The Role of International Environmental Standards for Firm Success: Integrating Resource-Based and Institutional Theorizing

Abstract

Firms' environmental management strategies encompass the employment of environmental friendly technologies to reduce, change or prevent emissions in the production process (i.e., pollution prevention) as well as the environmental responsible "gestalt" of firms' products (i.e., product stewardship). The present paper combines institutional and resource-based rationale to explain the performance of firms with international exposure. More specific, we examine how a firm's pollution prevention strategy and product stewardship strategy impact the likelihood of adopting strict firm-internal (opposed to industry-wide) environmental standards and how such standards impact the operational performance of the firms. We find that a pollution prevention and product stewardship strategy allow firms gaining competitive advantages by implementing strict firm-internal environmental standards leading to to enhanced firm performance whereas industry-wide standards do not allow firms to outperform competition.

Introduction

Firms' environmental management strategies encompass the employment of environmental friendly technologies to reduce, change or prevent emissions in the production process (i.e., pollution prevention) as well as the environmental responsible "gestalt" of firms' products (i.e., product stewardship) (Hart, 1995). MNEs are affected by environmental management at the local, regional, national and international level making it a highly relevant topic in the overall (international) business and management literature (Kolk, 2010). Environmental management is particularly pertinent in an international context as MNEs have to respond to various environmental institutional contexts mostly unfolding at the level of each nation state (Kolk & van Tulder, 2010). This dates back at least until "the early 1970s when environmental laws in industrialized countries sparked concerns about how differences in national pollution control standards might influence trade patterns and industry location decisions" (Brunnermeier & Levinson, 2004: 6). Thus, environmental institutional standards materialize completely different around the globe (Kolk & Pinkse, 2008) exposing MNEs to particular complexities.

Firms' environmental management in an international context is controversially debated in extant research (Aguilera-Caracuel et al., 2012). One stream of literature - primarily taking an external institutions perspective (e.g., DiMaggio & Powell, 1983) - argues that firms are forced to respond to the nation's environmental institutional prerequisites in order to adhere to established norms, laws, rules, and standards. According to this literature, the response to institutional prerequisites often incurs high costs and significant implementation and monitoring efforts. In order to conform with the institutional prerequisites and at the same time to keep the related costs low, MNEs invest into countries with the weakest environmental regulations – a phenomenon often referred to as the pollution haven hypothesis (for an overview of this literature see e.g., Brunnermeier & Levinson, 2004). Such behavior results in "a race to the bottom" (Madsen, 2009: 1297) in which governments implement lower environmental standards to attract more short-term investments at the cost of long-term

environmental degradation (Madsen, 2009). Against this background, extant international business literature focused on examining how international environmental policy regulations impact MNEs' strategic responses to the respective nation's environmental regulations. However, results of these studies remained largely inconclusive. While some authors argued that firms following a standardized and unified environmental strategy around the globe perform better (e.g., Christman & Taylor, 2001/2002), others argued that MNEs should respond to the respective host-country environmental contingencies in order to exploit advantages of, for example, lax environmental regulations in some countries (e.g., Stewart, 1993). While the former strategy incurs following the same usually quite stringent standard in all countries around the globe and, hence, exceeding national standards in many instances, the latter strategy involves exploiting national contingencies and voids which, at the same time, may incur higher coordination, information and implementation costs.

Another stream of literature - primarily taking an internal resource- and capability-based perspective (e.g., Barney, 1991) – argues that firms can achieve sustainable competitive advantages by following firm-internal environmental standards that go beyond the law of the respective nations. According to this literature, firms innovating green processes and products distinguish from competitors resulting in superior company performance (e.g., Jaffe & Palmer, 1997; Porter & van der Linde, 1995). Despite the costs and efforts related with implementing environmental management, innovation is spurred by environmental management providing opportunities to distinguish from competitors. The argumentation is that green resources that are valuable, rare, hard to imitate and non-substitutable (Barney, 1991) on the one hand allow firms distinguishing from the products offered by indigenous rivals and on the other hand fulfill or even go beyond the respective nation state's institutional laws resulting in superior company performance.

The present paper combines institutional and resource-based rationale to explain the performance of firms with international exposure. More specific, we examine how a firm's *pollution prevention strategy* and *product stewardship strategy* (Hart, 1995) impact the likelihood of adopting strict firm-internal (opposed to industry-wide) environmental standards and how such standards impact the operational performance of the firms. In this regard, we consider firm-internal and industry-wide environmental standards that go beyond the law and their respective performance implications. Considering firms' FDI activities, we draw on resource-based rationale (Barney, 1991) and argue that a pollution prevention and product stewardship strategy allow firms gaining competitive advantages by implementing strict firm-internal environmental standards leading to the outperformance of indigenous rivals nested in the host country context. On the contrary, we build upon institutional theory (DiMaggio & Powell, 1983) and argue that firms seeking to fulfill industry-wide standards based on mimetic and normative pressure adhere to commonly accepted standards only which does not allow firms to distinguish from competition, hence, making it less likely to enhance firm's performance.

