officers (CEOs), and frontline workers. Separate questionnaires were developed for the TMT members, the CEOs, and frontline workers. Such a multiple-source design reduces systematic measurement error and common method biases (Zhou et al. 2008).

To test our hypotheses, we collected data from manufacturing firms in Northern China during the period of 2011–2012. With the permission of top management teams, we invited the firm’s TMT members, CEOs, and frontline workers to respond to three separate questionnaires. We recruited trained interviewers to conduct onsite interviews because this method is more likely to generate valid information in China (Zhou et al. 2008). Participants

Table 2 Result of regression analysis^a

	OCBE		Environmental performance			OCBE			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9
Control variables									
Firm age	0.06	0.09	0.03	0.05	0.03	0.06	0.09	0.09	0.06
Firm size	-0.09	-0.12	0.06	0.04	0.08	-0.09	-0.12	-0.15	-0.13
Ownership structure	-0.13	-0.15	-0.04	-0.06	-0.02	-0.13	-0.15	-0.11	-0.13
Internationalization	0.21*	0.19*	-0.06	-0.07	-0.13	0.21*	0.19*	0.15	0.17*
Independent variables									
Strategic human resource management (SHRM)		0.29**		0.24**	0.15		0.29**	0.16	0.16
Internal environmental orientation (IEO)								0.29**	0.28**
OCBE					0.31**				
Interaction									
SHRM * IEO									0.18*
<i>R</i> ²	0.06	0.14	0.01	0.07	0.15	0.06	0.14	0.20	0.23
ΔR^2	0.06	0.08	0.01	0.06	0.08	0.06	0.08	0.06	0.03
<i>F</i>	2.28	4.80**	0.31	2.01*	4.09**	2.28	4.80**	6.04**	6.15**
ΔF	2.28	14.08**	0.31	8.71**	13.65**	2.28	14.08**	10.64**	5.64**

^a Tabled values are standardized regression weights; ** *p* < 0.01; * *p* < 0.05 (two-tailed)

were informed of the goal of the survey, assured of the confidentiality of their answers, and given a cash gift equivalent to an average worker's salary for a half-day. The interviewers matched together the questionnaires from TMT members, CEOs, and frontline workers of the same companies. We received completed responses from 212 TMT members, 198 CEOs, and 2,250 frontline workers. After eliminating unmatched and/or missing cases, the final sample in this study consisted of 151 matched questionnaires. The response rates were 71.2 % for TMT members, 76.3 % for CEOs, and 77.8 % for frontline workers. The average organizational tenure was 10 years ($SD = 8$) for TMT members and 12 years ($SD = 9$) for CEOs.

Measures

We developed measurement items by adopting measures from prior studies and modifying them to fit the context of our study. The [Appendix](#) lists the measurement items. All multi-item measures were based on five-point Likert scales. While the questionnaire was originally developed in English, it was subsequently translated into Chinese to facilitate respondents' understanding. We employed the back-translation technique to establish the linguistic equivalence of the two versions. Several changes were made to item wording for the final version of the questionnaire in accordance with the feedback given by several faculty members on the content validity and clarity of instructions.

Strategic human resource management (SHRM). We adopted a 9-item instrument on SHRM from the "Strategic Human Resource Management Index" developed by Huselid (1995). We asked TMT members (e.g., HR managers) to describe the extent to which their firms had adopted specific SHRM practices on a 5-point Likert scale, ranging from one (very low extent) to five (very high extent). A sample item is: "Our firm identifies managerial characteristics necessary to run the firm in the long term." The Cronbach's reliability coefficient was calculated and the alpha value was 0.91, indicating acceptable measurement reliability.

