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THE IMPACT OF SYMBOLIC AND SUBSTANTIVE ACTIONS ON ENVIRONMENTAL LEGITIMACY

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Abstract

Drawing on institutional theory and insights from stakeholder theory and impression management, we empirically analyze the impact of both environmental symbolic polices (participation in voluntary environmental programs, green trademarks, environmental-dedicated board committees, environmental pay policies and community communication) and substantive actions (environmental patents and pollution prevention practices) on environmental legitimacy. We show that (1) symbolic actions have a weaker positive effect on legitimacy than substantive actions, (2) that the impact of symbolic actions is greater when they are combined with substantive actions, (3) that this impact is only short-term while substantive actions have both short- and long-term effects.

Keywords: environmental management, institutional theory, legitimacy, stakeholder management, symbolic management.

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Introduction

Symbolic management has been at the center of a growing literature in the strategic field. Extant research has studied the importance of symbolic actions as means to obtaining organizational legitimacy, including topics like long-term incentives in executive pay (Westphal and Zajac, 1994), stock repurchase (Westphal and Zajac, 2001), adoption of ethics codes (Stevens, Steensma, Harrison, and Cochran, 2005), entrepreneurship (Zott and Huy, 2007), and corporate social responsibility (David, Bloom, and Hillman, 2007; Weaver, Treviño, and Cochran, 1999). The common denominator across these studies is that symbolic policies decoupled from actual implementation represent a strategy that allows firms to alter the public perception of their legitimacy and enhance social acceptance.

Despite the merit of previous studies, there are important questions that remain unanswered regarding the use and effectiveness of symbolic procedures in enhancing legitimacy. First, while pressures come from a variety of stakeholders, the literature has not addressed whether symbolic actions have distinctive effects depending on the target audience towards which these actions are oriented. However, a wide variety of stakeholders routinely assess a firm's legitimacy, and thus individual contributions from these groups deserve attention (Bansal and Clelland, 2004). Second, symbolic actions have been traditionally analyzed as decoupled from substantive actions and thus treated as an "either/or" type of question. However, the combined effect of both on organizational legitimacy has been largely neglected. Third, most extant studies analyzed the impact of symbolic actions cross-sectionally, and consequently assumed that these actions have immediate results. But little is known about the endurance of symbolism in longer horizons.

To address the three aforementioned gaps in the literature, this article focuses on environmental issues. Given the public concern about the natural environment, companies appear eager to associate themselves with the environment in order to preserve their reputations and further shape public image. In this context, some companies adopt "greenwashing" policies, while others embark upon more substantive environmental endeavors, offering the proper terrain to test the importance of both symbolic and substantive actions.

Drawing on notions of institutional theory, and using insights from stakeholder theory and impression management, we claim that (1) attending the claims of different stakeholders can

have an impact environmental legitimacy (i.e., distinctive effect); (2) the combination of both symbolic and substantive actions has a greater impact on environmental legitimacy (i.e., combined effect); and (3) symbolic environmental actions have only short-term impact on environmental legitimacy, while substantive actions have both short- and long-term effects (i.e., horizon effect). We test our hypotheses using a longitudinal sample of 167 firms from polluting industries and analyze the impact on environmental legitimacy of their symbolic actions (participation in voluntary environmental programs sponsored by the government, green trademarks, environmental dedicated board committees, environmental pay policies and community communication) as well as their substantive initiatives (environmental patents and pollution prevention practices).

Theoretical Framework and Hypotheses

Institutional theory (DiMaggio and Powell, 1983; Meyer and Rowan, 1977; Scott, 1995, 2005) focuses on the role of social stimuli in shaping an organization's actions. According to this perspective, when companies adopt strategies in adherence to institutional prescriptions, they reflect an alignment of corporate and societal values (Meyer and Rowan, 1977) and obtain external validation or legitimacy (Scott, 1995). Legitimacy, in turn, sustains organizational operability and enables the firm to compete more effectively as it allows better access to resources, attracts better employees, and improves the exchange conditions with partners (Aldrich and Fiol, 1994; DiMaggio and Powell, 1983; Oliver, 1991; Pfeffer and Salancik, 1978; Turban and Greening, 1997). As such, the acquisition of legitimacy is a strategic concern for organizations (Deephouse, 1999; Scott, 1995).

Legitimacy refers to the degree to which actions by organizations in a given field are accepted as appropriate and useful by the broader public (Scott, 1995; Schuman, 1995). Legitimacy is conferred when stakeholders – those who affect and are affected by the firm's actions (Freeman, 1984) – endorse and support organizational actions. In line with institutional theory, a key premise of the stakeholder management perspective is that satisfied stakeholders grant it social legitimacy (Wood, 1991) and thus secure the firm's long-term survival and success (Freeman, 1984; Freeman and McVea, 2001; Hillman and Keim, 2001).

Environmental legitimacy is obtained when firms successfully respond to pressures streaming from different actors that establish norms and common beliefs (Hoffman, 1999; Wade-Benzoni, Hoffman, Thompson, Moore, Gillespie, and Bazerman, 2002), often towards the avoidance of environmental misconduct (Berrone and Gomez-Mejia, 2009). When firms manage to conform to stakeholders' environmental expectations, stakeholders grant legitimacy to the firms and they gain reputational capital (Bansal and Clelland, 2004; Fombrun, 1996; Godfrey, 2005; Hart, 1995). Conversely, poor environmental performance endangers social legitimacy and seriously hinders corporate prestige (Bansal and Clelland, 2004; Fombrun, 1996; Hart, 1995). As Wood (1991, p. 697) argues, when "stakeholders lose confidence in the firm's performance, legitimacy may be withdrawn as the stakeholders refuse to provide their share of reciprocal benefits. Customers stop buying products, shareholders sell their stock, employees withhold loyalty and best efforts, government halts subsidies or imposes fines or regulates, environmental advocates sue. If the firm cannot compensate for lost stakeholder benefits, it becomes 'illegitimate' and dies."

Using this notion as a central argument, environmental management research has long established the importance of different interest groups regarding environmental claims and as

sources of environmental legitimacy (Berry and Rondinelli, 1998; Buysse and Verbeke, 2003; Henriques and Sadorsky, 1996, 1999; Kassinis and Vafeas, 2006). For instance, Henriques and Sadorsky (1996) found empirical evidence indicating that a firm's formulation of an environmental plan was positively influenced by pressures from customers, shareholders, community groups, and the government. Along similar lines, Alvarez-Gil et al. (2007) found that communities, customers, employees, and the government influence the adoption of recycling and other reverse logistics programs. Similarly, Kassinis and Vafeas (2006) documented a positive relationship between community stakeholder pressures and environmental performance at the plant level. More recently, Murrillo-Luna, Garcés-Ayerbe, and Rivera-Torres (2008) studied the influence of different stakeholders on environmental strategies.

In response to the environmental pressures from stakeholders, firms may adopt a variety of practices and policies in order to obtain societal approval. These practices can be generally classified as symbolic or substantive.