We contribute to the existing literature in several ways. First, we elaborate on how pollution prevention and product stewardship strategies impact firm-internal (opposed to industry-wide) environmental standards that go beyond the law. Thus, distinguishing between process and product environmental management practices contributes to explaining the antecedent effects

of the implementation of firm-internal (opposed to industry-wide) environmental management standards. In this regard, we seek to contribute resolving the inconclusive results obtained by studies taking an internal resource-based perspective opposed to literature taking a more external institutions perspective. Second, we distinguish between firm-internal and industry-wide standards and argue that the former have positive operational performance implications while the latter do not sufficiently allow distinguishing from competitors. Thus, we advance recent studies combining resource-based and institutional perspectives (e.g., Aguilera-Caracuel et al., 2012; Madsen, 2009) arguing that industry-wide institutional pressures imply MNEs' mimetic behavior, which, however, does not allow distinguishing from others in the industry following the same industry standards. In this regard, we advance prior literature arguing that going beyond the respective nation's law does not necessarily enhance operational performance, but only *in tandem* when also considering and exceeding the environmental practices of indigenous rivals in the same industry. We show that firms have to develop firm-internal resources and capabilities - going beyond *both* the law *and* the industry standard - to yield sustainable competitive advantages. Our work is consistent with and expands the study by Rugman and Verbeke (1998) distinguishing between firm-level compliance with environmental regulations and the development of new green resources and capabilities. We argue that firms improving green products and processes as an internal strategy are performance-driven compliance fulfillers distinguishing from rivals while companies seeking for compliance with industry-wide regulations are enforcement-driven resulting in mimetic behavior of other actors in the industry. The resulting conformity of the firm with the rest of the industry does not result in competitive advantages and, hence, in no superior company performance.

The remainder of the paper is structured as follows: The next section presents the background literature including the institutional and resource-based perspective. Based on this, we develop detailed rationale and hypotheses for the relationship between pollution prevention and product stewardship and the implementation of firm-internal (opposed to industry-wide) environmental management standards as well as the operational performance implications thereof. We test our hypotheses on a sample of 397 firms with international exposure. We finally discuss our findings, address limitations of our study and derive some practical implications.

Background Literature

Resource-based-view (RBV)

The RBV focuses on the internal perspective of the firm and seeks to explain the sources of firms' sustained competitive advantage (Barney, 1991). Consistent with Porter's (1985) rationale, the RBV focuses on the firm's strategic resources as a source for competitive advantage and how a firm employs such resources to respond to external developments. According to Barney (1991) strategic resources are heterogeneously distributed among firms and companies possessing resources that are valuable, rare, inimitable, and non-substitutable are able to achieve sustainable competitive advantages over rivals. In this regard, the RBV has emerged as one of the key approaches to explain company performance (for a meta-analysis see Crook et al., 2008).

Referred to our research context and drawing on RBV rationale, the natural resource-based view is "a theory of competitive advantage based upon the firm's relationship to the natural environment" (Hart, 1995: 986). The natural resource-based view encompasses the interconnected core strategies of pollution prevention and product stewardship.[1] According to Hart (1995) the environmental driving force behind pollution prevention is the minimization of emissions, effluents, and waste while for product stewardship it is to reduce the costs related to products' life-cycle. The key resource of the former is continuous process improvement resulting in the reduction of costs, whereas the key resource of the latter is stakeholder integration resulting in preemption of competition. Following the natural resource-based view, firms have to continuously invent green resources and capabilities in order to achieve sustainable competitive advantage (e.g., Aguilera-Caracuel et al., 2012; Hart, 1995; Menguc & Ozanne, 2005).

RBV and the specifically tailored natural resource-based view of the firm found broad consideration in extant research. For example, Clarkson et al. (2011) develop detailed rationale consistent with the RBV to test determinants and consequences of proactive environmental strategies by means of a longitudinal study design. Russo and Fouts (1997) draw on RBV and posit that firms' environmental performance has a positive impact on economic performance and that this relationship is contingent on the growth rate of the respective industry in such that the association is stronger in higher-growth industries. Menguc and Ozanne (2005) apply the (natural) resource-based approach to explain performance of Australian manufacturing firms, while King and Lenox (2002) examine the impact of waste prevention on firm performance and Bu et al. (2013) show the relevance of environmental capabilities for locational choices of US firms pursuing FDI in China. In summary, a significant amount of researches proposes that environmental management practices can function as an idiosyncratic resource of the firm spurring innovation and leading the company to obtain sustainable competitive advantages over rivals (Palmer et al., 1995; Porter & van der Linde, 1995).

Institutional theory

Rather than focusing on the internal perspective of the firm, institutional theory emphasizes an external view. The core underlying question institutional theory seeks to answer is "what makes organizations so similar?" (DiMaggio & Powell, 1983: 147). The core argumentation proponents forward is that organizations undergoing structural change rather become more similar than dissimilar compared to, for example, their industry-peers. However, this process of assimilation does not necessarily make the firm more efficient (DiMaggio & Powell, 1983). According to institutional theory three underlying primary drivers, through which organizational change occurs, exist: "1) coercive isomorphism that stems from political influence and the problem of legitimacy; 2) mimetic isomorphism resulting from standard responses to uncertainty; and 3) normative isomorphism, associated with professionalization" (DiMaggio & Powell, 1983: 150). Successful firms are those that achieve legitimacy and support by conforming to the external pressure (Meyer & Rowan, 1977).

