Strategic Management Journal, Vol. 19, 363–375 (1998)

CORPORATE STRATEGIES AND ENVIRONMENTAL REGULATIONS: AN ORGANIZING FRAMEWORK

ALAN M. RUGMAN[1]* and ALAIN VERBEKE[2]
[1]*Templeton College, University of Oxford, Oxford, U.K.*
[2]*Solvay Business School, University of Brussels, Brussels, Belgium*

An emerging subfield of strategic management is that dealing with the natural environment as it affects corporate strategy. To analyze this we organize the literature on environmental regulations and corporate strategy into a new managerial framework. Next we develop a resource-based view of the interaction between firm-level competitiveness and environmental regulations, including the conditions for the use of green capabilities. Finally, we analyze the green capabilities of multinational enterprises within a standard international business model, using firm-specific advantages (FSAs) and country-specific advantages (CSAs). We then use this FSA/CSA configuration to explore hypotheses on environmental regulations, competitiveness, and corporate strategy. © 1998 John Wiley & Sons, Ltd.

Strat. Mgmt. J., Vol. 19, 363–375, 1998

INTRODUCTION

Societal concerns over the negative environmental impacts of commercial and manufacturing activities have led to a sharp increase in environmental regulations throughout the world at various institutional levels. Rugman, Kirton, and Soloway (1997) have distinguished five levels of environmental regulations: multilateral (e.g., GATT/WTO), regional (e.g., EU/NAFTA), national, subnational, and municipal. This article assesses the strategic management implications of environmental regulations at these different levels.

In the first section we develop an organizing framework for the rapidly growing literature on environmental regulations and corporate strategy. In the next section, we introduce a framework that allows us to position the various, sometimes contradictory, perspectives of the impact of environmental regulations on firms. In the third section we develop a resource-based perspective on the impact of environmental regulations. Finally, in the fourth section we discuss the interactions between environmental regulations and multinational enterprise (MNE) strategies.

The corporate strategy implications of environmental regulations are important as various empirical studies suggest that most firms already spend between 1 and 2 percent of their revenues as a response to environmental concerns (Medhurst, 1993). The hypothesis that environmental regulation represents a main determinant of managerial action to deal with environmental concerns has been tested empirically by Henriques and Sadorsky (1996) in the Canadian context. They found that other forces such as customer pressure, shareholder pressure, community pressure, etc., may play a significant role in the development of an environmental plan at the firm level. However, their research also demonstrated that government regulation does represent the single most important source of pressure on firms to consider environmental issues.

Key words: natural environment, green capabilities, multinational enterprises, firm-specific advantages, country-specific advantages

* Correspondence to: Alan M. Rugman, Templeton College, University of Oxford, Oxford OX1 5NY, U.K.

CCC 0143–2095/98/040363–13 $17.50

ENVIRONMENTAL REGULATIONS AND INDUSTRIAL PERFORMANCE

The analysis of the impact of environmental regulations on firm strategies and industrial performance has led to a wide variety of academic and practitioner perspectives and prescriptions. The most widely known environmental perspective in the strategic management field is the one voiced by Michael Porter (1990, 1991); and Porter and van der Linde (1995a, 1995b). Porter argues that an appropriately designed environmental policy may lead to first mover advantages at the firm level. Early adoption of strict environmental standards may lead to 'innovation offsets' that lower costs or improve quality and ultimately lead to net benefits for the firm.

At the other end of the spectrum, Walley and Whitehead (1994) have argued that win–win solutions are rare in the area of environmental programs. Such investments mostly yield a negative financial return to shareholders. Hence, they view the minimization of shareholder value destruction as the main goal to be pursued in environmental strategies. Their approach could be viewed as a dynamic, managerial response to government-imposed environmental regulations, driven by a desire to internalize external costs. Their perspective is important because the more conventional environmental economics literature has mainly focused on the societal benefits associated with environmental regulations and the comparative performance of different policy tools, such as command and control regulations and price-based instruments (taxes and subsidies). Here costs imposed on firms have been viewed as secondary, as compared to the immediate increase of economic welfare at the macroeconomic level (Cropper and Oates, 1992).

