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Exploring the impact of stakeholder pressure on environmental management strategies at the plant level: What does industry have to do with it?

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TITLE:

Exploring the Impact of Stakeholder Pressure on Environmental Management Strategies at the Plant Level: What Does Industry Have to Do with It?

ABSTRACT:

Stakeholder theory and empirical evidence confirm the positive relationship between stakeholder pressure and the implementation of environmental practices and strategies. However, the specific mechanisms and impact of selected stakeholder groups on environmental management strategies are relatively underexplored. In this paper, this shortcoming is addressed by exploring the impact of selected stakeholder groups on environmental management strategies taking the contingency factor industry into consideration (i.e., dynamic vs. static industries). Basing the arguments primarily on stakeholder theory, it is suggested that stakeholder pressures are perceived differently in plants in dynamic versus static industries. Similarly, it is suggested that the influence of stakeholder pressures on the implementation of environmental strategies is influenced by industry type. To test the proposed research model, primary survey data from 502 plants collected in the United States across multiple industries is used. Thus, this paper contributes to the sustainability operations management literature through exploring the relationship between stakeholder pressure, environmental strategy implementation and contextual factors (i.e., industry type) through hypotheses testing. Results indicate that industry type does indeed affect stakeholder pressure, and the relationship between stakeholder pressure and environmental strategy implementation. Plants situated in dynamic industries experience a significantly higher level of stakeholder pressures as opposed to plants situated in static industries across an array of environmental strategies.

Subject Areas:

Sustainability, stakeholder theory, industry, survey

1.0 INTRODUCTION

The pressure for companies to implement environmental practices has been apparent and increasing in recent years. Initially, many companies were willing to adopt environmental management practices that were both good for the environment and immediately good for the bottom line. However, discussion and debate continue among practitioners and researchers regarding what pressures and secondary benefits motivate companies to adopt more complex environmental strategies which consist of environmental practices that may not have an immediate direct impact on the bottom line. Research identifies various drivers that pressure companies to adopt sustainable practices, such as changes in customer preferences and demand, governmental regulation, ethical motivations, and performance considerations (Zhu and Sarkis, 2004; González-Benito and González-Benito, 2005; Montabon et al., 2007; Zhu and Sarkis, 2007). Some researchers have studied these drivers of sustainable practices through the lens of stakeholder theory (Sarkis et al., 2010) and what external factors influence stakeholder pressure (Rueda-Manzanares et al., 2008; Plaza-Ubeda et al., 2009). These studies have not converged on any specific set of contingencies that best explain the influence of stakeholder pressures on the adoption of environmental practices.

Many of the studies which have been undertaken to provide insight into how different stakeholders influence the adoption of environmental strategies focus on a single industry. For example, Pereira-Moliner et al. (2012) focus on the hotel industry; Massoud et al. (2010) focus on the food industry; Moors et al. (2005) focus on the metals producing industry; and Gonzalez-Benito (2008) focuses on the automobile industry. Practitioners and researchers recognize that industry is an important contextual factor as related to perceived stakeholder pressures and selection of environmental strategies (Zhu and Sarkis, 2006) and that further research is needed to

discover which variables better explain the influence of stakeholder pressures on environmental strategy adoption (González-Benito and González-Benito, 2010). Contingency theory suggests that organizational effectiveness results from fitting the characteristics of the firm, such as structure, to contingencies that reflect the environment of the firm (Donaldson, 1987). From a contingency theory perspective and in this research, industry is the contingent variable determining the structure of organization. Industry is introduced through the concept of industry clockspeed which describes the rate of change within an industry sector (Fine, 1998). Dynamic industries have a high rate of change and viewed through the lens of contingency theory would be expected to have an organic (participatory) structure and be more open to perceived stakeholder pressures while static industries have a lower rate of change and viewed through the lens of contingency theory would be expected to have a more mechanistic (formal) structure and be less open to perceived stakeholder pressures.

Thus, this research is set out to explore the following two interrelated research questions: *(1) How does industry type affect perceived stakeholder pressures and environmental strategy implementation? And (2), how does industry type affect perceived stakeholder pressures influence on environmental strategy implementation?* Through exploring these interrelated research questions, this study attempts to make the following contributions: First, it addresses calls in the literature to further explore how external contingencies may impact the deployment of specific capabilities (Barney et al., 2001; Priem and Butler, 2001a; 2001b; Aragon-Correa and Sharma, 2003). Second, it attempts to identify alternate sources of benchmarking and best practices for practitioners. Third, it responds to the need to further explore the relationship among stakeholders and environmental strategy implementation within a specific context (Buysse and Verbeke, 2003; Sanders et al., 2013).

The present study aims to empirically investigate the research questions above utilizing primary survey data from 502 plants collected within the United States across multiple industries. Multivariate analysis of covariance and ordinary least squares regression are utilized to answer the proposed research questions. Mixed results are found for specific types of stakeholder pressures impacting environmental management strategies. However, results indicate that plants situated in dynamic industries experience a significantly higher level of stakeholder pressures as opposed to plants situated in static industries across an array of environmental strategies.

The paper proceeds as follows: In the following section, the literature review is extended and sets of hypotheses regarding the identified research questions are developed. In the third section, the background regarding the survey development, sample selected, measures utilized, and the supporting statistical information is presented. In the fourth section, the results obtained in the empirical analysis are presented. The fifth section contains discussion surrounding the theoretical and managerial implications from this research. Finally, in the sixth section, the main conclusions and limitations of this research are summarized as well as opportunities for future research.

2.0 LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The main arguments in this research derive their theoretical base from the stakeholder perspective. From a conceptual perspective, stakeholder theory posits that various internal and external stakeholders put implicit and explicit pressure on organizations to act in certain expected ways. These groups of internal and external stakeholders pressurize companies to reduce negative externalities and to increase positive ones (Sarkis et al., 2010).