[1] Sustainable development is the third core strategy of the natural resource-based view. However, according to Hart (1995) pollution prevention and product stewardship strategies concern the link between business and environment in developed economies, while a sustainable development strategy primarily concerns the negative association between business and environment in developing economies. Given the research focus in the present paper, we focus on the former two strategies in the remainder of the paper.

MNEs operating in multiple countries are exposed to and have to respond to various kinds of different institutions around the globe (Kostova & Roth, 2002). Generally, the MNE has to deal with "liabilities of foreignness" resulting from formal institutional differences between the home and the host country in terms of, for example, law, politics, or economic conditions, but also informal institutional differences in terms of, for instance, language and culture (Johansson & Vahlne, 1977/1990). This challenge is enhanced in the present paper's underlying research context as environmental management is highly complex with specific environmental regulations installed on the level of every nation state having its own requirements (Kolk & van Tulder, 2010). MNEs have to respond to national institutions in order to meet the standards, norms, and laws of the respective country and to avoid costly sanctions or burdens. Such coercive isomorphisms impact the MNEs' employment of environmental management standards. Besides coercive pressure, mimetic pressure results from firms' imitative behavior of "norms and practices in the organization's institutional field" (Aguilera-Carcuel et al., 2012: 463). Finally, normative isomorphisms result from professionalization in, for example, the MNE's respective industry where certain standards and norms prevail and the MNE has to respond to such norms to obtain legitimacy.

Prior international environmental management literature is inconclusive regarding the impact of institutions on the MNEs' implementation of environmental management standards. Some authors (e.g., Christman & Taylor, 2001/2002) suggest that firms should develop a unified corporate environmental management strategy worldwide. As the corporate environmental standards are often quite stringent, such strategy leads the MNE to exceed the national standards of many economies. Having one corporate standard also saves costs in terms of a lower level of implementation, coordination, and monitoring. Another stream of literature argues that firms should respond to each nation's environmental institutions separately in order to avoid exceeding national levels and, hence, saving costs by exploiting lax environmental regulations in some countries (e.g., Stewart, 1993).

We argue that both - the internal resource-based and the external institutional dimension - are important to consider when seeking to explain company performance. To this end, the present paper links RBV and institutional rationale in order to explain the impact of a pollution prevention and product stewardship strategy on the propensity to implement a firm-internal (opposed to industry-wide) environmental standard. Moreover, we examine the impact of a firm-internal (opposed to industry-wide) environmental standard on firms' operational performance. Based on the natural resource-based view, our argumentation is that firms following a pollution prevention and product stewardship strategy have a higher propensity to develop firm-internal (opposed to industry-wide) environmental standards. Furthermore, we derive detailed rationale that companies with firm-internal environmental standards develop idiosyncratic resources allowing them to distinguish from competitors leading to competitive advantages and, hence, superior operational performance. On the other hand, we argue that firms following an industry-wide environmental standard follow mimetic and normative isomorphisms. The isomorphic pressure leads the company to conform to industry rules and standards, however, such conformation does not allow the MNE to distinguish from competitors, hence, having no operational performance implications. Combining RBV and institutional theory is consistent with recent trends in the overall management literature (e.g.,

Oliver, 1997), the international business domain (e.g., Brouthers et al., 2008), and specifically in the international environmental management field (e.g., Aguilera-Caracuel et al., 2012; Madsen, 2009). In the following section, we develop more detailed rationale for our theoretical assumptions.

Hypotheses development

Pollution prevention

Pollution control based on end-of-pipe technologies involves environmental investments representing high extra costs for firms (Porter & van der Linde, 1995; Cohen et. al., 1995). Compared to this, pollution prevention is based on process-integrated environmental technologies lowering the environmental impacts of production by improving process efficiency whilst at the same time reducing costs, future liabilities, and environmental risks. Consequently, protection of the value of a firm's assets including brands and other intangible assets is an important benefit of this approach to environmental management (Reed 1998).

The concept of pollution prevention covers approaches aimed at reducing, changing or preventing emissions, effluents and wastes at the source before they occur (Hart, 1995). Approaches under the paradigm of pollution prevention therefore relate to material substitution, process innovation (e.g., closed-loop processes and process-integrated environmental technologies), materials cycling (e.g., internal and external recycling or reuse), and better house-keeping (Hart 1995; Porter van der Linde 1995).