This mainstream economics view, in turn, is in sharp contrast to a large body of 'green management' literature, advocating the adoption of a new business paradigm centered on sustainable development (Gladwin, Kennelly, and Krause, 1995). For example, Elkington (1994) has observed the emergence of various regulatory schemes to move national economic systems toward 'sustainable' forms of development. The growth of green consumerism and increased pressure from environmentalists will force companies to develop strategies in this area. His view was supported empirically by Klassen and McLaughlin (1996). They found that public announcements of environmental awards had an immediate positive impact on the market valuation of firms with shares traded on the NYSE and AMEX. They also found significant negative impacts immediately following environmental crises (e.g., oil spills) linked to a specific firm.

Shrivastava (1995) has argued that Michael Porter's three generic strategies (cost leadership, differentiation, and focus) can be made 'ecologically sustainable' by integrating a number of sustainability principles contained in several codes for environmentally sound business practices. These codes exist in countries such as the United States, Japan, the United Kingdom, and Germany. As another example of this approach, Hutchinson (1996) has provided an enthusiastic description of successful environmental strategies, including those pursued by Proctor & Gamble (e.g., recycling of plastic bottles) and Xerox (elimination of CFCs, the 'design-for-environment' concept, etc.). Hutchinson states that environmental regulations have been the single most important driver of these environmental strategies.

Newton and Harte (1996), however, have criticized the business literature which advocates the adoption of 'green management.' Most of this literature assumes that firms are capable of engaging in an 'ordered conversion' to environmentalism (for example, as a response to regulations imposed by the Council of Ministers of the E.U.) Environmental considerations are supposedly to be directly integrated into conventional management systems, through the use of instruments such as environmental audits and other business environmental performance measurement systems (James, 1994). Newton and Harte view this as unrealistic. They argue that the examples cited in the green management literature, alleging the industrial success of environmental practices, are valid for only a small set of firms and a narrow set of 'environmentalized' markets, such as battery manufacturers that have been forced to avoid mercury or cadmium in their products.

Thus the existing academic and practitioner literature provides a variety of lenses for managers to view environmental regulations at the firm level. These viewpoints can be summarized in Figure 1. This figure represents an organizing framework to classify the relevant literature on corporate strategy and environmental regulations.

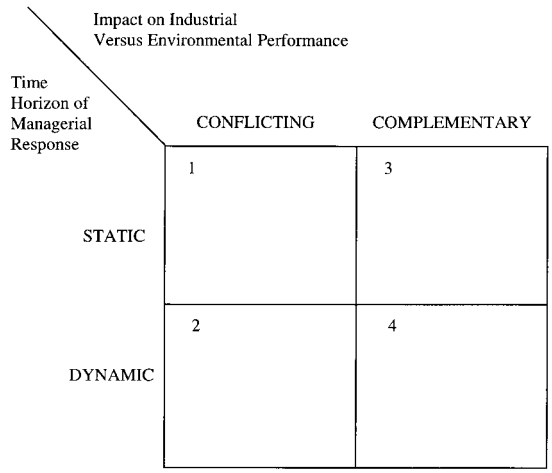

Figure 1. The impact of environmental regulations on the firm: Four managerial perspectives

In Figure 1 the horizontal axis evaluates the impact of environmental regulations on industrial vs. environmental performance at the firm level. Industrial performance reflects conventional parameters, including profitability and growth. Environmental performance includes a set of variables such as emission levels, degree of resource consumption, and ecological impact measures. Managers need to determine whether environmental regulations (which are intended to improve environmental performance) either conflict with maintaining industrial performance, or may complement and perhaps even improve industrial performance. The vertical axis of Figure 1 makes a distinction between dynamic managerial perspectives (adopting a longitudinal approach to evaluating the impact of environmental regulations) and the static, cross-sectional perspectives that focus more on immediate impacts or do not explicitly consider the time dimension as a relevant managerial parameter.

