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A STRATEGIC ENVIRONMENTAL MANAGEMENT FRAMEWORK: EVALUATING THE PROFITABILITY OF BEING GREEN

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The extent to which corporate environmental governance is correlated with financial performance remains a topic for debate; however, consensus of opinion seems to be that there are some environmental management initiatives that add value to a firm's bottom-line and other environmental management initiatives that adversely impact a firm's bottom-line. This paper puts forth a new Strategic Environmental Management Framework (SEM Framework), which ties together much of the existing theory on corporate environmental management. The SEM Framework provides analysts and corporate strategists with a conceptual model that demonstrates how various forces influence a firm's environmental governance commitment. Factors which influence a firm's commitment to environmental governance are extracted from the SEM Framework and employed to guide assessment of publicly available corporate environmental disclosures for 88 firms listed on 5 major stock market indices in Singapore and Canada. The environmental governance commitments of these firms were then compared to aggregated financial performance data in order to provide the comparative data for evaluating the environmental governance — financial performance relationship. The empirical research fails to confirm a significant correlation between environmental governance and financial performance for firms within any of the industry indices studied. Acknowledging the positive contributions that certain environmental initiatives can have on firm profitability, this paper concludes that a weak correlation between environmental governance and financial performance could exist; however, the correlation is not strong enough to out-weigh the other elements that influence a firm's profitability. The implication of these findings for policy makers is that mechanisms other than free-market incentives are necessary if policy is to guide corporations toward adopting more sustainable environmental governance practices.

1. Introduction

The main intent of the empirical research presented in this paper is to contribute to efforts to clarify the extent to which improved corporate environmental governance supports and enhances a firm's financial performance. Specifically, the research attempts to empirically

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measure the strength of the correlation between corporate environmental governance and reported financial performance.

Existing research concerning the corporate environmental governance and financial performance relationship has skirted the main issue by focusing on overly-narrow proxies for evaluating the corporate environmental governance financial performance relationship. The current body of research in this field supports claims that *some* elements of improved corporate environmental governance support improved financial performance; however, a holistic link between corporate environmental governance and financial performance has yet to be supported. Studies have been carried out which show that;

- There appears to be a link between reducing pollutant emissions and financial performance (King and Lenox, 2001[b]; Stanwick and Stanwick, 1998).
- There appears to be a link between lean production (less waste) and financial performance (King and Lenox, 2001[a]; Porter and Van der Linde, 1995).
- There appears to be support for the premise that some firms adopt the ISO14000 environmental management system to improve financial performance (Berthelot and Coulemount, 2004).
- There appears to be a link between superior environmental governance as perceived by independent evaluation bodies and market valuation (Connelly and Limpaphayom, 2004; Kiernan, 2001).
- There appears to be a link between significant environmental events and market valuation (Klassen and McLaughlin, 1996).
- Many CEO's perceive a link between financial performance and environmentally-friendly technological investments and innovations their firms have made (Karagozoglu and Lindell, 2002).

Despite such promising indications that aspects of corporate environmental governance are positively related to financial performance, there is a notable absence of research to prove that a significant correlation exists between *overall* corporate environmental governance and financial performance. It is posited that the reason for the dearth of such studies stems from the complexities involved in measuring overall corporate environmental governance. Quantifying a firm's corporate environmental governance commitment requires identification and measurement of

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environmental initiatives related to inputs (i.e. material usage), processes (i.e. energy use, production efficiencies) and outputs (i.e. waste and emissions). This implies that a high degree of insider knowledge is required to understand a firm's corporate environmental governance commitment. In the absence of sufficient insider knowledge, assessing corporate environmental governance poses a significant challenge.

In order to evaluate the corporate environmental governance — financial performance relationship from a macro perspective, a promising approach would be to develop a method to permit the analysis of corporate environmental governance from external sources of information. Consequently, the main conceptual goal of this paper is to develop a framework that will guide analysts in understanding the forces which influence corporate environmental governance. By understanding what causes firms to embrace corporate environmental governance initiatives, an interpretivist model can then be created to help analysts better evaluate information provided in environmental disclosures to assess corporate environmental governance.

This paper contributes to the body of knowledge in corporate environmental management from three perspectives. First, the development of the conceptual SEM Framework represents a first attempt at collating existing research to develop a model for understanding the exogenous and endogenous strategic forces which influence a firm's environmental governance policies. Second, the paper also demonstrates how the SEM Framework can be utilised to guide evaluation of corporate environmental strategy. This is demonstrated by using the SEM Framework to guide development of an evaluative tool for assessing the properties of a firm's environmental disclosures. Third, the empirical results presented in the latter part of this paper contribute to a growing body of empirical data on the corporate environmental governance — financial performance relationship. The empirical research which evaluates environmental disclosures and financial data from 88 firms in Singapore and Canada fails to confirm evidence of a statistically significant linkage in the corporate environmental governance — financial performance relationship.

2. A New Conceptual Framework

The Strategic Environment Management Framework was constructed from previous environmental management and environmental reporting research.

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Thus, it represents a compendium of existing knowledge. As no such framework currently exists, it is believed that the creation of the SEM Framework represents a significant contribution to corporate environmental governance research from both academic and applied perspectives.

It is believed and hoped that the academic value of the SEM Framework stems from the graphic clarity with which the strategic forces which influence corporate environmental governance have been collated. The framework allows academic scholars to begin to consider the inter-relationships between these forces. As the empirical section of this paper will demonstrate, by seeing these forces from a holistic perspective, a better understanding of a firm's environmental governance strategy can be ascertained.

From an applied perspective, the SEM Framework represents a first attempt to graphically organise the existing research on elements of corporate environmental management strategy into one cohesive model. Thus, the SEM Framework can serve as a guide map for practitioners who wish to clarify their firms environmental management strategies.

i) *Developing the SEM framework*

The fundamental premise upon which the SEM Framework has been conceptualised stems from the widely recognized tenet that forces influencing the development of corporate strategy are both exogenous (not within the control of the corporate strategist) and endogenous (within the control of the corporate strategist) (Grant, 2005). As will be seen as the model is clarified in this section, forces that influence the development of corporate environmental management strategies are similarly manifest in both the exogenous and endogenous realms.