The fundamental difference between pollution control and pollution prevention is that the former does entail expensive, non-productive expenditure on control equipment, whereas the latter may save the costs of installing and operating end-of-pipe technology (Hart 1995). Pollution control is effective but inefficient, whereas pollution prevention is also efficient (i.e. cost-minimizing or profit maximizing). From a FDI perspective, a pollution prevention-based strategy implies a stronger capability for strict environmental standards for locating sites outside the home country. The reason for this is that more efficient processes, improved productivity and lower compliance costs often make it more likely, that regulatory targets are exceeded. Furthermore, since under a pollution control strategy compliance costs are relatively higher, it is more likely that firms pursuing this latter strategy avoid strict firm-internal standards (Porter 1991; Reed 1998). To protect their reputation and to differentiate from firms pursuing pollution control makes it again advisable for pollution prevention-oriented firms to use more stringent environmental management standards in their FDI. Finally, the negative correlation of environmental performance improvements and capital expenditure under a pollution prevention strategy is an additional factor why firms pursuing such a strategy are more inclined to adopt strict firm-internal environmental management standards because they are able to meet requirements at relatively lower cost. This leads to the following hypothesis:

H1: Firms that pursue a pollution prevention strategy are more likely to adopt firm-internal (as opposed to industry-wide) strict environmental management standards.

Product Stewardship

The focus on process efficiency improvements leads pollution prevention-oriented firms to still producing potentially socially undesirable products (although with less waste). Furthermore dedication of resources to process efficiency in traditional technologies can hinder firms to develop capabilities to developing radically improved products (with e.g. higher durability or service intensity), re-defining business objectives or markets or developing new markets (Day 1998). Opposed to this, product stewardship requires taking into account the more intangible benefits of longer-term competitiveness that result from the creation of a sustainable competitive advantage.

Hart (1995) describes product stewardship as integrating environmental concerns (including external stakeholder perspectives) into product design and development by minimizing use of non-renewable materials, avoiding toxic materials and using renewable resources below or at their rate of replenishment. In this respect, Esty and Porter (1998) stress the importance of finding innovative ways to improve product quality, features and functionality by reconfiguring product definition, design, production, delivery and disposal. The approach most commonly used to integrate environmental considerations systematically from the very beginning into product design is Design for Environment (DfE). A corporate strategy based on product stewardship can therefore be characterised as focussed on product innovation, as having an organizational focus on DfE and as having a competitive advantage focus on the production chain including customers and suppliers of a product (Porter, 1980). This implies that firms pursuing environmental product innovation have stronger incentives to apply strict environmental management standards in their FDI activities.

Markets for environmentally friendly products are usually smaller, and adoption of strict environmental management standards has been suggested as a useful strategy to secure higher shares in these markets. Ultimately this results in a sustainable competitive advantage (Ghemawat, 1986; Hart, 1995), which increases the incentives to firms with a strategy based on product stewardship to use strict standards for competitive preemption helping a firm to build reputation and to differentiate products (Hart, 1995). Furthermore, new market development (e.g. in the form of moving into new regions by means of FDI) is important to a product stewardship strategy, in turn constituting an additional argument, why firms oriented towards product stewardship are more likely to apply strict environmental management standards. This leads to the following hypothesis:

H2: Firms that pursue a product stewardship strategy are more likely to adopt firm-internal (as opposed to industry-wide) strict environmental management standards.

Performance effects

As concerns the profitability effects of strict environmental management standards the argument has been made that firms can increase their international competitiveness without

exploiting weak environmental regulations if they have already developed environmental capabilities, as signalled by strict environmental management standards (Rugman & Verbeke, 1998). Consistent with this argumentation, Dowell et al. (2000) find that MNCs with globally unified environmental management systems (EMS) originating from the US have higher Tobin Q values than those without a unified system. Given that EMS are required to ensure legal requirements are met, in a world with heterogeneous environmental regulations it is implied that unified EMS will have requirements that at least in some countries go beyond legal requirements. If MNCs with (in this sense) strict environmental management standards perform better economically, a possible implication is that countries trying to attract MNC with weak environmental regulations may in fact attract less competitive MNC. Related to this, King and Shaver (2001) show that foreign firms often do not possess capabilities that are useful in the specific regulatory context of the host country (such as environmental capabilities able to address stringent environmental regulation). This makes it more challenging for foreign firms without strict environmental management standards to successfully pursue FDI activities in locations with stringent environmental regulation. However, in the case of strict environmental management standards it seems necessary to distinguish firm and industry standards. For example, von Flotow (2001) finds that despite the fact that MNCs organizing their environmental management internationally are motivated by reputation concerns, there is variation in the areas covered and the level of detail. Consistent with this argumentation the results of Rondinelli and Vastag (2000) analyzing an in-depth case study of the Aluminium Company of America (ALCOA) reveal that whilst ALCOA is exceeding the legal minimum standards with regard to environmental management in some areas but not in others. This discretion leads to a high specificity of the capabilities, resulting ultimately to the creation of strategic resources. Opposed to this, industry standards may exceed some regulatory requirements in some countries, but they are not capable to create competitive advantage, because they are open and accessible to all firms in an industry. This means that industry-based environmental management standards, even if strict, can in principle not constitute strategic resources because they cannot by definition be tacit, thus not rare nor difficult to imitate and hence ultimately not idiosyncratic which leads to the following hypotheses:

H3: Firms that adopt firm-internal (as opposed to industry-wide) strict environmental management standards achieve significantly higher levels of profitability.