The conventional environmental economics paradigm is located in quadrant 1 of Figure 1. Here, environmental regulations are imposed on firms. Examples are policies building upon the 'polluter pays' principle and the 'cradle-to-grave' responsibility of manufacturers required to take back used products from consumers. As a result, in quadrant 1 firms merely comply with environmental regulations but they do not see any advantages to be gained in developing green competencies. Thus they do not invest in firm-level improvements to enhance their green performance beyond compliance with environmental regulations. A second case of conflicting impacts of industrial and environmental performance is in quadrant 2 of Figure 1. This is the Walley and Whitehead viewpoint, where firms reject the development of green capabilities in response to environmental regulations. They argue that the managerial challenge facing firms is to minimize, in a dynamic sense, the perceived negative impact of environmental regulations on industrial performance.

In contrast, most of the win–win literature on sustainable development and green management is captured in quadrant 3 of Figure 1, where it is argued that greening has become inevitable as a result of external forces. Here firms will invest in the development of green capabilities because the environmental regulations are viewed as having a complementary impact on industrial performance. Finally, the Porter hypothesis is positioned in quadrant 4 of Figure 1. The dynamic focus of Porter is on the development of green capabilities in innovation offsets, due to the complementarity between the home base environmental regulations and industrial performance. The development of such capabilities naturally requires substantial managerial effort and time before they materialize.

To examine the relevance of the organizing framework developed in Figure 1 we can use it to position the views of 12 business and environmental experts invited by the *Harvard Business Review* to formulate comments on the extreme Walley and Whitehead (1994) perspective that firms reject environmental pressures. We will now position all of these views using our conceptual framework.

Clarke (1994: 37–38) and Esty (1994: 41–42) argue that much environmental regulation of the command-and-control type is ill conceived and leads to unnecessarily high costs, i.e., the impacts occur in quadrant 1 of Figure 1. However, in their view, appropriate market-based incentives would allow a shift to quadrant 4, in which environmental excellence could be integrated into business strategy.

Gray (1994: 46–47) states that there will usually be a conflict between industrial and environmental performance, both from a static (quadrant 1) and dynamic (quadrant 2) perspective. However, this should not necessarily be viewed as a problem as managers in some international companies such as British Telecom and the Body

Shop have internalized the view that this is really a necessary conflict to allow sustainable development at the macro level.

Stavins (1994: 38–39) finds the impact of environmental regulations on industrial performance to be very limited, but identifies a long-term macroeconomic effect in the form of a productivity slowdown, thus positioning his perspective in quadrant 2.

Smart (1994: 42–43) also focuses primarily on a quadrant 2 scenario, in which environmental regulations can be viewed as the price to be paid by polluting firms to obtain the right to continue in business. However, the magnitude of the conflict can be reduced by incorporating environ- mental concerns into strategic planning, and by stimulating government to introduce economic incentives to which business can respond effectively.

Greeno (1994: 39–40) argues that the 'corporate environmental rhetoric' of firms is designed to portray a positive image in quadrant 3 of environmental regulations as a business opportunity. This image is directed towards a variety of stakeholders, including public agencies, consumers and shareholders, while the day-to-day management reality is often closer to quadrant 2. Greeno states that the main managerial challenge is to achieve superior efficiency and effectiveness in environmental spending, thus providing a leaner cost structure as compared to those of rivals forced to engage in regulation-driven price adjustments to be borne by consumers.

Wells (1994: 43–44) observes a trend in environmental regulations towards more flexibility, allowing firms to design more cost-effective initiatives. In his view, it is largely a management challenge and not a technological challenge for firms to find complementarity between environmental and industrial performance in quadrant 3. The key is to understand the contribution of environmental performance to customer requirements and shareholder value.

Bavaria (1994: 40) adopts a perspective largely positioned in quadrant 4. His insight is that industrial performance will increasingly require environmental performance, and this is especially valid in industries directly confronted with environmental degradation (e.g., the fishing industry and resource-based companies). Yet complementarity does not mean that environmental concerns can be usefully integrated into corporate goal-setting to improve long-run industrial performance. Environmental performance represents in itself a necessary condition to be satisfied in order to reach any satisfactory level of industrial performance in the long run.