Previous researchers indicate that identifying and defining who stakeholders are is a substantive weakness of stakeholder theory (Lepineux, 2005; Orts and Strudler, 2009). Orts and Strudler

(2009) indicate that previous literature identifies a "narrow" and "broad" definition of stakeholders. A "narrow" version defining stakeholders encompasses specifically what groups of people are within the boundaries of the business. The "broad" version defining stakeholders is used when researchers are invoking stakeholder theory for a strategic purpose (Orts and Strudler, 2009) and that is the focus that this research utilizes. Freeman (1984) broadly defined the concept of stakeholders as *"any individual or group who can affect the firm's performance or who is affected by the achievements of the organization's objective"*. When utilizing stakeholder theory from a strategic management perspective, stakeholders are conceptualized as those that have relevant interests and should be considered in business decisions. Scholars have made it clear that when stakeholders are defined broadly for strategic stakeholder analysis, stakeholder theory cannot address the full array of questions that arise without reference to any other theory (Freeman et al., 2010; Orts and Strudler, 2009). To overcome these inherent weaknesses, stakeholder theory is combined with a contingency perspective in an attempt to provide a richer explanation of the role of stakeholders and their relationship to environmental strategy selection.

2.1 Contingency theory, industry and stakeholder pressures

Contingency theory (Lawrence and Lorsch, 1967; Thompson, 1967) contends that no method or theory can be applied in all circumstances. Two prongs of contingency theory have developed which address contingencies at different organizational levels. Bureaucracy theory focuses on the macro level of organizations and posits that both specialization-formalization and decentralization increase with size. While organic theory focuses on a more micro level of the organization and posits that both specialization-formalization and centralization decrease with increasing task uncertainty (Donaldson, 2001). The current research focuses on the manufacturing plant, a more

micro level perspective and the hypotheses will be developed from the organic theory of contingencies. According to Donaldson (2001), in organic theory of organizational structure a mechanistic structure (one based more on hierarchy) is more effective for tasks with low uncertainty while an organic structure (one based more on participation) is more effective for tasks with higher degrees of uncertainty. Innovation is a major source of task uncertainty and much of this uncertainty comes from the technological and market changes in the environment (Donaldson, 2001).

The contingency, according to Lawrence and Lorsch (1967) is the level of innovation from the environment that the organizational structure needs to fit. For low innovation environments, the optimal structure has been shown to be centralized using planning and formal controls (Brech, 1957). For high innovation environments, the optimal structure has been shown to be decentralized using participation (Likert, 1961). Previous research has utilized environmental dynamism as an important contingency variable to reflect the degree of innovativeness within an environment (Lawrence and Lorsch, 1967; Hofer, 1975; Bensaou and Venkatraman, 1995; Teece et al., 1997). There are many ways to classify industries when examining dynamic versus static industry environments, e.g., competitive intensity, concentration, barriers to entry and exit, industry clockspeed, or environmental impact (Banerjee et al., 2003; Wiengarten et al., 2012). Alternate sources of environmental dynamism include the rate of change of innovation in the company's principal industry (Lawrence and Lorsch, 1967; Miller and Friesen, 1983). In this research, the categorization of static or dynamic is determined from the degree of technological change. This approach is consistent with Donaldson (2001) who identifies technological change as a major indicator of innovation, which is an indicator of degree of task uncertainty.

Previous research has provided inconsistent results in the way stakeholder pressures are perceived by firms (e.g., Rueda-Manzanares et al., 2008; Plaza-Ubeda et al., 2009). A possible explanation for these inconsistent results may lie in the contingency view. Firms operating in a dynamic industry adopt a more organic approach in identifying and communicating with their stakeholders so that they remain more attuned to their environment so they stay competitive in their market place. This increase in attention to stakeholder pressure should lead firms in a more dynamic industry to perceive higher stakeholder pressures than firms in static industries. Therefore, this research will incorporate industry dynamism as a contingency variable to further explain differences in the way stakeholder pressures are perceived by firms.

A firm's response to stakeholder pressures in the presence of an environmental event, like the BP oil spill, is likely to differ from their "normal operations". This research evaluates the effect of industry type on stakeholder pressures and how the identified stakeholder pressures influence environmental investment in regular day-to-day operations. This research is built on the works of Fine (1998) and Wiengarten et al. (2012) and group industries into dynamic and static industries to represent different degrees of innovation thereby representing differences in the degree of task interdependence. Section 3.2 describes the division of the sample into companies competing in dynamic versus static industries (Chavez et al., 2012; Wiengarten et al., 2012).

2.2 Dynamic versus static industries and stakeholder pressures

While some researchers have conceptualized stakeholders as a single group or lobby (Sarkis et al., 2010), this is oversimplified. For example, stakeholders, such as employees, might take a different view on whether selected externalities are judged as positive or negative as compared to shareholders.

A company's stakeholders have been typically categorized into external primary stakeholders, secondary stakeholders, internal primary stakeholders, and regulatory stakeholders (Buysse and Verbeke, 2003). This aligns with **External primary stakeholders** are domestic and international customers and domestic and international suppliers. **Internal primary stakeholders** are employees, shareholders, and financial institutions. **Secondary stakeholders** are domestic and international rivals, international agreements, environmental non-governmental organizations (ENGOs), and the media. **Regulatory stakeholders** are national governments and local public agencies. In this study, it is proposed that industry differences result in varying levels of perceived stakeholder pressure from the aforementioned four groups.

Plants producing in industries characterized as dynamic are exposed to high clockspeed. Based on contingency theory, the contingent factor (industry type) influences the overall structure of the plant. In a dynamic industry this structure is assumed to be more organic and participatory. Organic contingency theory allows for different functional areas within the same company or plant to have different levels of centralized – decentralized structures depending on the degree of task interdependence each functional area experiences (Donaldson, 2001). For example, if the organization needs to innovate through their product offering, the research and design department will likely become more decentralized in response to their changing environment, while other functional areas will not modify their structure as they are not required to do so to maintain fit with their environment. However, it is expected that a plant in a more dynamic industry will generally have a more organic structure. This more organic structure based on participation may increase the opportunity for plants to be more aware of the pressure of the various stakeholders compared to companies acting in static environments with more mechanistic structures (less participatory). This

increased awareness of plants in dynamic industries should result in an increase in perceived stakeholder pressure. Therefore, the following hypotheses are proposed:

H1$_{(a,b,c,d)}$: Plants competing in dynamic industries perceive relatively higher pressure from their stakeholders ((a) external primary stakeholders, (b) internal primary stakeholders, (c) secondary stakeholders, (d) regulatory stakeholders) as compared to plants in static industries.

