

DO ACTIONS SPEAK LOUDER THAN WORDS? AN EMPIRICAL INVESTIGATION OF CORPORATE ENVIRONMENTAL REPUTATION

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ABSTRACT

In this study, we investigate the extent to which firms' environmental performance is reflected in perceptions of their environmental reputation and whether environmental disclosure serves to mediate the negative aspects of poorer environmental performance associated with those assessments. We also examine whether differences in environmental performance and environmental disclosure appear to be associated with membership selection to the Dow Jones Sustainability Index (DJSI), a factor we also believe may be associated with perceptions of environmental reputation. Based on a cross-sectional sample of 92 U.S. firms from environmentally sensitive industries, we find that environmental performance measured using Trucost environmental impact scores is *negatively* related to both reputation scores and membership in the DJSI. We argue this is due to the more extensive disclosure levels of firms that are worse performers and the finding of a significant *positive* relation between environmental disclosure and both the environmental reputation measures and DJSI membership. Finally, we show that the DJSI designation positively influences perceptions of corporate reputation. Overall, our results suggest that voluntary environmental disclosure appears to mediate the impact of poor environmental performance on environmental reputation. Perhaps more troubling, our results also suggest that membership in the DJSI appears to be driven more by what firms say than what they do. Thus, like voluntary disclosure, the DJSI may actually be hindering improved future corporate environmental performance.

Keywords: corporate environmental disclosure; corporate environmental performance; corporate reputation; Dow Jones Sustainability Index.

1. INTRODUCTION

This investigation is concerned with the extent to which a company's environmental performance is reflected in perceptions of its environmental reputation. Certainly, major environmental catastrophes such as the 2010 British Petroleum oil spill in the Gulf of Mexico seriously impact corporate reputations. What is less clear is whether general levels of environmental performance influence perceptions of corporate environmental reputation and whether voluntary environmental disclosure serves to mediate that effect.

Our study integrates two prior streams of environmental disclosure research. First, we build on recent studies claiming a negative relation between environmental performance and environmental disclosure. Cho and Patten (2007), for example, argue that because companies with worse environmental performance face greater exposure to social and political pressures, they have an incentive to use disclosure to address these exposures (see also Hughes, Anderson, and Golden, 2001, and Patten, 2002). We extend this research by examining not only whether environmental performance is associated with levels of environmental disclosure, but also whether differences in environmental performance appear to influence membership in the Dow Jones Sustainability Index (DJSI) (and thus, indirectly, perceptions of environmental reputation). Second, we add to the limited number of studies examining the relation between social and/or environmental disclosure and perceptions of corporate reputation. Both Toms (2002), using U.K. company annual report disclosures, and Brown, Guidry and Patten (2010), investigating the impact of first-time issuances of sustainability-type reports in the U.S., report positive associations between the extent of disclosure and measures of corporate reputation.

Neither of these prior studies, however, considers the potential concurrent impact of actual environmental performance, and neither considers the potential indirect relation disclosure (and/or performance) may have through its influence on inclusion in the DJSI.

Based on a sample of 92 U.S. companies from environmentally sensitive industries and using environmental reputation scores reported in the first-ever *Newsweek* magazine ranking of the “greenest” companies in America (McGinn, 2009, p. 35), we explore the relations between environmental performance, environmental disclosure, membership in the DJSI, and perceptions of corporate environmental reputation. Using path analysis, we find that environmental performance, measured using impact scores also reported in the *Newsweek* rankings, is *negatively* (and significantly) related to both reputation and membership in the DJSI. We contend that these unexpected results are a function of the relation between environmental performance and environmental disclosure. Our analysis also finds that the extent of voluntary environmental disclosure included in annual financial reports and, where issued, stand-alone corporate social responsibility (CSR) reports is negatively related to environmental performance (worse performers have more extensive disclosures). Further, our results indicate environmental disclosure is positively (and significantly) associated with both environmental reputation scores and membership in the DJSI. Our results are thus consistent with the argument that companies use voluntary environmental disclosure to offset the potential reputational effects of poor environmental performance. Perhaps most troubling, our results show that while inclusion in the DJSI is associated with positive reputational effects, membership in the Index appears to be related more to what companies say (their environmental disclosure) than what they do (their environmental performance). As such, the DJSI may

be reducing the incentives for companies included as members to improve their future environmental performance.

Background and Hypotheses Development

One reason that firms may use environmental disclosures to lessen their exposure to social and political pressures is to obtain *legitimacy*. Suchman (1995, p. 574) broadly proposes that “legitimacy is a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within some socially constructed system of norms, values, beliefs, and definitions.” The concept of legitimacy therefore refers to organizational actions that are congruent with overall social expectations (Mathews, 1993). Legitimacy theory holds that legitimacy is a necessary input for an organization’s survival and that communication strategies can be used as a tool to “become identified with symbols, values and institutions which have a strong base of social legitimacy” (Dowling and Pfeffer, 1975, p.127). One such method involves the management of environmental disclosures in corporate reports (Lindblom, 1994; Deegan, 2002).

The major concern we address in this investigation is whether voluntary environmental reporting, spurred by concerns of enhancing social legitimacy, may actually be serving as a potential impediment to future improvements in corporate environmental performance. Freedman and Patten (2004) note that voluntary disclosure, by projecting a positive, more favorable picture of the firm, may lessen the impacts of poorer environmental performance. They further argue that such an effect may reduce the incentives for companies to work toward improving their actual future performance. This study explores this issue relative to the association between environmental performance, environmental disclosure, and perceptions of corporate environmental

reputation. We also investigate the intervening role the DJSI may be playing relative to the effects of disclosure and performance on reputation.

Performance, Disclosure, and Reputation

Fombrun (1996, p. 37) defines corporate reputation as “the overall estimation in which a company is held by its constituents” and further notes (p. 61), that in at least the normative sense, it ought to be based upon underlying performance. Often, that appears to hold true. For example, several studies (e.g., Brammer and Pavelin, 2006; Brown and Perry, 1994; Brown et al., 2010) provide evidence that actual financial performance is clearly aligned with measures of companies’ general reputations. Similarly, anecdotal evidence suggests that highly visible instances of poor operating performance erode the reputational stock of affected companies. Both Toyota, in response to its massive recall due to acceleration problems in its automobiles, and British Petroleum, owing to the major oil spill in the Gulf of Mexico, appear to have taken major hits on their reputation within the recent past.¹ Normatively, therefore, we would expect companies that are better environmental performers to enjoy more positive environmental reputations. We state this hypothesis as:

H1_a: *Ceteris paribus, perceptions of corporate environmental reputation are positively associated with firm environmental performance.*

However, Bebbington, Larrinaga, and Moneva (2008, p. 339) argue that while reputations may be viewed “as having some basis in organizations’ actions,” they are also “constructed by others via their perceptions of these activities.” Similarly, Brady (2005) notes that reputation is based on individuals’ images of the firm, and while image and

¹ See, e.g., Ahrens (2010) and Ferguson (2010).

reputation are closely related, it is the potential for image manipulation that suggests performance might not always be reflected in perceptions of corporate reputation.