Organizational citizenship behavior for the environment (OCBE). We applied a ten-item scale developed by Boiral and Paillé (2012) to evaluate OCBE. Specifically, we asked frontline workers to rate statements such as: "In my work, I weigh my actions before doing something that could affect the environment," using a 5-point response scale ranging from one ("strongly disagree") to five ("strongly agree"). An acceptable level of agreement among frontline workers warranted aggregating responses at the firm level (median $Rwg = 0.95$; $ICC(1) = 0.50$, $ICC(2) = 0.92$). We then applied the AMOS 7 software package to perform a second-order confirmatory factor analysis (CFA) in order to assess the homogeneity of the

three sub-dimensions of OCBE. All the measurements were modeled to load to the corresponding sub-dimensions, and all three sub-dimensions were loaded to an overall higher order factor measuring OCBE. Convergent validity was examined by investigating the item loadings and their significance. The overall model's Chi squared, comparative fit index (CFI), root mean square error of approximation (RMSEA), and the incremental fit index (IFI) were used to assess model fit.¹ The second-order CFA model proved to be a very good fit for the data ($\chi^2(32) = 73.83$, $IFI = 0.97$, $CFI = 0.96$, $RMSEA = 0.093$); these items were aggregated into a composite score for the subsequent analyses. The aggregate-level Cronbach's reliability coefficient was then calculated, giving the alpha value of 0.85, which indicates acceptable measurement reliability.

Internal Environmental Orientation

We applied a four-item scale developed by Banerjee et al. (2003) to measure internal environmental orientation. We asked TMT members (e.g., HR managers) to respond to questions using 5-point response scales ranging from one (strongly disagree) to five (strongly agree). A sample item is: "At our firm, we make a concerted effort to let every employee understand the importance of environmental preservation." The Cronbach's reliability coefficient for the internal environmental orientation scale was 0.77.

Environmental performance. We used a five-item scale developed by Chow and Chen (2012) to evaluate the environmental performance of respondents' firms. CEOs responded using 5-point response scales ranging from one (small extent) to five (large extent). A sample item from this scale is: "Our firm reduced the environmental impacts of its products/service." Cronbach's alpha for this measure was 0.93.

Control variables. We controlled for firm age, firm size, ownership structure, and internationalization because of their potential effects on OCBE and environmental performance (Autio et al. 2000; Darnall and Edwards 2006; Teo and King 1997; Zhou and Li 2007). Specifically, we controlled firm age by controlling for the number of years the firm had existed prior to the study. We resorted to a categorical description of firm size based on Judge and Elenkov (2005). We defined firms with fewer than 100 employees as small firms and assigned them code "1." Firms with more than 100 employees but fewer than 1,000 employees were identified as "medium-sized" firms and

¹ The acceptable standards of the goodness-of-fit are suggested as follows: (1) $1.0 < \chi^2/df < 3.0$ (Hair et al. 2010), (2) $CFI > 0.90$ (Bentler and Bonett 1980), (3) $IFI > 0.90$ (Bentler and Bonett 1980), and (4) $RMSEA < 0.100$ (MacCallum et al. 1996).

were coded as “2.” Firms with more than 1,000 employees were identified as “large” organizations and were coded as “3.” We coded ownership structure as “1” for state-owned and “0” for non-state-owned, whereas internationalization was coded as “1” for internationalization and “0” for non-internationalization.

Data Analysis and Results

Confirmatory Factor Analysis

We conducted confirmatory factor analyses (CFAs) to ensure sufficient convergent and discriminant validity among all constructs. Given the small sample size relative to the number of measurement items, we adopted procedures frequently used by researchers (e.g., Hui et al. 2004). We reduced the number of items by creating three indicators for each single-dimension construct. Based on the factor analysis results, the items with the highest and lowest loadings for each construct were combined first, followed by the items with the next highest and lowest loadings, until all the items had been assigned to one of the indicators. Scores for each indicator were then computed as the mean of the scores on the items that constituted each indicator. We examined a four-factor CFA model that included SHRM, OCBE, internal environmental orientation, and environmental performance. The proposed four-factor model fitted the data well, $\chi^2(48) = 63.43, p > 0.05$; CFI = 0.99, IFI = 0.98; RMSEA = 0.046. In addition, all factor loadings were significant, demonstrating convergent validity.

Discriminant validity of the four proposed constructs was analyzed by examining construct correlations (Kling 2001) and whether the square root of the average variance extracted (AVE) for each construct was larger than its correlation with other factors (Gefen et al. 2000). As shown in Table 1, all construct correlations were less than 0.80, and the square root of AVE for each construct was significantly higher than the correlation between any pair of factors, confirming the discriminant validity of the constructs.