2.3 Environmental strategy and industry characteristics

Various researchers have classified environmental investments and practices based on strategic considerations. Roome (1992) identified five strategic environmental categories: (i) noncompliance, (ii) compliance, (iii) compliance plus, (iv) commercial and environmental excellence, and (v) leading edge. Similar categories were developed by Hunt and Auster (1990), Wartick and Cochran (1985) and Carroll (1979). Henriques and Sadorsky (1999) synthesized these categories into the following environmental commitment profiles: reactive, defensive, accommodative, and proactive. Furthermore, Hart (1995) based his work on the resource-based view (RBV) which he extends into the natural resource based view (NRBV). Through the NRBV framework, Hart assessed the performance enhancing characteristics of capabilities in terms of sustainable competitive advantages. However, in addition to the RBV, the NRBV incorporates environmental aspects into the capability - sustainable competitive advantage relationship. According to the NRBV, where a firm has the existing capabilities, it will execute a proposed environmental strategy more quickly, and thus, it will evidence strategy specific results. Hart (1995) building on Barney (1991) identified tacit, socially complex, rare, and firm specific resources as the type of resource capabilities that could lead to a competitive advantage.

The earliest level of progression in Hart's strategic framework is a **pollution prevention strategy**, where the environmental driving force is to minimize emissions and waste. Internal

production environmental practices and logistics environmental practices primarily focus on minimizing emissions and waste. Hart (1995) indicates the key characteristics of capabilities at the pollution prevention level are causally ambiguous (tacit) like continuous improvement programs. The second level of progression in Hart's (1995) strategic framework is a **product stewardship strategy** where minimizing the life-cycle cost of products is a driving force. Key characteristics of capabilities at the product stewardship strategy level include socially complex skills. At the third level of the NRBV strategic framework, a **sustainable development strategy** (in this paper referred to as environmental development strategy) is identified as minimizing the environmental burden of firm growth and development. Key characteristics of capabilities at the sustainable development level include rare and firm specific skills like developing a shared vision with stakeholders (Hart, 1995). All three levels are categorized as sources of competitive advantage. The capabilities at the pollution prevention level help companies to gain a competitive advantage in terms of lower costs. The capabilities at the product stewardship level help companies to preempt competitors. The capabilities at the sustainable development level help companies in terms of their future position (Hart, 1995). This paper closely follows Hart's original classification to explore the impact of industry type on the degree of environmental practice implementation in the following areas: pollution prevention, product stewardship, and environmental development. Hart (1995) further proposes that firms which have preexisting resource capabilities (tacit, socially complex, rare, and firm specific) will have an advantage when implementing the environmental strategies which are linked to these resource capabilities.

The increasing focus and investment of companies in environmental practices can be attributed to various root causes. Researchers have identified various drivers for investing in environmental practices such as changing customer preferences, ethical motivations, potential performance gains

(Montabon et al., 2007; Prajogo et al., 2012; Zhu and Sarkis, 2007), governmental regulations (Jones, 2010), and marketing and legitimization (Wiengarten et al., 2013). Other researchers have identified both positive economic performance and negative economic performance factors (Zhu and Sarkis, 2007). Positive economic performance factors include decreasing cost and/or fees for materials purchasing, energy consumption, waste treatment, waste discharge, and decreasing fines for environmental accidents. Negative economic performance factors include increases in investments, operational costs, training costs, and the cost of purchasing environmentally friendly materials. The presence of these negative economic performance factors provides a counterpoint to the NRBV perspective (Hart, 1995), which suggests that if a firm already has similar existing underlying capabilities, these firms would be more likely to invest in the environmental strategies linked to those capabilities.

Recently, Wiengarten et al. (2012) explored the level of supply chain environmental investments and their impact on performance in dynamic and static industries. Wiengarten et al. (2012) identified that, in dynamic industries, investments in environmental supply chain practices are not as effective as in static industries based on the following two opportunity cost related reasons. First, investing capabilities in environmental management means not investing capabilities elsewhere. In dynamic industries, investments in product development, process design, and supplier developments are crucial in order to stay competitive. Second, dynamic industries are characterized by relatively short product life cycles, making it harder to leverage the high upfront costs of environmental investments into eco-efficiency (Wiengarten et al., 2012). Furthermore, they identified that firms situated in dynamic industries on average invest less in supply chain environmental practices compared to firms situated in static industries. Their rationale for this finding is based on the fact that, in dynamic industries, companies are faced with tough competition

through innovation. Similarly, investing in R&D leaves little to invest in environmental practices. In an attempt to extend Wiengarten et al.'s findings, it is proposed that, on average, companies competing in dynamic industries, even though they are more attuned to stakeholders and have higher margins than companies competing in static industries, invest less to follow a pollution prevention, product stewardship, and environmental development strategy because of their need to invest in R&D. Subsequently, the following hypotheses are proposed:

H2$_{(a,b,c)}$: Plants competing in dynamic industries invest less in (a) pollution prevention, (b) product stewardship, and (c) environmental development strategies as compared to plants situated in static industries.

2.4 The impact of stakeholder pressure and industry characteristics on environmental strategy

Research has applied stakeholder theory to investigate the extent to which stakeholders generate significant pressure for organizations to adopt an assortment of environmental practices and strategies with mixed results (Buysse and Verbeke, 2003; Eesley and Lenox, 2006). Some studies have shown that stakeholder pressure is perceived as one steady set of pressures (Murillo-Luna et al., 2008), while other studies have empirically derived multiple sets of stakeholder groups with only a subset of these groups actually influencing the type of environmental strategy (Henriques and Sadorsky, 1999; Buysse and Verbeke, 2003; González-Benito and González-Benito, 2006).