Data and Method

The empirical analysis involves data from two surveys of German manufacturing firms which took place in 2001, 2006 and 2011, respectively, and were aimed at exploring amongst other things international environmental management activities and perceived outcomes. Furthermore a number of questions elicited firm responses on different characteristics like firm size and the industry the firm mainly operates in. We use the 2001 and 2011 waves since in 2006 the questions on environmental standards were not asked. The first survey in 2001 was addressing a random sample of 2000 firms drawn from the Amadeus database of Bureau van Dijk. Firms were mailed a printed questionnaire and the returned and completed

questionnaires, corresponds to a response rate of 17.1%. The second survey carried out in 2011 addressed the combined set of firms from 2001 and 2006 the plus additions (due to firm exits) to re-balance the sample. Thus 2300 firms were invited by electronic mail to participate in a web questionnaire and the responses resulted in a response rate of 8.8%, which is similar to those in other countries on similar topics (Belz & Strannegard, 1997; Kestemont & Ytterhus, 1999).

To assess representativeness and response bias, comparing responses to the 2001 survey in terms of their characteristics revealed no significant differences in the mean values of the responses of all variables other than late responding firms being significantly smaller. Furthermore, as can be seen from Table A1 the Appendix there is large variation across the responses in both surveys indicating that also firms less active in terms of environmental management did respond to the survey. Furthermore, we compared firms in terms of the legal form of national versus multinational firms (defined for the purposes of our analysis as those with own sites outside Europe) and did not find significant differences between 2001 and 2011. Also the average R&D intensities and those for national and multinational firms separately suggest the sample structure did not alter significantly between the two survey periods, as does the comparison of the industry distribution over time in terms of low-, mid- and high-technology industries. Finally, comparing responses with data from the Bundesanstalt für Arbeit (BfA, 1999) it can be said, that larger firms with more than 500 employees are represented over-proportionally in the responses, whereas firms with up to 500 employees are under-represented in the data. Therefore, a size bias in the data needs to be acknowledged (relative to the population of manufacturing firms in Germany), which however did not worsen significantly from 2001 to 2011 and is also a persistent issue in empirical management in general (Armstrong & Overton, 1977).

To address the hypotheses formulated earlier, as concerns the first stage multinomial logit regressions, the dependent variable used is a three-level indicator distinguishing no standard use (reference category), use of firm-individual standards and use of industry standards. As concerns the second stage ordered logit regressions, the dependent variable used is a five-level indicator distinguishing much below average profits (coded 1), below average profits (coded 2), average profits (coded 3), above average profits (coded 4) and much above average profits (coded 5). This approach was chosen since German firms in surveys are notoriously unwilling to provide actual profit figures since in many instances (e.g. GmbH) they are not liable by law to publicise such data and hence also refrain from doing so upon request. Several control variables are included in both stages.

Firm size is measured as the logarithm of the number of employees because the untransformed employee data is right-skewed. Existence of a quality management system (QMS) and certified environmental management system (EMS) as a binary dummy variable (yes equalling 1) was included since QMS and EMS are complementary with environmental standards (Christmann, 2000; Wagner, 2007a). Firm type was included in the analysis in terms of a dummy variable (coded 1 if the firm is completely independent) because corporate governance structures differ across types of firms and have been suggested to be more or less supportive of environmental management (Kestemont & Ytterhus, 1999; Wagner, 2010). Breadth measured as the number of corporate functions was included as a predictor of firm-

individual standards since higher functional coverage makes own standards increasingly more cost-effective for a firm (Belz & Strannegard, 1997; Wagner, 2007b). Finally, a dummy for whether a firm had generally no foreign direct investment (FDI) outside Europe was included to account for effects on the three-level indicator and on profitability.

In the second stage, growth in the main market was included on a 5-point scale ranging from a "considerably decreasing" (highest score) to a "considerably increasing" (lowest score) market in order to account for its potential effects on profitability (Waddock & Graves, 1997; Dess & Beard, 1984). The main explanatory variables of the second stage regressions are two dummies derived from the three-level indicator of the first stage that indicate use of a firm-individual standard versus use of an industry standard. As concerns the main explanatory variables of the first stage regressions, pollution prevention and product stewardship, two separate indices were constructed based on survey questions including the items listed in Table 1.

Table 1: Items for calculation of pollution prevention (PP) and product stewardship (PS) indices

PP: reduced water use in production; material recycling within the firm; use of waste streams of other firms; measures to reduce emissions to air; measures to reduce emissions to surface water; measures to reduce solid waste; implementation of cleaner technology
PS: 'green' design of a new product; using less material per unit of product; substitution of non-renewable materials; substitution of hazardous inputs; product recycling; packaging recycling; using less packaging per unit of product

Inspecting the correlations reported in Table A2 of the Appendix suggests that multi-co-linearity is not an issue for the multivariate analysis. Hence all estimations are done by pooling the two samples. We control for the two waves in our analysis by means of a year dummy in all regressions. Due to missing values on individual variables, the final sample contains 397 observations across both waves.

In the next section the above hypotheses on environmental standards are tested with a multinomial logit regression model (Greene, 2003). Then, the hypotheses on the effect of environmental standards on profitability are examined using an ordered logit regression modeld (Long, 2002). All models are estimated with robust standard errors and include detailed industry categories. The model implemented using the STATA software and maximum likelihood.