Common Method Variance

To ensure that common method variance (CMV) would not be a pervasive problem in our study, we used several procedural and statistical remedies suggested by Podsakoff et al. (2003). First, as explained above in the “Methods” section, a multiple-source design (i.e., CEOs, TMTs, and frontline workers) was used to gather the data. Second, we used different sets of instructions and included a number of

filler items in between constructs, placing them in different parts of the survey, so as to reduce participants’ perception of any direct connection between these constructs. Third, during the data collection process, we guaranteed respondents’ anonymity and the confidentiality of responses to limit concerns such as evaluation apprehension and social desirability. Finally, we tested the potential influence of CMV statistically with Harman’s one-factor test. Principal factor analysis with Varimax rotation was performed to determine whether a single method factor explained a majority of variance. More than one factor with eigenvalues greater than 1 were found, with the first factor accounting for 20.07 % of the total variance explained (71.33 %). Thus, CMV did not appear to be a pervasive problem in this study.

Test of Hypotheses

Past management research has often used hierarchical linear regression (HLR) with SPSS software and structural equation models (SEM) with software such as AMOS and PLS to test models involving interaction effects, such as the one developed in our study (Hypothesis 4). HLR is preferred to the product of the indicators in SEM since the latter overestimates the interaction effects and underestimates their significance, leading to reduced accuracy and loss of power (Goodhue et al. 2007; Rai and Tang 2010). Furthermore, Majchrzak et al. (2005) suggested that HLR is preferred to SEM, especially when the model involves a continuous moderator, which is the case in adherence to internal environmental orientation. Therefore, in this study, we used HLR to test the proposed hypotheses.

We followed Cohen et al.’s (2003) procedures by conducting HLR analysis to test our hypotheses. First, Models 1 and 2 specified the effects of the control variables and then SHRM on OCBE. Three models were then developed to test the mediating hypothesis. Model 3 shows a regression equation with control variables on environmental performance. In Model 4, we added SHRM based on control variables. In Model 5, we added OCBE. Next, four models were developed to test the moderating hypothesis, i.e., Hypothesis 4. Model 6 shows a regression equation with control variables on OCBE. In Model 7, we added SHRM. We then added internal environmental orientation in Model 8 and the multiplied moderating variables in Model 9.

Table 2 shows the results of the analyses. The results for Model 1 indicate that the effect of internationalization is positive and significant (standardized beta = .21, $p < .05$). However, the explanatory power of the equation is not significant ($R^2 = .06, F = 2.21, ns$). In Model 2, SHRM

has a significant and positive effect on OCBE (standardized beta = .29, $p < .01$). The explanatory power of the equation is significant at the 0.01 level (with $\Delta F = 14.08$). Hypothesis 1 was supported.

As per the regression results in Table 2, Model 3 indicates that no control variables are significant. In Model 4, the variable SHRM has a significant and positive effect on environmental performance (standardized beta = .24, $p < .01$). However, in Model 5, the effect of SHRM is positive but not significant (standardized beta = .15, *ns*), while the effect of OCBE is positive and significant (standardized beta = .31, $p < .01$). Using the approach suggested by Baron and Kenny (1986), we found that OCBE fully mediates the relationship between SHRM and environmental performance. The explanatory powers of the equations are both significant at the 0.01 level (with $\Delta F = 8.71$ and $\Delta F = 13.65$, respectively). Therefore, Hypothesis 2 and Hypothesis 3 were both supported.

The data in Model 6 indicate that the effect of internationalization is positive and significant (standardized beta = .21, $p < .05$). However, the explanatory power of the equation is not significant ($R^2 = .06$, $F = 2.28$, *ns*). In Model 7, the variable SHRM has a significant and positive effect on OCBE (standardized beta = .29, $p < .01$). Moreover, Model 8 indicates that internal environmental orientation has a positive and significant effect on OCBE (standardized beta = 0.29, $p < 0.01$). As mentioned above, the explanatory power of the equations is significant at the 0.01 level (with $\Delta F = 14.08$ and $\Delta F = 10.64$, respectively). Finally, in Model 9, the interaction term between internal environmental orientation and SHRM is both positive and significant (standardized beta = 0.18, $p < 0.05$), which supports Hypothesis 4, indicating a positive moderating effect of internal environmental orientation on the relationship between SHRM and OCBE. This suggests that the positive effect of SHRM on OCBE is more likely to be observed in firms with a high level of

internal environmental orientation. Figure 2 depicts these moderating relationships.