Buysse and Verbeke (2003) assessed the impact of a company's perception of the importance of these stakeholders on their environmental approach. They found that the importance attached to internal primary stakeholders would be highest for environmental leaders. Sarkis et al. (2010) identified that stakeholder pressure (clients, government, shareholders, workers, ENGOs - a combination of internal, external, and secondary stakeholders) has a positive impact on proactive environmental strategies. Murillo-Lunea et al. (2011) found that internal pressures influenced the

adoption of a more proactive environmental strategy. Furthermore, Henriques and Sardorsky (1999) found that organizational stakeholder pressure (customers, suppliers, employees, shareholders - a combination of external primary and internal primary stakeholders) is positively influencing environmental proactivity. When viewed through an NRBV lens, Hart (1995) indicates the key characteristics of capabilities at the sustainable development level are rare and firm specific capabilities like a shared vision of the future. Environmental leadership and environmental proactivity identified in the studies above either are fully or partially based on the key characteristics identified by Hart. Therefore, these strategies would be most closely linked to sustainable development and each of these studies is consistent in showing that external and/or internal primary stakeholder pressures influence the implementation of more strategic environmental practices.

Previous research concerning regulatory stakeholder pressure (e.g., governmental pressure) suggests regulatory stakeholder pressure does not impact environmental logistics practices (González-Benito and González-Benito, 2006) which would be considered an environmentally proactive set of practices. However, these results are not consistent with a study by Buysse and Verbeke (2003). They identified that firms pursuing an environmental leadership strategy (an environmentally proactive strategy) attach importance to regulatory stakeholder pressures. Additionally, Buysse and Verbeke (2003) found that firms pursuing a reactive or pollution prevention strategy also attached importance to regulatory stakeholders. While Henriques and Sardorsky (1999) found regulatory stakeholder pressure (e.g., governments and trade associations) was perceived as important by managers in firms with a proactive, accommodative, and defensive environmental profile, it was not perceived as important in firms with a reactive environmental profile. Thus, previous results indicate that stakeholder pressures clearly influence the

implementation of environmental strategies and practices. However, this relationship does not appear consistent across all levels of environmental strategies or contextual environments.

These seemingly inconsistent results regarding perceived stakeholder pressures and implemented environmental strategies may be explained through taking the contingency perspective into consideration and looking at these relationships through the different types of industries that these sampled companies compete in. Hypotheses set H1 examined the relationship between stakeholder pressures and industry type and predicted that manufacturing plants in dynamic industries would experience higher stakeholder pressures than manufacturing plants in static industries. Additionally, Hypotheses set H2 examined the relationship between implementation of environmental strategies and industry type and predicted that manufacturing plants in dynamic industries would implement fewer environmental strategies, thereby creating a counter point offsetting stakeholder pressures. Previous literature supports the perspective that, in certain contexts, stakeholder pressures have a significant positive influence on the implementation of environmental strategies. In this research, it is expected that plants in dynamic industries which are expected to have more organic structures will be more open to the influence of perceived stakeholder pressures on environmental strategy implementation. In contrast, it is expected that plants in static industries which are expected to have more mechanistic structures will be less open to the influence of perceived stakeholder pressures on environmental strategy implementation. Subsequently, the following hypotheses are proposed:

$H3_{(a,b,c)}$: The impact of perceived stakeholder pressures [(i) external primary stakeholders, (ii) internal primary stakeholders, (iii) secondary stakeholders, (iv) regulatory stakeholders] on environmental strategies [(a) pollution prevention, (b) product stewardship, (c) environmental development] will be relatively higher for plants competing in dynamic industries as compared to plants competing in static industries.

Insert Figure 1 Here

Figure 1 graphically illustrates the three sets of hypotheses. In summation, in the first set of hypotheses it is proposed that plants competing in dynamic industries perceive higher pressure from their stakeholders as compared to plants situated in static industries. Furthermore, in the second set of hypotheses it is proposed that plants competing in dynamic industries invest less in environmental strategies as compared to plants situated in static industries. Finally, in the third set of hypotheses it is proposed that the impact of stakeholder pressure on environmental strategies is higher for plants competing in dynamic industries as compared to static industries.

3.0 RESEARCH METHODS

The following subsections will describe the sampling frame, survey development and the selection of the measurement items. Furthermore, the measurement properties will be tested through confirmatory factor analysis.

3.1 Survey development

To provide answers to the previously stated research questions (1) *how does industry type affect perceived stakeholder pressures and environmental strategy implementation*? And (ii), *how does industry type affect the impact of perceived stakeholder pressures on environmental strategy implementation*? a survey questionnaire was developed. The initial instrument was reviewed with academics for comprehensibility and accuracy. In order to assess the content validity, the survey was distributed to 17 academics and industry experts. The researcher interviewed the managers to determine how well each scale captured its intended construct, whether the wording for each item was clear and understandable, and if the survey design was user-friendly. Of the 17 individuals, 9

academics and 8 industry experts provided feedback on both the clarity of the items and the appropriateness of the anchor points for the survey questions. Minor changes were made to wording of several items based on feedback from this process. The level of analysis is at the plant level.

3.2 Sample

The data for this study was collected in the United States (US). Since the primary focus of the study is to assess industry effects on stakeholder and environmental strategy adoption, it was determined that the initial research should focus on one country rather than confounding the research results with country culture effects combined with industry effects. Specifically, the survey was distributed to manufacturing firms across multiple industries (see Table 1). The data was collected at the manufacturing plant level to provide insights among the proposed relationships at the implemented strategy level. Capturing the data at the plant level allows us to assess implemented strategy rather than intended strategy. The sample was initially randomly selected from a series of data based on industry SIC codes 25, 28, and 36 (furniture and fixtures, chemical sector, and electronic equipment) which have been utilized in previous research regarding environmental practices and stakeholder pressures. Two additional data bases with US manufacturing plant contact information where then utilized to collect data from manufacturing plants with SIC codes other than those identified above to provide a sample with a broader industry representation.

After removing duplicate companies among the state databases and the SIC code databases, a total of 2224 companies were identified. Companies were contacted through multiple ways, such as telephone, mail, and email. The data collection process started in July 2011 and finished in

October 2011. A total of 530 surveys were returned. Of these, 237 were completed via a web link and 293 were completed via a mail survey. Data was collected on 74 operational characteristics and 12 demographic questions from 530 survey respondents. Of these 530 survey responses, 28 survey responses were missing more than 30% of the operational characteristic responses and were deleted from the analysis. The adjusted survey response rate is 22.6% (502/2224).