Symbolic Actions

Institutional theory suggests that "the appearance rather than the fact of conformity is often presumed to be sufficient for the attainment of legitimacy" (Oliver, 1991, p. 155). Under this view, symbolic actions are effective responses to external claims since firms need to gain legitimacy by conforming with norms sanctioned by stakeholders, but also face pressures to maintain internal flexibility (Meyer and Rowan, 1977). As a result, firms and their managers may favor symbolic rather than substantive practices (Suchman, 1995). Prior studies show that symbolic actions are not uncommon. For instance, there is evidence that managers satisfy shareholder demands by adopting but not implementing new governance structures (Westphal and Zajac, 1994; Zajac and Westphal, 1995).

The final goal of symbolism is to influence societal perceptions of the company by using more visual actions in order to obtain a benefit (i.e., legitimacy). This is consistent with the field of study known as impression management. While essentially being a theory applied to individuals, impression management has been applied extensively to organizations, particularly to explain the reactions of firms facing legitimacy threats (Ashforth and Gibbs, 1990; Elsbach, 1994; Elsbach and Sutton, 1992).

In the context of environmental issues, impression management actions in the form of symbolic responses decoupled from core processes can be used as responses to legitimacy threats (Elsbach, 1994; Elsbach and Sutton, 1992) since impressionist citizenship behaviors contribute to legitimacy enhancement (Bolino, 1999). That is, given that environmental symbolic actions "'provide cover' for poor emissions performance by appearing to take steps in the right direction" (Russo and Harrison, 2005: 588), firms may acquire environmental legitimacy, recognizing the importance of good environmental performance for stakeholders, by focusing on actions that are easiest to observe.

Social and environmental claims may come from both external and internal constituencies (Weaver et al., 1999). Prior research has identified five general groups that demand that firms protect the natural environment: government, communities, shareholders, customers, and employees (Alvarez-Gil et al., 2007; Henriques and Sadorsky, 1996, 1999). We focus on how symbolic environmental actions towards these groups can influence environmental legitimacy.

Government. Regulatory bodies like the U.S. Environmental Protection Agency (EPA) are major constituencies linked to environmental issues. These agencies establish regulations and control enforcement mechanisms such as penalties, fines and the ability to pursue legal prosecution of violators. They also establish voluntary programs which seek corporate commitment to actions that improve the natural environment (see Darnall and Sides, 2008 for a recent meta-analysis on the issue).

One way firms may signal their commitment to the environmental stance of governments is by participating in these environmental programs sponsored by agencies like the EPA. While these programs are intended to provide specialized information, technical assistance, and ultimately reduce pollution, they can be largely symbolic. Indeed, costs associated with membership are in many cases negligible (Delmas and Keller, 2005), and previous works have shown that poorly-performing firms are likely to be engaged in voluntary programs (King and Lenox, 2000; Klassen and Whybark, 1999). In addition, there are no penalties in the case of not reporting environmental achievements, and participants can publicize their membership, regardless of their environmental record. Firms can enter voluntary programs not only to communicate their previous environmental initiatives in an effort to get governmental recognition (King, Lenox and Terlaak, 2006) but also as a vehicle for interacting with governmental officials, and they can try to obtain an "insurance" against risks such as claims for negligence and costly regulatory sanctions (Delmas and Keller, 2005). Given that participating firms send a "signal" that they are proactive in their environmental management, government may consider them greener and cleaner than non-participants. As a result, we expect that firm membership in environmental programs will benefit the firm in terms of governmental acceptance and thus increase the firm's legitimacy.

Hypothesis 1a: Participation in voluntary environmental programs sponsored by governmental agencies has a positive effect on environmental legitimacy.

Community. Communities can be very active in demanding that companies protect the natural environment. Community pressures toward the conservation of the natural environment can take different forms such as non-profit organizations, local groups of neighbors or social activists. Environmental management research (Alvarez-Gil et al., 2007; Henriques and Sadorsky, 1996, 1999) has documented the relevance of neighborhoods and community groups in the firms' formulation of their environmental stance.

To alleviate social monitoring and public scrutiny, companies can disclose their green stance to the general public through intense efforts in environmental communication. That is, firms try to project an image of "good corporate neighbor" by publicizing that they are transparent and socially responsible (e.g., green and protect the environment). Extant studies (Hooghiemstra, 2000; Patten, 1992) showed that companies operating in an industry that experienced a major social incident felt their social acceptance threatened, and responded by increasing their coverage of environmental issues in annual reports. In this way, firms issue formal communications to manage public opinion, to respond to public pressure, and to react to perceived public perception about their legitimacy. While these communications may be largely decoupled from the actual implementation of social actions (Stevens et al., 2005; Weaver et al., 1999), the community may give the "benefit of the doubt" to these firms regarding their environmental behavior. Thus, we expect the following.

Hypothesis 1b: Formal reporting procedures have a positive effect on environmental legitimacy.

Shareholders. A group with growing influence on environmental issues of firms is the shareholders. Increasingly investors care about the social conduct of firms, and there has been a dramatic rise in the number and assets of socially screened mutual funds and indexes such as Domini 400, Dow Jones Sustainability Indexes and FTSE4Good Index. According to a recent report on SRI (Social Investment Forum, 2007), assets in socially screened portfolios climbed to $2.71 trillion in 2007, an increase from $2.16 trillion in 2003. Consequently, socially conscious investors are claiming better representation of their social interests within firms (David et al., 2007).

Traditional studies in governance (Eisenhardt, 1989; Fama and Jensen, 1983) indicate that shareholders are represented by the board of directors. The board of directors' main function is to monitor managers to protect shareholders' interests, including those with social content (Greening and Gray, 1994; Kassinis and Vafeas, 2002). Board committees, smaller subgroups than the board overall, are an important mechanism because they keep specific issues at the top of the corporate agenda. Companies sometimes explicitly and formally delegate environmental oversight responsibilities to a subgroup of the board (that is, an environmental committee). Presumably, an environmental committee may provide resources to firms by drawing on the expertise of directors, and the board is in a better position to assess the firm's performance on the environmental dimension. Yet some scholars expressed their reservations about the actual effectiveness of dedicated environmental committees (Berrone and Gómez-Mejía, 2009), indicating that a board with environmental oversight is only a signal to investors that the firm will adequately address environmental issues (Walls, Phan, and Berrone, 2007) and that a negative impact of an environmental mishap is unlikely, which may be enough for investors to assume that the firm is on the right path (Berrone, Surroca, and Tribo, 2007). Thus, we expect the following.

Hypothesis 1c: The presence of a dedicated environmental board committee has a positive effect on environmental legitimacy.