Discussion

The aim of this study was to examine the relationships between SHRM, internal environmental concern, OCBE, and environmental performance. In doing so, we addressed the relationship between SHRM and environmental performance from the employees' viewpoint, and we proposed the mediating mechanism of OCBE and the moderating influence of environmental orientation. From a multisource survey of CEOs, their TMT members, and frontline workers in Chinese manufacturing firms, our findings support the hypotheses. Hence, we have filled a gap in the extant literature linking HRM and EM. As expected, SHRM and OCBE were positively related, as were OCBE and environmental performance. In addition, we found that OCBE fully mediates the effect of SHRM on environmental performance. Finally, we also determined that in the case of high internal environmental concern, the relationship between SHRM and OCBE is positively moderated, whereas in the case of low internal environmental concern, the relationship between SHRM and OCBE is slightly moderated. Our findings contribute to the literature in three important ways.

First, Jackson and Seo (2010) have suggested that “working at the intersection of strategic HRM and environmental sustainability provides an opportunity to address a pressing real-world problem while also developing a new knowledge that advances our scholarship” (p. 288). By addressing this call, our findings contribute to generate new knowledge at this intersection. More specifically, the findings indicate that firms can improve environmental performance by adopting SHRM. Although recent research has hypothesized on the importance of SHRM in a firm's achievement of superior environmental results (e.g., Jackson et al. 2011; Jackson and Seo 2010; Renwick et al. 2013), studies on this issue have remained largely speculative. Based on data collected from manufacturing firms in China, the present paper empirically tests and confirms the claim that a firm's SHRM practices contribute to the improvement of environmental performance. Therefore, a firm with strong SHRM should generate superior environmental performance due to its emphasis on aligning HR functions or activities with the firm's environmental strategy.

Second, we considered OCBE from an employee-level perspective as an important intervening construct in the SHRM—environmental performance relationship. By exploring how SHRM improves environmental performance

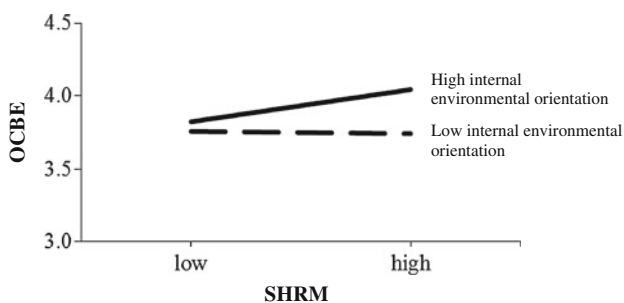


Fig. 2 Interaction between SHRM and internal environmental orientation

through influencing employees' attitudes and behaviors, the present study fills a gap in previous research. Although existing HRM studies have confirmed repeatedly that SHRM can improve a firm's performance through firm-level mechanisms such as knowledge sharing and corporate entrepreneurship (Wei et al. 2011), no study to date has explained how OCBE and environmental performance are related. As explained in the theoretical section, the potential positive role of OCBE in environmental performance was first suggested by Daily et al. (2009). Although recent research has advised that employees' voluntary and discretionary environmental initiatives should be considered critical for a firm to achieve superior environmental results (e.g., Boiral and Paillé 2012; Daily et al. 2009; Ramus and Killmer 2007), few studies actually link SHRM to environmental performance through employees' pro-environmental behavior such as OCBE. As expected, our data report that OCBE fully mediates the relationship between SHRM and environmental performance. These data confirm the important role of pro-environmental behavior in the workplace for the achievement of environmental performance. Although this role has been acknowledged by previous research, in most cases, it has only been hinted at by data. For example, numerous researchers reported that the efficiency of environmental management system depends on the extra efforts made by frontline employees (Jiang and Bansal 2003; Kitazawa and Sarkis 2000). In the same way, other research has indicated that HRM practices contribute to the efficiency of environmental management system (Jabbour et al. 2008, 2010). Although these works are localized in different research fields—EM and HRM, respectively—convergent findings have been reported suggesting that frontline employees play an important role in environmental issues. However, what people do exactly remains unclear, which could be explained by the lack of appropriate tools available for capturing pro-environmental behaviors in the workplace.