The primary business for the majority of firms is electronic and other electrical equipment and components (US-SIC 36) (n=105) and chemical and allied products (US-SIC 28) (n=75). Most of the respondents were plant managers (n=224) or operations managers (n=103), the majority of the "other" respondents held titles similar to "VP of manufacturing". Table 1 below provides descriptive information about the respondents and their associated companies in terms of industry, size, and job title of the respondent.

Insert Table 1 Here

T-tests were conducted to assess the possibility of response bias through comparing early and late respondents and mail surveys and web surveys. Results indicated that there were no significant differences in the responses between the early and late returned questionnaires or the mail surveys and the web surveys. Furthermore, no significant differences were identified between the respondents in the various states.

3.3 Measures

A company's perceived stakeholder pressures are measured through the four dimensions of **external primary stakeholders** (i.e., domestic customers, international customers, international suppliers), **secondary stakeholders** (i.e., international rivals, domestic rivals, international agreements, environmental NGOs, press), **internal primary stakeholders** (i.e., employees,

shareholders, financial institutions) and **regulatory stakeholders** (i.e., national governments, local public agencies) (Buysse and Verbeke, 2003). Respondents were requested to indicate the level of influence on a seven point Likert scale ranging from no influence (1) to moderate influence (4) and very strong influence (7). Respondents were asked: *"Over the last four years, please indicate the impact of the following stakeholders on decisions related to the implementation of the environmental practices implemented during that time"*.

Hart's (1995) concept of the NRBV is utilized to categorize environmental strategies into pollution prevention, product stewardship, and environmental development. These categories differ not only in terms of environmental practices but also in terms of strategy (Klassen and Whybark, 1999; Buysse and Verbeke, 2003). Respondents are asked to indicate the extent to which their plant has implemented environmental practices on a scale of 1 to 7, ranging from 1 (i.e., not at all to only what regulation requires) through 4 (i.e., to a moderate extent: somewhat more than regulation requires) to 7 (i.e., to a great extent; it has been a primary priority) on various measures. Respondents were asked: *"Over the last four years, indicate the degree of implementation at your plant of each of the following environmental practices"*. The measures for pollution prevention, product stewardship, and environmental development were based on Gonzalez-Benito and Gonzalez-Benito (2005).

Pollution prevention is defined as a company's effort to reduce, change, or prevent emissions and effluents through better housekeeping, material substitution, recycling, or process innovation (Hart, 1995). It can be achieved through two means: control and prevention. Following this definition, a company's pollution prevention strategy is measured through the following items: *(i) Production planning and control focused on reducing waste and (ii) Production planning and control focused on optimizing materials exploitation*.

Product stewardship is defined as the integration of external views into product design and development processes. According to Hart (1995), through product stewardship, firms can (i) exit environmentally hazardous businesses, (ii) redesign existing product systems to reduce liability, and (iii) develop new products with lower life-cycle costs. In this paper, product stewardship is measured through the following items: (i) *Substitution of polluting and hazardous materials/parts, (ii) Designs focused on reducing resource consumption during production and distribution, (iii) Designs focused on reducing waste generation during production and distribution, (iv) Designs focused on disassembly, reusability, and recyclability, and (v) Preference for green products in purchasing.*

Environmental development is defined as the strategic long-term effort to develop and deploy low-impact technologies. It includes the strategic direction of a company towards environmental management (Hart, 1995). Environmental development is measured through the following items: *(i) Explicit definition of environmental policy, (ii) Clear environmental objective, (iii) Long-term environmental plan, and (iv) Well-defined environmental responsibilities*.

3.4 Confirmatory factor analysis: validity and reliability

To test the validity and reliability of the measures, confirmatory factor analysis (CFA) was conducted with all items in the model measuring perceived stakeholder pressure and environmental strategy. CFA was conducted because previously validated scales were adopted. CFA results in terms of descriptive statistics, factor loadings, t-values, standard errors, R^2s, and Cronbach alphas are listed in Table 2 below. The measures of absolute and incremental model fit (χ^2/df=2.77; RMSEA=.053; NFI=.96; NNFI=.97; CFI=.98; IFI=.98; RFI=.96; GFI=.89) reflect a relatively good fitting measurement model (Bollen, 1989; Gerbing and Anderson, 1992).

Insert Table 2 Here

Convergent validity is the degree to which items measure their underlying construct. Convergent validity is tested by evaluating whether the individual item's standardized coefficient from the measurement model is greater than twice its standard error (Anderson and Gerbing, 1988). Results in Table 2 indicate that all of the coefficients of the measurement items exceed twice their standard error. Another test for convergent validity is the value for the Bentler-Bonett coefficient Δ. The coefficient is the ratio of the difference between the chi-square of the null measurement model and the chi-square of the specified measurement model to the chi-square value of the null model. Coefficient values of 0.90 or above demonstrate strong convergent validity. Results indicate that coefficient values were well above the cut-off value, indicating convergent validity (Bentler and Bonett, 1980).

Discriminant validity is tested by constraining the correlation between any two constructs to one and then testing for the significance of difference between the unconstrained models (Bagozzi and Phillips, 1982; Anderson and Gerbing, 1988; Merle et al., 2010). Results of the chi-square difference test indicate that the chi-square value for the constrained model was significantly larger than that for the unconstrained model. This provides evidence of discriminant validity.

Cronbach's alpha (α) has been used to test for the reliability (internal consistency) of each scale. The Cronbach's alpha values listed in Table 3 are at or above the commonly accepted level of 0.70, which indicates that reliability is relatively strong (Nunnally, 1978). Following the confirmation of measurement properties, the Pearson correlations are shown in Table 3.

Insert Table 3 Here

4.0 RESULTS

The statistics conducted to test the hypotheses requires the data to be normally distributed. Normal distribution was tested through conducting the Shapiro Wilk test for normality in SPSS. Results indicate that the data does not unanimously follow a normally distributed curve. Subsequently, the LG10 function to transform the data was applied. This transformation resulted in normally distributed data that can be used for the hypotheses testing.