Customers. Consumers can be particularly vocal about the environmental footprint of the products they consume (Polonsky, 1995; Vandermerwe and Oliff, 1990). A 2007 McKinsey survey of 7,751 people found that 87% of consumers worry about the environmental and social impact of the products they buy (Bonini and Oppenheim, 2008). This suggests that consumers expect that the products they use perform effectively without unnecessarily harming the environment. Otherwise, they may boycott the companies (e.g., stop buying tuna caught in drift nets). Firms may respond to these pressures with ingratiation actions such as the adoption of green brands and trademarks, which 'profess' an environmental stance every time consumers look at the product. This is often portrayed by changing the name or label of a product and including the word "green" in the product's name, for instance, to give the feeling of nature and project to consumers the image of environmentally preferable products. While there is little research on the extent to which green brands and labels are actually authentic, consumer ombudsmen and related associations like TerraChoice and EnviroMedia Social Marketing suggest that green brands may not necessarily mean green companies. Still, consumers may prefer to buy products from companies that claim to offer products that are environmentally responsible as they are seen as trustable and valuable (Thøgersen, 1999). Thus, we expect that:

Hypothesis 1d: Green trademarks have a positive effect on environmental legitimacy.

Employees. Pressure for good environmental performance may also come from groups inside the firm (Polonsky, 1995). More and more employees prefer to work for companies that are socially responsible. They show greater commitment and harder work if the companies they work for have their social goals aligned (Turban and Greening, 1997). In addition, if a company is to adopt an environmentally-aware approach to its activities, the employees are the key to success or failure (Wehrmeyer, 1996).

One way companies show their employees that they are committed to environmental issues is by formulating policies that include environmental criteria as a measure of employees' efforts, recognize the value of good environmental performance and assume a commitment with their staff to steadily reward it (Berrone and Gómez-Mejía, 2009; Russo and Harrison, 2005). A formal tie between environmental performance and employees' pay may help focus employees' efforts on environment-related activities (Lothe, Myrtveit, and Trapani, 1999). Still, recent research (Berrone and Gómez-Mejía, 2009; Russo and Harrison, 2005) has showed that environmental performance is not necessarily enhanced when there is a formal link between pay and environmental criteria. This practice however allows firms to send a positive signal to their employees regarding the relatively-higher importance of environmental issues than in firms that adopt a less formal stance, and this will presumably be valued by employees (Turban and Greening, 1997). Therefore, we expect that:

Hypothesis 1d: The adoption of environmental pay policies has a positive effect on environmental legitimacy.

Substantive Actions

Some institutional authors (Ashforth and Gibbs, 1990; Staw and Epstein, 2000; Suchman, 1995) have argued that exceeding minimum requirements may also confer legitimacy, so that "once minimal standards are met, corporations are likely to continue working... to be the best or the most admired" (Staw and Epstein, 2000, p. 526) and that the firm's constituents prefer more substantive responses (Suchman, 1995).

In terms of the environment, substantive actions often require significant changes in core practices, and entail certain risks, which should culminate in real improvements in the firm's subsequent environmental performance and ultimately increase the firm's environmental legitimacy. The environmental management literature has identified at least two substantive environmental practices: pollution prevention strategies and environmental innovation.

Pollution prevention (PP). Pollution prevention strategies are intended to minimize or eliminate the creation of toxic chemical agents during the various stages of production (Christmann, 2000; Hart, 1995; Klassen and Whybark, 1999; Russo and Fouts, 1997; Sarkis and Cordeiro, 2001). Research has shown that PP efforts provide organizations with unique advantages (Christmann, 2000; Hart, 1995; Klassen and Whybark, 1999; Russo and Fouts, 1997).

PP strategies require structural investments in cleaner technologies (Klassen and Whybark, 1999; Russo and Fouts, 1997). At the same time, PP strategies are complex and risky. They are technologically complex because they require changes in systems, processes, and products (Aragon-Correa and Sharma, 2003); socially complex because they involve diverse stakeholders at

different levels (Russo and Fouts, 1997); and structurally complex because they require managerial commitment and cross-functional coordination (Aragon-Correa, 1998). Yet given that PP strategies reduce and eliminate waste generation, they can potentially satisfy the environmental claims of all stakeholders which will in turn grant legitimacy to firms.

Hypothesis 2a: Evidence of pollution prevention strategies has a positive effect on environmental legitimacy.

Environmental innovation (EI). Some firms may see the opportunity to generate profits from resources and capabilities because of imperfectly competitive strategic factor markets (Barney, 1991; Teece, Pisano, and Shuen, 1997) created by the ambiguity of the meaning and impact of environmental development (Bansal, 2005). Pressures for the conservation of the environment may spawn innovations as they may be the path for organizations to become unique and sufficiently different to avoid competitors' imitation (Barney, Wright, and Ketchen, 2001; Peteraf, 1993). Yet, by definition, innovative activities are inherently risky as they provide greater variability of outcomes and greater probability of failure (Baysinger, Kosnik, and Turk, 1991). Also, innovative endeavors require long-term investments (Hoskisson, Hitt, and Hill, 1993). Consequently, innovation requires substantive commitments in terms of resources and time. At the same time, environmental related innovations are intended to reduce the toxic burden of production processes and therefore respond adequately to the stakeholders' claims regarding the natural environment. Thus, by engaging in environmental innovations, firms can successfully conform to social demands while searching for competitive advantage (Berrone, Gelabert, Fosfuri, and Gómez-Mejía, 2008).

Hypothesis 2b: Environmental related patents have a positive effect on environmental legitimacy.

Combined Effect

In the previous paragraphs we claim that both symbolic and substantive environmental actions can have a positive impact on environmental legitimacy. Therefore, it is reasonable to expect that when both actions are joined the result will be greater legitimacy. This is so because decoupling symbolic from substantive environmental actions within polluting industries may represent a dangerous strategy for firms as their legitimacy is placed at risk. In this sense, King, Lenox, and Terlaak (2005) argued that if environmental certifications are not coupled with the actual implementation of the prescribed practices, firms may not be able to provide credible information to their buyers and sellers about their environmental stance, which increases information asymmetries and their subsequent drawbacks. Moreover, gross deviations from that policy would be perceived as hypocritical. If symbolic actions are decoupled from substantive actions and this dissonance is exposed to the public, companies relying exclusively on symbolic environmental actions may be seen as untruthful, unreliable, calculating, and manipulative, resulting in lower legitimacy.

In addition, precisely because symbolic actions may be more visible than substantive actions, they may be seen as "cosmetic" or opportunistic (King and Lenox, 2000). Achieving legitimacy exclusively with "symbolic" strategies, however, may be more difficult in a strong institutional field such as the one regarding pollution, where objective measures are made public and institutional pressures are steady (Berrone and Gómez-Mejía, 2009). But if symbolic actions are accompanied by consistent substantive initiatives, the effect on legitimacy should be higher.

H3: Symbolic environmental actions will have greater impact on environmental legitimacy if coupled with substantive environmental actions.

