EVOLVING SUSTAINABLY: A LONGITUDINAL STUDY OF CORPORATE SUSTAINABLE DEVELOPMENT

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This study operationalizes corporate sustainable development and examines its organizational determinants. Data for this project pertain to Canadian firms in the oil and gas, mining, and forestry industries from 1986 to 1995. I find that both resource-based and institutional factors influence corporate sustainable development. By exploring time-related effects, I also find that media pressures were important in early periods and resource-based opportunities endured over time. This finding challenges the assumption that firms first adopt innovations in response to technical rewards which are later institutionalized. These counter-intuitive results may be attributable to the unique characteristics of the dependent variable, corporate sustainable development. They raise important questions and directions for future research. Copyright © 2004 John Wiley & Sons, Ltd.

In 1987, the World Commission on Economic Development (WCED) popularized the term ‘sustainable development’ in its well-cited report, Our Common Future (Diamond, 1996). According to the WCED (1987: 43), sustainable development ‘is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.’ The WCED asserted that sustainable development required the simultaneous adoption of environmental, economic, and equity principles. This assertion was met with skepticism as it challenged the deep-rooted assumption that environmental integrity and social equity were at odds with economic prosperity. A decade later, Rondinelli and Berry (2000) found that many large multinationals had accepted the argument that these three principles of sustainable development were internally consistent. Over time, corporate commitment to sustainable development has changed considerably. This paper attempts to explain why.

Explanations stem primarily from two different logics: resource-based and institutional. The resource-based view emphasizes internal firm processes. Firms accumulate valuable resources and capabilities that lead to superior firm performance (Barney, 1991). Institutional arguments, on the other hand, argue that change is often motivated by firms seeking social approval (Meyer and Rowan, 1977). I apply both of these perspectives to understand why firms commit to sustainable development and why the reasons for this commitment may change over time.

In seeking to answer the research question, this paper makes three contributions. First, it defines and operationalizes corporate sustainable development. Societal-level sustainable development is often analyzed and understood, but our understanding of how sustainable development is
Operationalized in firms is weak. An important contribution of this paper is its efforts to identify how the principles of sustainable development apply to and are articulated by firms. Second, this research provides new insights into the adoption of administrative innovations. Most studies examine best practices that are well defined, impact only the firm, and in which the outcomes are anticipated. This study considers the response to an issue that is defined ambiguously, that has high externalities, and for which the organizational outcomes are often unknown. Third, this paper contributes to research on organizations and the natural environment by integrating resource-based and institutional arguments to identify the factors relevant in explaining a firm’s commitment to sustainable development. Most studies of the factors that influence corporate sustainable development have taken exclusively either a resource-based orientation (Hart, 1995; Klassen and Whybark, 1999; Russo and Fouts, 1997) or an institutional orientation (Hoffman and Ventresca, 1999, 2002; Jennings and Zandbergen, 1995); few have integrated the two. The findings suggest that an integration of the two perspectives is relevant in explaining corporate sustainable development.

SUSTAINABLE DEVELOPMENT

The three principles of sustainable development

In its early years, the meaning of the term ‘sustainable development’ was ambiguous, leading to a proliferation of definitions. Only recently has the WCED definition emerged as the dominant one. Discussions have also coalesced around the three principles that ground sustainable development: environmental integrity, economic prosperity, and social equity (Elkington, 1998; WCED, 1987). Each of these principles represents a necessary, but not sufficient, condition; if any one of the principles is not supported, economic development will not be sustainable. These principles are described below.

Environmental integrity

The environmental integrity principle ensures that human activities do not erode the earth’s land, air, and water resources. Ecosystems are assumed to have limited regenerative capability and carrying capacity (IISD, 1995). Population growth, combined with excessive consumption, escalating pollution, and depletion of natural resources, threatens environmental integrity (Pearce, Markandya, and Barbier, 1989; WCED, 1987). Human activities can have a significant negative impact on the natural environment including, but not limited to, decreased biodiversity, ozone depletion, accumulation of greenhouse gases, waste management, deforestation, and toxic spills (Doering et al., 2002). If the natural environment is compromised, then basic and necessary resources for human life, such as air, water, and food, will also be compromised.

Social equity

The social equity principle ensures that all members of society have equal access to resources and opportunities. Central to the definition of sustainable development is the recognition that ‘needs,’ present and future, must be met (WCED, 1987). Human needs not only include basic needs such as food, clothing, and shelter, but also include a good quality of life such as health care, education, and political freedom (IUCN, UNEP, and WWF, 1996; UNCED, 1992; United Kingdom Secretaries of State for the Environment, 1994). The WCED (1987: 43) document states that sustainability is a universal goal and that even the ‘narrow notion of physical sustainability implies a concern for social equity between generations, a concern that must logically be extended to equity within each generation.’ This implies that future generations, indigenous peoples, and the disenfranchised are entitled to the same level of resources as more privileged people in developed countries (Gladwin, Kennelly, and Krause, 1995).

Economic prosperity

Finally, the economic prosperity principle promotes a reasonable quality of life through the productive capacity of organizations and individuals in society (Holliday, Schmidheiny, and Watts, 2002). Economic prosperity involves the creation and distribution of goods and services that will help to raise the standard of living around the world. Open, competitive, international markets that encourage innovation, efficiency, and wealth creation are fundamental aspects of sustainable development.
Corporate sustainable development

Organizations must apply these principles to their products, policies, and practices in order to express sustainable development. Below, the three principles underpinning sustainable development are extended to the level of the firm. As with the societal notion of sustainable development, it is assumed that corporate sustainable development is achieved only at the intersection of the three principles. As a result, all three of the principles defined below are necessary conditions for corporate sustainable development.

Environmental integrity through corporate environmental management

Corporate environmental management is an effort by firms to reduce the size of their ‘ecological footprint.’ Every firm has an environmental impact, whether it is merely by lighting of buildings or, more significantly, through the waste and emissions generated by production processes. A number of taxonomies have been developed to describe corporate environmental management, ranging from the more reactive to the more proactive (Aragon-Correa, 1998). Pollution control or compliance refers to ‘end-of-pipe’ solutions, where the firm disposes its waste responsibly (Hart, 1995). In most cases, this involves adding physical equipment that filters toxins or contracting waste removal services (Russo and Fouts, 1997). Pollution prevention, on the other hand, reduces or eliminates waste through innovative processes or technologies applied throughout the production process (Klassen and Whybark, 1999). Through continuous improvement, the firm identifies inefficiencies and improves processes. In this way pollution prevention stimulates firms to develop superior resources and capabilities more so than pollution control processes (Russo and Fouts, 1997). Product stewardship shifts the focus from the firm’s processes to its products, in an effort to reduce their ‘cradle-to-grave’ impact (Hart, 1995). Products are designed to use fewer materials, toxic or otherwise, and to be disassembled for recycle or reuse at the end of their life. Sound corporate environmental management practices are likely to be related to strong corporate environmental performance.

Social equity through corporate social responsibility

Corporate social responsibility requires that firms embrace the economic, legal, ethical, and discretionary expectations of all stakeholders, not only financial shareholders (Carroll, 1979). Wood’s framework for socially responsible processes has achieved the greatest traction in business research (Hillman and Keim, 2001; Swanson, 1995; Waddock and Graves, 1997). Corporate social responsibility involves three processes: environmental assessment, stakeholder management, and social issues management (Wood, 1991). Environmental assessment or scanning enables firms to identify social, economic, and environmental issues and respond to them accordingly (Fahey and Narayanan, 1984). Through stakeholder management, firms respond to individuals, outside organizations, and even the natural environment (Starik, 1995) that have a legitimate stake in the organization (Freeman, 1984). An important aspect of stakeholder management, then, is building strong stakeholder relationships through transparent operations, representing stakeholder interests in decision-making, and distributing the value created by firms equitably among all relevant stakeholders. Social issues management is the process of addressing social issues, such as the decision not to employ child labor, not to produce socially undesirable products, and not to engage in relationships with unethical partners. While these practices may uphold social causes, they may not be consistent...
with the views of all stakeholders (Hillman and Keim, 2001). But, by acting in societal interests, the firm is acting responsibly. A high standard in corporate social responsibility is often related to high corporate social performance (Frederick, 1994).