Accordingly, in conceptualising the development of a framework to aggregate these forces into one model, it was decided that the forces would be best grouped according to the extent of control that strategist had over the forces- working from exogenous to endogenous realms. The framework is presented in Fig. 1.1 with the realms summarised below:

- The first realm of influential forces are those broad forces that occur in the macro-economic environment. Unsurprisingly, these forces are also forces which the corporate strategist has the least control over.
- The second realm of forces are the forces that arise through the efforts of secondary stakeholders (community members, interest groups etc.). The

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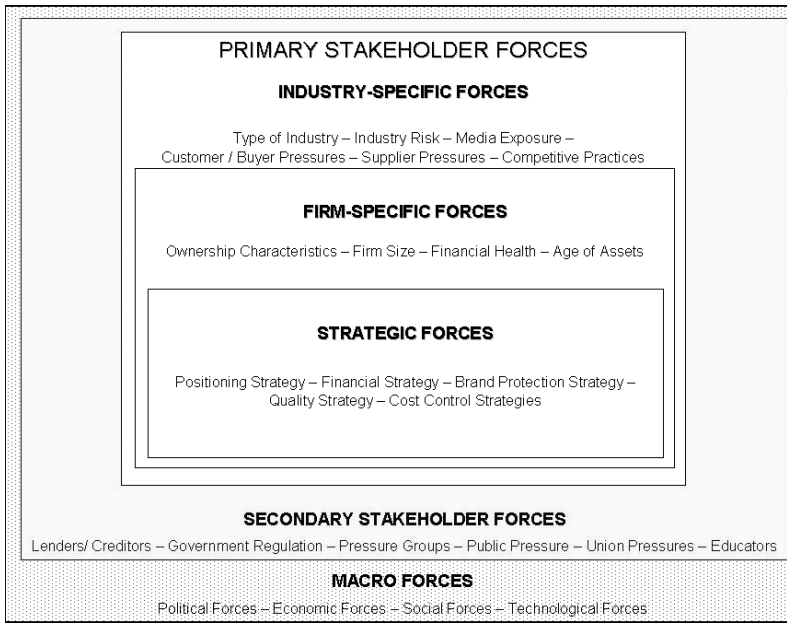

Fig. 1.1. The strategic environmental management framework.

strategist may be able but manipulate these forces; but by and large, these forces are also exogenous to firm control.

- The third realm of forces are industry-specific forces. Since firms have the ability to adjust strategy to enter and exit market niches, there is a degree of strategic control implied when strategists consider how to respond to these forces.
- The fourth realm of forces are firm-specific forces. These forces are predominantly structural in nature and as such can be manipulated by the firm. However, the structural foundation of these forces implies that manipulation of these forces does not come without significant strategic repositioning and organisational re-engineering.
- The final realm of forces are those which are endogenous and strategic in nature. In short, this final strategic realm is the realm within which most corporate environmental management currently takes place because these elements are strategically controllable.

In subsequent paragraphs these five realms will be clarified with examples from prominent extant research which exists in each realm.

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Furthermore, an intuitive review of the impact that the forces from each realm should have on environmental reporting will be provided in order to guide conceptual development of an analytical tool that will be used later in the paper for conducting the empirical research.

ii) *Realm 1- macro forces*

Macro forces are the broadest forces that influence how a firm approaches environmental management. In strategic management theory, these forces are referred to as PEST forces: Political, Economic, Social and Technological (Grant, 2005). The tenet is that the PEST forces in each country influence the extent to which firms within industries approach environmental governance (Kolk, 2005).

Macro forces act as "expectation dampeners". The macro forces which influence an industry frame the degree of environmental governance that stakeholders expect of a firm. A comparison between macro forces influencing corporate environmental governance in China and Canada is insightful as an example. In China, civic reaction to poor corporate environmental governance is less intense for a number of macro reasons (Iu and Batten, 2001). Economically, the country is in the throes of an economic boom and; therefore, sustaining economic growth is driving public policy. Although there are recent indications of change,[1] economic growth currently takes precedence over environmental protection. Moreover, as the Tiananmen Square protests of 1989 exemplify, the Chinese government does not respond well to unauthorised mass public protest. On the other hand, in Canada, civic reaction to poor corporate environmental governance is relatively more robust because the environmental watchdog community is well-established and has better access to communication networks to voice dissent. Moreover, Canadian citizens are comparatively more affluent so they exhibit a higher propensity to accept higher taxes to facilitate improved environmental policies (Costanza *et al.*, 1997). In short, it can be concluded that environmental governance expectations are currently higher in Canada than in China because of the macro forces which act on society (Kolk, Walhain and Wateringen, 2001). In summary, macro forces influence the environmental governance contributions expected of corporations and

[1]For example, China now boasts the second largest number of ISO14000 certified firms in the world.

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therefore, frame the lower limits of environmental disclosure done in a country (Kolk, 2005).

iii) *Realm 2- secondary stakeholder forces*

A significant amount of research has emerged over the past decade in support of the contention that firms must balance strategic objectives to ensure that a broad spectrum of stakeholders' expectations are adequately satisfied (Neely, Adams and Kennerley, 2002; Kaplan and Norton, 1996). Secondary stakeholders may have less direct contact with a given firm; but nevertheless, they possess formidable power in influencing the fortunes of the firm. Six secondary stakeholder groups which have been identified in previous research as having a particularly strong influence on how a firm approaches environmental governance include:

- Creditors (See for example: Deegan, 2002; Wilmshurst and Frost, 2000).
- Government Regulators (See for example: Yakhou and Dorweiler, 2004; Patten, 1992).
- Interest Groups (See for example: Adams, 2004; Wilmshurst and Frost, 2000).
- General public (See for example: Van Tulder, 2005; Cormier and Magnan, 2003).
- Educators (See for example: Russell, 2006; Cormier, Gordon and Magnan, 2004).
- Unions (See for example: Van Tulder, 2005).

Secondary stakeholders represent significant threats to firms in regard to environmental governance issues (Khanna, 2005). Lenders and borrowers who are displeased with a firm's environmental stewardship can punish the firm by denying the firm access to funding (Wilmshurst and Frost, 2000). Government regulators who are displeased can impose stricter regulations, levy financial penalties, and even force businesses to close (Beets and Souther, 1999). Union displeasure can result in plant closures. Most significantly, public pressure and pressure from watchdog groups can severely impact the market viability of a firm's product offerings (Van Tulder, 2005; Carter, 2001). Accordingly, given the severity of these threats, firms are motivated to embrace stakeholder theory and ensure that secondary stakeholder expectations are, at a minimum, satisfied.