Brady (p. 52) argues that an individual's perceived image of the firm is the result of a filtering process, and the concern we address in this investigation is the potential use of voluntary environmental disclosure to serve as a lens² for filtering and shaping perceptions of what Brady (p. 63) refers to as "environmental credibility."³ This appears to be in line with Bebbington et al.'s (2008) representation of reporting as a mechanism for perception creation, a primary premise underlying their concerns with the use of CSR disclosure⁴ as a tool for reputation risk management.

Unerman (2008, p. 362), in a comment on Bebbington et al. (2008), notes that "a corporation's reputation among its economically powerful stakeholders is a valuable asset which needs to be protected and developed," and "within this context, CSR reporting is a potentially powerful medium which corporations can use to try to influence these perceptions." It is perhaps not surprising, therefore, that proponents of the business case for CSR reporting claim reputation protection and enhancement as one of the primary potential benefits for corporations choosing to engage in the practice. For example, Group of 100⁵ (2004, p. 14) specifically claims that disclosure "can play an important role in managing stakeholder perceptions, and, in doing so, protect and enhance corporate

² Hopwood (2009) refers to reporting in this vein as a corporate veil designed to provide a new face to the outside world while hiding the inner workings of the company.

³ Brady (2005, p. 63) notes that credibility is not the same thing as performance, but might better be viewed as "perceived performance."

⁴ While environmental disclosure is only one component of the broader concept of CSR, arguments from the CSR literature often have been relied upon to support the more specific arena of environmental disclosure (see, e.g., Brown and Deegan, 1998; Cho and Patten, 2007; Patten, 2002).

⁵ Group of 100 is an organization which consists of the top management from 100 of Australia's largest corporations.

reputation.” Similarly, the Global Reporting Initiative (GRI), the organization perhaps most acknowledged as the leader in the development of sustainability reporting guidelines (Ballou, Heitger, and Landes, 2006; Gray, 2006; Woods, 2003), asserts reporting can lead to enhancement of corporate reputation (GRI, 2010).

At least two prior studies provide evidence indicating that CSR disclosure may be successful in improving perceptions of corporate reputation. Toms (2002), based on an overall sample of 215 U.K. firms, codes annual report environmental disclosure⁶ quality along a six point spectrum and finds higher levels of disclosure are positively associated with the “community and environmental responsibility rating” from *Management Today*’s surveys of the most admired companies in Britain. Brown et al. (2010) test whether the first-time issuance of a stand-alone sustainability-type report by a sample of 59 U.S. corporations led to changes in *Fortune* most admired scores adjusted for the financial halo effect identified by Brown and Perry (1994). Although they report no significant changes in reputation scores, on average, Brown et al. do find that report quality (measured using a 55 point content scheme derived from the GRI’s G3 reporting guidelines) is positively associated with changes in reputation. While both studies support the claims that CSR disclosure can enhance corporate reputation, neither of these prior examinations investigates the influence actual environmental performance may have on the disclosure/reputation relation.

Based on the arguments summarized above, we expect that more extensive corporate environmental disclosure will lead to perceptions of better corporate environmental reputation. We formally state this hypothesis as:

⁶ Toms (2002, p. 269) notes that where the annual reports “included a cross-reference to a supplemental environmental report, the separate report” was also included as part of the analysis.

H1_b: *Ceteris paribus, perceptions of corporate environmental reputation are positively associated with firm environmental disclosure.*

DJSI Membership

Aside from the filtering processes performed by individuals, Fombrun (1996, p. 60) notes that “a whole performance assessment and reputation-building industry has evolved that scrutinizes, evaluates, and champions companies.” Fombrun argues (p. 60) that because these organizations “enjoy lots of analytic resources and often have access to better information ... their opinions significantly affect the way a company is regarded by its less-informed observers.” Within the social and environmental domain, perhaps foremost among these assessment groups (see, e.g., Fowler and Hope, 2007) is the DJSI.

Created in 1999, DJSI is now comprised of several different listings based on geographic location.⁷ Inclusion in the DJSI is determined by Sustainability Asset Management, a fund-management firm based in Zurich, Switzerland (Fowler and Hope, 2007). Fowler and Hope (p. 247) note that selection is based on a review of company-submitted questionnaires, as well as a review of “annual reports; environmental reports; health and safety reports and reviews; press releases; articles; and media and stakeholder commentaries on the company.” Membership is limited to the top 10 percent (20 percent) of companies included in the broader Dow Jones Global Index (regional Dow Jones Indexes).

Membership in the DJSI has been lauded as a signal of leadership in terms of corporate sustainability (Makipere and Yip, 2008) and has even been used as a proxy for CSR reputation (see, e.g., Robinson, Kleffner, and Bertels, 2011). As such, it seems plausible that inclusion in the DJSI could be perceived as a measure of superior

⁷ According to the DJSI website (www.sustainability-index.com), separate sustainability listings are currently posted for (1) World, (2) Europe, (3) North America, (4) U.S., and (5) Asia/Pacific regions.

environmental standing leading to a higher environmental reputation. This leads to the following hypothesis:

H2_a: *Ceteris paribus, perceptions of corporate environmental reputation are positively associated with firm membership in the DJSI.*

Because membership in the DJSI is meant to reflect leadership in sustainability performance (Fowler and Hope, 2007), we would normatively anticipate, similar to general assessments of corporate reputation, that actual environmental performance should be positively associated with inclusion in the Index. However, the DJSI has been criticized both for its overweighting of financial performance relative to social or environmental company attributes (Fowler and Hope, 2007), as well as for its heavy reliance on company-provided internal and external reporting documents (Crane and Matten, 2007, p. 255). It is this latter criticism, in particular, that suggests membership in the DJSI may be influenced more by what companies are saying (disclosure) than what they are doing (performance). Thus, in addition to potential direct effects of disclosure and/or performance on perceptions of reputation, these factors may also have an indirect relation on the assessments due to their influence on membership in the DJSI. This discussion leads to the following hypotheses:

H2_b: *Ceteris paribus, firm membership in the DJSI is positively associated with firm environmental performance.*

H2_c: *Ceteris paribus, firm membership in the DJSI is positively associated with firm environmental disclosure.*