_Economic prosperity through value creation_

Firms create value through the goods and services that they produce (Bowman and Ambrosini, 2000). Firms increase the value created by improving the effectiveness of those goods and services efficiently. Value is created, then, by producing new and different products that are desired by consumers, by lowering the costs of inputs, or by realizing production efficiencies (Conner, 1991; Porter, 1985). Firms may choose to sell their goods and services in the marketplace or trade them in kind. When the firm sells the goods or services for a price that at least exceeds the cost of those goods and services, the firm captures the value it creates and enhances its financial performance (Bowman and Ambrosini, 2000). But, high value creation is not always related to high financial performance. Market conditions or regulations through intense competition, for example, may erode the firm’s ability to capture value (Makadok, 2001). For example, Napster was not able to capture the value it had created through its web site portal that allowed users to share music. Cooperatives create value for their members, but do not capture that value directly through revenues. When a firm does create and capture value, it distributes this value to consumers through its goods and services, to shareholders through dividends and equity, and to employees through salaries.

**EXPLAINING THE CORPORATE SUSTAINABLE DEVELOPMENT**

In what follows, I develop resource-based and institutional explanations for corporate sustainable development. To select the most relevant explanations, I analyzed interviews of key informants. A description of these interviews and their analysis is provided in the methods section of this paper.

**Resource-based explanations**

The resource-based view argues that effective corporate strategies build rent-earning resources and capabilities. Firm resources can include tangible assets, such as the firm’s financial reserves, physical plant and equipment, and its raw materials; and intangible assets, such as the firm’s reputation, culture, and intellectual capital (Grant, 1991). Capabilities are the skills that firms develop to reproduce and manage these resources (Barney, 1995). The rent-earning potential of a firm’s resources and capabilities are determined by their scarcity, uniqueness, durability, inimitability, and non-substitutability, which ultimately determine the firm’s competitive advantage (Barney, 1995; Dierickx and Cool, 1989; Peteraf, 1993). These resources and capabilities are acquired in imperfect factor markets, and over time they develop further by the growth and resource acquisition paths taken by the firm (Barney, 1986; Teece, Pisano, and Shuen, 1997). As a result, the firm’s resources and capabilities are shaped by previous paths taken.

Resource-based rationales apply well to corporate sustainable development for several reasons: (1) corporate sustainable development has been shown to influence firm performance (Hart and Ahuja, 1996; Waddock and Graves, 1997); (2) corporate sustainable development requires investments of financial and/or human resources (Sharma and Vredenburg, 1998); and (3) new resource-based opportunities from corporate sustainable development are created through changes in technology, legislation, and market forces (Porter and van der Linde, 1995). In what follows, I identify three resource-based variables that may influence corporate sustainable development. These variables received the greatest support in interviews with organizational representatives (see Methods section).

**International experience**

International experience is developed by operating in, and depending upon, foreign markets. Through this experience, firms acquire knowledge from multiple jurisdictions, as well as develop capabilities in coordinating distant parts of the organization (Roth, 1995). Sustainable development practices vary within and among foreign jurisdictions because of differences in local regulations, community preferences, and even technologies. Firms with international experience can leverage knowledge acquired in different jurisdictions and develop a set of best practices based on their collective learning. For example, an interviewee spoke about
the need to have third-party audits in Australia and the opportunity to use that experience in Canada. Firms with international experience are often more adept than domestic firms at developing organizational structures and systems that allow coordination across different jurisdictions with different regulatory structures. For example, many multinational firms will have one person responsible for all environmental, health, and safety issues across all its international subsidiaries. Capabilities in systems integration are useful for sustainable development practices because of the wide range of functional areas to which sustainable development applies (Russo and Fouts, 1997). Finally, firms with international experience recognize the value of achieving high environmental and social standards in order to facilitate their license to operate in local countries (Bansal and Roth, 2000). For example, an interviewee from a mining company indicated that his experiences with the aboriginal people in Papua New Guinea made him more responsive to aboriginal issues in Canada. For these reasons, I propose:

Hypothesis 1: International experience will be positively associated with corporate sustainable development.

Capital management capabilities

Capital management capabilities are developed by managing physical assets and technologies. These capabilities are developed through a number of means. First, capital-intensive projects, such as those found in oil and gas firms, are likely to generate more pollution and have a more significant impact on the local community than the labor-intensive projects undertaken by service firms. Hence, firms with capital management capabilities are more likely to be aware of sustainable development issues. Second, pollution control and prevention activities require add-ons that filter toxins or the redesign of processes to reduce wastes (Russo and Fouts, 1997). Pollution prevention, in particular, requires employee involvement and empowerment, which is consistent with the social equity principle because it incorporates more stakeholders in decision-making. It also involves continuous improvement, which is consistent with environmental management systems. Third, avoiding industrial accidents which reduce the health hazards for employees and the local community often require investments in new technology (Klassen and Whybark, 1999). These factors, then, lead to the accumulation in the firm of capabilities associated with continuous improvement and process innovations, shown to be related to corporate sustainable development (Christmann, 2000; Klassen and Whybark, 1999). Some interviewees in the forestry industry illustrated this mindset with the examples of new saws, new mills, and new processes that use dioxin-free chlorines. Finally, firms with good capital management capabilities will attempt to adopt best practices and superior technologies in order to avoid expensive capital refits associated with changing environmental and social regulations. As a result, I propose:

Hypothesis 2: Capital management capabilities will be positively associated with corporate sustainable development.

Organizational slack

Organizational slack is ‘that cushion of actual or potential resources which allows an organization to adapt successfully to internal pressures for adjustment or to external pressures for change’ (Bourgeois, 1981: 30). It allows firms to make investments in resources and capabilities that may not have an immediate pay-off (Levinthal and March, 1981). Slack can help the firm develop the resources and capabilities necessary for improving the speed and degree to which it can adapt to its external environment (Cheng and Kesner, 1997). Interviewees frequently spoke about the time and money required to invest in sustainable development practices. Investments were required in new technologies, in conducting environmental and social audits, in implementing new health, safety, and environmental programs, and in the remediation of exploited land. Many respondents noted that large firms, firms with extra financial resources, or large environmental health and safety departments were more likely to implement new practices. The financial benefits that accrue from sustainable development can often be long term and diffuse, for example, through improved corporate reputation or social capital. In these circumstances, organizational slack permits firms the latitude to seek new solutions to corporate sustainable development creatively.
Hypothesis 3: Organizational slack will be positively associated with corporate sustainable development.

Institutional explanations

Institutional theory emphasizes the social context within which firms operate. Although firms have discretion to operate within institutional constraints, failure to conform to critical, institutionalized norms of acceptability can threaten the firm’s legitimacy, resources and, ultimately, its survival (DiMaggio and Powell, 1983; Oliver, 1991; Scott, 1987). Institutional norms can penetrate the social context and become so intractable and taken for granted that firms are not always conscious of conforming to them (Meyer and Rowan, 1977). Firms may also respond strategically to institutional norms, recognizing that conforming will result in improved access to resources (Oliver, 1991; Suchman, 1995). Institutions can include the government, professional associations, public opinion, or the media.