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In environmental reporting, signals that a firm is attempting to appease secondary stakeholders are indicated through qualitative exhortations which seek to positively laud isolated but comparatively minor environmental achievements. This type of reporting is the realm within which legitimization attempts would most likely occur. It is also the most unreliable area in which to judge actual corporate performance because firms that subjectively claim a commitment to superior environmental management may or may not be committed to such goals behind corporate doors.

iv) *Realm 3- industry-specific forces*

In 1980, Michael Porter, an authority on corporate strategy introduced his 5 Forces framework which demonstrated how forces in a firm's industry influence the attractiveness of the industry and define the parameters within which firms in the industry must operate if they are to succeed in the long run (Porter, 1980). Since industry forces influence overall strategy, it should come as no surprise that industry-specific factors related to environmental governance also impact a firm's environmental strategy. Research has identified six groupings of industry-specific forces that impact the extent to which firms embrace environmental governance initiatives. Previous research has identified the following elements of industry structure as influencing corporate-level environmental governance:

- Types of Industry (See for example: Shirley, 2005; Campbell, 2003).
- Risks associated with specific industry tasks (See for example: Cormier, Gordon and Magnan, 2004; Cerin, 2002).
- Media exposure (See for example: Adams, 2004; Cormier *et al.*, 2004).
- Customer (buyer) pressure (See for example: Kolk, Walhain and Wateringen, 2001; Wilmshurst and Frost, 2000).
- Supplier (vendor) incentives (See for example: Wilmshurst and Frost, 2000).
- Industry business practice (See for example: Kolk, 2005; Deegan, 2002).

Overall, industry-specific forces have the capacity to either raise the bar in terms of corporate environmental governance in an industry or dampen progress. At the end of the day, a firm's continued viability is directly related to its ability to compete successfully with rival firms and to profit in doing so (Porter, 1980). Consequently, when it comes to industry best practice,

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there is a tendency for firms to adopt a herding mentality. For this reason, comparison of corporate environmental practices in firms from different industries should be undertaken with the knowledge that an industry-type will impact the extent of commitment to corporate environmental governance.

In environmental reporting, the presence of industry-specific forces will often induce similar reporting patterns for firms from similar industries. In fact, it would not be unreasonable to assume that environmental report writers at one firm use the disclosures of competing rivals as benchmarks to guide the presentation of content in their own firm's environmental disclosures. Therefore, when analyzing environmental disclosures, analysts should be aware of the possibility that disclosures which seem on the surface to be of superior quality may, in fact, simply be a product of common practice within the industry.

v) *Realm 4- firm-specific forces*

Firm-specific forces can be defined as influences on corporate environmental governance that are related to the unique structure of a given firm. In particular, the type of ownership and characteristics associated with the firm's asset base influence the extent to which firms can financially support environmental governance initiatives beyond those initiatives that actually produce positive returns to the firm. For example, firms that are facing cash flow constraints and which possess an ageing asset base are in a less viable position to upgrade to new technologies that would reduce pollution and waste levels. There are five main firm-specific structural characteristics that have been identified in the literature as influencing how a firm approaches corporate governance.

- Ownership characteristics (See for example: Cormier and Magnan, 2003; Cormier and Gordon, 2001).
- Firm size (See for example: Cormier and Gordon, 2001; Kolk, Walhain and Wateringen, 2001).
- Financial health (See for example: Cormier, Gordon and Magnan, 2004; US EPA, 2000).
- Age of assets (See for example: Cormier, Gordon and Magnan, 2004).
- Environmental reputation (See for example: Cerin, 2002; Patten, 1992).

Two observations concerning the influence that firm-specific forces have on corporate environmental governance are worth highlighting.

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First, similar to the impact that macro forces have on corporate environmental governance, firm-specific forces act as *constraints* to corporate environmental governance. This characteristic is important to understand because it implies that all firms do not share the same capacity to commit to superior environmental governance practices. Larger firms with a more concentrated ownership base, newer assets and healthy levels of cash flow should be financially able to adopt more proactive environmental stewardship strategies.

Second, firm-specific forces represent the only cluster of forces that can be assessed through quantitative analysis of a firm's financial statements. The breadth of the ownership base, the relative size of the firm, a firm's financial health and the age of assets can all be determined through quantitative financial statement analysis.

Thus, knowledge of a firm's structure can play an influential role in interpreting a firm's commitment to corporate environmental governance. Quantitative analysis of financial reports can identify constraints if any, that a firm is facing which would limit its ability to adopt more proactive environmental management strategies. Overall, analyzing a firm's capital structure (ownership, size, past profitability, cash flow, age of assets etc.) can tell an analyst what upper limits to environmental governance can be expected to emerge in environmental disclosure.

vi) *Realm 5- strategic forces*

Strategic forces represent the activities that firms undertake in the environmental governance sphere which directly impact a firm's market valuation, revenue prospects or cost performance in either the short or long term. These forces stem from the principle of "economic rationality"- firms will adopt environmental management practices that contribute positively to a firm's financial health (Deegan, 2002; p. 290).

The ability to strategically manipulate these forces underlie the foundation of Porter's Hypothesis (Porter and Van der Linde, 1995). Previous research have identified the following areas where issues related to environmental governance can be strategically managed:

- Green positioning strategies (See for example: Kiernan, 2001; Hawken, 1992).
- Financial strategies (See for example: Khanna, 2005; Beets and Souther, 1999).

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- Brand Protection strategies (See for example: Ruf *et al.*, 2001; Kolk, Walhain and Wateringen, 2001).
- Quality strategy (See for example: Stanwick and Stanwick, 2001; Berry and Rondinelli, 1998).
- Cost-control strategies (See for example: Adams, 2004; Porter and Van der Linde, 1995).

In environmental reporting, strategic environmental initiatives are often highlighted in order to convey the message to shareholders and stakeholders alike that the firm is achieving balance between environmental responsibility and profitability. For example, in Xerox's 2005 Environment Health and Safety Report, quantitative data is provided which illustrates progress over the previous year in reducing the firm's ecological footprint. However, in the same document, Xerox also draws attention to the fact that its improved environmental governance efforts also resulted in significant cost savings to the firm.

vii) *Pulling the elements together*

Systems which are comprised of numerous elements that are inter-related and that themselves are constantly evolving are known as complex adaptive systems (Brown and Eisenhardt, 1997). As the name implies, the main distinguishing characteristics of a complex adaptive system (CAS) are the complexity of interrelationships that impact the evolution of the system and the dynamic nature of the system's components which results in goal posts that are constantly moving (Stacey, 1995). As should be evident at this point in the paper, the forces discussed in this paper which influence a firm's environmental governance strategy and environmental disclosures should be considered collectively as elements within a CAS. Thus, the SEM Framework which was presented in Fig. 1.1 represents an attempt to visualize this complex CAS in a clear conceptual framework.

Extrapolating from the observations made earlier regarding how each of the five groupings of forces identified in the SEM framework influence environmental disclosure, a conceptual model can be derived to demonstrate how the strength of a given firm's commitment to environmental governance strategy relates to the type of environmental disclosure it makes.