Piet (1994: 43) prescribes a quadrant 4 scenario to firms, arguing that in the long run the environmental 'value' of products will become increasingly important for a variety of stakeholders. However, selectivity in the choice of environmental issues to be dealt with is the key to a successful environmental strategy.

Cairncross (1994: 40–41) explicitly rejects such a quadrant 4 scenario, arguing that most environmental regulation is actually meant to achieve a quadrant 1 outcome, namely the internalization of external costs. In addition, she recognizes a quadrant 4 case in which domestic environmental regulations are captured by home base firms seeking shelter against foreign rivals. This situation is explored by Vogel and Rugman (1997) within the context of NAFTA.

Finally, Fischer and Schot (1994: 47–50) focus on how a firm can shift from quadrant 2 to quadrant 4. First, they argue that in some industries quantum leaps rather than incremental steps are necessary when integrating environmental concerns into strategy. The impact of environmental regulations, for example on the Canadian paper industry, is such that long-run survival requires a major managerial shift in understanding the forces driving industry competition and a change in most companies' strategies. Second, the complementary nature of industrial and environmental performance does not naturally exist but must be crafted by introducing new performance measures. Third, the inclusion of an environmental agenda into strategic planning should be congruent with the development of new relationships with a variety of stakeholders, including employees, environmental groups, customers, etc.

The above discussion of a broad literature suggests that, at the firm level, environmental regulations can have a wide variety of impacts. It is often unclear *ex ante* whether industrial and environmental performance is complementary or conflicting. The managerial response to environmental regulations can also have a time dimension; this longitudinal perspective has often been ignored. The next section introduces a dynamic, resource-based view of the impact of environmental regulations. This provides further insights into the issues of complementarity vs. conflict at the firm level by focusing on the dynamic aspects of

the managerial response to environmental regulations.

ENVIRONMENTAL VS. INDUSTRIAL PERFORMANCE: A RESOURCE-BASED VIEW

The resource-based perspective suggests that unique resources and capabilities represent the main determinants of corporate performance relative to rival firms (Penrose, 1959; Rumelt, 1984; Barney, 1991; Conner, 1991). The key question at the firm level is whether specific resource commitments expressly intended to achieve environmental performance may simultaneously improve industrial performance. The resulting competencies must be valuable, nonsubstitutable, firm-specific and difficult to imitate if they are to contribute to industrial performance. They may include assets, human skills, and organizational processes, and they must be bundled into capabilities to perform specific value-added activities.

In the context of environmental regulations, we need to recognize that a firm's key competencies and capabilities (which are viewed traditionally as the sources of industrial performance) may actually hinder the leveraging of environmental competencies. This occurs when competencies and capabilities can act as core rigidities (Leonard-Barton, 1992; Ostlund, 1994). This is a quadrant 2 of Figure 1 scenario, as discussed above, where core rigidities may prevent adjustment. Levy (1995) also reviewed the empirical evidence on the impact of environmental performance on industrial performance and found mixed results. Pollution-reducing investments were neither consistently profitable nor unprofitable, suggesting that both the quadrant 2 and quadrant 4 scenarios in Figure 1 depend on a number of contingent factors at the firm level.

Hart (1995) identifies the sources which contribute to environmental performance and may simultaneously improve industrial performance. They include quality management systems for pollution prevention which lead to overall cost reduction and savings in resources due to technological improvements. Life cycle analysis at the product design stage and supplier selection systems to preempt competition may allow firms to differentiate products and thereby increase customer value.

It does appear, however, that the competencies and capabilities which serve both environmental and industrial performance and thus allow firms to move to quadrant 4 in Figure 1 are path-dependent, as evidenced by Florida's (1996) analysis. Florida based his work on a survey of 256 U.S. manufacturing firms and found substantial path dependencies when attempting to improve environmental performance, a finding which is consistent with the resource-based view of the firm. His work suggests that environmental improvements largely result from broader corporate efforts to innovate and implement new and more efficient manufacturing systems and practices, and thus cannot be dissociated from them. Hence, the creation of 'environmental excellence' (going beyond compliance to environmental regulations) cannot be undertaken in a vacuum.