Institutional theory is relevant to corporate sustainable development because: (1) individual value and belief systems judge a firm’s commitment to sustainable development, affecting perceptions of the firm’s acceptability and legitimacy (Bansal and Roth, 2000); (2) actors with differences of opinion on issues of corporate sustainable development will dialogue and debate to establish norms and common beliefs (Hoffman, 1999; Wade-Benzoni et al., 2002); and (3) elements of sustainable development are becoming institutionalized through regulations and international agreements (Frank, Hironaka, and Schofer, 2000). Meyer and Rowan assert that: ‘as the issues of safety and environmental pollution arise, and as relevant professions and programs become institutionalized in laws, union ideologies and public opinion, organizations incorporate these programs and professions’ (Meyer and Rowan, 1977: 345). Jennings and Zandbergen (1995) argue that the type of institutional pressure, be it coercive, mimetic, or normative, influences the rate at which sustainable development practices diffuse among firms. These three pressures are described below.

Fines and penalties

Institutional processes can work through coercive pressures imposed by institutions that directly influence firms (DiMaggio and Powell, 1983). Failing to comply to these pressures, particularly those imposed by urgent and powerful stakeholders, can result in loss of earnings, a damaged reputation, or even loss of the license to operate (Oliver, 1991; Pfeffer and Salancik, 1978). Every person interviewed spoke to the role of government in influencing corporate sustainable development. Firms that have previously incurred fines are scrutinized closely by the government and special interest groups for further indiscretions because of their loss of legitimacy (Meyer and Rowan, 1991). In an effort to deflect this scrutiny, these firms will subscribe to a higher standard of corporate sustainable development. Firms that have been subject to fines and penalties will also become more sensitive to acceptable sustainable development practices and be more informed of what they need to do to avoid further infractions. Based on this logic, I argue that:

Hypothesis 4: Fines and penalties will be positively associated with corporate sustainable development.

Mimicry

Firms will actively attempt to reduce the level of uncertainty in their organizational environment by imitating the structures and activities of similar firms (DiMaggio and Powell, 1983). Sustainable development is marked by considerable uncertainty because of changing expectations, the complexity of the problem, and the difficulty of its resolution. Through imitation, firms may capitalize on the successes of their peers. Firms will likely mimic the visible and well-defined activities of others, such as environmental audits and certified environmental management systems, especially when these activities have been reported to outsiders. Firms that mimic their peers are less likely to suffer public or financial sanctions because of the legitimacy that is often conferred when many players are engaged in the same practice. Interviewees often said that their industry association and the development of codes of conduct were important factors in influencing change and there was a common sentiment that efforts towards sustainable development had to be undertaken collectively.
Hypothesis 5: Mimicry will be positively associated with corporate sustainable development.

Media attention

The media can play an important role in mobilizing social movements such as environmental interest groups. It can also assign importance to some issues and expose gaps in others. In doing so, it becomes part of the institution-building process, shaping the norms of acceptable and legitimate sustainable development practices. According to Simon (1992), the media is the main source of environmental information. The media not only plays a passive role in shaping institutional norms, but also a more active one by choosing the stories worth reporting and framing them to reflect editorial values. Empirical studies have shown that the media has been particularly influential on corporate environmental responses (Bansal and Clelland, 2004; Bansal and Roth, 2000; Bowen, 2000; Henriques and Sadorsky, 1996). The total amount of media coverage raises the firm’s visibility, inviting further public attention and scrutiny. The threat of negative media publicity can apply coercive pressure to firms to commit to sustainable development by eroding the legitimacy of a firm if the media finds some practices unacceptable. In addition, negative coverage can also incite environmental interest groups and other stakeholders to lobby organizations and government to change business practices. Many interviewees spoke to the importance of the media in influencing the opinions of special interest groups. Several interviewees also indicated that while they did not react to media exposure, they avoided bringing either positive or negative attention to the firm.

Hypothesis 6: Media attention will be positively associated with corporate sustainable development.

EXPLAINING TIME-RELATED EFFECTS

The resource-based view and institutional theory each provide distinct insights into the organizational determinants of corporate sustainable development. The intersection and interaction of these two logics can further illuminate our understanding of a firm’s commitment to sustainable development, particularly over time. In what follows, hypotheses are developed that explain when and why firms commit to sustainable development.

Institutional pressures are likely to be instrumental in the early stages of corporate sustainable development because of the ambiguity and significant externalities associated with sustainable development. Externalities can lead to high-profile events, such as the release of the first pictures of the ozone hole, the Exxon Valdez oil spill, the Union Carbide gas leak, and the decommissioning of Shell’s Brent Spar. These events raise public interest in environmental concerns and are likely to elicit public and regulatory pressures. Hoffman (1999) and Richards and Gladwin (1999) show that regulations and the media are important coercive pressures that move firms towards sustainable development when the issue is first recognized. It is important for the firm to protect organizational performance by showing commitment to sustainable development and developing appropriate institutional relationships in the early years when institutional pressures are high (Oliver, 1997a).

In early years, some firms may also see the opportunity to generate rents from resources and capabilities because of imperfectly competitive strategic factor markets (Barney, 1986; Teece et al., 1997) created by the ambiguity of the meaning and impact of sustainable development. If the three principles of sustainable development are congruent with the firm’s existing cultural norms and values, firms will likely be open to sustainable development. However, not all firms will agree on the full value of the innovation, so not all firms will commit to it. Some firms will aggressively innovate and capitalize on the rewards of sustainable development. Others will wait until there is less uncertainty, even if they have the requisite resources and capabilities on which to build. And there will be other organizations that lack the organizational slack to commit to sustainable development practices.

Over time, firms will imitate other firms, facilitating the institutionalization of sustainable development. Organizational and societal fields will become interconnected and their boundaries blurred through advances in technology, globalization and professionalization (Jennings and Zanderbergen, 1995; Scott and Meyer, 1991). As organizational and societal fields become more interconnected, normative and mimetic pressures help
to diffuse norms and integrate corporate practices. Firms will mimic each other in order to reduce uncertainty and to capture the economic rents created by their competitors (Jennings and Zandbergen, 1995). The ambiguity of the meaning, measurement, and impact of sustainable development is reduced as the concept gains greater objectivity and exteriority through the discourse and behaviors of social actors. With objectivity and exteriority comes a taken-for-grantedness which further enhances institutional processes (Tolbert and Zucker, 1996).

Movement towards the shared understanding of sustainable development will reveal competitive opportunities (Hoffman, 1999). The opportunity to differentiate products based on valued dimensions and to build corporate reputations will become more evident as stakeholders improve their understanding of sustainable development. As nation states impose tighter and more complex regulations, particularly with the depletion of their natural resources, a firm’s international experience will become helpful in seeking sustainable development. Natural resources will become scarcer in supply, which may lead to higher prices for goods such as energy, paper, metals, and other commodities. As prices increase, firms with slack resources will be able to develop resources and capabilities that are unique and imitable, because not all firms will have slack resources. Rent-earning resources and capabilities and escalating institutional concerns are self-reinforcing and interrelated. By responding to both the resource-based and institutional environments and by building the relationships that are stimulated through sustainable development, firms may see the opportunity to enhance their organizational performance (Oliver, 1997a). Based on these arguments, I predict the following:

Hypothesis 7a: Fines and penalties and media attention will be of declining importance in explaining a corporate sustainable development over time.

Hypothesis 7b: Mimicry will be of increasing importance in explaining corporate sustainable development over time.

Hypothesis 7c: Resource-based variables will explain corporate sustainable development in both early and later time periods.