Third, this study adds to our knowledge of the positive role of internal environmental orientation, especially in the relationship between SHRM and pro-environmental behaviors (OCBE). Consistent with current literature on environmental management reporting that among internal barriers, the human factor is probably the most important (e.g., Hillary 2004; Murillo-Luna et al. 2011), low internal environmental orientation of managers can be a source of difficulties. Murillo-Luna et al. (2011) indicated that internal barriers can be explained by a lack of organizational capabilities, a lack of strategic capabilities, and/or a lack of financial capabilities. In their paper, each of the internal barriers is explained by a set of problems (see Table 2). Interestingly, Murillo-Luna et al. (2011) noted

that limited preparation of employees and lack of management commitment are often identified as problems associated with organizational capabilities and strategic capabilities, respectively. While limited motivation and preparation of employees have been reported as important internal barriers, this has not been the case for lack of management commitment. Given that relevant literature has indicated that an unwillingness of managers to support environmental actions can be viewed as an important cause of failure (e.g., Ramus 2001), it was considered necessary to examine the extent to which the relationship between SHRM and OCBE would be affected by internal environmental orientation. Based on our data, internal environmental orientation weighted positively the effect of SHRM on OCBE. Our findings suggest that when managers are convinced of the importance of environmental issues, they can play a facilitator role. In order to achieve environmental performance, firms need to overcome both a lack of organizational capabilities by motivating employees through the implementation of SHRM practices, and a lack of strategic capabilities by creating a sense of responsibility among managers toward the environment.

Therefore, regarding these three main contributions, the most relevant findings of the present paper highlight that internal environmental concern and OCBE are two important intervening variables in the effect of SHRM on environmental performance. Finally, the paper indicates that adopting HRM practices at the strategic level is important to the achievement of the environmental performance under the condition that the overall staff (from top management to frontline workers) are convinced of and engaged in environmental sustainability.

Managerial Implications

The findings of this study also provide some managerial implications for business practitioners. According to York (2010), "managers and employees need to have a shared vision and a common understanding of the mission of the organization so that strategies can be translated into organizational goals and objectives" (pp. 6–7). If one of the missions of the firm is to harm the natural environment as little as possible, it is vital to involve people by adopting appropriate HRM practices at the strategic level. Firms must be able to rely on employees who, on the one hand, accept the responsibility to act for the good of the environment beyond the demands of the job task, and who, on the other hand, are convinced of the importance of environmental issues. Given existing pressures to protect the

natural environment (Molina-Azorín et al. 2009), it is important for firms to be supported by motivated employees in order to achieve environmental performance. Thus, motivated employees willing to go the extra mile can be a source of competitive advantage for firms involved in protecting the environment. This highlights the importance of taking into account pro-environmental behaviors such as OCBE at work. As reported, adopting HRM practices at a strategic level contributes to the enhancement of environmental performance via OCBE. In addition, as suggested by our data, beliefs concerning the importance of the natural environment could be an important issue for successfully implementing HRM practices. All staff should be involved from top management to frontline workers. This means that firms must be aware of the importance of aligning environmental objectives with their personnel environmental concerns. In doing so, current and future employees could be rewarded. Consistent with relevant literature (e.g., Huffman et al. 2009), employers may organize specialized training workshops to educate current employees about environmental issues. For future employees, selection and recruitment should place emphasis on the fit between candidates' personal values with regard to the environment and those of the firm (Huffman et al. 2009).

Limitations and Future Research

Several limitations of our study can be noted for future research. One limitation is that subjective measures of environmental performance were employed. Although perceptual measures are often used in the management literature (Ketokivi and Schroeder 2004), it is possible for discrepancies to exist between subjective measures and the environmental information released by firms. Further research could corroborate our results by employing objective measures of environmental performance. Furthermore, in this study, based on employees' perspectives, we examined OCBE derived only from SHRM. This does not mean that OCBE is the sole most important mediating factor underlying SHRM—environmental performance process. Future examination combining strategic process and employee involvement may help to draw a more comprehensive picture of the overall effect of SHRM on environmental performance.