Arora and Cason (1996) investigated why some firms commit resources to achieve environmental performance beyond mere compliance to environmental regulations. Their analysis is based on a study of firm responses to a U.S. Environmental Protection Agency's (EPA) program to reduce transfers of key toxic chemicals. The authors built their perspective on the hypothesis that resources will only be committed to environmental performance if it can be expected that they will also improve industrial performance (in this case profits). The authors found that firms with more contact with final consumers (as measured by advertising expenditures) and greater R&D expenditures were more likely to perform beyond compliance. The former case reflects a stronger expected public recognition of environmental efforts, and thus a higher probability of final customer value. The latter case implies a higher expected probability of successful innovation when increasing R&D expenditures benefit industrial performance. This occurs due to expected positive spillover effects which motivate the firms to move beyond compliance.

We develop Figure 2 because substantial attention must be devoted to the leveraging potential of resource commitments aimed at improving environmental performance in terms of their simultaneous contribution to industrial performance (Ghemawat, 1986) and the flexibility regarding the reversibility of these resource commitments. These two variables are taken into account in Figure 2, where we analyze the development of firm-level green resources and capabilities, which

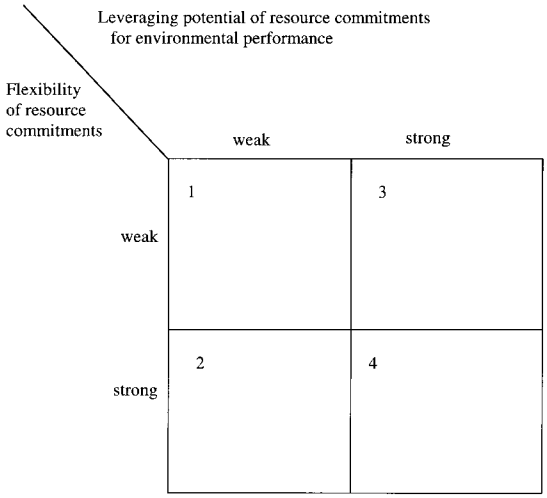

Figure 2. The development of firm-level green capabilities

can lead to a joint improvement of environmental and industrial performances.

The horizontal axis of Figure 2 assesses the leveraging potential of environmental resource commitments in terms of improving industrial performance (weak or highly uncertain vs. strong). On this axis the issue is whether these resource commitments may improve or generate competencies and capabilities that can be deployed to obtain competitive advantage. This can occur in two ways: first, by improving industrial performance in existing markets or by allowing penetration of new markets; second, by improving the firm's 'absorptive capacity,' new options are created to augment technological capabilities in the long run.

The vertical axis of Figure 2 measures the flexibility of environmental resource commitments in terms of alternative uses (reversibility). In addition to assessing expected leveraging effects, firms must also take into account the reversibility of resource commitments intended to improve environmental performance (Dixit and Pindyck, 1994). Irreversibility can be viewed as an exit barrier, whereas the prospect of engaging in irreversible investments acts as an entry barrier (Rivoli and Salorio, 1996). Resource commitments in the area of environmental improvement are closely linked to a bundle of firm-specific technological capabilities and, as such, are mostly irreversible. Such commitments are inseparable from complementary resources and capabilities and their outcome often contains an important tacit component that is difficult to codify or transfer, due to strong embeddedness within the firm. Since low reversibility reduces the flexibility of future options, firms may delay environmental resource commitments until uncertainty about future environmental regulations and consumer reactions can be resolved.

The framework of Figure 2 allows managers to assess the possible contribution to industrial performance as well as the risks associated with specific resource commitments designed to improve environmental performance. We can label the quadrants as follows. The quadrant 4 case reflects a 'green success' scenario. Quadrant 1 suggests the opposite, i.e., an 'irreversible green mistake.' Quadrants 2 and 3 constitute intermediate cases. Quadrant 2 suggests a weak leveraging potential but also a high reversibility of mistakes in resource commitments, i.e., a 'reversible green mistake.' Quadrant 3 embodies a low flexibility scenario, but it is associated with a high potential contribution to industrial performance, i.e., a 'green gamble.'