Figure 1.2 illustrates that semantic patterns in environmental disclosures can be used to approximate a firm's commitment to environmental

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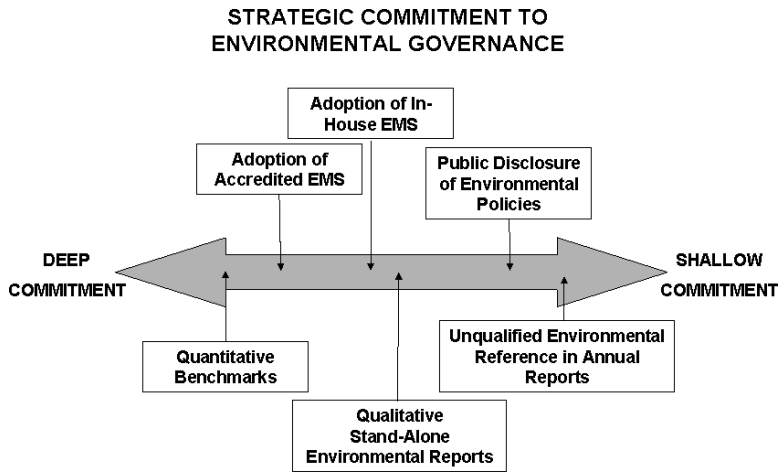

Fig. 1.2. Strategic commitment to environmental governance and the relationship to environmental disclosure.

governance. Specifically, working left to right along the spectrum:

- The presence of *quantitative* environmental performance data in environmental disclosures indicates that not only has a firm thought deeply about environmental governance policy, but it has also established systems and structures to monitor commitment. Such firms can be considered as highly committed to corporate environmental governance strategy.
- Less committed, but still strategically superior firms can be identified by a commitment to maintain internationally certified environmental management systems (EMS) such as ISO14000 or EMAS. These standards commit the organization to a process of formally adopting the processes and structures necessary to receive external certification. Although these standards do not commit firms to specific environmental performance standards, these independently-verified environmental management systems are representative of a high level of formalized commitment to improving corporate environmental governance (King and Lenox, 2005).
- References in environmental disclosures to the adoption of in-house EMS are indicative of firms that are showing signs of adopting more sophisticated strategic environmental governance policies. The disparate nature of in-house EMS imply that these firms may not be as strongly committed to improved environmental governance as firms

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with ISO14000 or EMAS certification; however, in-house EMS regardless of their scope, take time and effort to develop. Accordingly, such firms should be considered to be above average in terms of commitment to environmental governance.

- Similarly, firms which produce stand-alone environmental reports should be considered to be above average in terms of commitment to environmental governance practices. Although for some firms, the production of stand-alone environmental reports may be partly a marketing exercise (Cerin, 2002); creating a stand-alone document that will be vetted by external stakeholders requires significant consideration of environmental issues.
- The level of commitment to environmental governance strategy for firms that limit public disclosure of environmental governance to environmental policy statements published on corporate web-sites or in corporate public disclosures is difficult to assess. Such policy statements may in fact guide concrete environmental initiatives but policy statements may also simply be attempts to legitimize a firm's environmental governance to external stakeholders. Accordingly, in the absence of specific examples of environmental initiatives to support the policy claims, these types of statements should be considered as extemporaneous legitimization efforts because stakeholder theory and legitimacy theory imply that firms which can publicly laud environmental governance achievements will do so.
- Finally, in some Annual Reports, firms that do not have a strong commitment to environmental governance may present vague, qualitative exhortations which declare a concern for the environment and the corporate intent to be responsible corporate citizens. Again, in the absence of specific examples of environmental initiatives to support these declared intentions, such statements should be considered as legitimization efforts which lack substance.

With a clearer conceptual understanding of how the five realms of Strategic environmental management forces influence the nature of corporate environmental disclosure, we can now turn to the empirical research.

3. Research Objective and Methodology

The main premise of the empirical study presented here is to test the strength of the corporate environmental governance — financial

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performance relationship. Formally stated, the central hypothesis is affirmatively stated as follows:

A significant positive correlation exists between a firm's commitment to corporate environmental governance and its financial performance.

Prior to selecting subjects for inclusion into the research project, it is necessary to establish two baseline standards to operationalise the variables. First, a standard for measuring a firm's commitment to corporate environmental governance through the interpretation of environmental disclosures must be determined. Second, a standard or set of standards for measuring a firm's financial performance must be established. Standardizing measures in these two areas will enable comparison of firms to establish relative performance.

i) *Baseline standards for measuring environmental performance*

As per the conceptual foundation outlined in Fig. 1.2, strategic commitment to environmental governance can be measured on a scale from deep to shallow commitment and this commitment can be assessed by analyzing the contents of environmental disclosures. The presence of quantitative environmental benchmarks or other environmental performance data reflects a firm with a comparatively deep commitment to environmental governance. At the other extreme, the presence of unqualified environmental exhortations in environmental disclosures is indicative that a firm's commitment to environmental governance is more style than substance- it is trying to legitimize a largely ambivalent commitment to environmental governance. This conceptual understanding permits the creation of standardized measures.

Table 1.1 demonstrates that conceptual knowledge of how environmental governance strategy and environmental disclosure interact permit the development of operational measures that can be applied to environmental disclosure analysis in order to interpret a firm's commitment to environmental governance. The five levels of commitment identified in Table 1.1 represent the standards by which the firms in this research study will be measured to evaluate commitment to corporate environmental governance. The deepest form of commitment to environmental governance is represented by Level 1- Leaders. Similarly, the weakest form of commitment is represented by Level 5- Avoiders.

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Table 1.1. Standards for measuring environmental governance.

Level 1- Leaders
Are defined as . . .
- *Firms committed to setting quantitative benchmarks in environmental initiatives.*

Which appears in environmental reporting as . . .
- *Quantitative progress indicators related to environmental initiatives.*

Level 2- Contenders
Are defined as . . .
- *Firms which have adopted externally accredited environmental management systems.*

Which appears in environmental reporting as . . .
- *Specific reference made to ISO14000 or EMAS accreditation.*

Level 3- Talkers
Are defined as . . .
- *Firms that are currently experimenting with the effectiveness of environmental management initiatives.*

Which appears in environmental reporting as . . .
- *Qualitative stand-alone environmental reports.*

Level 4- Pretenders
Are defined as . . .
- *Firms that understand the threat posed by poor environment governance. These firms therefore, endeavour to demonstrate that they meet all binding regulations.*

Which appears in environmental reporting as . . .
- *Qualitative environmental disclosure over 50 words amidst Annual Reports or on web-sites.*

Level 5- Avoiders
Are defined as . . .
- *Firms that obey environmental regulations because they must. However, they do not see a need to strategically address any environmental issues.*

Which appears in environmental reporting as . . .
- *Empty space. Firms classified as Avoiders do not disclose any information on environmental issues.*

ii) *Baseline standards for measuring financial performance*

There has been considerable debate over which financial metrics should be used for judging the competitive performance of a firm (Ruf *et al.*, 2001). For the purposes of this study, four metrics have been established as collective indicators of financial health: 1) % change in sales volume, 2) Profit margin, 3) Return on equity and 4) Return of assets.