Time Horizon

A key assumption of symbolism management is that impression management practices like messages and signals may suffice to obtain legitimacy from stakeholders. That is, stakeholders do not go through the actual verification of the firm's claims; rather, they naively believe all that the firms claim. While this may be true in the short term, it might not be the case in the long haul. Several reasons may support this. First, as time passes, there are more chances for stakeholders to realize if there are dissonances between organizational actions and societal requirements (Milstein, Hart, and York, 2002). Second, symbolic environmental actions are presumably more visual, cheaper, and easier to implement than substantive actions, and thus are more easily copied. Consequently, symbolic actions will have more limited impact on legitimacy. Conversely, substantive environmental endeavors, as explained in the previous section, posses the ability to become organizational capabilities and as such are more difficult to imitate, having more enduring effect on legitimacy.

H4a: Symbolic environmental actions will only have a positive impact on environmental legitimacy in the short term.

H4b: Substantive environmental actions will a positive impact on environmental legitimacy in both the short and long term.

Methods

Sample and Data Collection

Data on an institutional field should represent firms facing similar institutional pressures (Hoffman, 2001). Consistent with prior research (Berrone and Gómez-Mejía, 2009; Russo and Harrison, 2005), we chose to focus on firms from industries subject to reporting under the "Toxic Release Inventory" program of the Environmental Protection Agency (EPA), which requires facilities exceeding a threshold level to report their emissions. These firms are all subject to the same regulatory framework and arguably face similar media attention, scrutiny from activists, community concerns, and changes in consumer preferences (Berrone and Gómez-Mejía, 2009).

We collected information from different sources to construct the database. We started identifying firms belonging to the 20 most polluting sectors according to the EPA's TRI (Toxic Release Inventory) program.[1] Then we cross referenced this initial sample with the KLD and Compustat database and searched for data from other data sources to get information on all the remaining independent variables as we describe in the next section. The final sample after dropping firms with missing values is an unbalanced panel of 167 firms between 1997 and 2002.

[1] The 20 most polluting U.S. sectors for the analyzed period at the two-digit SIC code are: 10, 50, 33, 49, 28, 36, 12, 13, 20, 32, 30, 51, 26, 34, 29, 31, 35, 37, 24, 27.

Measures

Dependent Variable

Environmental legitimacy. Following previous empirical literature (Bansal and Clelland, 2004; Hamilton, 1995; Konar and Cohen, 1997), we drew on media accounts to assess environmental legitimacy. We used *The Wall Street Journal* as the media source, given its national coverage and its importance as a communication medium. We relied on this journal as the single source in order to avoid duplication of news, since our measure of environmental legitimacy is sensitive to the number of articles. We followed the next steps to compute the measure of environmental legitimacy: First we extracted the full text electronic articles including the company name and at least one of the keywords from an environmental words list between 1996 and 2002. The keywords included are those used by Bansal and Clelland (2004) ("sustainable development," "environment," "pollution," and "toxic") and others added from papers cited in that article ("hazardous," "waste," "disposal," "alternative energy," "ecology," and "contamination"). We obtained over 1500 articles for the period under analysis. Second we read each of the articles, identified the relevant stories and coded them as "-1", "0" or "1" depending on whether they reflected a "negative", "neutral" or "positive" contribution to the firm's environmental legitimacy. The coding was performed by two of the authors. We performed an intercoder reliability check for 100 randomly selected articles. The two raters agreed on 91% of the cases suggesting a high level of reliability (Weber, 1991). Since the disagreements had mostly to do with the use of the neutral category, we dropped those articles classified as neutral to reduce unreliable coding. Finally, following Deephouse (1996) and Bansal and Cleelland (2004), we used the Janis-Fadner coefficient (see Appendix 1) to construct our measure of environmental legitimacy. The measure ranges from 1 (when there is a high presence of favorable articles) to -1 (when there is a high presence of unfavorable articles).

Independent Variables and Controls

a) Symbolic actions

Voluntary government programs. In the United States alone there are over 200 of this type of program (Darnall and Carmin, 2005). Variety among these programs is large, with some of them oriented exclusively to specific sectors or topics, or limited in time or restricted in terms of participation. For our purpose, we needed voluntary participation in a broad program. Following Delmas and Keller, (2005), we use the case of the United States, Environmental Protection Agency's (EPA's) WasteWise program[2] in order to estimate the effect of participation in these types of initiatives on environmental legitimacy. This program was originally established by the EPA to reduce municipal solid waste, covers the period under analysis, is open to a broad set of industries, and sets little requirements for participation. The variable takes the value of "1" if the firm participates in the WasteWise program and "0" otherwise. This information was generously provided by a representative of the EPA's WasteWise Program.

Community communication. In order to measure the firm's level of communication with the community concerning its environmental behavior, we drew on the KLD database which has been frequently used in the empirical social literature (Graves and Waddock, 1994; Johnson and Greening, 1999; McWilliams and Siegel, 2000; Neubaum and Zahra, 2006; Waddock and

[2] See Delmas and Keller (2005) for a complete description of the program.

Graves, 1997). More precisely, we used the fifth question about strengths in the "Environment" section, which is labeled as "Communications" (ENV.str-E). The variable takes the value of "1" if the firm is signatory to the CERES Principles, publishes a notable substantive environmental report or has notably effective internal communications systems in place for environmental best practices, and "0" otherwise.

Environmental-dedicated board committee. We used a measure constructed by Berrone and Gomez-Mejia (2009) to identify those firms that had an environmental–dedicated committee on the board. To determine whether the firm had an environmental-dedicated board committee they analyzed annual proxy statements searching for dyadic relationships between the items in an environmental wordlist (the wordlist we used to compute our measure of environmental legitimacy) and the word "committee". The paragraphs extracted were individually inspected to determine whether or not the company had a committee responsible for environmental issues. Finally, the variable takes the value of "1" if the firm had a board committee responsible for environmental issues, and "0" otherwise.

Environmental trademarks. We obtained total environmental trademarks registered at the United States Patents and Trademarks Office for each of the firms in the sample for the period under analysis. We proceeded by extracting for our sampled firms all the registered trademarks including in its description at least one of the following keywords: "alternative energy," "clean," "Earth," "eco," "ecology," "environment," "friendly," "green," "natural," "organic," "planet" and "sustainable." In order to refine the search, we included words with suffixes and prefixes (e.g., ecology, ecologic, ecological). The variable was defined as the total number of environmental trademarks registered in a particular year. For our timeframe there were no firms with more than one environmental trademark in a given year. So the variable takes the value "0" or "1."