The Relation between Performance and Disclosure

Finally, several recent studies (Cho and Patten, 2007; Hughes et al., 2001; Patten, 2002) provide evidence that corporate environmental disclosures appear to be negatively

related to firm environmental performance.⁸ For example, Patten (2002) shows that, controlling for firm size and membership in environmentally sensitive industry groups, companies with higher levels of size-adjusted toxic releases (worse environmental performance) include more extensive environmental disclosures in their 10-K financial reports.⁹ According to Cho and Patten (2007), companies use this disclosure as a tool for reducing the negative potential impacts of actual performance information. Bebbington et al. (2008) note that, in this context, the disclosure may help lead to firm legitimacy by protecting the reputation of the poorer performing companies. Thus, while poor environmental performance might normatively be expected to negatively impact reputation, increased disclosure may lessen that effect. This is an issue that, to our knowledge, has not yet been empirically investigated. We therefore examine the relation between environmental performance and environmental disclosure and state this hypothesis as:

H3: *Ceteris paribus, firm environmental disclosure is negatively associated with firm environmental performance.*

Figure 1 presents the hypothesized relations within our overall theoretical model.

----- Figure 1 about here -----

⁸ In contrast, other recent studies (e.g., Al-Tuwaijri, Christensen, and Hughes, 2004; Clarkson, Li, Richardson, and Vasvari, 2008) report a positive association between environmental performance and environmental disclosure. One possible explanation for the contrasting results is these studies' inclusion of small firms in their samples. Clarkson, Li, Richardson, and Vasvari (2011) note that small firms exhibit worse environmental performance than larger companies and numerous prior studies document that firm size is a major factor explaining differences in environmental disclosure. Because our study focuses only on larger firms, we rely on the arguments for a negative relation between environmental performance and environmental disclosure.

⁹ Patten's (2002) disclosure scale excludes litigation-related environmental information.

Research Methods

Sample

In September of 2009, *Newsweek* magazine released its first ever ranking of 500 large U.S. companies “on their actual environmental performance, policies, and reputation” (McGinn, 2009, p. 35). Our sample is drawn from this ranking. However, Brammer and Pavelin (2006, p. 438) argue that “since industry environments are correlated with significant pressure from institutional, and other, stakeholders” the impacts of performance on reputation can be expected to vary across industry sectors. Because environmental reputation is more likely to be an important resource for companies whose operations are subject to greater political scrutiny relative to their environmental performance, we focus only on those firms from the basic materials, oil and gas, and utility industries, as classified by *Newsweek*.¹⁰ Limiting the investigation to companies with greater environmental exposures is consistent with a number of prior studies related to environmental disclosure including Alciatore, Dee, and Easton (2004), Clarkson, Li, Richardson, and Vasvari (2008), Freedman and Wasley (1990), and Patten (1992). Although the *Newsweek* rankings include 96 companies from these sectors, three firms are excluded because they lack necessary data and one is deleted because it was not possible to identify the timing of the company’s only stand-alone social responsibility report (discussed below). Thus, the final sample consists of 92 firms (28 from basic materials, 30 from oil and gas, and 34 from utilities). Sample firms ranged in size (based

¹⁰ The other industry sectors classified by *Newsweek* are (1) banks and insurance, (2) financial services, (3) food and beverage, (4) general industrials, (5) health care, (6) industrial goods, (7) transport, aerospace, (8) media, travel, and leisure, (9) consumer products, cars, (10) pharmaceuticals, (11) retail, and (12) technology. *Newsweek* does not identify the basis on which firms were allocated to the various industry sectors. In sensitivity tests discussed below, we address potential concerns with *Newsweek*’s industry classification relative to prior studies using an ‘environmentally sensitive’ categorization.

on FY 2008 revenues) from \$2.2 billion to \$425.1 billion with a mean (median) of \$22.8 billion (\$10.8 billion).

Environmental Reputation

We rely on the environmental reputation scores reported by *Newsweek* (McGinn, 2009) as our measure of reputation. As noted by McGinn (2009), the scores are based on a survey conducted for *Newsweek* by CorporateRegister.com. The survey, conducted during July of 2009, collected opinions from professionals, academics, and other environmental experts. The CEOs of firms included in the assessment were also invited to participate in the survey.¹¹ It is important to note that *Newsweek*'s environmental reputation scores cannot be interpreted as capturing broad stakeholder perceptions, but instead only the opinions of the respondent groups. However, as noted by Guidry and Patten (2010, p. 5), the sample for the *Newsweek* survey is a much broader group than those surveyed by *Fortune* for its annual "Most Admired" reports. A further strength of the *Newsweek* reputation survey is that respondents were asked only to state opinions on environmental reputation and not on other aspects of firm performance. In spite of this, however, Guidry and Patten (2010) show that the scores still appear to suffer, at least to some extent, from the "financial halo effect" that Brown and Perry (1994) documented with respect to *Fortune* magazine's annual Most Admired reputation scores. Guidry and Patten (2010) find, however, that the halo effect is less prevalent for companies from environmentally sensitive industries (as the sample companies in this study are). An assessment of the impact of Brown and Perry's (1994) financial performance variables on the reputation scores for our sample indicated none was statistically significant in the

¹¹ *Newsweek* does not provide information on the actual number of respondents, breakdown across participant groups, or weighting of responses for its 2009 survey.

predicted directions.¹² As such, we use the reported reputation scores in our analysis. Reputation scores for the sample companies ranged from 8.86 to 63.70 with a mean (median) of 35.64 (34.56).¹³

Environmental Performance

As the primary measure of corporate environmental performance for this study, we use the “Environmental Impact Score” as also reported by *Newsweek*.¹⁴ McGinn (2009) notes this measure was calculated for *Newsweek* by Trucost, an organization specializing in quantitative environmental performance measurement. According to McGinn, the measure captures the effects of actual performance across a wide spectrum of environmental impact areas including greenhouse gas emissions, water use, solid waste disposal, acid rain emissions, and toxic waste emissions. The scores are normalized by Trucost to allow for comparisons across firm size and industry membership. The mean (median) environmental impact score for our sample companies was 20.31 (18.20) and ranged from 0.20 to 84.40, where higher scores denote better performance. A *t*-test of means indicated that the average environmental impact scores for the firms in each of our selected industry groups is significantly lower than the

¹² Similar to Brown and Perry (1994), we regressed the reputation scores against five measures of financial performance. These variables (all calculated following Brown and Perry, 1994) are market-to-book, returns (average return on assets), growth (percentage change in sales), size (sales), and risk (debt/equity).

¹³ The reputation scores for the overall *Newsweek* sample ranged from 1 to 100 with a mean (median) of 34.44 (32.97).