METHODS

Sample

The sample was drawn from Canada’s forestry, mining, and oil and gas industries for two reasons. First, I selected industries in which corporate sustainable development was relatively high in order to generate a non-zero dependent variable. Prior research indicates that firms in visibly polluting sectors such as the primary producing industries are responsive to environmental issues (Bansal and Roth, 2000; Bowen, 2000). Second, the cluster of industries needed to be limited because practices associated with sustainable development are often context-specific; yet there needed to be a large enough number of industries from which to draw a sufficiently large sample and allow variance in the dependent variable. The industries included here were considered relatively similar to each other by Natural Resources Canada (1996) because of their orientation to primary goods extraction, heavy operating costs, the risks their activities pose to the natural environment, and their level of media scrutiny.

Restricting the sample to these three industries may limit the generalizability of the findings. Firms in the primary goods-producing industries are older, more capital-intensive, and more visible than firms in the manufacturing or services sectors. As a result, they are more likely to experience institutional pressures and find resource-based opportunities in sustainable development practices. The restricted sample limits the generalizability of the findings in a number of ways. First, the operationalization of the dependent variable was induced through the sample, so conceptions of sustainable development may differ in other industries. Second, the independent variables may differ based on the industry sampled. For example, capital management capabilities will likely be of less importance in industries that are less capital-intensive. The dependent variable, model, and findings should not be generalized without due consideration of these limitations. However, a restricted sample does add more power to the findings, because uncovering findings in a sample in which the variance in the independent variables is restricted is more difficult than when the variance is large.

Following the lead of Tolbert and Zucker (1983), 4 years of panel data (in this case: 1986, 1989,
1992, 1995) were included to assess changes in corporate sustainable development. The earliest year was chosen because it preceded the year that sustainable development was popularized by the first UNCED conference and the Montreal Protocol. Early discussions with forestry officials indicated that there was little awareness of sustainable development prior to 1987, and the search of articles in Proquest and the Globe and Mail revealed only one mention of sustainable development prior to 1986. The final year of analysis, 1995, was the last year for which all companies completed an annual report during the data collection period.

Only publicly traded firms were sampled because annual reports were used as a data source. The final sample was formed by the number of companies for which a full set of annual reports existed from 1986, 1989, 1992, and 1995 in the three sectors. There were 45 companies in total. The average firm age in 1995 was 39 years. The oldest firm was in the forestry industry and had been operating for 52 years. The youngest firm in the sample was in the oil and gas industry, operating for 29 years. The average firm size in 1995 was Canadian $1.5 billion assets, the largest of which was an oil and gas firm with Canadian $2.3 billion in assets.

**Dependent variable**

*Corporate sustainable development*

To operationalize corporate sustainable development, a set of items that described the variable was required. The items needed to be grounded in theory and relevant to the firms in the sample during the research period. A three-step process was developed to achieve these objectives. In the first step, sustainable development was defined, as shown in the first full section of this paper, based on a review of academic and practitioner-oriented literature in the area (cf. Gladwin et al., 1995; Hart, 1995; IISD, 1992; Pearce et al., 1989; Schmidheiny, 1992a; WCED, 1987).

In the second step, a comprehensive list of items that characterize corporate sustainable development was developed by interviewing practitioners and by reviewing the annual reports of companies in the sample. Open-ended, semi-structured interviews were conducted in 1995 and 1996 with the Chief Foresters of eight of the nine largest forestry companies in Canada and representatives of three forestry industry organizations in British Columbia. Directors and Vice Presidents of the environmental, health and safety departments of two mining companies and two oil and gas companies were later interviewed to generalize the items to the entire sample. Respondents were asked to define sustainable development, describe how sustainable development had affected their company and industry, and provide reasons for why their organization committed to sustainable development. The interviews were not audio recorded because the topic may have been sensitive to interviewees; however, detailed notes were taken during the interview and transcribed immediately afterwards. Over 100 pages of single-spaced, typed notes were accumulated. Almost all interviews exceeded the allotted 1.5 hours. The interview transcripts were then coded independently by the author and by a researcher unfamiliar with the hypotheses, as recommended by Niskala and Pretes (1995), to develop a list of items that define and explain corporate sustainable development.

To further add to the list of items that operationalize corporate sustainable development, the author and an independent researcher not familiar with the hypotheses generated a list of items inductively from a sample of the annual reports. Each researcher independently analyzed 24 annual reports: two reports in each sector for each of the four panels. In this analysis, the researcher looked for examples of organizational practices that were consistent with corporate sustainable development. Any activity identified by either coder that was consistent with the three principles of sustainable development was included in the list. Activities that fell within the definition of one principle of sustainable development, but seemingly inconsistent with either of the other two, were excluded. For example, value creation activities could not come with an obvious environmental or social cost. Given that the two lists were generated independently, many of the items used different words to refer to the same items. It was important, then, to develop a single list of items that represented corporate sustainable development.

Following the lead of O’Reilly, Chatman, and Caldwell (1991) in their development of a list of organizational values, the list of items identified by the two coders was pared down based on the four following criteria: (1) generality—the item needed to apply to most firms independent of the product, industry, size, or country; (2) discriminability—the item was unique and fit
more clearly into one category than the others; (3) readability—the item was easy to understand; (4) non-redundancy—the item could not be substituted with another item. Seven doctoral students with experience in general management research were provided with the definition of sustainable development and its three principles and asked to screen the list according to these four criteria. The students suggested that some items be deleted if they overlapped with other items, recommended edits to some items that were not easy to understand, and flagged items that covered more than one sustainable development principle. Based on their suggestions, several of the items were changed.

In the third step, the degree to which the items reliably reflected the three principles for sustainable development was tested. To do so, the assistance of six researchers in the area of corporate sustainable development was solicited. These researchers were provided with the definition of sustainable development developed in step one and the randomized list of items developed in step two. Each researcher was asked to complete the following task: ‘Please read the three-page definition of sustainable development that is being used for this research project. For each item in the Table, please assign an EI, EP, or SE to reflect environmental integrity; economic prosperity, or social equity respectively. Each item can be assigned only one code. If you believe there are any missing items, please write them in.’ For all of the items, at least four judges agreed on the code. I used Anderson and Gerbing’s (1991) measure of substantive validity to test whether the items were theoretically connected to the construct. All items met the condition. The list of the final items used to define corporate sustainable development and their associated criteria are provided in Table 1.

To calculate the score for sustainable development, the following calculation was used. Since all three principles represented necessary conditions for sustainable development, for a firm to have a corporate sustainable development score of greater than zero at least one item in each of three principles had to be identified in the company’s annual report. The total number of items mentioned in the annual report was summed in each category. Given that the final number of items within each category could be considered arbitrary, the number