Environmental pay-policies. We used a measure constructed by Berrone and Gómez-Mejía (2009) to identify those firms with an explicit environmental pay-policy. To define whether the firm has established an explicit pay policy they analyzed annual proxy statements searching for paragraphs that contained any word(s) from the environmental wordlist (the wordlist we used to compute our measure of environmental legitimacy) plus any word(s) from a pay wordlist. The pay wordlist included the terms "pay," "compensation," "salary," "wage," "reward," "remuneration," "incentives," "bonus," "stock," and "income." Finally, they visually inspected the texts and created a dummy variable that takes the value of "1" if there was at least one explicit relationship between executive pay and environmental performance in the firm's annual proxy statement, and "0" otherwise.

b) Substantive actions

Pollution prevention. Following previous environmental literature (King and Lenox, 2000, 2002), we measured pollution prevention strategies as the difference between a predicted value and some actual pollution level; more precisely, we use the measure computed by Berrone and Gómez-Mejía (2009). Given that facilities must report their production ratios for the current reporting year as compared to the previous reporting year (i.e., the ratio of the production volume in $t+1$ to the production volume in t), we used these values to estimate total waste generation and then compared them with real values. [3] In order to estimate waste generation we followed these next steps: First, we weighted each chemical by its Human Toxicity Potential Factor (HTP) developed by Hertwich et al. (2001), which measures toxicity in terms of benzene

[3] PR values often vary around 1. For instance, a ratio of 1.1 would indicate a 10% increase in production.

equivalence (for carcinogens) or toluene equivalence (for non-carcinogens); second, we aggregated the results across chemicals at facility level; third, we multiplied these results by their corresponding production ratio values; fourth, we aggregated results by parent company; and finally, we compared these results against real values (see Appendix 2 for an analytical description of this procedure). Since the HTP method offers cancer and non-cancer values, we calculated the formulas in Appendix 2 using these values separately and obtained two different measures of pollution prevention. Given the high skewness of these variables, we log-transformed them to approach normality. Later, we calculated their reliability and, given their high Cronbach alpha score ($\alpha = 0.96$), standardized and averaged both measures to create our final pollution prevention measure.

Environmental innovation. We used patent data from the CHI's Patent Citation Indicators database to measure environmental innovation. This database tracks information about environmental-related patents of firms with more than 40 patents in the last 5 years. This database represents more than 60% of all United States patents granted since 1992 and more than 70% of those patents that are not held by private individuals. We gathered information provided by Nameroff et al. (2004) about company-assignees of over 3,200 environmental-related patents during 1983-2001 and the number of forward citations for each of these patents. [4]

A well known source of concern with the use of patent counts as a measure of innovation output is that it does not take into account that, while some patents are very valuable, others are worth almost nothing. Recognizing this problem, Lanjouw and Shankerman (1999) and Hall, Jaffe and Trajtenberg (2005) among others, have suggested the use of adjusted measures that use patent citations as a proxy of its quality. Along this line, we measured environmental innovation computing an index where patents are weighted by their corresponding citations (see Appendix 3).

c) Controls

Following Deephouse (1996), we further controlled for other potential determinants of environmental legitimacy such as size, age and financial performance. Larger firms may have more contractual and social ties and also endorsements from actors from their environments (Pfeffer and Salancik, 1978; Singh, 1986). Concerning age, older organizations are more likely to develop strong exchange relationships and be endorsed by powerful social actors (Hannan and Freeman, 1984; Singh, 1986). Additionally, firms with better financial performance are more efficient at producing goods and services, and society values such efficiency (Dowling and Pfeffer, 1975; Meyer and Rowan, 1977). We measured size by the logarithm of the total number of employees, we obtained the foundation year to compute the firm age, and we proxied financial performance using the annual return on assets (ROA). All three measures were obtained from Compustat database. We also included the firm level of emissions (over sales) as an additional control variable. *Ceteris paribus*, firms with higher emissions are expected to have lower environmental legitimacy. Finally, all the specifications include sector dummies at the two-digit SIC code and annual dummies.

[4] See Nameroff et al. (2004) for a more comprehensive description of the CHI Research Inc database. A full description of the patent search filter used to identify environmental patents is available at http://www.chemistry.org/greenchemistryinstitute.

Empirical Analysis

Given that the dependent variable (Environmental legitimacy) is bounded between -1 and 1, and may have many observations in the boundaries, a Tobit model is appropriate. It is reasonable to think that firm fixed effects may explain part of the variation in our dependent variable so we want to include them as controls. However, when the number of periods of the panel is small, including firm fixed effects in nonlinear models may produce inconsistent estimates, the so called "incidental parameters" (as discussed in Neyman and Scott, 1948; Wooldridge, 2002). So we proceed by reporting first the estimations of the Tobit model with random effects and then report the results of estimating a linear model with random and fixed effects.

Results

Table 1 reports some descriptive statistics and correlations of the variables used in the analysis. The total number of firm/year observations is 667. The reported correlations do not raise any concern about possible multicollinearity.

Table 2 shows the results of modeling environmental legitimacy as a function of substantive and symbolic contemporaneous (same year) actions and some time-varying controls. Columns (1) and (2) report the results of the pooled Tobit and Random Effects Tobit respectively. Columns (3) to (5) report the results of the pooled linear model and with random and fixed effects.

Results of the Tobit and linear models are quite similar concerning the signs and significance of the coefficients (model 1 compared to model 3, and model 2 compared to model 4), suggesting that the estimation bias resulting from the positive probability of the upper and lower limits of the dependent variable do not appear to be very strong. As a result our preferred specification is always the linear model with fixed effects (column 5), since it controls for unobserved heterogeneity and, in addition, the Hausman test rejects the use of random effects in favor of fixed effects.

We turn now to the basic findings. The use of environmental pay-policies and participation in voluntary government programs do not have a significant effect in our sample in any of the specifications. Concerning the other symbolic actions, according to the linear model with fixed effects (model 5), community communication has a significant positive effect supporting hypothesis 1b. Contrary to our expectation, the presence of an environmental committee has a significant negative effect on environmental legitimacy. Finally, although the coefficient of environmental trademarks is significant and positive for models 1 to 4 it is not significant for model 5, providing partial support for hypothesis 1d. Substantive actions have a positive and significant effect across all the specifications, providing strong support for hypotheses 2a and 2b.

Table 1

Descriptive Statistics and Correlations

	Mean	s.d.	Min	Max	1	2	3	4	5	6	7	8	9	10	11	12
1. Environmental legitimacy	0.098	0.469	-1	1	1											
2. Environmental innovation	0.359	1.970	0	29.844	0.339	1										
3. Pollution prevention	-0.419	1.254	-2.354	1	0.225	0.084	1									
4. Government programs	0.334	0.472	0	1	0.036	0.083	-0.028	1								
5. Community Communication	0.085	0.279	0	1	0.064	0.017	-0.032	0.033	1							
6. Environmental committee	0.119	0.325	0	1	0.095	0.067	-0.057	0.002	0.135	1						
7. Environmental trademarks	0.028	0.166	0	1	0.329	0.610	0.119	0.107	-0.020	0.047	1					
8. Environmental pay-policies	0.046	0.211	0	1	0.098	0.123	-0.032	0.054	0.034	0.269	0.176	1				
9. ROA	5.885	10.107	-80.244	42.626	0.118	0.110	-0.129	0.173	0.170	0.174	0.060	0.164	1			
10. Firm size	3.166	1.207	0.134	6.188	-0.034	-0.080	-0.072	0.008	-0.011	-0.014	-0.047	0.066	0.073	1		
11. Firm age	44.144	24.879	11	89	-0.079	-0.061	0.026	0.045	0.004	0.061	-0.024	-0.024	-0.206	-0.072	1	
12. Emissions over sales	3.118	2.483	0	8.901	0.025	0.019	-0.271	0.008	0.118	0.216	0.026	0.172	0.199	0.025	-0.061	1

The total number of firm-year observations equals 667.