Results

Table 2 shows the results of testing hypotheses H1 and H2 on the first stage. As can be seen, H2 is supported, whereas H1 cannot be confirmed directly. However, the argument has been made, that firms producing "green" products automatically need to be concerned about the quality of their production, that is, a firm can hardly be envisaged to produce environmentally friendly products without utilizing clean processes (Hart, 1995; Wagner, 2007a).

Table 2: Multivariate probit model for effects on firm-internal and industry standards (relative to no standard)

Variables	Firm-internal standard	Industry standard
Observation from 2011	1.17 (2.86)***	0.58 (0.67)
Employees	0.57 (5.30)***	0.00 (0.01)
Consumer	-1.19 (-1.80)*	15.16 (0.01)
Chemicals	-0.37 (-0.58)	16.48 (0.01)
Materials	-0.31 (-0.46)	15.91 (0.01)
Machines	-0.83 (-1.29)	15.09 (0.01)
Electric	-0.61 (-0.89)	15.48 (0.01)
Other	-1.11 (-1.56)	15.74 (0.01)
Product stewardship	1.46 (1.89)*	0.13 (0.08)
Pollution prevention	-0.53 (-0.71)	0.50 (0.31)
Breadth	0.15 (0.29)	-0.32 (-0.34)
QMS	0.24 (2.07)**	0.43 (1.85)*
EMS certification	-0.04 (-0.23)	-0.15 (-0.44)
No FDI outside Europe	-1.04 (-3.03)***	-0.04 (-0.05)
Independent firm	-17.21 (-0.02)	-16.77 (-0.01)
Constant	-5.49 (-4.82)***	-20.36 (-0.01)

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; z values in brackets; omitted industry: wood and paper; LR $chi^2 = 147.70$***, Log-likelihood = -165.93, Pseudo-$R^2 = 0.308$

As can be further seen from Table 2, a number of further variables are also significant in the expected direction. This includes a trend of increasing firm size being associated with a higher likelihood of having a firm-internal standard and QMS certification being a strong complement to any standard-setting activity within the firm.

As concerns H3 on the second stage, Table 3 reveals, in that also this hypothesis finds support in that a significant positive association of a firm-internal standard on profitability exists (whereas the corresponding coefficient for industry standards is insignificant and negative).

Table 2: Ordered Probit Model for effects of standards on profitability

Variable	Profitability
Firm-internal standard	0.61 (2.03)**
Industry standard	-0.24 (-0.41)
Observation from 2011	0.02 (0.07)
Employees	0.10 (1.55)
Consumer	0.69 (1.78)*
Chemicals	1.01 (2.46)**
Materials	0.52 (1.32)
Machines	0.70 (1.72)*
Electric	0.42 (0.98)
Other	0.77 (2.00)**
Breadth	0.05 (0.77)
Market growth	-0.01 (-0.14)
QMS	0.19 (1.94)*
No FDI outside Europe	-0.35 (-1.36)
Independent firm	-0.30 (-1.01)
Constant	0.34 (1.61)

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; z values in brackets; omitted industry: wood and paper; LR $chi^2 = 33.07$***, Log-likelihood = -468.72, Pseudo-$R^2 = 0.034$

The results of our analysis and the testing of the above three hypotheses remain stable with a number of modifications. Firstly, when measuring product stewardship and pollution prevention orientation more narrowly with two single binary items referring to whether a firm has implemented cleaner technology or the 'green' design of a new product (rather than with the indices reported in Table 1), the results of our hypothesis testing do not change qualitatively in terms of significance, sign and order of magnitude of the coefficients reported

in Tables 1 and 2. Secondly, when including product stewardship and pollution prevention orientation in the second stage as explanatory variables for profitability, the results found for firm-internal and industry standards in Table 2 do also not change qualitatively. In fact, that product stewardship and pollution prevention orientation remain insignificant in the variant estimation including them on the second stage suggests that our two-stage model is more appropriate in that product stewardship and pollution prevention orientation are mediated in their effect on profitability by their influence on standard choices. Finally, as a further element sensitivity analysis we also estimated all models not only with the detailed industry categories reported in Tables 1 and 2, but also broader ones based on Chandler (1994) for which all results however again do not change qualitatively in terms of significance, sign and order of magnitude of the coefficients reported. We are thus confident that our findings are robust over a range of specifications and thus can be used in further discussion and for deriving more general conclusions.

Discussion

The primary goal of the present paper was to combine resource-based and institutional rationale to explain the impact of environmental standards (firm-internal opposed to industry-wide) on firms' operational performance. To this end, we first examined the impact of a pollution prevention and product stewardship strategy on the propensity of firms to adopt strict firm-internal (opposed to industry-wide) environmental standards. Second, we examined how firm-internal and industry-wide environmental standards going beyond the law impact operational performance differently. In the following, we discuss the present paper's findings in greater detail and in light of prior literature.