In our view, many firms at present fear a quadrant 1 scenario. They do not invest in developing green capabilities because of the high uncertainty regarding leveraging effects associated with these investments. In many cases it is, for example, unclear (a) how government regulation, both in terms of command and control regulations and market-based instruments will evolve over time, (b) to what extent the impact of 'green consumerism' will increase in terms of affecting purchasing decisions of buyers, (c) what the industry standards and benchmarks will be in the area of environmental protection. This is consistent with Jaffe's analysis, which demonstrated the benefit of waiting to make irreversible investments in clean technologies until better technologies become available (Jaffe *et al*, 1995).

In quadrant 1 of Figure 2, as an irreversible green mistake, we also place Florida (1996). He has argued that, in practice, companies do not pursue environmental strategies expressly designed to prevent pollution, to eliminate toxins or to transfer environmentally superior technologies. This undoubtedly reflects a weak or uncertain leveraging potential of resource commitments for environmental performance, combined with a low flexibility of such commitments.

In contrast, green design and environmentally

conscious manufacturing can be integrated into a bundle of innovative practices aimed at improving industrial performance. Further, improved environmental performance can build upon spillover effects from efforts to improve quality (e.g., zero defect and zero inventory manufacturing strategies). Thus, the close relationship between the resource commitments for industrial performance and those for environmental performance can provide strong leveraging potential of the latter, putting them on the right-hand side of Figure 2. In quadrant 3, this leveraging potential is offset by the lack of flexibility of the resource commitments, whereas in quadrant 4 both flexibility and leveraging potential work together.

The quadrant 3 scenario of a green gamble is significant when low reversibility may stimulate firms to lobby government to adopt firm-level environmental performance as industry standards, thus creating entry barriers for other firms (Salop and Scheffman, 1983; Barrett, 1991, 1992; Fri, 1992). For example, Barrett observed that Du Pont asked that CFCs be banned, although Du Pont manufactures this product itself. The reason was that Du Pont had already engaged in substantial irreversible resource commitments (sunk costs) in the search for substitutes and was therefore in an excellent position to obtain a first mover advantage in the new market for substitutes.

Another example of a quadrant 3 green gamble is the BMW 'design for disassembly' initiative, preempting 'take-back' policies of the German government. BMW set up an 'exclusive recycling infrastructure' in Germany involving the few high-quality domestic dismantler firms and obtained a first mover cost advantage *vis-a-vis* its competitors (Hart, 1995). In this context, Nehrt (1996) found a positive linkage between first mover investments in pollution-reducing manufacturing technologies that lead to saleable products (high leveraging effect) and profit growth in the chemical bleached paper industry. Here, the first mover benefits resulted from the slow diffusion of knowledge in this industry and 'time compression diseconomies,' faced by late movers. The former parameter reflects the importance of tacit knowledge in learning and the latter parameter the complexity of developing new resources and capabilities. They therefore represent proxies for the level of reversibility, whereby highly tacit knowledge and high complexity imply a weak flexibility of resource commitments.

Shrivastava and Hart (1994) have provided some examples of green success stories in quadrant 4. These include 3M Company's Pollution Prevention Pays (PPP), Dow Chemical's Waste Reduction Always Pays (WRAP) program, and Chevron's Save Money and Reduce Toxics (SMART) program.

We conclude that the analysis of Figure 2 can explain the main reasons for the divergence between the Porter (quadrant 4 in Figure 1) and the Walley and Whitehead (quadrant 2 in Figure 1) perspectives in the previous section. Porter assumes that the necessary conditions are fulfilled for a green success to occur (quadrant 4 in Figure 2), whereas Walley and Whitehead observe that many firms in practice fear making an irreversible green mistake (quadrant 1 in Figure 2). However, so far we have only dealt with the effects of environmental regulations in a domestic context, without taking into account an international strategic management perspective. The international dimension is explored explicitly in the next section, using a standard model from the field of international business.