¹⁴ As we note below, because prior studies of the relation between environmental performance and environmental disclosure (e.g., Patten, 2002; Cho and Patten, 2007, Clarkson et al., 2008) use alternative measures of performance such as environmental performance scores compiled by the research firm KLD Associates, we run sensitivity tests using this alternative measure of performance.

average for the remaining *Newsweek* sample companies, indicating that, on average, our sample firms are worse performers.¹⁵

Environmental Disclosure

We measure the extent of environmental disclosure based on a hand-review of (1) the most recent set of annual financial reports in print prior to June 30, 2009 and (2) the most recent stand-alone corporate social responsibility (CSR) report issued between July 1, 2007 and June 30, 2009. Where a separate annual report and 10-K report were published for a given company, we reviewed both documents for environmental disclosures. Because our data collection occurred subsequent to the period when the environmental reputation survey was administered we are unable to include web only disclosures in our measure. While we acknowledge this as a limitation of our study, we note, first, that Cormier and Magnan (2004) report very consistent disclosure across web-based and hard copy environmental reporting. Further, other recent studies of environmental disclosure (e.g., Aerts and Cormier, 2009) also focus only on hard-copy reporting.

To find stand-alone CSR reports, we reviewed each of the sample companies' web site as well as CorporateRegister.com. In total, we identified 48 firms with CSR reports published over the period of interest. As noted above, one company included in the *Newsweek* rankings had a 2009 sustainability-type report available, but because it was not possible to identify through company web site information or through

¹⁵ Tests also indicated the impact scores for the firms from the oil and gas sector were significantly higher, on average, than the scores for companies from either the basic materials or the utility industries. As such, we repeated our analyses including an indicator control variable for the oil and gas industry firms. With the exception that the paths from performance to both DJSI and to reputation were not statistically significant, results were consistent with those reported for our primary analysis.

CorporateRegister.com if it was released prior to July, this company was eliminated from the analysis.

We assessed the extent of the environmental reporting using the Clarkson et al. (2008) comprehensive environmental disclosure scale. This 95-point index was largely based on GRI guidelines and consists of two major sections. The “hard disclosure items” include four sub-sections labeled as (1) governance and structure management systems, (2) credibility, (3) environmental performance indicators (EPIs) and (4) environmental spending, whereas “soft disclosure items” comprise three sub-sections classified as (1) vision and strategy claims, (2) environmental profile and (3) environmental initiative. Several disclosure items are contained within each sub-section. The total maximum possible score is 95 of which 60 are potentially generated by the EPI sub-section due to various weights attributed for each EPI item. Reports were independently reviewed by two members of the research team and any coding differences were discussed and reconciled. Financial report disclosure scores ranged from zero to 11 with a mean score of 3.7. In contrast, the average disclosure score for the 48 stand-alone reports was 21.7 based on a range from four to 43. We integrated the two metrics into a single “total disclosure” score for each firm (eliminating duplicated disclosure category scores). Our total disclosure scores ranged from zero to 44, with a mean (median) of 13.5 (9.5).

DJSI

We code membership in the DJSI using a one/zero indicator variable. DJSI membership is updated each September. Because CorporateRegister.com conducted its reputation survey during July of 2009, we use the 2008 DJSI listing for our classification. In total, 20 of our 92 sample firms were included in the 2008 DJSI.

Control – Media Exposure

Carroll and McCombs (2000) suggest that perceptions of corporate reputation might also be influenced by media exposure.¹⁶ Following Bansal and Clelland (2004), Clarkson et al. (2008), and Deephouse (1996), we control for potential media impacts using the Janis-Fadner coefficient of imbalance (Janis and Fadner, 1965). The Janis-Fadner measure is based on the proportion of favorable and unfavorable news articles published about a given firm and can range from -1 to 1 with a more positive rating indicating more positive media exposure. For our analysis, we used the *Lexis-Nexus Academic Universe* database to identify, for each of the sample companies, all environmental-related articles published by major U.S. newspapers and magazines over the period from January 1, 2008 through June 30, 2009. Each article was read and coded as being favorable, unfavorable, or neutral with respect to its reflection on the firm's environmental standing. The media exposure scores for our sample ranged from -1.00 to 1.00 with a mean (median) of -0.118 (0.00). Table 1 presents the Pearson product-moment correlations for the variables used in our analysis.

----- Table 1 about here -----

Results

Our study's hypothesized relations are interconnected (see Figure 1). We therefore use path analysis to test our hypotheses so that we can consider the direct and indirect relations among all constructs. As all of the variables within our study are

¹⁶ Media exposure has also been argued to influence levels of voluntary environmental disclosure (Aerts and Cormier, 2009; Brown and Deegan, 1998; Clarkson et al., 2008). We control for this possible relation in sensitivity tests discussed below.

observed (indicator) variables that are directly measured, we estimate an overall structural model but not a measurement model.¹⁷

Figure 2 presents the results of the path model testing the hypothesized relations. The model also includes the media exposure control variable to control for the potential relation between media exposure and reputation (Carroll and McCombs, 2000). As shown in Figure 2, the path from media exposure to environmental reputation is statistically insignificant. Thus, the findings of the direct and indirect influences of environmental performance, environmental disclosure, and DJSI membership on environmental reputation do not appear to be influenced by media exposure.

Following Hair, Black, Bahin, Anderson, and Tatham (1998), we examine several indices to determine whether the path model has acceptable fit. First, the Chi-square statistic of 1.13 (degrees of freedom = 2) is insignificant ($p = 0.29$), indicating that the path model is a strong fit for the sample (Schumacker and Lomax, 2004). Second, the root-mean-square error of approximation (RMSEA), a global fit measure, is .000, which is well under the recommended threshold of .08 (Hair et al., 1998). Third, Hair et al. (1998) indicate that higher values of the goodness of fit (GFI) measure signify a better model fit; the value from our path analysis is .99, indicating a strong fit. Finally, the comparative fit index (CFI) of 1.00 well exceeds the recommended threshold of .90 (Bentler and Bonnett, 1980). Thus, these indices all demonstrate that the tested path analysis model has acceptable fit.

¹⁷ We utilized the “proc calis” procedure of SAS 9.2 to estimate the paths, using the “PATH” statement to specify the six paths in the path analysis model. The variable DJSI is binary (coded as “0” or “1”). The use of a binary variable in path analysis does not violate path analysis’s assumptions of multivariate normality as long as the variable has relatively small skewness and kurtosis, which has been defined as less than 1.5 (Schumacker and Lomax, 2004), or less than 2 for skewness and 7 for kurtosis (West, Finch, and Curran, 1995). As the skewness of DJSI is 1.474 and its kurtosis is .176, the use of the variable does not appear to violate the assumptions of multivariate normality and is appropriate for use in path analysis. Furthermore, none of the other model variables violate assumptions of normality.