One focus of our paper is on the antecedents of the implementation of environmental standards. Hence, we contribute to the ongoing discussion on "why companies go green" (Bansal & Roth, 2000: 717) and distinguish between pollution prevention and product stewardship strategies as primary drivers of the implementation of firm-internal strict environmental standards. In this regard, our study is consistent with and expands Hart's (1995) framework suggesting that the implementation of strict firm-internal environmental standards is an important contingency for firms to yield superior performance when following a pollution prevention and product stewardship strategy. However, we do not find a pollution prevention strategy to exert an impact on the implementation of firm-internal environmental standards. One reason for this lack of finding could be that for companies pursuing pollution prevention the 'fruits are no longer hanging low' (Hart, 1995). While reducing emissions, waste, and effluents offers a lot savings potential in early stages, it becomes way more difficult to yield saving potentials in later stages when environmental performance has already improved substantially leading to a weakening of the propensity to install firm-internal environmental standards. Moreover, pollution prevention considers the company's entire supply chain emphasizing a more holistic view rather than an emphasis on single more pronounced measures potentially exerting a stronger impact on the implementation on firm-internal environmental standards. This discussion implies that more research is necessary to reflect on the stages of environmental management (Berry & Rondinelli, 1998) and which environmental measure has an impact in which stage.

We find a product stewardship strategy to be positively related with the implementation of firm-internal strict environmental standards. Thus, a product stewardship strategy encompasses more of a stakeholder perspective integrating the voice of the firm's environment into overall company's strategy (Hart, 1995). Our differentiated findings contribute to the literature by offering more detailed results which environmental practices feed forward in the implementation of strict firm-internal environmental standards leading to an improved competitive advantage. In this regard, we advance existing literature by illustrating that firms' firm-internal environmental standards can function as a catalyst between the implementation of a product stewardship strategy and sustainable competitive advantage of the firm resulting in superior performance. As a way forward we encourage studies to consider other dimensions and to shift focus beyond what has been done in the present paper. Consistent with Berry and Rondinelli (1998), we encourage future studies to consider regulatory demands, stakeholder forces, and competitive requirements and their impact on the implementation of firm-internal strict environmental standards and the normative implications resulting thereof. Moreover, a stronger theoretical reflection and empirical testing of the contextual conditions intervening in the consistency of effects is an important topic to move the literature forward (Bansal & Roth, 2000). This is particularly pertinent in an international context where the boundary conditions are much more complex due to formal and informal institutional regulations on each nation state. To date, the international business literature is limited in this regard and we encourage future research to take more comprehensive views in order to reveal which factors determine companies going green in an international context.

Our study finds firm-internal (opposed to industry-wide) environmental standards to enhance the company's operational performance. In this regard, we contribute to extant literature focusing on the relationship between corporate environmental standards and financial performance (for a meta-analysis see Orlitzky et al., 2003). The existing literature on the normative outcomes of corporate environmental standards and performance is quite fragmented with mixed empirical findings. We contribute to resolving such inconclusive results by demonstrating that the implementation of firm-internal environmental standards (opposed to industry-wide standards) allows firms to sustainably distinguish from rivals allowing to yield a competitive advantage resulting in superior company performance. However, consistent with prior literature in this domain, we encourage future research to consider the boundary conditions of this relationship in greater detail. In this regard, the contingency on different industry factors, home and host country regulations in an international context and also the moderating influence of informal institutional pressures resulting, for example, from host-country culture should be considered. We also encourage studies to take more long-term (opposed to short-term) perspectives to resolve how normative outcomes of the implementation of environmental management standards are affected over time. In this regard, the study by Wang and Bansal (2012) taking a long-term perspective on the relationship between firm's social responsibility and performance in the context of new ventures may be very informative. Related with the study by Wang and Bansal (2012) another important contingency is that we encourage literature to delve deeper into different firm types in terms of size. Recently, Brammer et al. (2012) have shown that environmental management practices represent a significant challenge for small firms. Small- and medium-sized

enterprises suffering from lack of resources may react differently to country-specific environmental regulations in an international context (Lepoutre et al., 2006). Hence, a way forward in the literature is to disentangle the relationship between the implementation of firm-internal environmental standards and operational performance and to reflect on the boundary conditions of this important relationship in greater detail.