To test the hypotheses sets H1 and H2, multivariate analysis of covariance (MANCOVA) was conducted to test for differences in mean levels of perceived stakeholder pressure (i.e., external primary stakeholders, secondary stakeholders, internal primary stakeholders, regulatory stakeholders) and environmental management strategy (i.e., pollution prevention, product stewardship, environmental development). Common practice was followed and plant size was included (approximated through number of plant employees) as a control variable. Subsequently, plant size was included as the covariate.

The industries are divided into dynamic and static industry types in Table 1 (Wiengarten et al., 2012). Based on the clockspeed concept by Fines (1998) and building on the recent work by Wiengarten et al. (2012) dynamic industries are characterized by high volatility, intense competition, short product life cycle and general high levels of clock speeds. This is on the opposite end of static industries which are characterized by relatively low volatility, relatively low competition, and relatively longer product cycles, and relatively lower levels of clock speeds. Donaldson (2001) indicates that a major source of task uncertainty is innovation and innovation in turn is driven by technological change. The Organization for Economic Co-operation and Development (OECD) utilizes a measure of R&D intensity based on levels of technology to group industries (OECD, 2009). The R&D industry intensity classification system developed by the

OECD incorporates two dimensions of technology to classify industries. The first dimension encompasses the level of technology specific to the sector, and the second dimension encompasses the level of technology embodied in purchases of intermediate and capital goods. The OECD industry intensity classification system was utilized to group manufacturing plants below the mean OECD industry classification into the static industry group and those above the mean OECD industry classification into the dynamic industry group.

In hypotheses set H1, it was proposed that plants competing in dynamic industries perceive relatively higher pressure from their stakeholders to be environmentally friendly as compared to companies in static industries. Before conducting the analysis, the Levene Test for equality of variance was conducted. Results indicate that the variance in each group (i.e., dynamic vs. static industries) does not significantly differ, thus confirming homoscedasticity. The Bonferroni test was selected because a series of comparisons was conducted.

Insert Table 4 Here

Results in Table 4 highlight the descriptive statistics for hypotheses set H1. Table 4 indicates that companies situated in dynamic industries do indeed perceive stakeholder pressure from all four groups relatively higher compared to companies situated in static industries. In order to test whether these differences are significant, the Bonferroni test was conducted, which is listed in Table 5. Results indicate that the mean differences are significant for the external primary (p=.014) and secondary (p=.005) stakeholder groups. However, the differences are non-significant for the internal (p=.339) and regulatory (p=.254) stakeholder groups. Thus, the data provides partial support for the hypotheses set H1.

Insert Table 5 Here

In hypotheses set H2, it is proposed that companies competing in dynamic industries invest less in environmental strategies as compared to companies situated in static industries. the Levene test for equality of variance and confirmed homoscedasticity was also conducted. After testing for the equality of variance the Bonferroni test was conducted.

Insert Table 6 Here

Results in Table 6 highlight the descriptive statistics for hypotheses set H2. Table 6 indicates that companies situated in dynamic industries do indeed invest less in pollution prevention and product stewardship strategies. However, they invest more in environmental development strategies as compared to companies situated in static industries. In order to test whether these differences are significant, the Bonferroni test was conducted, which is listed in Table 7. Results indicate that the mean differences are all non-significant. Subsequently, hypotheses set H2 is rejected. Companies competing in dynamic industries do not place significantly less emphasis on environmental issues.

Insert Table 7 Here

Finally, in hypotheses set H3 it is proposed that the impact of perceived stakeholder pressures on environmental strategies (i.e., pollution prevention, product stewardship, environmental development) will be relatively higher for companies competing in dynamic industries as compared to companies competing in static industries. To test hypotheses set H3, ordinary least squares (OLS) regression analyses was conducted which included the control variable and the stakeholder groups having three models in terms of the three environmental strategies. Results are shown in Table 8, Table 9, and Table 10, and significant effects are highlighted with gray shadows.

Insert Table 8 Here

Table 8 indicates the results for pollution prevention. Results show that for companies competing in static industries, none of the stakeholder groups affect pollution prevention significantly. However, in dynamic industries, external primary stakeholders and internal primary stakeholders do have a significant positive impact on pollution prevention strategies.

Insert Table 9 Here

Furthermore, Table 9 indicates the results for product stewardship. Results show that for companies competing in static industries, only external primary stakeholders affect product stewardship significantly. However, in dynamic industries, internal primary stakeholders and regulatory stakeholders have a significant positive impact on product stewardship strategies.

Insert Table 10 Here

Finally, Table 10 indicates the results for environmental development. Results show that for companies competing in static industries, only regulatory stakeholders affect environmental development significantly. However, in dynamic industries, internal primary stakeholders and regulatory stakeholders have a significant positive impact on environmental development strategies.

5.0 DISCUSSION

The purposes of this study are to first assess how does industry type (i.e., dynamic versus static) affect perceived stakeholder pressures (i.e., external primary, secondary, internal primary, and regulatory) and environmental strategy (i.e., pollution control, pollution prevention, and environmental development) and second to assess how industry type affects the perceived impact of stakeholder pressures on environmental strategy. These questions are addressed at the plant

level. Using primarily stakeholder theory with the support of the contingency perspective three research hypotheses were developed with partial support found for two of the hypotheses. Results indicate that plants situated in dynamic industries perceive higher external primary stakeholder pressures and higher secondary stakeholder pressures as compared to plants situated in static industries (whist this is the case for stakeholders it is only significant for external primary and secondary stakeholders). Thus, providing partial support for H1. Furthermore, results also provide partial support for H3. In selected cases the impact of perceived stakeholder pressures on environmental strategies is higher for plants competing in dynamic industries. However, results do not confirm H2. Companies situated in dynamic industries do not invest significantly less in pollution prevention, product stewardship and environmental development as compared to companies situated in static industries.

These findings will be discussed from a theoretical and managerial perspective as well as from a policy perspective.

5.1 Theoretical implications

From a theoretical perspective stakeholder theory has been applied and combined with a contingency perspective to assess the role of industry type on perceived stakeholder pressure and environmental strategy.