<table>
<thead>
<tr>
<th>Table 1. Codes describing the principles of sustainable development</th>
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<tbody>
<tr>
<td><strong>Environmental integrity</strong></td>
</tr>
<tr>
<td>1. Mined/manufactured products that have a less environmentally harmful impact than in previous years or than its competitors</td>
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<tr>
<td>2. Mined/manufactured products with less environmentally damaging inputs than in previous years or than its competitors</td>
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<tr>
<td>3. Chose inputs from sources that are remediated or replenished</td>
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<tr>
<td>4. Reduced environmental impacts of production processes or eliminated environmentally damaging processes</td>
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<td>5. Eliminated or reduced operations in environmentally sensitive locations</td>
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<td>6. Attempted to reduce likelihood of environmental accidents through process improvements</td>
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<td>7. Reduced waste by streamlining processes</td>
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<td>8. Used waste as inputs for own processes</td>
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<td>9. Disposed waste responsibly</td>
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<tr>
<td>10. Handled or stored toxic waste responsibly</td>
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<td><strong>Economic prosperity</strong></td>
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<tr>
<td>1. Worked with government officials to protect the company’s interests</td>
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<td>2. Reduced costs of inputs for same level of outputs</td>
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<tr>
<td>3. Reduced costs for waste management for same level of outputs</td>
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<td>4. Differentiated the process or product based on the marketing efforts of the process/product’s environmental performance</td>
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<tr>
<td>5. Sold waste product for revenue</td>
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<tr>
<td>6. Created spin-off technologies that could be profitably applied to other areas of the business</td>
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<tr>
<td><strong>Social equity</strong></td>
</tr>
<tr>
<td>1. Considered interests of stakeholders in investment decisions by creating a formal dialogue</td>
</tr>
<tr>
<td>2. Communicated the firm’s environmental impacts and risks to the general public</td>
</tr>
<tr>
<td>3. Improved employee or community health and safety</td>
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<tr>
<td>4. Protected claims and rights of aboriginal peoples or local community</td>
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<tr>
<td>5. Showed concern for the visual aspects of the firm’s facilities and operations</td>
</tr>
<tr>
<td>6. Recognized and acted on the need to fund local community initiatives</td>
</tr>
</tbody>
</table>
of reported items for each principle was divided by the total number of possible items for that principle. For example, if a firm satisfied five of the ten items for environmental integrity and two of the six items for social equity, its corporate sustainable development score would be \((5/10 + 1/6 + 1/6)\).

Data were extracted from the annual reports of each company in the target year. All reports were coded by a single rater. To test for reliability, a random selection of 24 annual reports was coded by an independent researcher. Both researchers were familiar with the definition of sustainable development because it would improve the integrity of the coding process and help to align perceptions, but were not familiar with the hypotheses to avoid coding bias. Each factor was coded as ‘0’ or ‘1,’ where ‘0’ represents no indication of the item and ‘1’ represents some presence. The codes were compared and inter-rater reliability was satisfactory based on Cohen’s kappa (0.79), so only the codes from the primary coder were used to retain consistency in codes.

The use of annual report data to assess the presence of an issue has been criticized on two grounds: annual reports reflect impression management rather than accurate disclosure (McGuire, Sundgren, and Schenewein, 1988; Salancik and Meindl, 1984; Wiseman, 1982), and there may be inconsistencies in the disclosure (Ingram and Frazier, 1980). In spite of these weaknesses, annual reports provided the most reliable data source for this study for several reasons. First, assessments of social responsibility from annual reports have been shown to be consistent with the evaluations by third-party agencies (Guthrie and Parker, 1989; Meek, Roberts, and Gray, 1995; Niskala and Pretes, 1995). Second, annual reports are unobtrusive, so that firms cannot engage in research-specific posturing as they can with interviews or surveys. Finally, annual reports provide an opportunity to collect historical, time-sensitive data that are only otherwise available through employee recall, which is considered unreliable when evaluating the timing of an adoption decision (Dobbin et al., 1988; Van de Ven and Huber, 1990). As Miller and Friesen (1980) write, ‘The only way to perform longitudinal research on many organizations is through detailed, published reports containing continuous history.’

**Independent variables**

To identify the key independent variables, I applied grounded theory, which accommodates primary data and extant theory (Glaser and Strauss, 1967; Strauss and Corbin, 1990). After reviewing relevant research in sustainable development, I analyzed the comments made in the interviews described above and reconciled those comments with what was reported in existing research. A researcher not familiar with the resource-based view and institutional theory coded the interview notes for potential explanatory factors. She also counted the occurrences that each of those factors was mentioned in the interviews, and retained the seven most frequently mentioned factors. Then, I reviewed the interview notes and reworked these factors and relabeled them so that they were consistent with the existing theory. This two-step process helped to ensure that theoretical biases were not introduced into the data analysis, but achieved consistency with received theory. Table 2 illustrates how these variables were articulated by interviewees.

**International experience**

Two measures were used for international experience for each panel: the number of countries in which the firm operates and percentage of foreign sales relative to total sales. The Canadian Institute of Chartered Accountants Handbook requires that firms report all significant international sales by geographic segments based on the similarity of factors relevant to their business. The data were right censored at 10 countries, because the reliability of the data for larger numbers was questionable. For foreign sales, the percentage of sales outside of Canada was divided by the total sales as reported in the segment data of the financial statements. Following the lead of Sanders and Carpenter (1998), each variable was normalized to a value between zero and one and summed to derive a single variable for international experience with a theoretical maximum value of two.

**Capital management capabilities**

Capital intensity was used to proxy capital management capabilities. Capital intensity was measured by the value of property plant and equipment.
Table 2. Illustrative comments supporting independent variables

**International experience**
In Australia we are really trying to figure out how to do third-party environmental audits. It is difficult to manage each of our mines differently, so we are trying to reach some sort of common standard.
We have a VP of community development at our site in Peru and we learned from that experience that we have to be involved with the community. We have a community consultation group on this project in Peru and it has helped us to develop better practices here.
We use the same process internationally as in Canada.
We must meet standards from the United States and here.

**Capital management capabilities**
There have been radical changes in timber harvesting due to our capital and technology investments.
From a capital investment perspective, we have had to make investments that are not necessarily wise, but they are what the public demands.
A small machine from Scandinavia is more sensitive to the environment and more productive, so we have tried to move to this.
We have pressure put on us to maintain jobs but we need technology to move towards sustainable development.

**Organizational slack**
People just react because we are so busy, but the ground work comes from the firms that know what is going on and champion a project.
The firm is asked to pay for benefits reaped by the public.
In the long term, sustainable policies provide a competitive advantage, but with good practices there may be losses in the short term.
Environmental policies and practices take up a lot of time.

**Fines and penalties**
The threat of prosecution is an incentive to be conscious of the environment.
The government has imposed new legislation rather than worked with industry.
Regulation is the basic main driver (not the case for all companies, especially small companies).
Legislation is the biggest driver.

**Mimicry**
The Forest Resource Commission (FRC) recognized the problems and issues facing the forest industry and in 1991 composed a report that represented all firms.
We are the same as everyone else, we basically just to do it, not because we understand what we are doing or because it is beneficial to us.
Petrocan is now following us with respect to working with environmental groups.
For the global mining initiative, a number of CEOs got together and said that as an industry they saw a push towards becoming sustainable.

**Media attention**
One bad move can develop enough negative publicity that can really hurt you.
The media has had a large impact because the main story is conflict.
We are very aware of the media and don’t always get the play that we would like out of things.
There has also been a huge increase in public knowledge and perception of what is going on in the forests.

after depreciation divided by sales. This mirrors the choice of capital intensity measures used by Sharma and Kesner (1996), Lubatkin and Chatterjee (1994), and D’Aveni and Ilinitch (1992). The fourth root of capital intensity was taken to generate a normal distribution.

**Organizational slack**
The measure of organizational slack is used to recognize extra liquidity that could be invested in sustainable development activities. Current assets over current liabilities was used in the analysis for each panel, which has also been used by Schuler (1996). The inverse of organizational slack was used because it yielded the most normal distribution.

**Fines and penalties**
This variable included two components that were summed. The first component was the number of times that the firm incurred a fine or penalty under the Canadian Environmental Protection Act (CEPA) and the Canadian Fisheries Act (CFA). Fines imposed in year \( t - 1 \) and \( t \) were included.
because both would likely influence corporate sustainable development in year $t$. The second component was the number of fines or penalties disclosed in the annual report that were not covered under CEPA and CFA.