The justification for using these four metrics as financial performance measures is largely provided by Ruf *et al.* (2001). Growth in sales was selected because of the significant role it plays both in strategy formulation and in investment valuation models. Moreover, sales growth is not as prone to the criticisms often applied to return on investment measures that such

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measures can be manipulated by accountants (Ruf *et al.*, 2001). Profit margin represents the most commonly referenced measure of a firm's overall operating effectiveness. Return on equity was selected because it is the primary measure of evaluating profitability from an investor's perspective (McLaney and Atrill, 2002) and return of assets was selected because it provides a measure of profitability that aggregates both equity and debt sources of capital. It is conceivable for all four measures to vary from one another.[2] Therefore, in order to leverage the benefits of each of the four measures while concurrently avoiding the disadvantages associated with the specialised perspectives on financial performance that each measure represents, it was deemed that an equally-weighted aggregate of all four measures would be used to evaluate financial performance.

It was decided to use corporate annual reports as the basis from which to gather audited data related to financial performance. On the other hand, data related to public disclosure of environmental governance initiatives were gathered from three sources: (1) corporate annual reports, (2) stand-alone environmental reports if available on a given firm's web-site and (3) information on environmental activities presented on the web-sites of the subject firms. Campbell (2003) confirms that for the sake of assessing public disclosure strategy, annual reports and other documents available on corporate internet sites can provide sufficient information for assessing a firm's social reporting practices.

The target firms selected for inclusion in the study came from two geographically-defined sources. Group 1 firms were all from Singapore. Firms from one country were analyzed together in order to eliminate the disparate influences on corporate environmental governance activities caused by macro forces and secondary forces as described in the ELF conceptual framework. Singapore was chosen as the target country for Group 1 firms because its political environment "constrains citizen demands for information and minimizes regulatory pressure on companies" (Perry and Sheng, 1999: 310). In other words, secondary stakeholder influence is comparatively light in Singapore. Accordingly, it was anticipated that firms from Singapore will have a lower propensity to produce environmental disclosures that attempt to legitimize environmental governance performance.

[2]In fact the data from the empirical study bears witness to the validity of this claim. Many firms in this study reported disparate performance in the four areas of financial measurement.

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Group 2 firms were all from Canada. Once again, the rationale for grouping firms from one country together was to reduce environmental reporting distortions caused by macro and secondary forces. Canada and Singapore have similar levels of affluence in terms of per capita GDP and both countries are Commonwealth nations so political structures are similar. Therefore, the allure of choosing Canada as a foil to Singapore is that the similarities permit comparison of whether or not the comparably higher presence of environmental watchdog groups in Canada (Perry and Sheng, 1999) influence environmental governance.

In total there were 88 firms chosen for the study: 60 firms from Singapore and 28 firms from Canada.

In order to isolate industry-specific forces which influence environmental governance (as outlined in the ELF framework), it was decided to select target firms from common industry groupings. Two environmentally-sensitive industrial groupings were selected because previous studies indicate that environmental governance and environmental disclosure will be most robust in environmentally-sensitive industries (Shirley, 2005; Campbell, 2003; Deegan and Gordon, 1996). The two broad industrial areas selected were (1) construction/industrial production and (2) transport, shipping and telecommunications.

In order to try and minimize distortions caused by disparate sized firms (a concern identified in the SEM framework), all the firms chosen for the study were leaders in their respective fields. In order to determine which firms were recognized as industry leaders, all the firms selected for the study were part of stock market industry indexes.

In summary, the firms chosen for the empirical study included:

- All the firms comprising the Singapore Stock Exchange Construction Index (20 firms in total).
- All the firms comprising the Singapore Stock Exchange Transport, Shipping and Telecommunications Index (29 firms in total).
- All the firms comprising the Toronto Stock Exchange Industrials Index (22 firms in total).
- All the firms comprising the Toronto Stock Exchange Telecommunications Index (6 firms in total).

In total, this represents 77 of the 88 firms included in the study. The other 11 firms were all firms comprising the Singapore Stock Exchanges Hotels Index (11 companies). They were included to provide a reference

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benchmark for service industry firms. It was felt that earmarking a major service industry as a reference benchmark would provide an opportunity to compare correlation results in order to determine whether or not environmental-sensitivity in a given industry truly does influence environmental disclosure.

As a first step, after reviewing all the publicly available information from 2002 relating to environmental activities,[3] each firm was classified into one of the five environmental governance levels outlined earlier:

- L1 = Leaders (quantitative data on corporate environmental governance).
- L2 = Contenders (adoption of ISO14000 or EMAS).
- L3 = Talkers (publishing stand-alone environmental reports).
- L4 = Pretenders (producing qualitative environmental discourse of over 50 words).
- L5 = Avoiders (making no public mention of environmental activities).

For each firm, the highest level of environmental governance commitment identified through environmental reporting analysis was regarded as the defining level for that firm. For example, if a firm published a stand-alone environmental report (L3), was ISO14000 accredited (L2) and included quantitative data on corporate environmental governance in its stand-alone environmental report (L1), it was listed as an L1 firm.

Next, total revenue and operating profit data were extracted from audited Income Statements for years 2002–2005 in order for sales growth[4] and profit margin[5] statistics to be determined. Furthermore, total assets and total equity data for 2003–2005 were extracted from the audited balance sheets of each firm in order to calculate return on equity[6] and return on asset[7] data.

For each year, averages for all the firms within a given index were calculated for sales growth, profit margin, return on equity, and return

[3]2002 public disclosures were used for this process in order to link environmental reporting to future financial performance. Financial data from 2002–2005 were used for this purpose.
[4]Sales Growth = (Current year revenues — Previous year revenues)/Previous year revenues.
[5]Profit Margin = Operating Profit/Total Revenue.
[6]Return on Equity = Operating Profit/Total Shareholder Equity (including reserves).
[7]Return on Assets = Operating Profit/Total Assets.

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on assets. A smoothing methodology was used to calculate these averages. In the smoothed average approach, 10% of the firms exhibiting the most extreme performance variances (either above or below industry average) were removed from the pool before the industry average was calculated. This was done separately for the Singapore Stock Exchange Construction Index firms, the Singapore Stock Exchange Transport, Shipping and Communications Index firms, the Singapore Stock Exchange Hotel Index firms, the Toronto Stock Exchange Industrials Index firms, and the Toronto Stock Exchange Telecommunications Index firms.

Once smoothed averages for the firms in each of the five index categories were calculated, the performance of each firm was then compared to the smoothed index average in the respective indices. This facilitated the identification of firms that outperformed the average for each financial performance metric used.