----- Figure 2 about here -----

Tests of H1_a and H1_b

The first two hypotheses investigate whether environmental performance and environmental disclosure, respectively, are associated with perceptions of corporate environmental reputation. As shown in Figure 2, each of these items is significantly related to environmental reputation scores. However, contrary to our expectations, the path from environmental performance to environmental reputation is negative, indicating that firms with *worse* environmental performance actually have higher environmental reputation scores. H1_a is therefore not supported. In contrast, the path from disclosure to reputation is positive and statistically significant ($p < .05$, one-tailed), documenting that more extensive firm environmental disclosure is associated with more favorable reputation scores. This finding is consistent with Toms (2002) and Brown et al. (2010), and thus, H1_b is supported.

Tests of H2_a, H2_b, and H2_c

The second set of hypotheses relate to DJSI membership. H2_a posits a positive association between DJSI membership and perceptions of environmental reputation. As indicated in Figure 2, the path from DJSI membership to environmental reputation is positive and strongly statistically significant ($p < .01$, one-tailed), supporting H2_a. DJSI listed companies appear to be perceived by the CorporateRegister.com survey respondents as having more favorable environmental reputations. H2_b and H2_c focus on whether firm membership in the DJSI is related to firm environmental performance and/or firm environmental disclosure. Figure 2 displays that both of these items are significantly associated (at $p < .01$) with DJSI membership. However, and similar to its

relation with the *Newsweek* reputation measure, environmental performance is negatively associated with membership in the DJSI. This signifies that firms with *worse* environmental performance are also more likely to be included in the DJSI; H2_b is therefore not supported. In contrast, and again similar to the relation between disclosure and reputation, the path between environmental disclosure and DJSI is positive. This finding supports H2_c and shows that firms with higher levels of voluntary environmental disclosure are more likely to belong to the DJSI than companies with lower disclosure.

Test of H3

The final hypothesis examines whether environmental performance is associated with environmental disclosure. The path from environmental performance (using impact scores as reported by *Newsweek* magazine) to environmental disclosure is negative and strongly statistically significant ($p < .01$, one-tailed). Thus, the results are consistent with the findings of Cho and Patten (2007), Hughes et al. (2001), and Patten (2002) that poorer environmental performers disclose more voluntary environmental information.

Mediation Tests

While the negative associations between environmental performance and both reputation and membership in the DJSI are contrary to normative expectations, we believe they are due to the mediating effect disclosure plays on the relationships. To test this supposition, we perform Sobel (1982) tests for the indirect paths from performance through disclosure to reputation and to DJSI membership. Results indicate that disclosure significantly mediates the relationship between environmental performance and reputation ($p < .03$), and environmental performance and inclusion in the DJSI ($p < .01$), thus supporting our claims.

Sensitivity Test - Alternative Performance Measure

Our path analysis results indicate several interesting findings regarding environmental performance (as measured by *Newsweek* magazine's impact scores). In particular, we find firms with poorer environmental performance are more likely to be members of the DJSI and have more favorable environmental reputation scores. Our results also show that poorer environmental performers also make more extensive environmental disclosures. To ensure that these findings are not a function of the particular performance measure used (impact scores), we repeat our path analysis using an alternative performance measure used in prior studies: KLD environmental concern scores (e.g., Cho and Patten, 2007; Cho, Roberts, and Patten, 2010). Whereas higher environmental impact scores reflect more favorable environmental performance, higher KLD concern scores indicate greater environmental concerns and hence worse environmental performance.¹⁸ To allow for consistent interpretation across our models, we invert this latter relation by multiplying the KLD scores by negative one. As such, higher (lower) transformed scores also indicate better (worse) environmental performance.

Figure 3 presents the results of the path analysis model using this alternative measure of performance. The overall model fit appears to be acceptable. While the RMSEA of .10 slightly exceeds the recommended ceiling of .08, the other indices reflect acceptable fit (e.g., Chi-Square Statistic of 3.89 (degrees of freedom = 2; $p = .14$); GFI and CFI of .98). Using the transformed KLD concern scores in place of the *Newsweek* impact scores, we find that environmental performance is still negatively related to the

¹⁸ The two measures of environmental performance (impact scores and KLD concerns) are strongly negatively correlated (correlation coefficient = $-.423$, $p < .001$).

level of environmental disclosure and is still strongly statistically significant. We again fail to find a positive relation between environmental performance and either environmental reputation or membership in the DJSI. Indeed, both paths remain negative, but using the alternative performance measure, neither is now statistically significant. The difference in statistical significance relative to the initial analysis may be due to differences in the performance constructs themselves, differences in the relations between the performance measures and the media exposure control variable, or a combination of the two.¹⁹ Sobel tests on the indirect paths from performance through disclosure to reputation and to DJSI membership, consistent with results using the Trucost environmental impact scores, are statistically significant (at $p < .05$), indicating disclosure's mediating role.

----- Figure 3 about here -----

Additional Sensitivity Tests

As noted above, DJSI has been criticized for its over-reliance on financial as opposed to social and environmental performance. As such, a possible explanation for the negative relation between environmental performance and DJSI membership is that environmental performance could be negatively associated with some aspect of firm financial performance, and it is actually the financial performance factor that drives membership in the DJSI. To test this, we examine the correlations between environmental performance (*Newsweek* impact scores) and the five financial performance

¹⁹ According to McGinn (2009), the Trucost environmental impact assessments are based on an analysis of measurable impacts across more than 80 aspects of environmental performance. In contrast, the KLD concern ratings focus on an assessment of performance across only seven broad areas. The two performance measures are significantly correlated with each other ($p < .001$) but differ in their correlations with our media exposure control variable (MediaJF). While the broader KLD assessment metric is significantly related to MediaJF ($p = .03$), the Trucost impact scores are not ($p = .868$).

factors identified by Brown and Perry (1994). Non-tabulated results indicate that environmental performance measured using impact scores is significantly, but *positively* correlated with two of the financial measures (growth and ROA, each at $p < .05$), but not with any of the other financial variables. Thus, the negative relationship between DJSI and environmental performance does not appear to be due to a negative relation between environmental and financial performance. We also re-ran all of the analyses with each of the five different financial performance measures used by Brown and Perry (1994: market-to-book, average return on assets, percentage change in sales, sales, and debt-to-equity ratio) as a control for DJSI, and repeated each set of analyses using the alternative KLD concern scores as the environmental performance measure. The previously reported path analysis results never change with the inclusion of any of these financial performance measures, and the path from the financial performance variable to the DJSI is never statistically significant. These results suggest that DJSI inclusion is fairly robust to controls for financial performance.