**Mimicry**

This variable was coded ‘1’ if the following conditions were met: the firm conducted an environmental audit in that year; the firm had not been assigned a ‘1’ in the past; and over 20 percent of firms in the prior panel for the industry conducted an environmental audit. The 20 percent rule was applied because Fligstein (1985) showed that firms were more likely to adopt a multidivisional form once industry adoption rates surpassed 20 percent. An environmental audit could include a formal or informal audit, conducted by an internal audit group or a consultant. Data were extracted from annual reports.

**Media attention**

Media attention incorporated two measures: (1) the total number of articles that included a statement about the company and their environmental issues, which was labeled ‘total media’; and (2) the number of articles about the company with a negative aspect of their environmental practices, which was labeled ‘negative media.’ The articles were extracted from the computerized databases of two of Canada’s national newspapers: the Globe and Mail and the Financial Post. The search used keywords that included the company name and signals for sustainable development (sustainable development, environmental, pollution, and toxic) for articles in the year prior to and the year of the panel. All relevant articles were included in total media. Among the relevant articles, those that had a negative orientation were identified. Eighty of the articles were coded by a different researcher and an acceptable Cohen’s kappa coefficient of 0.87 was obtained for negative media. In total, 1343 articles were extracted, of which 380 were considered negative. As the distributions of both measures were highly skewed, with many firms with no articles, ‘1’ was added to both measures, the natural log of each was taken, and then summed to produce the final variable.

**Control variables**

**Firm size**

Larger firms tend to be more visible and attract more media and stakeholder scrutiny, which influences both their legitimacy and their reputation (Fombrun, 1996; Suchman, 1995). Given that both resource-based and institutional processes work through firm size, it was treated as a control variable. The natural log of total assets was used for company size. Transforming total assets to the log of total assets was used to achieve a simple linear structure, constant variance, and normal distribution (Cox and Snell, 1981).

**Financial performance**

Prior researchers have argued that environmental management and corporate social responsibility are related to financial performance (Klassen and McLaughlin, 1996; McGuire et al., 1988). As a result, return on equity was used as a proxy of financial performance.

**Data analysis**

The data included 45 firms over four panels, allowing the use of time series cross-sectional data analysis techniques. This methodology is superior to analyzing cross-sectional data because it controls for the confounding effect of time-invariant and company-specific variables, such as organizational age, which are omitted from the regression model, (Wiersema and Bowen, 1997). Prior to testing the model, I visually analyzed all the variables and their bivariate relationships to ensure that there were no anomalies in the data. To test the model, the software package STATA was used. The results of the Hausman specification test suggested that a fixed-effects model was appropriate. Hypotheses 1–6 were tested using a single model with all of the independent and control variables to predict corporate sustainable development. To test Hypotheses 7a, 7b, and 7c, a linear trend variable was introduced with values from one to four to represent each contiguous panel. To test the hypotheses, the coefficients of the interaction between the hypothesized variable and the linear trend variable were evaluated.
RESULTS

Table 3 provides the means, standard deviations, and correlations for the dependent and independent variables. The descriptive statistics have been reported for each panel because the relatedness of the variables over time exaggerates the bivariate correlations if the data are pooled.

Table 4 reports descriptive statistics for corporate sustainable development over the research period for each industry and for each of the sustainable development principles. The mean of corporate sustainable development was significantly different \( (F = 11.88; p < 0.001) \) in each panel and increasing among the four panels. It is not surprising that sustainable development was increasing over time, given the inherent bias introduced by anchoring the operationalization of this dependent variable in the final panel. Corporate sustainable development was also significantly different over time among forestry and mining firms \( (F = 11.89 \text{ and } F = 6.46 \text{ respectively}) \), but the changes were less pronounced in the oil and gas sector \( (F = 1.48) \). Firms in the oil and gas industry appear to have lagged behind mining firms and the forestry firms, the latter of which had the highest level of corporate sustainable development in 1995. Table 4 also shows that environmental integrity and economic prosperity increased from 1986 to 1992 but decreased slightly from 1992 to 1995, which suggests that corporate sustainable development was being fueled by commitment to the principle of social equity.

Table 5 speaks to the hypotheses. Of the resource-based variables, only international experience was significant and positive as predicted by Hypothesis 1. Although the coefficients for capital management capabilities and organizational slack were positive as predicted in Hypotheses 2 and 3 respectively, the coefficients were non-significant. Among the institutional variables, mimicry and media attention were significant and positive as predicted by Hypotheses 5 and 6 respectively. Finally, although the coefficient for fines and penalties was positive as predicted by Hypothesis 4, it was not significant. In terms of control variables, this study confirmed the belief that larger firms are more likely to commit to sustainable development than smaller firms. Financial performance, however, was significant and negatively related to corporate sustainable development.

Hypotheses 7a, 7b, and 7c addressed the time-related effects of the independent variables. As predicted in Hypothesis 7a, the main effect for media was significant and its trend over time was negative, suggesting a significantly decreasing impact of media on corporate sustainable development over time. Both the main effect and time-related effects of fines and penalties were non-significant. The coefficient for the time-related effect of mimicry was non-significant. Finally, the only resource-based variable that exhibited change over time was organizational slack; its importance declined over time. There were no significant changes in the influence of international experience and capital management capabilities over time. These findings partially support Hypotheses 7a, 7b, and 7c.

DISCUSSION AND CONCLUSIONS

This study aimed to explain why firms commit to sustainable development and the reasons that commitment changes over time. In doing so, this paper identified how the three principles of sustainable development were incorporated by Canadian oil and gas, forestry, and mining firms from 1986 to 1995. To operationalize the principles, interviews of industry members involved with sustainable development were conducted and company annual reports were reviewed. The data revealed that corporate sustainable development increased from 1986 to 1995, fuelled primarily by greater concern for social equity especially in later time periods. This suggests that firm commitment to social equity developed later than their commitment to economic prosperity and environmental integrity.

As expected, the study also showed that international experience, media pressure, mimicry, and organizational size were positively related to corporate sustainable development. Surprisingly, return on equity was negatively related to the dependent variable, which is counter to the results of prior research (e.g., Russo and Fouts, 1997; Waddock and Graves, 1997). The direction of causality cannot be deduced from this analysis; in other words, it is not clear if corporate sustainable development causes poor firm performance or firms performing poorly are more likely to commit to sustainable development. Prior research into the relationship between
### Table 3. Descriptive statistics and Pearson correlations