The number of times each respective firm outperformed the industry average (within the 12 performance metrics) along with the firm's environmental management commitment rating (L1 to L5) were then plotted through correlation analysis in order to determine if there was correlation between environmental commitment and financial performance either in the base year or in two subsequent years. Trend analysis that included identification of the coefficient of determination (r^2) was applied to each of the five indices in order to assess the strength of correlation between corporate environmental governance and financial performance.[8]

4. Results of the Environmental Reporting Comparison

A) *Singapore*

As Fig. 1.3 outlines, only 17% of the Singapore firms included in the study disclosed information on environmental activities in a public manner and only 14% could be considered substantive reporters (L1 and L2) of environmental initiatives. This parallels findings in a 2002 survey of environmental reporting conducted by ACCA-Singapore which found that only 10% of the Singaporean firms surveyed produced substantive environmental disclosures (ACCA, 2005a).

[8]In this instance, *r*-squared represents the fraction of variability in financial performance that is attributable to a firms level of environmental governance (L1 to L5).

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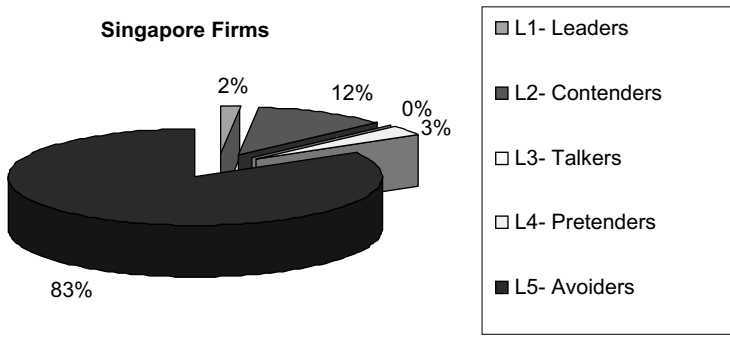

Fig. 1.3. Percentage of singaporean firms falling within each L-classification.

Some specific points relevant to the findings from Singaporean (Group 1) firms include:

- There was only one "L1-Leader" (Singapore Airlines) which produced an environmental report with quantitative data.
- Six firms were classified as "L2-Contenders" on the basis of ISO14000 certification.
- There were no "L3-Talkers", because the only firm that produced a stand-alone report (Singapore Airlines) was also ISO14000 certified (classifying it as a L2 firm) and included quantitative data in its environmental disclosure (classifying it as an L1 firm). As stated earlier, the end rating assigned to each firm was based on the highest attainment achieved on the L1-L5 scale.
- Only two firms (CWT and SMRT Corporation) were classified as "L4-Pretenders". These two companies made qualitative mention of their intention to operate in an environmentally responsible manner. However, the disclosures failed to identify any significant initiatives designed to support such a quest.
- None of 11 Singapore hotels included in the survey provided corporate environmental disclosure of any type. They were all "L5-Avoiders". It is likely that this reflects the underlying mind-set of many service industry firms that their ecological impact is negligible and that, therefore, there is no need to report on environmental governance (Cerin, 2002).

Overall, the results of the research support previous findings that environmental initiatives in Singapore are, by and large, limited to

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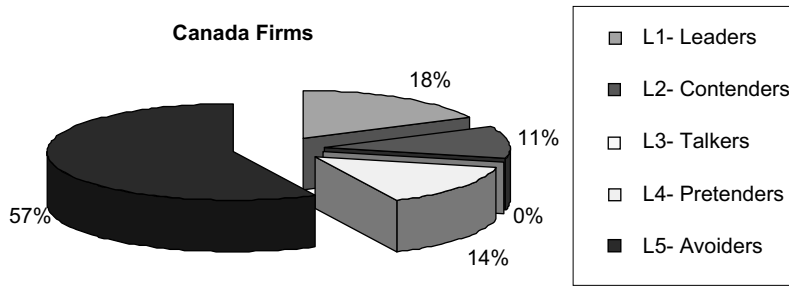

Fig. 1.4. Percentage of canadian firms falling within each L-classification.

compliance initiatives (Perry and Sheng, 1999); and consequently, corporate reporting in also limited (ACCA, 2005).

B) *Canada*

As Fig. 1.4 indicates, 43% of the Canadian firms included in the research study provided public disclosures concerning environmental activities. Although this appears to be considerably superior to the percentage of firms in the Singapore group that produce environmental disclosures (17%), if the L4-Pretenders (firms which produce disclosures that are not supported by substantive examples) are factored out, the ratio of firms that provide substantive reporting (L1-Leaders and L2-Contenders only) narrows to 29% for the Canadian firms and 14% for the Singaporean firms.

Some specific points relevant to the Canadian findings include:

- Of the five "L1-Leaders" which produced an environmental report with quantitative data, only two were ISO14000 certified. In other words, the other three generated quantitative reports based on in-house environmental management systems. This supports previous research which states that in-house Environmental Management Systems (EMS) are as prevalent as ISO14000-based EMS in North America (Berthelot and Coulmont, 2004).
- The three firms that were classified as "L2-Contenders" on the basis of ISO14000 certification, included Bombardier (the airplane manufacturer), Finning (the sales agent for Caterpillar tractors) and Quebecor (the global printing company). These three firms have likely sought ISO14000 certification because they operate in international markets where ISO14000 certification is a competitive strength.

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- As with the Singapore cluster of firms, there were no "L3-Talkers" in the Canadian cluster because the three firms that produced stand-alone environmental reports (CN Rail, Bell Canada-BCE and Manitoba Telecom) also included quantitative data in their environmental disclosures (classifying them as L1 firms).
- There were four firms classified as "L4- Pretenders". These companies publicised policy statements that they intended to operate in an environmentally responsible manner. However, the disclosures failed to support these exhortations with examples of supporting initiatives. It is possible that there were twice as many Pretenders in Canada as there were in the Singapore study because leaders of Canadian firm's deem it necessary to legitimize their environmental governance efforts due to pressure from numerous environmental watchdog organizations in Canada.

Contextual inferences

The data presented above, cannot be used as a proxy to represent the overall level of reporting undertaken in Canada or Singapore. This is because the scope of the firms included in the research sample was not representative of the entire scope of business in each respective country.[9] As was pointed out during the development of the SEM Framework, factors such as firm size, financial health and industry type play roles in influencing the extent to which firms commit to environmental governance. In the case of the firms included in this study, the firms were all market leaders in their respective industries. As a result, they were all comparatively larger than most rival firms and in comparably better financial health because the equity shares of the firms were included on major indices which attract funds more easily. Furthermore, these firms were from the same industries; therefore, extending the results to firms from other industries would likely result in attribution errors (Shirley, 2005).

The true value of the data presented above is to provide a contextual background to the reporting done by firms in Singapore and Canada. Given that substantive environment reporting (L1-Leaders and L2-Contenders) was significantly higher concerning the Canadian firms (29%) than the

[9]Note- It was not the intention of this paper to undertake a study of broader scope. The main thrust of this paper is to test the corporate environmental governance — financial performance link; therefore, limiting the scope of the study was necessary in order to eliminate industry distortions.