We also conduct several additional sensitivity tests examining the inclusion of an alternative control variable (firm size) and other paths from the control variables to test the robustness of our results. Specifically, we run models that add a path from media exposure to environmental disclosure, models that use firm size (log of 2008 sales) as a control for reputation, and models that incorporate combinations of these elements. When firm size is included in the model, the direct path from disclosure to environmental reputation is no longer statistically significant at conventional levels. Further, when firm size is substituted for media exposure, the negative relation between environmental performance (using impact scores) and environmental reputation is no longer statistically

significant. With these exceptions, however, the hypothesized relations supported by the original analysis continue to hold, and in no models are the paths from media exposure and/or firm size to reputation statistically significant.

Our final set of sensitivity tests centers on concerns that *Newsweek's* classification of firms into industry sectors may not be consistent with prior published work investigating companies from environmentally sensitive industries (e.g., Cowen, Ferreri, and Parker, 1987; Patten, 1991; 2002) where firms are classified based on companies' primary Standard Industrial Classification (SIC) codes. Industries (and their SIC codes) often classified as environmentally sensitive include mining (10xx, 12xx), oil and gas (13xx, 29xx), paper (26xx), chemical (28xx) excluding pharmaceuticals (283x), metals (33xx), and utilities (49xx). For comparability purposes, we collected from COMPUSTAT, the primary SIC code for all firms included in the 2009 *Newsweek* rankings. We found two situations where classification might appear to be inconsistent with prior studies. First, *Newsweek's* oil and gas sector included four companies with primary SIC codes of 3533 (Oil and Gas Field Machinery and Equipment). These firms likely would not have been classified as being environmentally sensitive in prior studies. Second, five companies with primary SIC codes of 284x were included in the "consumer products, cars" industry sector by *Newsweek*. Prior studies would likely have classified these firms as being environmentally sensitive.

To assure that our reported findings are not sensitive to the differences in industry classification noted above, we ran our primary path model (1) excluding the four 3533 SIC firms, (2) including the five 284x SIC companies, and (3) both excluding the 3533 firms and including the 284x companies. With the exception that, in all three cases, the

negative paths from performance to DJSI and to reputation were no longer statistically significant, all primary results remained consistent with the findings using our original sample. We also repeat the series of Sobel tests for each of these three alternative samples and find that the previously reported relationships all remain (all $p < 0.05$). Thus, the overall mediating effects remain consistent regardless of industry classification.

Overall, our sensitivity tests support the robustness of the direct and indirect (through impact on membership in DJSI) influence of disclosure on environmental reputation scores.

Conclusion

The primary intent of this investigation was to identify whether companies' environmental performance is reflected in perceptions of their environmental reputation and whether environmental disclosure serves to mediate of the influence of poorer environmental performance on environmental reputation. We also examine whether differences in environmental performance and environmental disclosure appear to be associated with membership selection to the DJSI, given our belief that such designation is likely to positively influence external perceptions of corporate environmental reputation. Based on a sample of 92 U.S. firms from industries facing higher levels of environmental exposure and using reputation scores as identified in *Newsweek* magazine's rankings of the greenest corporations in America, we find that environmental performance as captured by Trucost environmental impact scores is actually *negatively* related to both reputation scores and membership in the DJSI. We argue this negative relation is due to the voluntary disclosure practices of the sample firms. Consistent with several prior studies, we find that environmental performance is also negatively related to

the level of environmental disclosure (worse performing companies make more extensive disclosures). We also document a significant *positive* relation between disclosure and both the environmental reputation measures and membership in the DJSI. Thus, the higher levels of environmental disclosure appear to mediate the potential negative effects of poorer performance on environmental reputation. Finally, as expected, we show that DJSI designation positively influences perceptions of corporate reputation. While results are fairly robust to alternative sensitivity tests, supplemental analysis indicates that the direct relationships between disclosure and environmental reputation and environmental performance and reputation may be sensitive to firm size. We also find that the effect of environmental performance on DJSI inclusion and environmental reputation is also sensitive to industry classification, whereas the overall pattern of mediating relationships remains. Nevertheless, the direct and indirect influences of disclosure on environmental reputation appear strong. While these results suggest a certain degree of naivety on part of users of environmental disclosure, they are consistent with findings from other recent investigations of the use of environmental disclosure (see, e.g., Cho, Phillips, Hageman, and Patten, 2009; Jacobs, Singhal, and Subramanian, 2010; Milne and Patten, 2002).

An important implication of our findings is that voluntary environmental disclosure appears to be an effective tool for reputation risk management. However, while business managers may see this as good news, proponents of improved corporate environmental performance might view it in a more negative light. As noted by Hopwood (2009), it appears that many, particularly larger, companies tend to channel their environmental disclosures more toward discussion of strategies and policies than toward providing meaningful performance information. To the extent that this disclosure

lessens the potential negative impacts of performance in the social and political arenas, the disclosure may actually reduce the incentives companies have for bettering their actual environmental performance in the future. This would seem to be contrary to the desires of society. Perhaps even more troubling, our results appear to indicate that the DJSI, one of the most visible proclaimed indicators of excellence in corporate sustainability, is far more influenced by what companies say (their environmental disclosure) than by what they do (their environmental performance). Thus, like voluntary disclosure, the DJSI may actually be hindering improved future corporate environmental performance. Investigating the relation between changes in either environmental reputation or DJSI membership and *subsequent* environmental performance would be a potentially interesting extension of our study.

Like all investigations, ours is subject to limitations. As an archival study, we can only provide evidence on associations, not causality (see, e.g., Alewine, 2010). Exploring how individuals perceive disclosure (and potentially, membership in indexes such as the DJSI) in relation to reputation using an experimental or qualitative design could add evidence along this dimension. Also, we focus only on relative large U.S. companies, and as such, the extent to which the relations we show hold in other settings cannot be generalized. Further, both environmental performance and environmental reputation are constructs that must be measured using proxies. While we believe the measures we use are valid proxies for those constructs, we acknowledge that, like all proxies, they may not perfectly reflect the true underlying attributes they attempt to capture. In addition, our environmental disclosure scale, although used in prior studies, is much more a measure of the quantity as opposed to the quality of environmental

disclosure. It is also based only on hard copy, not web-based, disclosures. Finally, we do not explore whether, or how, the relations between environmental performance, environmental disclosure, membership in the DJSI and perceptions of corporate environmental reputation may change over time. Extensions of our work along any of these lines, therefore, would appear to be valuable.