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pooled (all years)</th>
<th>1986</th>
<th>1989</th>
<th>Correlations (1986 above diagonal, 1989 below)</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6a</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable development</td>
<td>4.73 4.37</td>
<td>1.94</td>
<td>2.33</td>
<td>Mean 4.73 S.D. 4.37</td>
<td>0.34* −0.42** −0.36   −0.08 0 0.62** 0.56** −0.05</td>
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<tr>
<td>International experience</td>
<td>0.42 0.46</td>
<td>0.36</td>
<td>0.42</td>
<td>Mean 0.42 S.D. 0.41</td>
<td>−0.48** −0.43** 0.16 0 0.13 0.14 −0.06</td>
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<tr>
<td>Capital mgt capabilities</td>
<td>1.07 0.31</td>
<td>1.10</td>
<td>0.38</td>
<td>Mean 1.07 S.D. 0.32</td>
<td>−0.29† 0.64** −0.08 0 −0.23 −0.50** −0.26</td>
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<tr>
<td>Organizational slack</td>
<td>0.76 0.44</td>
<td>0.74</td>
<td>0.42</td>
<td>Mean 0.76 S.D. 0.41</td>
<td>−0.15 0.37* −0.03 0 −0.33* −0.51** −0.19</td>
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<tr>
<td>Fines and penalties</td>
<td>0.11 0.34</td>
<td>0.02</td>
<td>0.15</td>
<td>Mean 0.11 S.D. 0.38</td>
<td>0.06 −0.23 −0.11 0 −0.10 0.02 0.00</td>
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<tr>
<td>Mimicryb, c</td>
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<td>0</td>
<td>0</td>
<td>Mean 0.13 S.D. 0.29</td>
<td>−0.22 −0.01 0.14 0.32 0.00 0.00</td>
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<tr>
<td>Media</td>
<td>1.65 1.99</td>
<td>1.17</td>
<td>1.81</td>
<td>Mean 1.65 S.D. 2.28</td>
<td>0.18 −0.22 −0.07 0.35* 0.52** 0.66** −0.08</td>
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<tr>
<td>Firm size</td>
<td>6.25 1.74</td>
<td>5.64</td>
<td>2.03</td>
<td>Mean 6.25 S.D. 1.33</td>
<td>0.24 −0.09 0.02 0.14 0.41** 0.69** 0.03</td>
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<tr>
<td>Financial performance</td>
<td>0.33 0.96</td>
<td>0.47</td>
<td>0.94</td>
<td>Mean 0.33 S.D. 0.45</td>
<td>0.14 −0.13 −0.13 −0.11 −0.09 −0.07 0.21</td>
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<table>
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<th>Correlations (1992 above diagonal, 1995 below)</th>
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<th>4</th>
<th>5</th>
<th>6a</th>
<th>7</th>
<th>8</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Sustainable development</td>
<td>6.00</td>
<td>4.56</td>
<td>Mean 6.00 S.D. 4.57</td>
<td>−0.24 −0.28† 0.17 0.40** 0.53** 0.48** −0.12</td>
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<tr>
<td>International experience</td>
<td>0.43</td>
<td>0.47</td>
<td>Mean 0.43 S.D. 0.47</td>
<td>−0.09 −0.31* −0.05 0.37* 0.24 0.27† −0.15</td>
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<td>Capital mgt capabilities</td>
<td>1.06</td>
<td>0.27</td>
<td>Mean 1.06 S.D. 0.27</td>
<td>−0.23 −0.16 0.38** −0.09 0.00 −0.15 0.20 0.21</td>
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<td>0.43</td>
<td>Mean 0.80 S.D. 0.38</td>
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<td>Fines and penalties</td>
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<td>Mean 0.16 S.D. 0.34</td>
<td>0.28† −0.17 −0.09 −0.12 0.15 0.22 −0.06</td>
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<tr>
<td>Mimicryb, c</td>
<td>0.29</td>
<td>0.46</td>
<td>Mean 0.29 S.D. 0.37</td>
<td>−0.05 0.02 0.12 0.11 0.01 0.21 0.36* 0.17</td>
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<td>Media</td>
<td>1.64</td>
<td>1.83</td>
<td>Mean 1.64 S.D. 1.89</td>
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<td>6.37</td>
<td>1.54</td>
<td>Mean 6.37 S.D. 1.34</td>
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<td>Financial performance</td>
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* n = 180; † p < 0.10; * p < 0.05; ** p < 0.01
b Categorical variable, so means and S.D. not shown.
c Zero (constant) in 1986.
Table 4. Descriptive statistics of corporate sustainable development over time

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Pooled (n)</strong></td>
<td>180</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>11.88***</td>
</tr>
<tr>
<td>Mean</td>
<td>4.73</td>
<td>1.94</td>
<td>4.42</td>
<td>6.00</td>
<td>6.55</td>
<td></td>
</tr>
<tr>
<td>S.D.</td>
<td>4.37</td>
<td>2.33</td>
<td>4.00</td>
<td>4.56</td>
<td>4.73</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>0–17.11</td>
<td>0–8.80</td>
<td>0–14.67</td>
<td>0–14.91</td>
<td>0–17.11</td>
<td></td>
</tr>
<tr>
<td><strong>By industry</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td><strong>Forestry (n)</strong></td>
<td>60</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>15</td>
<td>11.89***</td>
</tr>
<tr>
<td>Mean</td>
<td>7.35</td>
<td>3.05</td>
<td>7.61</td>
<td>9.21</td>
<td>9.55</td>
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<tr>
<td>S.D.</td>
<td>4.19</td>
<td>1.99</td>
<td>3.38</td>
<td>3.21</td>
<td>4.42</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>0–17.11</td>
<td>0–6.60</td>
<td>1.96–14.67</td>
<td>3.91–14.91</td>
<td>2.69–17.11</td>
<td></td>
</tr>
<tr>
<td><strong>Mining (n)</strong></td>
<td>48</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>6.46***</td>
</tr>
<tr>
<td>Mean</td>
<td>4.36</td>
<td>1.30</td>
<td>2.93</td>
<td>6.15</td>
<td>7.07</td>
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</tr>
<tr>
<td>S.D.</td>
<td>4.28</td>
<td>2.09</td>
<td>2.88</td>
<td>4.97</td>
<td>4.12</td>
<td></td>
</tr>
<tr>
<td>Range</td>
<td>0–13.44</td>
<td>0–6.36</td>
<td>0–7.09</td>
<td>0–13.44</td>
<td>1.22–12.22</td>
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<tr>
<td><strong>Oil &amp; Gas (n)</strong></td>
<td>72</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>1.48</td>
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<tr>
<td>Mean</td>
<td>2.78</td>
<td>1.45</td>
<td>2.74</td>
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<td>0–8.80</td>
<td>0–9.53</td>
<td>0–10.51</td>
<td>0–14.42</td>
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<td><strong>By principle</strong></td>
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<tr>
<td>Mean</td>
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<td>1.80</td>
<td>2.96</td>
<td>2.93</td>
<td>11.65***</td>
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<tr>
<td>S.D.</td>
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<td>1.22</td>
<td>1.84</td>
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<td>2.04</td>
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<tr>
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<td>0–5</td>
<td>0–7</td>
<td>0–7</td>
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<tr>
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</tr>
<tr>
<td>Mean</td>
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<td>0.40</td>
<td>1.04</td>
<td>1.36</td>
<td>1.31</td>
<td>6.28***</td>
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<tr>
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<td>0–4</td>
<td>0–5</td>
<td>0–5</td>
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</tr>
<tr>
<td>Mean</td>
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<td>1.47</td>
<td>1.82</td>
<td>2.31</td>
<td>9.40***</td>
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<tr>
<td>S.D.</td>
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<td>1.53</td>
<td>1.54</td>
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<tr>
<td>Range</td>
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<td>0–5</td>
<td>0–5</td>
<td>0–6</td>
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†p < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

corporate environmental performance, corporate social performance, and financial performance has shown mixed results, especially when the elements of each of these measures are deconstructed. For example, in the area corporate environmental performance, Klassen and Whybark (1999) found that pollution prevention was positively related to manufacturing performance, while pollution control was negatively related. Similarly, in the area of corporate social performance, Hillman and Keim (2001) found that stakeholder management activities were positively related to market-value added, whereas social issue participation was negatively related. The negative relationship between return on equity and corporate sustainable development may be because of the composite nature of the dependent variable, or it may reflect the short-term costs of investing in corporate sustainable development. In addition to the pooled cross-sectional analysis, this research also investigated the time-related effects of the independent variables on corporate sustainable development. Here, institutional variables were integrated with resource-based view variables to explain corporate sustainable development. This study found that the media and organizational slack decreased in importance over time. These findings are important because they suggest that institutional pressures, such as the media, can be present in early periods but its importance may erode over time. Similarly, it was interesting to note that organizational slack was relatively important in early periods, when firms are accommodating new changes in respect to sustainable development, but once the firm had moved along this path organizational slack was increasingly less important. It is also worth noting that there were no significant time-related effects for international
Table 5. Regression analysis