Our paper applies RBV and institutional theory to explain the impact of pollution prevention and product stewardship strategy on the implementation of firm-internal (opposed to industry-wide) environmental standards and the performance implications thereof. Thus, from a theoretical stance our paper is consistent with and expands recent contributions linking the internal RBV perspective with the external institutions theory to explain sustainable competitive advantage. For example, Oliver (1997) develops a model including the context and process of resource selection and its impact on firm heterogeneity and competitive advantage. She suggests that both resources and institutional capital are indispensable for firms to achieve sustainable competitive advantage. We advance Oliver's (1997) general management/organizational perspective by considering the specific case of environmental management. While we generally concur that considering both firm-internal and industry-wide external dimensions to explain firm heterogeneity is important, we demonstrate that in our specific research context adopting industry-wide standards may allow for gaining legitimacy but this legitimacy may not suffice to result in superior performance. We argue that the development of firm-internal standards which may also exceed external industry-wide standards is necessary to compete against rivals. However, our paper is lacking a detailed perspective on the inter-relationships of firm-internal and industry-wide environmental standards. In this regard and consistent with the detailed conceptual argumentations developed by Oliver (1997), we suggest that the way forward in the literature is to delve deeper into the interconnections and contingencies of firm-internal resources and industry-wide standards. To this end, a fruitful way forward would be to consider intra-industry alliances, personnel mobility within an industry, and the use of industry benchmarking and competitor analysis (Oliver, 1997) and their impact on the relationship between firm-internal and industry-wide environmental standards and company performance. In a different study linking RBV reasoning with institutional rationale, Brouthers et al. (2008) suggest that firms' international institutional environment can impact the firm's resource-based advantages. By specifically considering the moderating impact of institutions on the relationship between resources and company performance, the authors suggest that in an international context resource-based advantages are largely contingent on the institutional context. We expand the study by Brouthers et al. (2008) by considering the direct effect of a pollution prevention and product stewardship strategy on the implementation of firm-internal (opposed to industry-wide) environmental standards and the performance implications thereof. However, we refrain from considering the boundary conditions and how the ability of resources to distinguish from firms varies by industry standards. For example, a firm may invent a superior environmental friendly technology; however, this technology does not yield sustainable international performance implications as it does not conform to the industry standards. To move the literature forward, consistent with Brouthers et al. (2008), we call for more studies connecting firm-internal and industry-wide standards and to probe deeper into their interactive relationships in an international context.

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Appendix

Table A1: Descriptive statistics of the estimation sample

Variable	Minimum	Maximum	Mean	Std. Dev.
Firm-internal standard	0	1	0.19	0.40
Industry standard	0	1	0.03	0.16
Observation from 2011	0	1	0.37	0.48
Employees	1.79	12.90	5.83	1.81
Consumer	0	1	0.16	0.37
Chemicals	0	1	0.14	0.34
Materials	0	1	0.15	0.35
Machines	0	1	0.16	0.37
Electric	0	1	0.11	0.31
Other	0	1	0.18	0.39
Product stewardship	0	1	0.46	0.29
Pollution prevention	0	1	0.50	0.29
Market growth	1	5	3.09	1.08
QMS	0	1	0.79	0.41
Breadth	0	8	3.55	1.77
EMS certification	1	4	3.17	1.01
Independent firm	0	1	0.59	0.49
No FDI outside Europe	0	1	0.13	0.34

Table A2: Correlation of variables in the estimation sample

Variable	Firm-internal standard	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Industry standards (2)	-0.0789	1.0000													
Observation from 2011 (3)	0.2015***	0.0090	1.0000												
Employee (4)	0.4161***	-0.0139	0.1258**	1.0000											
Consumer (5)	-0.1284**	0.0170	-0.1397***	-0.0416	1.0000										
Chemicals (6)	0.0470	0.0769	0.0588	0.0142	-0.1739***	1.0000									
Materials (7)	-0.0406	0.0245	-0.0829*	-0.1343***	-0.1813***	-0.1641***	1.0000								
Machines (8)	0.1705***	-0.0258	0.0216	0.2193***	-0.1904***	-0.1723***	-0.1796***	1.0000							
Electric (9)	0.0135	-0.0043	-0.0843*	-0.0178	-0.1528***	-0.1383***	-0.1442***	-0.1514***	1.0000						
Other (10)	-0.0490	-0.0339	0.1779***	0.0519	-0.2063***	-0.1868***	-0.1947***	-0.2044***	-0.1640***	1.0000					
Product stewardship (11)	0.1490***	0.0266	-0.2195***	0.1870***	-0.0301	0.0311	-0.1384*	0.1958***	0.1273**	-0.1245**	1.0000				
Pollution prevention (12)	0.1223	0.0437	-0.1951***	0.2873***	-0.0042	0.0577	0.0282	0.0759	-0.0463	-0.0538	0.4609***	1.0000			
QMS (13)	0.1449***	0.0046	0.1443***	0.1822***	-0.1586***	0.1156**	0.0921*	0.1744***	0.0416	-0.0603	0.0681	0.0761	1.0000		
Breadth (14)	0.2541***	0.1045**	0.2570***	0.2595***	-0.0212	0.0712	-0.0168	0.1528***	-0.0268	-0.0923*	0.4064***	0.3348***	0.1383***	1.0000	
EMS certification (15)	-0.1386***	-0.0427	-0.1957***	-0.1667***	0.0691	-0.0444	0.1144**	-0.0248	-0.0662	-0.1044**	-0.0117	-0.0538	-0.0904*	-0.2546***	1.000
Independent firm (16)	-0.1992***	0.0035	0.0505	-0.1437**	0.1849***	-0.0273	0.0408	-0.0719	-0.0716	-0.0988**	-0.0147	-0.0162	-0.0939*	-0.0542	0.1039
No FDI outside Europe (17)	-0.1883***	-0.0617	0.1555***	-0.0378	0.0159	0.0233	-0.0309	-0.1461***	-0.0611	0.1514***	0.0112	0.0056	-0.0039	0.1355***	-0.04
Market growth (18)	0.1191**	0.0761	0.1010**	0.1701***	-0.1752***	0.0356	-0.0205	0.1878***	0.0915*	-0.0202	0.1724***	0.0960*	0.1449***	0.1938***	-0.05

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$