Previous literature has asked who are salient stakeholders (Henriques and Sadorsky, 1999; Buysse and Verbeke, 2003; Gago and Antolin, 2004; Eesley and Lenox, 2006). This research suggests that salient stakeholders are contingent upon multiple factors. In dynamic industries, those stakeholder groups that are external primary stakeholders (i.e., domestic and international customers and suppliers) and secondary stakeholders (i.e., domestic and international rivals,

international agreements, ENGOS, and the media) are more influential than in static industries. However, internal primary stakeholders and regulatory stakeholder groups are not more influential in dynamic industries versus static industries. These findings support the perspective that stakeholder pressures are not perceived as one single group or lobby. Therefore, contrary to research suggesting that stakeholder pressure should be examined as one steady set of pressures (Murillo-Luna et al., 2008; Sarkis et al., 2010), the results of this research align with other previous research (Henriques and Sadorsky, 1999; Buysse and Verbeke, 2003), which suggests that stakeholder pressures can and should be categorized into groups to better evaluate external influences on perceived stakeholder pressures and to better evaluate specific stakeholder groups effect on other phenomena.

This study also finds that industry type does not significantly affect investments in environmental strategy. While in hypotheses set one, stakeholder perceptions were identified to differ based on industry, companies do not react toward these differences through selected environmental strategies. These results provide an interesting comparison with Wiengarten et al.'s (2012) results, which indicate that firms in dynamic (i.e., high clockspeed) industries do on average invest less in supply chain environmental practices compared to firms situated in static (i.e., low clockspeed) industries. In contrast, surprisingly, results indicate that industry type does not significantly affect environmental strategy investments, thereby challenging the assumption that highly dynamic industries will respond through investing less in environmental practices. The data for this research was collected within the United States, while the results for the Wiengarten et al. (2012) research was an international data set incorporating 19 countries. Therefore, the divergent results may be caused by the differences in geographical coverage and also by different classifications schemes of environmental strategies. Nevertheless, these contradictory findings call

for further research on the relationships among culture, industry, and environmental strategy; perhaps, using more specific measures such as research and development intensity (OECD, 2009) or utilizing country culture and/or company culture as a potential independent variable.

Furthermore, past research has theoretically and empirically examined the effect of perceived stakeholder pressures on environmental practices (Buysse and Verbeke, 2003; Eesley and Lenox, 2006), but very little research has attempted to identify the circumstances which explain higher or lower degrees of perceived pressure. This research builds on the current stakeholder theory research and utilizing contingency theory further refines under what industry conditions particular groups of stakeholders will influence the selection and implementation of environmental strategies. It was identified that the degree of *internal primary stakeholder* pressure consistently influences the adoption of environmental strategies by plants in dynamic industries as compared to plants in static industries across each of the three types of environmental strategies (i.e., pollution prevention, product stewardship, and environmental development). This suggests that technology-intensive, innovative plants situated in a high clockspeed environment pay closer attention to pressures from their employees, shareholders, and financial institutions than plants that are in static industries. Furthermore, *secondary stakeholder* pressures (i.e., domestic rivals, international rivals, ENGOs, and the media) do not significantly influence manufacturing plants to invest in any of the three environmental strategies for plants in either dynamic or static industries. When testing the effect of industry on the level of perceived secondary stakeholder pressure, plants in dynamic industries experienced higher levels of secondary stakeholder pressures. However, these perceived differences in secondary stakeholder pressures did not translate into increased adoption of environmental practices. These findings suggest that it is important that researchers examine the resulting actions taken by manufacturing plants in

conjunction with stakeholder pressures and not assume that increased perceptions of stakeholder pressures necessarily translate into actions by manufacturing plants.

External primary stakeholder pressures (i.e., domestic and international customers and suppliers) show unique relationships within each environmental strategy. In pollution prevention strategies, external primary stakeholders are a significant factor for plants in dynamic industries but not in static industries. In product stewardship strategies, external primary stakeholders are a significant factor for plants in static industries but not in dynamic industries; while, in environmental development strategies, external primary stakeholders are not significant for plants in either dynamic or static industries.

Finally, r*egulatory stakeholder pressures* (i.e., national governments, regional governments, and local public agencies) also show unique relationships within each environmental strategy. In the adoption of pollution prevention environmental strategies, regulatory stakeholder pressures are not a significant influence. In the adoption of product stewardship environmental strategies, regulatory stakeholder pressures are only a significant factor for plants in dynamic industries. In the adoption of environmental development strategies, regulatory stakeholder pressures are a significant factor for all plants regardless of industry. In this research, pollution prevention, product stewardship, and environmental development can be considered a continuum of environmental strategies that can be implemented together, but pollution prevention would be considered the closest to reactive while product stewardship and environmental development would be considered more proactive. In dynamic industries, regulatory stakeholder pressures are significant in product stewardship and environmental development strategies but not in pollution prevention strategies (reactive). These findings contradict Henriques and Sardorsky's (1999)

results in which they found regulatory stakeholder pressure positively influences reactive environmental strategies.

In conclusion, this paper makes two major contributions to theory. Firstly, this paper confirms the importance of taking a contingency perspective when analyzing aspects of stakeholder theory. Secondly, this paper highlights that stakeholder pressure needs to be analyzed through multiple dimensions when considering its impact on environmental strategies.

5.2 Managerial and policy implications

This research has various important implications for managers and policy makers. From a managerial perspective it is important to note that the various interacting stakeholder groups result in different environmental strategies. These differences are dependent on the industry that the focal company is competing in. Managers need to be aware of the growing stakeholder demand for environmental strategies in dynamic as compared in static industries. Thus, when competing or deciding to compete in dynamic industries managers need to have a clear environmental strategy and make upfront environmental investments to be able to respond to these higher stakeholder demands. It is also important to note that the increased perceived stakeholder pressure only relates to selected environmental strategies. Companies competing in dynamic industry environments should place an increased focus on external primary and secondary stakeholder groups.

Results indicate that, in this confined sample, these differences in perceived stakeholder pressure do not result in companies making more strategic investments in environmental strategies. This could present some managerial opportunities. Furthermore, companies are not making any strategic decisions to manage these differences in stakeholder pressures. Managers could take advantage of this through making strategic investments, directing their companies to become

environmental leaders and becoming proactive in their environmental strategy to fulfill stakeholder demands. Results indicate that companies are not making strategic environmental decisions as of yet. This provides companies with opportunities for competitive environmental advantages. To conclude this point it can be summarized that effective environmental management requires the identification of important stakeholders and it seams that companies are not managing it well.