<table>
<thead>
<tr>
<th>Variables</th>
<th>Main effects</th>
<th>Time-related effects</th>
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<td><strong>Independent variables</strong></td>
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<td>International experience</td>
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<td>Fines and penalties</td>
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<td>0.12</td>
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<td>Mimicry</td>
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<td>0.43</td>
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<tr>
<td>Media</td>
<td>1.46**</td>
<td>1.37**</td>
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<tr>
<td><strong>Controls</strong></td>
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<td>Firm size</td>
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<td>Linear trend</td>
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<td><strong>Time-related effects</strong></td>
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<tr>
<td>International experience × linear trend</td>
<td>0.34</td>
<td></td>
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<tr>
<td>Capital management capabilities × linear trend</td>
<td>0.21</td>
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<tr>
<td>Organizational slack × linear trend</td>
<td>-0.75**</td>
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<tr>
<td>Fines and penalties × linear trend</td>
<td>0.12</td>
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<tr>
<td>Mimicry × linear trend</td>
<td>-0.31</td>
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<tr>
<td>Media × linear trend</td>
<td>-0.43†</td>
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<tr>
<td>$R^2$</td>
<td>0.42</td>
<td>0.49</td>
</tr>
<tr>
<td>$F$</td>
<td>11.71**</td>
<td>10.23**</td>
</tr>
</tbody>
</table>

$n = 180; \dagger p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001$

experience, suggesting that this variable is relevant in both early and later time periods.

These results have important implications for research in organizations and the natural environment, and for the resource-based view and institutional theory. For research on organizations and the natural environment, this study indicates that both resource-based and institutional arguments influence corporate sustainable development. In particular, the media and mimicry were closely related to the corporate sustainable development. Of the resource-based drivers, only international experience was important. Most research in the area of sustainable development has taken either an institutional (Hoffman, 1999; Jennings and Zandbergen, 1995; Prakash, 1999) or a resource-based position (e.g., Hart, 1995; Klassen and Whybark, 1999; Russo and Fouts, 1997). This study renews the call by Oliver (1997b) for research that integrates both perspectives.

These findings are also important in light of previous research in institutional theory, which has found remarkably consistent results in the diffusion of new administrative forms: economic or technical explanations are more powerful in explaining early adoption, and are later supplanted by institutional explanations. Early adopters recognize the improvements to performance that can be captured through the innovation. After a sufficient number of firms adopt the innovation, the practice becomes accepted as an emerging norm. Through mimetic, coercive, and normative institutional pressures, remaining firms adopt the norm leading to its institutionalization. These results have been supported by studies researching civil service reforms (Tolbert and Zucker, 1983), the multidivisional form (Fliedstein, 1985; Mahajan, Sharma, and Bettis, 1988; Palmer, Jennings, and Xhou, 1993), personnel programs (Baron, Dobbin, and Jennings, 1986; Edelman, 1992), long-term incentive plans for CEOs (Westphal and Zajac, 1994), and total quality management (Westphal and Zajac, 1994). This study, however, raises questions as to whether these findings necessarily apply to corporate sustainable development.

The findings presented here suggest that institutional pressures can exist in early years and that their role in the organizational change process, as in the case of the media, can be of declining importance. Institutional pressures may have been important in early years because of the ambiguity associated with the meaning, measurement, and impact of sustainable development and because of its high externalities. The visual impact and high
externalities of clear-cut forests, open-pit mining, and oil spills generate greater public concern than do the multidivisional form, personnel structures, or civil service reform. Further, resource-based opportunities may exist throughout time partly because of the ambiguity associated with sustainable development and the difficulty of measuring its impact on firms. Some firms will take advantage of the imperfectly competitive strategic factor markets created by this ambiguity and impact to generate rents from resources and capabilities. As sustainable development becomes increasingly institutionalized, the resource-based opportunities become more transparent. I found post hoc support for this finding in the interview transcripts in the following statement made by a forester: ‘We have been forced to implement certain practices and technologies for environmental reasons that we were resistant to; however over time we have learned that some of these practices are actually better for the environment and they pay off economically.’ Cairncross (1995) and Schmidheiny (1992b) write that businesses are often surprised to discover the financial rewards pursuant with environmental management activities. This study, therefore, calls for further research into the relative timing of the resource-based and institutional explanations when administrative innovations are ambiguously defined, firm outcomes are unknown, and social involvement is significant.

This study has several limitations. First, there may have been measurement issues. I attempted to address these measurement issues by tackling three different measures of capital intensity and organizational slack. However, all efforts to find measures that were significant failed. In the case of fines and penalties, the measurement issues were more difficult to overcome. Given that the regulations enforcing sustainable development were relatively new and infrequently enforced at the time of this study, there was low variability in this measure. Fines and penalties in the Canadian context were not heavily imposed during the research period, so non-significant results are not entirely surprising and may reveal an empirical limitation, rather than a theoretical one. If this interpretation of the non-finding is correct, it is worth noting that fines and penalties may have little influence on corporate sustainable development if they are used only occasionally.

Second, important resource-based and institutional variables that explain corporate sustainable development may have been omitted, in other words, this model may be under-specified. In an effort to anticipate this potential weakness, exploratory research was used to identify the relevant variables through the interviews, corporate documents, and the extension of prior theory. However, managers may not have been willing to disclose the reasons for committing to sustainable development, or the reasons may not even be clear to them. Similarly, while prior theory may suggest the existence of the relationships investigated here, prior studies have primarily evaluated antecedents after the decision was made and was subject to post hoc rationalization.

Finally, this research also found relatively few time-related effects, and none regarding capital management capabilities, international experience, and mimicry. This may be because this study included data from only four time periods. Had the time period been longer, more significant findings may have emerged. It is important to reinforce the earlier point, however, that time series cross-sectional data analysis presents a higher hurdle for uncovering significant findings than strictly cross-sectional data analysis.

This study raises important avenues for pursuing future research. Speaking to the last limitation first, it would be worthwhile for future researchers to explore this analysis over a longer period to reveal more time-related effects. Also, these findings reveal the opportunity, arguably the need, to integrate institutional and resource-based view arguments to explain corporate sustainable development. Given that researchers tend to come from one tradition or the other, important opportunities exist to identify the ways in which the two perspectives cross-fertilize each other. This study has also highlighted the opportunity to refine the view that technical or resource-based view explanations are ultimately supplanted by institutional arguments. In fact, there is likely a complex interactive relationship between the two sets of explanations, particularly when the innovation being explored is defined ambiguously, its adoption is uncertain, and high externalities exist. Finally, this study anchored the operationalization of the dependent variable, corporate sustainable development, on a sample of three industries in 1995. At the outset, I argued that the definition of sustainable development was ambiguous, and even since this study was executed society’s understanding of sustainable development has evolved. For example,
notions of poverty alleviation, ‘selling to the bottom of the pyramid,’ and the rights of indigenous peoples have emerged as important aspects of sustainable development. There is an opportunity for future researchers to provide a more general operationalization of sustainable development rooted on a wider time frame and industry sample.

As corporate sustainable development becomes more commonplace, there is an associated need to understand the forces that influence this commitment. It is important to understand how social and economic processes interact in order to answer when and why firms commit to sustainable development. This research highlights the opportunity to investigate not only the relative importance of institutional and resource-based forces, but also how the forces reinforce each other, and the processes by which they effect change. For example, uncovering these motivations can assist government policy-makers to determine the relative efficacy of different initiatives such as regulations, voluntary initiatives (e.g., ISO 14 001, Energy Star), information disclosure (e.g., Toxics Release Inventory), and market mechanisms (e.g., carbon taxes). Only through such research is it possible to develop public and organizational policies that influence or shape corporate sustainable development.

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