Another limitation of this study is that it tested the proposed model at only one point in time. Even though the use of the term “effects” in the present work does imply causal relationships, further longitudinal research is needed to explore the process by which SHRM impacts the environmental performance of firms. Finally, we examined the unique institutional environment in China. This may limit the generalizability of our conclusions on institutional effects, though China is one of the most typical emerging economies and has the most potential to tap into the global business world. Future studies need to test our research model in other contexts, so as to generalize our findings to other cultural and institutional settings, especially to other emerging economies (Bruton and Lau 2008).

Conclusions

In this employee-level study, we developed a conceptual model to understand the relationship between SHRM and environmental performance. Analysis of the results confirmed that OCBE mediates the process through which SHRM has an impact on environmental performance. This leads to a need to focus more on selecting, training, and rewarding employees for their environmental friendly practices in the workplace in order to generate an environmental protection culture beneficial to a firm's environmental performance. In addition, there is a need to undertake trainings about the environment related to relevant topics that enable the overall staff (top, senior, and middle managers, and workforce) to carry out integration between HRM and EM. Universities are also important stakeholders that could offer sustainability teaching courses or programs (see de Castro and Jabbour, in press). Finally, by examining the effect of internal environmental orientation, this study was able to show that environmental orientation influences the relationship between SHRM and OCBE. This points to the critical effect of strategic orientation in directing and affecting the implementation of a firm's SHRM.

Appendix: TMT member, CEO, and frontline worker questionnaires

TMT member questionnaire

SHRM

Please indicate to what extent your firm has adopted the following practices. (1 = “very low extent” to 5 = “very high extent”)

SHRM1: Our firm identify managerial characteristics necessary to run the firm in the long term

SHRM2: Our firm modify the compensation system to encourage managers to achieve long term strategic objectives

SHRM3: Our firm design staffing patterns to help implement business or corporate strategies

SHRM4: Our firm evaluate key personnel based on their potential for carrying out strategic goals

SHRM5: Our firm conduct job analysis based on what the job may entail in the future

SHRM6: Our firm conduct staff development programs designed to support strategic changes

SHRM7: HRM department is able to deliver HR related information for business strategic decisions

SHRM8: There is HR planning in our business, with clear, formal procedure

SHRM9: There is formal HR strategy in our business

Internal environmental orientation

Please indicate to what extent you agree/disagree the following statements. (1 = “strongly disagree” to 5 = “strongly agree”)

IEO1: At our firm, we make a concerted effort to let every employee understand the importance of environmental preservation.

IEO2: Our firm has a clear policy statement urging environmental awareness in every area of operation.

IEO3: Environmental preservation is highly valued by our firm members.

IEO4: Preserving the environment is a central corporate value in our firm.

CEO questionnaire

Environmental performance

Please indicate to what extent you agree/disagree the following statements. (1 = “strongly disagree” to 5 = “strongly agree”)

EP1: Our firm reduced wastes and emissions from operations.

EP2: Our firm reduced the environmental impacts of its products/service.

EP3: Our firm reduced environmental impact by establishing partnerships.

EP4: Our firm reduced the risk of environmental accidents, spills, and releases.

EP5: Our firm reduced purchases of non-renewable materials, chemicals, and components.

Frontline worker questionnaire

OCBE

Please indicate to what extent you agree/disagree the following statements. (1 = “strongly disagree” to 5 = “strongly agree”)

OCBE1: In my work, I weigh my actions before doing something that could affect the environment.

OCBE2: I voluntarily carry out environmental actions and initiatives in my daily activities at work.

OCBE3: I make suggestions to my colleagues about ways to more effectively protect the environment, even when it is not my direct responsibility.

OCBE4: I actively participate in environmental events organized in and/or by my company.

OCBE5: I stay informed about my company’s environmental initiatives.

OCBE6: I undertake environmental actions that contribute positively to my organization’s image.

OCBE7: I volunteer for projects, endeavors or events that address environmental issues in my organization.

OCBE8: I spontaneously give my time to help my colleagues take the environment into account in everything they do at work.

OCBE9: I encourage my colleagues to adopt more environmentally conscious behavior.

OCBE10: I encourage my colleagues to express their ideas and opinions on environmental issues.

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