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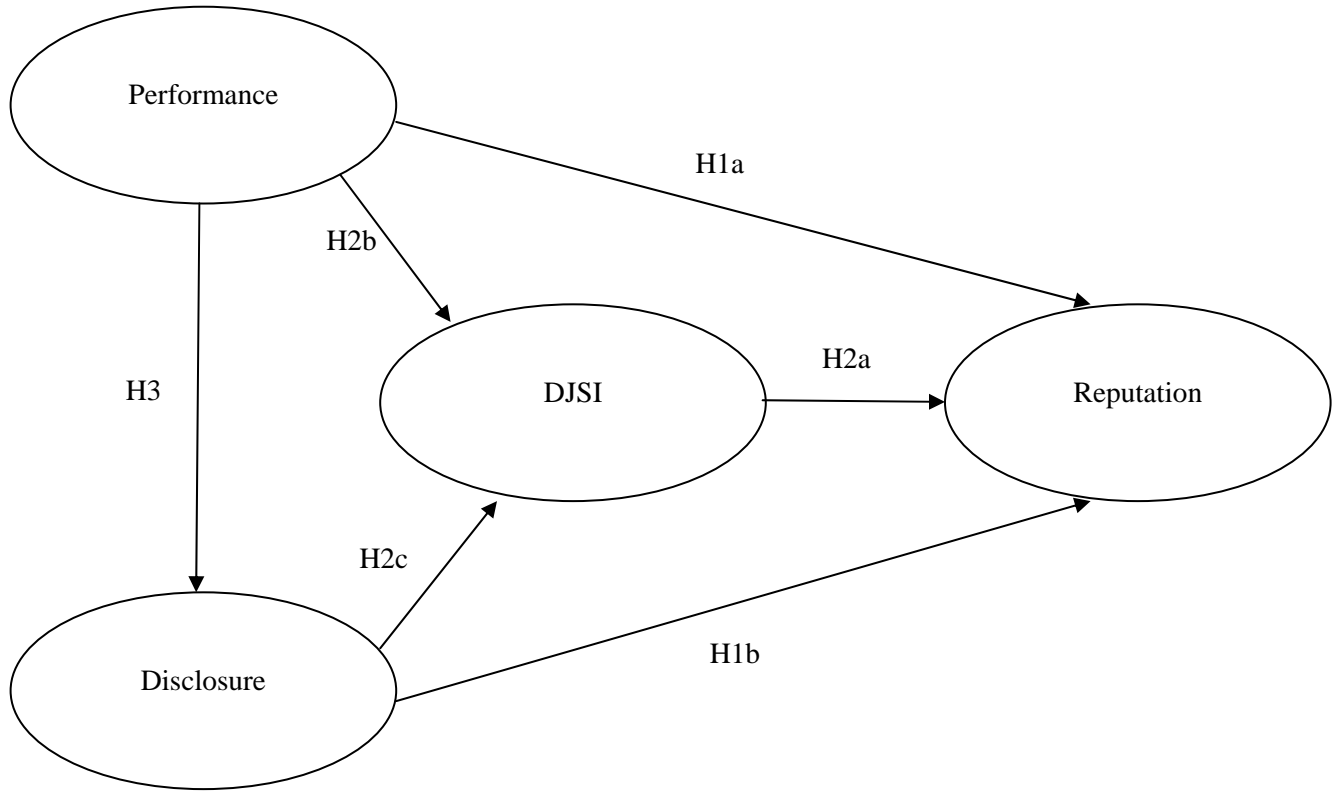
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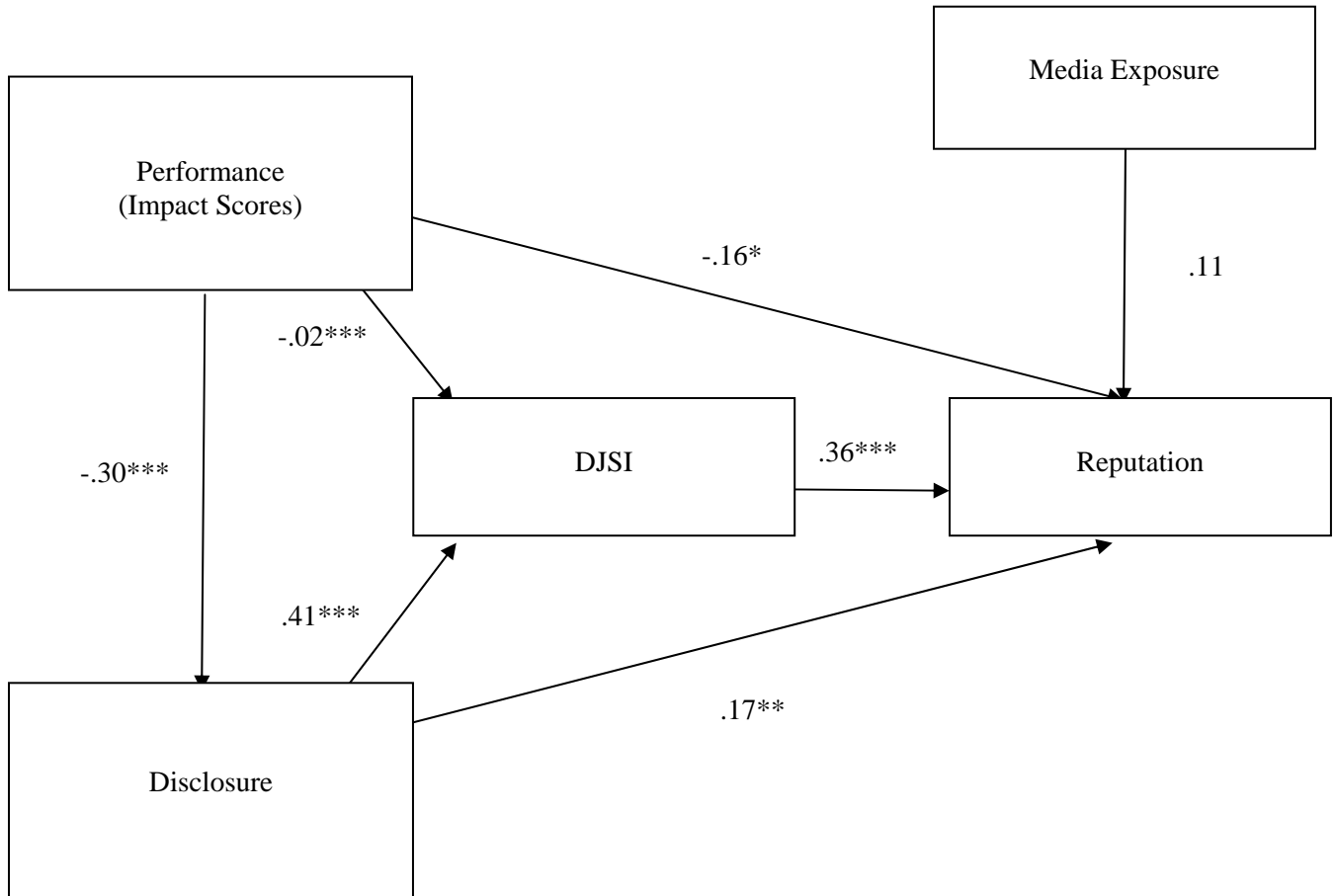
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Figure 1
Theoretical Model



Variable measurements are listed in Table 1.