Furthermore, internal primary stakeholders were the only category of stakeholders to consistently influence the adoption of pollution prevention, product stewardship, and environmental development strategies. This leads us to the second implication. These findings suggest that managers in manufacturing plants in dynamic industries will need to pay particular attention to managing their relationships with internal primary stakeholders (i.e., employees, shareholders, and financial institutions). A final managerial implication is that these results also suggest that managers in dynamic industries could look at other manufacturing plants within this same context for potential sources of benchmarking and best practices as related to managing their relationships with internal primary stakeholders.

These findings also have some implications from a policy perspective. This research indicates that industry type is not a significant factor determining perceived regulatory stakeholder pressure. In other words, management perceives rules and regulations (i.e., regulatory stakeholder pressure) in a similar manner, not dependent on industry type. Similarly, results indicate that the perceived importance of regulatory stakeholders is viewed as equally important or unimportant for companies in dynamic or static industries. However, results indicate that perceived stakeholder pressure from the regulatory side (i.e., national and regional governments; local public agencies) has a higher chance to lead to environmental investments if companies are competing in dynamic industries. This could mean that an increase in environmental rules and regulations and

enforcement practices are more likely to lead to companies investing in environmental strategies if they compete in dynamic industries. This is specifically the case for product stewardship and environmental development. Governments and local agencies may need to customize their approach (e.g., laws, enforcement practices) for static industries to achieve similar levels of environmental strategies as they do for dynamic industries.

Finally, since internal primary stakeholders are consistent influencers of environmental strategy adoption, governmental organization and regulatory agencies should consider educational programs and informative campaigns for internal primary stakeholders as a way to strengthen the effect of public pressure on environmental behavior in dynamic industries.

6.0 CONCLUSION

This research was guided to explore the following research questions: How does industry type affect perceived stakeholder pressures and environmental strategy implementation? And, how does industry type affect the impact of perceived stakeholder pressures on environmental strategy implementation? Through exploring these questions, this research shed insight on the stakeholder-environmental strategy relationship within industry context. Thus, this paper contributes to the sustainability operations management literature through exploring the relationship between stakeholder pressure, environmental strategy implementation and contextual factors (i.e., industry type) through hypotheses testing.

The manufacturing firms were divided into belonging either to dynamic or static industries. First, the differences in these two groups were examined as related to stakeholder pressures and environmental strategy implementation. From a contextual perspective, external primary stakeholders and internal primary stakeholders are perceived significantly more important in

dynamic industries versus static industries. Second, the differences in these two industry groups were examined as related to implementation of environmental strategies. Environmental strategy implementation is not significantly impacted by industry. Third, this research found that while stakeholder pressures are perceived differently within industry context, the actual influence of those stakeholder pressures on environmental strategy investments are unique. In other words, while stakeholder pressures may be recognized and felt more strongly in dynamic industries by manufacturing plants than in static industries, manufacturing plants appear to take action in response to unique sets of stakeholder pressures.

However, as with any research, this work has to be interpreted by taking various limitations into consideration. The majority of survey respondents were primarily plant managers and operations managers. For this type of research, these managers would be considered knowledgeable respondents and, as such, would assist in overcoming possible problems with common method variance. Statistical tests evaluating common method variance were performed and did not indicate this to be a specific issue with this study. However, future researchers should attempt to utilize multiple informants to better assess construct validity and the validity of the measurement model (Ketokivi and Schroeder, 2004). Additionally, the research sample for this study was drawn entirely from a single country. It could be that various cultural or socioeconomic factors may affect the results of this study and future research should investigate via a multi-country sample and see if the results of this study generalize to a larger population. It is worth repeating that the level of analysis in this study is the plant level. Whilst, per se this is not a limitation different levels of analysis may result in different results. Also, although the sample represents a wide array of industries some industries such as electronics, chemical and furniture and fixtures might be overly represented. Future research could look at other industries, including

services or different industry compositions of the sample. Furthermore, this research looked at the specifics of stakeholders within a one nation context, future research could evaluate the influence of societal stakeholders as defined by Lepineux (2005) which would include national societies and global societies. Finally, the sample was divided into dynamic and static industries using preexisting classifications by Wiengarten et al. (2012) and the concept of industry clockspeed. Other classification procedures may have resulted in a different split of this sample and subsequently to different results. Future research may employ more formal measures of industry clockspeed or industry dynamism.

Despite these limitations, this study makes a significant contribution by examining how industry type affects perceived stakeholder pressures and environmental strategy implementation and how industry type influences the impact of perceived stakeholder pressures on environmental strategy implementation.

Appendix A

Stakeholder Perception

Over the last four years, please indicate the impact of the following stakeholder on decisions related to the implementation of the environmental practices implemented during that time

	(1) No influence	(2)	(3)	(4) Moderate influence	(5)	(6)	(7) Very strong influence	N/A
Domestic Customers								
International Customers								
International Suppliers								
Domestic Suppliers								
International Rivals								
Domestic Rivals								
International Agreements								
Environmental NGOs								
Press								
Employees								
Shareholders								
Financial Institutions								
National (and Regional) Governments								
Local Public Agencies								

Environmental Strategy

Over the last four years, indicate the degree of implementation at your plant of each of the following environmental practices

	(1) Not at all to only what regulation requires	(2) To a small extent; slightly more than regulation requires	(3)	(4) Moderate influence	(5)	(6) To a large extent; significantly more than regulation requires	(7) To a great extent; it has been a primary priority
Production planning and control focused on reducing waste							
Production planning and control focused on optimizing materials exploitation							
Designs focused on reducing resource consumption during production and distribution							
Designs focused on reducing waste generation during production and distribution							
Substitution of polluting and							

hazardous materials/parts							
Design focused on disassembly, reusability, and recyclability							
Preference for green products in purchasing							
Explicit definition of environmental policy							
Clear environmental objective							
Long-term environmental plan							
Well-defined environmental responsibilities							

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