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Singaporean firms (14%), there are reasons to conclude that Canadian firms have a greater propensity to disclose environmental governance issues when compared with Singaporean firms. What the exact ratio is between firms releasing environmental reports in Singapore and firms releasing environmental reports in Canada would require a study of much broader scale and scope. For the purposes of this study it is merely of importance to understand that more Canadian firms report on environmental issues than compared to Singaporean firms.

The reason that this knowledge is of contextual importance to the study relates to the findings regarding the correlation between environmental governance and financial performance. If a significant positive correlation is identified, the observation that more Canadian firm's produce environmental reports implies that Canadian businesses might better understand the link between environmental governance and financial performance. In other words, more education would be necessary in Singapore to enlighten Singaporean businesses about the link between environmental governance and financial performance.

Evaluating the environmental governance-financial performance correlation.

The *Y*-Axis represents the percentage of financial indicators outperforming the industry average (aggregate total of the index firms). The 12 financial indicators include:

- 2003 Return of Equity, 2004 Return of Equity, 2005 Return of Equity.
- 2003 Return of Assets, 2004 Return of Assets, 2005 Return of Assets.
- 2003 Revenue Growth, 2004 Revenue Growth, 2005 Revenue Growth.
- 2003 Profit Margin, 2004 Profit Margin, 2005 Profit Margin.

For example, if a firm's performance in 2003 exceeded the industry average in Return on Equity and Profit Margin, its performance in 2004 exceeded the industry average in Return on Assets, and in 2005 it did not exceed the industry average on any of the 4 financial standards, then its total would be 3 indicators exceeded out of 12. Accordingly the *Y*-Axis measure would be 25%.[10] Three years of financial data following the environmental reports of 2002 were selected to ensure that the impacts

[10]It should be noted that for a handful of firms, data was not available for certain years. In these cases, the denominator for calculating the *Y*-Axis percentage was adjusted accordingly.

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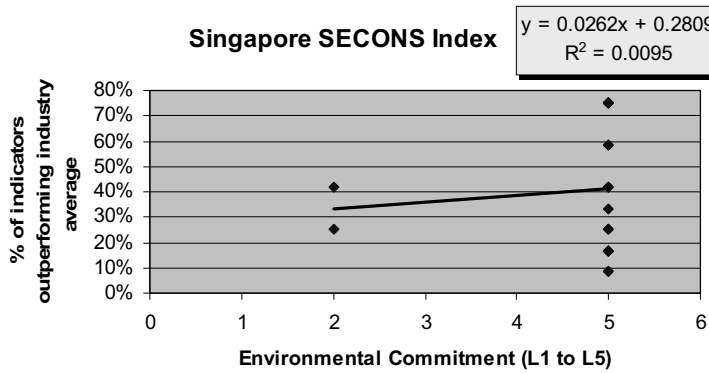

Fig. 1.5. The environmental commitment-financial performance link for Singapore exchange construction (SECONS) Firms.

of the environmental initiaitives were incorporated into the financial performance of the firms.

Singapore exchange construction index

Upon first glance, the upward sloping trend line in Figure x could be interpreted to mean that superior corporate environmental governance gives rise to inferior financial performance for firms in the SECONS index. However, with an R^2 value of 0.0095, it can be concluded that no significant correlation is evident between corporate environmental governance and financial performance for the firms studied in the Singapore exchange construction index.

Both of the ISO14000 accredited firms (L2) underperformed in over half of the financial indicators when compared to index financial performance averages.

Singapore exchange transport, shipping and communications index

As a visual fit purview of Fig. 1.6 indicates, there is a significant correlation between environmental governance commitment and financial performance is not evident for the 29 firms included in Singapore's Transportation, Shipping and Communications Index. Mathematically, an R^2 value of 0.0015 confirms this assertion.

Of particular interest, the firm with the best overall commitment to environmental management initiatives (Singapore Airlines) performed below the financial performance index averages 80% of the time.

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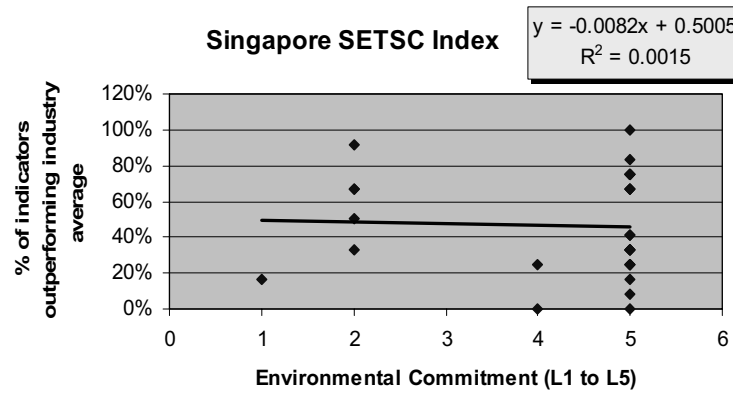

Fig. 1.6. The environmental commitment-financial performance link for Singapore exchange transport, shipping and communication (SETSC) Firms.

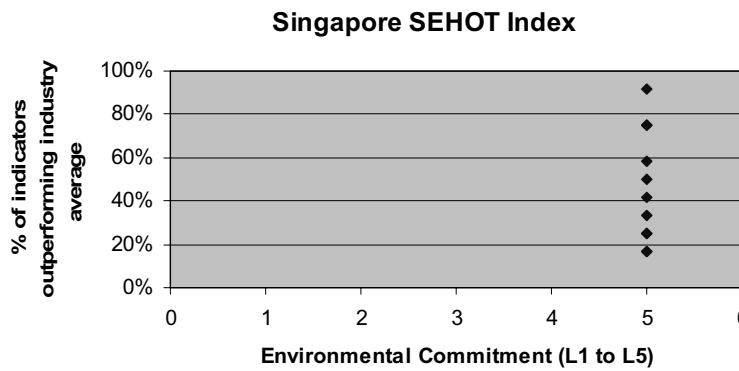

Fig. 1.7. The environmental commitment-financial performance link for Singapore exchange hotels index (SEHOT) firms.

Singapore exchange hotels index

Given that none the 11 firms included in Singapore's Hotels Index published environmental disclosures, creating a trend line was not possible. Figure 1.7 shows the dispersion of corporate data. With no disparate corporate environmental governance standards for comparison, a correlation between environmental commitment and financial performance could not be assessed.