Table 2

Determinants of Environmental Legitimacy

	Dependent Variable: Environmental Legitimacy$_t$				
	Tobit (Pooled) (1)	**Tobit (Random effects) (2)**	**OLS (Pooled) (3)**	**OLS (Random effects) (4)**	**OLS (Fixed effects) (5)**
Environmental innovation$_t$	0.136***	0.110***	0.041**	0.041***	0.035***
	(0.022)	(0.021)	(0.018)	(0.011)	(0.011)
Pollution prevention$_t$	0.104***	0.090***	0.084***	0.076***	0.064***
	(0.016)	(0.015)	(0.013)	(0.013)	(0.014)
Government programs$_t$	0.028	-0.014	-0.010	-0.012	-0.067
	(0.068)	(0.057)	(0.037)	(0.044)	(0.120)
Community Communication$_t$	0.170**	0.200***	0.132	0.015**	0.191*
	(0.077)	(0.090)	(0.089)	(0.007)	(0.104)
Environmental committee$_t$	0.028	-0.022	0.029	0.011	-0.111*
	(0.069)	(0.075)	(0.071)	(0.060)	(0.052)
Environmental trademarks$_t$	3.459***	2.422**	0.448***	0.363***	-0.037
	(1.221)	(1.836)	(0.117)	(0.136)	(0.176)
Environmental pay-policies$_t$	0.071	0.075	0.054	0.086	0.083
	(0.107)	(0.108)	(0.082)	(0.086)	(0.096)
ROA$_t$	-0.002	-0.001	0.001	-0.001	0.001
	(0.002)	(0.002)	(0.001)	(0.001)	(0.002)
Firm size$_t$	0.057***	0.060***	0.047***	0.047**	0.017
	(0.020)	(0.025)	(0.017)	(0.019)	(0.079)
Firm age$_t$	0.001	0.001	0.001	0.001	-0.020
	(0.001)	(0.001)	(0.001)	(0.001)	(0.015)
Emissions per sales$_t$	0.001	-0.011	0.002	-0.005	-0.069***
	(0.001)	(0.011)	(0.008)	(0.009)	(0.020)
Observations	667	667	667	667	667
Left censored	43	43			
Right censored	88	88			
LR Chi^2 (df)	246.43(34)***	104.05(34)***			
R^2			25.15%	24.83%	3.12%

All models include sector (at the two digit SIC code) and annual dummies. Standard errors in parentheses. All models include a constant term.

In Table 3 we test for hypothesis 3. In order to test for the significance of the interaction between substantive and symbolic actions, we compute a single measure of each type of action. Each measure is defined as the total number of actions. In order to define a single measure of substantive actions we proceeded first to transform the two measures of substantive actions (environmental innovation and pollution prevention) into dummy variables. For environmental innovation we assigned the value 1 if the firm has a positive value of the citation weighted index and 0 otherwise. According to the formula developed in Appendix 1, this environmental innovation dummy variable will take the value 0 when the firm has no environmental patents

or when it has environmental patents without any citations. For pollution prevention, we assigned the value 1 if the firm had a pollution prevention level higher than the median, and 0 otherwise. Next, we computed the sum of these two dummy measures to obtain a single measure of substantive actions. This measure can take the value 0, 1 or 2. Concerning symbolic actions, all the measures of each of the five symbolic actions are dummy variables, so in order to have a single measure we simply computed the sum. Table 3 shows the results of estimating the models with these two aggregated measures of substantive and symbolic actions and their interaction. Again results provided by the Tobit and linear models (model 1 compared to model 3, and model 2 compared to model 4) are quite similar in terms of significance and sign of the estimated coefficients so we will describe the results of the last specification with firm fixed effects (model 5). While there is strong support for the positive effect of substantive actions on environmental legitimacy, the model suggest that symbolic actions have a significant positive effect only when they are accompanied by substantive actions, providing support for hypothesis 3. When there is no implementation of substantive actions then the effect of symbolic actions is not significant. Although for some of the models without firm fixed effects (models 1, 2 and 3) symbolic actions are significant and positive, we believe that these significant coefficients only reflect correlation rather than a causal relationship between implementing those actions and obtaining a benefit on environmental legitimacy. As we argued before, in order to test for the causal relationship we have more confidence in the specification with fixed effects (model 5) where the direct effect of symbolic actions is not significant.

To finish in Table 4 we explore the long-term effect of symbolic and substantive actions, including a one-year lag of each of the actions considered in this analysis. For those symbolic actions that were significant in Table 2 (community communication and the existence of an environmental committee) we only find a short-term effect on environmental legitimacy, providing support for hypothesis 4a. Concerning substantive actions, both contemporaneous and one year lagged actions have a positive effect on environmental legitimacy, supporting hypothesis 4b.[5]

Concerning the control variables, size is not significant in those specifications that include firm fixed effects (models 5) probably due to little variation in the number of employees within firms for the period under analysis. Neither performance nor age is significant in any of the specifications. Lastly, as expected, a marginal increase in the level of firm emissions with respect to total sales (in dollars) reduces the firm's level of environmental legitimacy.

[5] We also explored the long-term effect of symbolic and substantive actions using the aggregated measures defined to test hypothesis 3. The results from re-estimating models 1 to 5 using the contemporaneous and the one-year lagged indexes of substantive and symbolic actions show that while symbolic actions are not significant, substantive actions have a significant positive effect both in the short- and long-run. Results are available upon request.

Table 3

Determinants of Environmental Legitimacy

	Dependent Variable: Environmental Legitimacy$_t$				
	Tobit (Pooled) (1)	**Tobit (Random effects) (2)**	**OLS (Pooled) (3)**	**OLS (Random effects) (4)**	**OLS (Fixed effects) (5)**
Substantive Index$_t$	0.155***	0.167***	0.162***	0.158***	0.193***
	(0.027)	(0.028)	(0.022)	(0.021)	(0.026)
Symbolic Index$_t$	0.119***	0.086*	0.037**	0.029	-0.043
	(0.026)	(0.051)	(0.017)	(0.019)	(0.026)
Substantive Index$_t$ X	0.171***	0.132***	0.057***	0.054***	0.034**
Symbolic Index$_t$	(0.028)	(0.028)	(0.013)	(0.016	(0.013)
ROA$_t$	-0.001	-0.001	-0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Firm size$_t$	0.039**	0.051**	0.036**	0.042**	0.045
	(0.017)	(0.023)	(0.016)	(0.017)	(0.075)
Firm age$_t$	-0.001	-0.001	0.001	-0.001	-0.020
	(0.001)	(0.001)	(0.001)	(0.001)	(0.014)
Emissions per sales$_t$	0.017**	0.007	0.015**	0.011	-0.064***
	(0.008)	(0.011)	(0.007)	(0.008)	(0.019)
Observations	667	667	667	667	667
Left censored	43	43			
Right censored	88	88			
LR Chi^2 (df)	(7) 250.67***	(7)160.30***			
R^2			27.45%	27.11%	4.95%

All models include sector (at the two digit SIC code) and annual dummies. Standard errors in parentheses. All models include a constant term. All models include a constant term.