Figure 2
Path Analysis of Hypothesized Relations^a



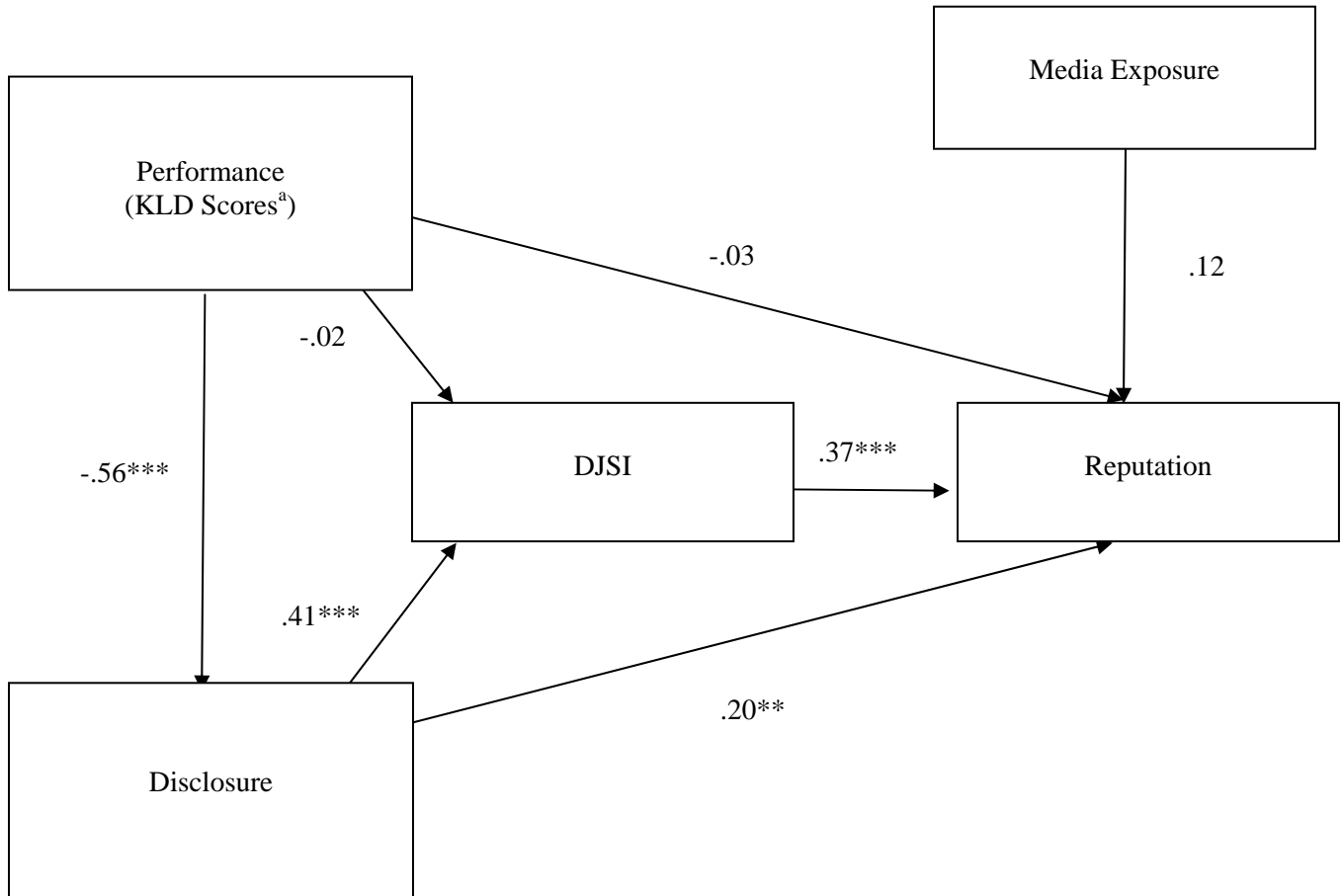
Model Fit Statistics
 Chi-Square, 1.13, (df=2), p. 0.29
 RMSEA, .000
 Goodness of Fit Index (GFI), .99
 Comparative Fit Index (CFI), 1.00

Probability Levels^b
 ***, p < .01
 **, p < .05
 *, p < .10

^a Variable measurements are listed in Table 1.

^b Significance levels are one-tailed, except for the paths from performance to DJSI, performance to reputation, and media exposure to reputation.

Figure 3
Path Analysis with Alternative Performance Measurement (KLD Concern Scores)^a



Model Fit Statistics
 Chi-Square, 3.89, df=2, p. 0.14
 RMSEA, .10
 Goodness of Fit Index (GFI), .98
 Comparative Fit Index (CFI), .98

Probability Levels^b
 ***, p < .01
 **, p < .05
 *, p < .10

^a KLD Scores represent the environmental concern scores compiled by the research firm KLD Research and Analytics, Inc. (higher scores indicate greater concerns and hence poorer performance). Remaining variable measurements are listed in Table 1.

^b Significance levels are one-tailed, except for the paths from performance to DJSI, performance to reputation, and media exposure to reputation.

Table 1
Correlation Matrix

Variable	Reputation	Performance	Disclosure	DJSI	Media Exposure
<i>Reputation</i>	1				
<i>Performance</i>	-.258**	1			
<i>Disclosure</i>	.370***	-.303***	1		
<i>DJSI</i>	.465***	-.145	.415***	1	
<i>Media Exposure</i>	.148	.018	.005	.102	1

Reputation is measured as environmental reputation scores as reported by *Newsweek* (2009).

Performance is measured as the environmental impact score as reported by *Newsweek* (2009).

Disclosure is measured as environmental disclosure in the most recent set of annual financial statements in print prior to June 30, 2009, and in the most recent stand-alone corporate social responsibility (CSR) report issued between July 1, 2007 and June 30, 2009.

DJSI is coded as "1" if a member of the 2008 DJSI, "0" otherwise.

Media Exposure is measured using the Janis-Fadner coefficient, based on the proportion of favorable and unfavorable news articles published between January 1, 2008 and June 30, 2009.

* Correlation is significant at the $p = .10$ level.

** Correlation is significant at the $p = .05$ level.

*** Correlation is significant at the $p = .01$ level.