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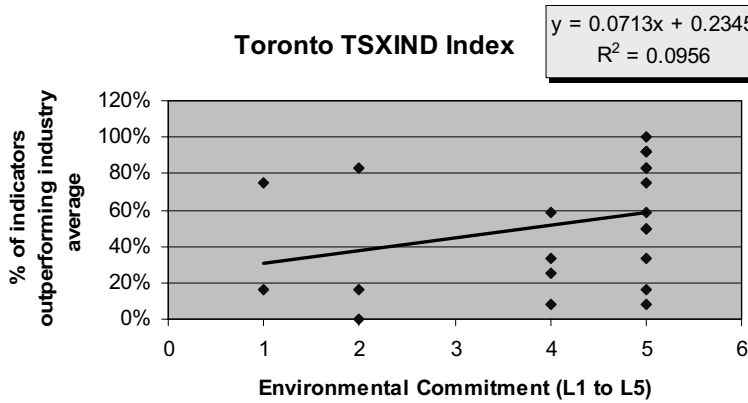

Fig. 1.8. The environmental commitment-financial performance link for toronto stock exchange industrial (TSXIND) firms.

Toronto exchange industrials index

The trend line in Fig. 1.8 also implies at first glance that an inverse correlation exists between corporate environmental governance and financial performance for the 22 firms included in the Toronto Stock Exchange Industrials Index. Although the R^2 value for the TSXIND firms of 0.0956 represents the highest correlation of all the five index correlation studies, the value is still too low to conclude that a significant correlation exists between the variables.

It is worth highlighting that the firms in Fig. 1.8 which produced quantitative corporate environmental governance measures (L1) and ISO14000 accredited firms (L2) achieved widely disparate financial performance results. Two firms in these two groupings (L1 and L2) reported financial performance which exceeded the index average in over 75% of the financial performance markers; however, 3 firms reported financial performance which fell below the index average in over 80% of the financial performance markers.

Toronto exchange telecommunications index

Unsurprisingly given the results from the other indices, evaluating the 6 firms listed in the Toronto Stock Exchange Telecommunications Index also produced evidence of no significant correlation between environmental commitment and financial performance (Fig. 1.8). Mathematically, the R^2 value of 0.002 supports this conclusion. Although the sample size was too

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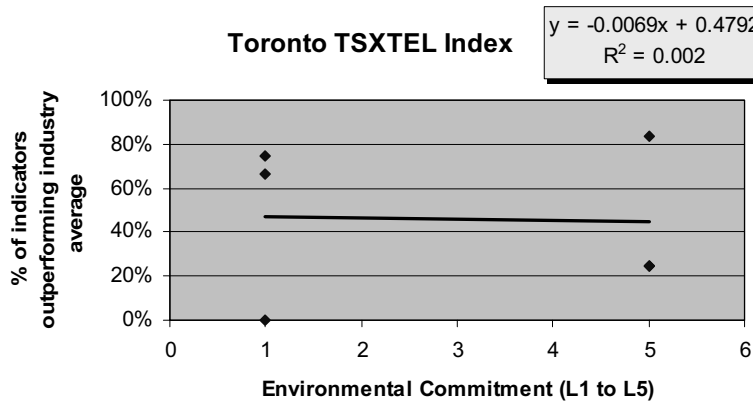

Fig. 1.9. The environmental commitment-financial performance link for toronto stock exchange telecommunications (TSXTEL) firms.

small for statistical reliability, the data strongly implies that other forces appear to influence financial performance to a far greater extent than corporate environmental governance does.

Based on the results of the research, it is valid to conclude that for the firms included in the indices researched in this report, no significant positive correlation can be proven between corporate environmental governance and financial performance over the range of years covered in this research study (2003–2005). Therefore, results from the research do not support the central hypothesis.

It should be noted that failure to confirm the central hypothesis does not necessarily mean that environmental commitment has *no* impact on financial performance. It does appear from the research study that there are other more significant influences on financial performance that render overall environmental governance commitment negligible in terms of influencing financial performance.

This interpretative conclusion is supported by the observation that the research findings also indicate that no significant *negative* correlation exists between corporate environmental governance and financial performance. If the abundance of anecdotal research which identifies financial benefits to some environmental initiatives is to be believed (Reinhardt, 1999; Porter and Van der Linde, 1995), and there is no significant positive or negative correlation found in this study between corporate environmental governance and financial performance, then it is justifiable to conclude that there are other more significant influences on financial performance that

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render overall environmental governance commitment negligible in terms of influencing financial performance.

5. Conclusion

From an environmental conservation perspective, it would have been heart-warming to conclude from the research undertaken in this study that a firm's commitment to environmental governance is positively and significantly correlated to financial performance. Clearly, if such a positive correlation did exist, a rational profit-maximizing firm would be negligent in its duties if it did not adopt enhanced environmental governance strategies. Proving that such a correlation exists could catalyze a new era of corporate environmental benevolence. However, the research presented in this paper indicates that such an absolute correlation likely does not exist. In all probability, any positive influence of environmental governance on financial performance is overpowered by other variables that influence financial performance.

This conclusion is in itself a useful contribution to the study of environmental governance policy. If it is a goal of environmental governance policy to promote improved corporate environmental governance practices, then policy makers must understand the realities which impinge upon this outcome.

With no significant correlation between environmental commitment and financial performance, a profit-maximizing firm can at best be expected to generally adopt *satisficing* environmental governance strategies (Doyle, 2003). Profit maximizing firms will seek to: (1) implement environmental initiatives that are profitable, (2) comply with regulations governing unprofitable areas of environmental governance and (3) satisfice stakeholders groups to defend against unwanted stakeholder protest.

If policy makers are to successfully develop policies to motivate improved corporate environmental governance, they need to make the effort to understand the realities underpinning the challenges that corporate leaders face. Policy makers need to understand that the vast majority of corporate leaders do not get up in the morning with the intent of carrying out policies to erode the planet's environmental capital. The vast majority of corporate leaders get up each morning with the knowledge that they must satisfy the profit expectations of their owners and the broad needs of various internal and external stakeholders. In other words, each day, management performs a precarious balancing act. True there are some corporate leaders

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that neglect environmental issues because they do not see environmental problems as part of the corporate remit. However, the majority of business people likely seek balance if only to reduce the risk of civil reprisal against poor environmental governance.

As the discussion leading to the development of the SEM Framework demonstrated, there are a number of justifiable business reasons to improve environmental governance. There are also a number of endogenous and exogenous forces that catalyze better corporate environmental governance. Until change comes to the economic, free market, capitalistic structure that guides corporate activities in most countries around the world, corporate leaders will continue to pursue profit-maximization within the limits prescribed by legislation, regulation, and stakeholder pressure. Within such bounded rationality, sustainable environmental management practices are unlikely to be attainable. Accordingly, rather than trying to change mindsets by appealing to the social consciences of corporate leaders, policy makers should be trying to change the structural flaws that give rise to this dilemma. In the short run, this may imply more regulatory control over environmental governance.

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