Table 4

Determinants of Environmental Legitimacy

	Dependent Variable: Environmental Legitimacy$_t$				
	Tobit (Pooled)	**Tobit (Random effects)**	**OLS (Pooled)**	**OLS (Random effects)**	**OLS (Fixed effects)**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**
Environmental innovation$_t$	0.127***	0.125***	0.054***	0.050***	0.048***
	(0.018)	(0.018)	(0.017)	(0.013)	(0.013)
Environmental innovation$_{t-1}$	0.110***	0.102***	0.040***	0.042***	0.041***
	(0.031)	(0.030)	(0.024)	(0.013)	(0.013)
Pollution prevention$_t$	0.025**	0.039**	0.075***	0.083***	0.078***
	(0.019)	(0.019)	(0.018)	(0.018)	(0.016)
Pollution prevention$_{t-1}$	0.044***	0.050***	0.102***	0.096***	0.094***
	(0.019)	(0.019)	(0.018)	(0.019)	(0.021)
Government programs$_t$	-0.087	0.006	0.137	0.092	-0.136
	(0.078)	(0.016)	(0.142)	(0.144)	(0.186)
Government programs$_{t-1}$	0.077	0.001	-0.145	0.111	-0.070
	(0.085)	(0.016)	(0.145)	(0.144)	(0.160)
Community Communication$_t$	0.172	0.199	0.214	0.229**	0.317***
	(0.129)	(0.123)	(0.240)	(0.112)	(0.140)
Community Communication$_{t-1}$	-0.264**	-0.265**	-0.231	-0.213	-0.118
	(0.171)	(0.124)	(0.150)	(0.180)	(0.128)
Environmental committee$_t$	-0.087	-0.087	0.027	0.014	-0.082*
	(0.078)	(0.078)	(0.091)	(0.069)	(0.049)
Environmental committee$_{t-1}$	0.077	0.074	0.049	0.029	-0.038
	(0.085)	(0.081)	(0.088)	(0.072)	(0.084)
Environmental trademarks$_t$	5.341	6.171	-0.436	-0.343	-0.476
	(5.122)	(7.043)	(0.272)	(0.228)	(0.374)
Environmental trademarks$_{t-1}$	-5.028	-5.133	0.446***	0.321*	0.087
	(6.765)	(6.221)	(0.167)	(0.172)	(0.190)
Environmental pay-policies$_t$	-0.073	-0.082	0.008	0.002	0.051
	(0.062)	(0.105)	(0.105)	(0.094)	(0.112)
Environmental pay-policies$_{t-1}$	0.062	0.099	-0.032	0.087	0.147
	(0.132)	(0.125)	(0.123)	(0.190)	(0.119)
ROA$_t$	-0.001	-0.001	0.001	-0.001	-0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
Firm size$_t$	0.001	-0.004	0.025	0.027	0.021
	(0.001)	(0.022)	(0.018)	(0.022)	(0.096)
Firm age$_t$	0.001	0.001	0.001	0.001	-0.023
	(0.001)	(0.001)	(0.001)	(0.001)	(0.023)
Emissions per sales$_t$	0.004	0.006	0.018**	0.010	-0.071***
	(0.008)	(0.010)	(0.001)	(0.010)	(0.022)
Observations	512	512	512	512	512
Left censored	37	37			
Right censored	71	71			
LR Chi^2 (df)	441.43(18)***	74.02(18)***			
R^2			27.39%	26.95%	9.75%

All models include sector (at the two digit SIC code) and annual dummies. Standard errors in parentheses. All models include a constant term.

Robustness Checks

We have run other models to verify the robustness of results. A potential concern with the reported results is that firms with no environmentally related articles were also included in the analysis. Notice that the Janis-Fadner coefficient assigns a value 0 when the number of positive articles equals the number of negative articles, but also when there are no positive or negative articles. However, we may suspect that *The Wall Street Journal* may have a certain bias in the type of firms they cover (perhaps towards bigger firms), and so the fact that for some firms there is no positive or negative news may not reflect the nonexistence of environmental events but the fact that some types of firms are not of interest for the journal. In order to check that the results are not driven by the behavior of firms with no environmentally related articles, we re-estimated all the models including only those firms that had at least one environmentally related article during the period under analysis. The number of firm/year observations drops from 667 to 445 but results are qualitatively unchanged; that is, the sign and significance of the coefficients of the main findings are not affected. We also analyzed whether results were sensitive to the use of other measures of the independent variables. An interesting finding has to do with the effect of environmental innovation. Results hold using other methods to compute a citation-weighted patent index, but the coefficient of environmental innovation becomes not significant if we simply use patent counts. All these results are available from the authors upon request.

Discussion and Conclusions

Society's increasing concerns regarding the natural ecosystem is placing environmental management at the forefront of the corporate agenda. Companies make all sorts of efforts in terms of greener practices to "save face" and gain the approval of their stakeholders. However, results of the article suggest that not all environmental actions are effective in achieving social acceptance. As a consequence, our work has important implications for both research and practice.

Implications for Research

One important assumption in the institutional theory is that minimum compliance with stakeholders' requirements is the optimal behavior to obtain legitimacy, since this allows firms to respond to external pressures while maintaining internal flexibility and control. However, our results debunk this assumption since just one of our symbolic measures (community communication) appeared to have a positive and significant effect on legitimacy while both of our substantive measures seemed to have enduring effect on legitimacy. Our work provides empirical evidence to the notion that, within strong institutional fields like polluting industries, it is extremely difficult to achieve legitimacy only through symbolic actions (Berrone and Gómez-Mejía, 2009). Our results are also consistent with the environmental management literature that suggests that the true value of environmental actions are in those actions that can effectively minimize or eliminate the creation of toxic chemical agents rather than those oriented towards compliance only (Christmann, 2000; Hart, 1995; Klassen and Whybark, 1999; Russo and Fouts, 1997; Sarkis and Cordeiro, 2001).

Our work also has implications for symbolism and impression management research. While our results suggest that symbolic actions may not be sufficient to achieve legitimacy, they do not indicate that symbolic actions are not important. We showed that symbolic and substantive actions are actually complementary instead of supplementary, and that they have a greater

impact on legitimacy when combined. Therefore, approaches that suggest decoupling as an effective strategy are here called into question. Theorists should refine their predictions involving ways to achieve and maintain legitimacy to recognize that there may be cases and contexts where symbolic actions in isolation are inadequate.

Interestingly, our results suggested that, in some cases, symbolic actions may actually have deleterious effects on social acceptance like in the case of environmental dedicated committees. One way to explain this result is that society interprets the adoption of an environmental committee as a "too obvious" artifact to pretend to be green, and then penalizes the company by withdrawing legitimacy. We also showed that there are differences in terms of time horizon. Symbolic actions may only have a short-lived impact on legitimacy while more definitive responses like environmental innovation or pollution prevention strategies have positive influence in both the short- and long-term. An idealist may interpret this as supporting evidence that society has the ability to recognize those actions that have true value to the environment.

We also enrich the legitimacy literature. While legitimacy is a central concept to which many studies anchored their theoretical underpinnings (Schuman, 1995), operationalization and empirical analysis of this construct is rather limited with a few notable exceptions (Bansal and Clelland, 2004; Deephouse, 1996; Higgins and Gulati, 2003). We shared with these studies the use of a legitimacy measure in our estimations. Unlike extant studies, however, our work is, to the best of our knowledge, the first one to systematically examine a variety of both symbolic and substantive actions as determinants of environmental legitimacy, showing what actions help to enhance it. In this way, we contributed to filling the gap in the literature regarding the limited understanding on what firms must do to acquire legitimacy (Zimmerman and Zeitz, 2002).

Implications for Practice

More and more organizations are jumping on the Green Management bandwagon but there is a wide variety in the way they do it. Perhaps the most important message for practitioners is that only genuinely green credentials are effective in acquiring social legitimacy. An environmental stance is difficult to fake, especially if your company is within an environmentally-sensitive sector. Prior research indicates that managers may opt for symbolic rather than substantive responses to stakeholders. Our study indicates that this might be a dangerous strategy. Symbolic actions regarding the natural environment may have short-term impact on legitimacy at best. We showed that investing greater efforts (e.g., more money or time) in signaling being green (that is, operating with consideration for the environment), rather than spending resources on environmentally sound practices, may have lower impact on the firm's legitimacy.

Thus, managers should realize that while certain symbolic actions may nullify stakeholders temporarily, sustainable stakeholder satisfaction is only achieved with substantive actions. This may be so because symbolic actions are easily copied by rivals. For instance, we found that transparency in communication had an impact on legitimacy. According to a study, the number of large publicly traded United States corporations that report on their sustainability efforts has increased significantly over the past three years; 86 percent of the S&P 100 companies now have corporate sustainability websites, compared with 58% in mid-2005. This means that disclosure on sustainability performance has become the norm for these firms, most likely because symbolic actions can be readily mimicked. Thus these actions have little potential to become a differential elements vis-à-vis rivals. Substantive environmental actions, on the other

hand, are more effective in gaining legitimacy sustainably and therefore constitute a base for a competitive advantage (Hart, 1995; Porter and van der Linde, 1995).

Our results suggest that community communications may be important in gaining legitimacy at least in the short-term. Therefore, companies may need to dedicate some efforts in conveying the green message to society. However, this recommendation should be taken with caution because the effect is short-term and, moreover, some authors have suggested that enacting a wide variety of symbolic actions is more effective than only a limited set (Zott and Huy, 2007). But this does not to seem to be the case for environmental legitimacy. The message here is clear: more environmental symbolic actions do not mean a greener company.

A company that merely adopts environmental behaviors in a symbolic manner decoupled from substantive actions may jeopardize their legitimacy as it may be perceived as deceitful. Yet our findings do not suggest that symbolic actions are entirely worthless. When properly balanced with more definitive environmental responses, symbolic actions are the perfect complement for substantive endeavors to boost legitimacy. Thus, effective management of environmental legitimacy implies a balance between symbolic and substantive actions.

Caveats and Future Research

An important limitation of this work is that we focus exclusively on publicly traded firms and thus we cannot speak about the effectiveness of symbolic and substantive environmental actions in privately held companies. It is likely that the limited impact of symbolic actions on legitimacy is because public companies are more exposed to public scrutiny. But this might not be the case for private companies and they may get away with symbolic actions. New studies could explore the extent to which our conclusions apply to less visible firms like private companies or other organizational forms such as family firms. More research on alternative settings like a non–United States context could also expand this line of inquiry. Moreover, given that legitimacy is socially constructed, it has several dimensions, but the results of this study are confined to environmental legitimacy. Future research could explore the effect of both symbolic and substantive actions on alternative dimensions of legitimacy like political or moral. Another limitation is that we identified specific symbolic actions believed to be oriented towards specific stakeholders. However, some of these symbolic actions may go beyond the domain of a certain stakeholder. For instance, community communication may be oriented not only towards the community; it may also have an influence on other constituencies. Researchers could analyze the extent to which symbolic actions are oriented toward one or more stakeholders. Finally, we tested a reduced number of symbolic and substantive environmental actions. Others actions like ISO 14001 certification or environmental program training may also have an impact on environmental legitimacy, which are left for future research.

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Appendix 1

Environmental Legitimacy Measure

$$\text{Environmental legitimacy}_{it} = \frac{(p_{it}^2 - p_{it} n_{it})}{T_{it}^2} \quad \text{if } p_{it} > n_{it}$$

$$= \frac{(p_t n_t - n_t^2)}{T_t^2} \quad \text{if } p_{it} < n_{it}$$

$$= 0 \quad \text{if } p_{it} = n_{it}$$

Where p_t is the number of positive environmental articles in year *t*, n_t is the number of negative environmental articles in year *t* and N is the total number of positive and negative environmental articles in year *t* ($T_t = p_t + n_t$).

Appendix 2

Pollution Prevention Measure

First, we obtained a weighted waste score for each facility as follows,

$$ww_{jt} = \sum_k \sum_l E_{klt} * f_{kl},$$

where E_{klt} is the emissions of chemical *l* to medium *k* in year *t* by facility *j*; and f_{kl} is the weighting factor corresponding to chemical *l* emitted to medium *k*.

Next we make a prediction of waste generation using the reported PR as in the next expression,

$$\text{Predicted\_waste}_{it+1} = \sum_j ww_{jt} * PR_{jt+1}$$

Finally, we compute the difference between actual waste and predicted waste and aggregate at the parent firm level to obtain a firm measure of pollution prevention as we show next,

$$\text{Pollution prevention}_{it+1} = \sum_j ww_{jt} * PR_{jt+1} - \sum_j ww_{jt+1}$$

where j are the facilities that belong to firm i.

If actual waste level is lower than the predicted level, formula 2 would yield positive values, evidencing reduction of waste generation. Thus, bigger values are associated with better PP performance.

Appendix 3

Environmental Innovation Measure

$$\text{Environmental innovation}_{it} = w_{it} * Patents_{it}$$

$$\text{with } w_{it} = \frac{(Citations \div Patents)_{it}}{\frac{\sum_{i=1}^{i=N}(Citations \div Patents)_{it}}{N_t}}$$

and where $Patents_{it}$ denotes total environmental patents of firm *i* granted during year *t*, $Citations_{it}$ denotes all the citations received by the patents granted to firm *i* during year *t* and N_t denotes the total number of firms in the sample for year *t*.