MULTINATIONAL CORPORATE STRATEGIES AND ENVIRONMENTAL REGULATIONS

The linkage between environmental regulations and the strategies of multinational enterprises (MNEs) is presently the subject of an important worldwide debate in the academic community, in public agencies and at the managerial level. The study of MNE environmental strategies is particularly significant because MNEs dominate pollution-intensive industries such as chemicals, petroleum and heavy manufacturing. In addition, MNEs often need to comply with environmental regulations at five institutional levels simultaneously (Rugman *et al.*, 1997). Consequently MNEs are usually involved in the development of environmental policies and standards, such as ISO 14000, and they devote executive time to participation in multilateral environmental institutions. Finally, MNEs are faced with the challenge of diffusing environmental practices to production operations dispersed across several countries.

Properly crafted strategies to manage environmental regulations are important to MNEs for two reasons. First, strict environmental regulations

implemented at the national or subnational levels may influence the relative location advantages of a specific country for the operation of both domestic and foreign MNEs. Within an individual MNE, managers need to determine if the configuration of the country – specific advantages (CSAs) of the various production locations relevant to the firm will be affected in a substantial fashion.

Second, environmental regulations may require MNEs to develop green resources and capabilities. These are referred to as firm-specific advantages (FSAs) in the international business literature (Rugman, 1981; Dunning and Rugman, 1985; Rugman and Verbeke, 1990, 1992). The green resources and capabilities which allow green success (as discussed in the previous section) are positioned in quadrant 4 of Figure 2. However, the green success scenario does not explicitly take into account the complexities of international business. In contrast, the key characteristic of FSAs is that they allow the MNE to obtain a competitive advantage internationally, through scale economies, scope economies or the benefits of exploiting national differences (Rugman and Verbeke, 1992, 1993, 1995).

It is the nonlocation-bound FSAs, when combined with the existence of market imperfections associated with international transactions, that explain the existence of MNE activity (Rugman, 1981). However, pressures for national responsiveness exerted by governments, consumers and other stakeholders may stimulate MNEs to develop location-bound FSAs (Rugman and Verbeke, 1990). These are resources and capabilities which can only contribute to industrial performance in specific countries. In the event of green FSA development, following the discussion in the previous section, the MNE manager must decide whether specific green FSAs can be developed and used within individual countries (as a response to pressures for national responsiveness), or whether these FSAs can be used globally, i.e., in a nonlocation-bound fashion. The basic question is how the MNE's FSA configuration will be affected.

Given the impact of environmental regulations on CSAs and FSAs, the entry mode choices by MNEs may also be affected (Rugman, 1981). Indeed, in the international context, specific environmental policies may act as a catalyst for firms to alter their trade and foreign direct investment (FDI) strategy. Here, four important cases should be distinguished:

1. The 'declustering' case, wherein strict environmental regulations lead to a substantial weakening of a nation's CSAs, as perceived by MNEs. This may lead to a shift of production abroad, i.e., outward FDI, possibly combined with an increase of imports into the country with the weakened CSAs.
2. The 'pollution haven' case, reflecting the expectation that weak environmental regulations will fundamentally strengthen a nation's CSAs, as perceived by MNEs. In this case, inward FDI may be expected in the pollution haven, possibly combined with an increase of exports to countries with less favourable CSAs.
3. The 'environmental innovation cluster' case, in the event of strict environmental regulations, which implies a strengthening of a nation's CSAs. This strengthening, in turn, influences the FSAs of various companies involved in an innovation cluster, as described by Porter (1990).
4. The 'strategic environmental policy' case, leading to a shift from exports to FDI to secure a market. This occurs when environmental measures are used as protectionist instruments to shelter domestic companies. This is a special case of policy being captured by firms seeking artificial entry barriers against foreign rivals.

These four cases are peculiar to MNEs and require an analytical technique which extends beyond the green success of quadrant 4 of Figure 2. Consequently we develop, in Figure 3, a matrix which considers the impact of environmental regulations on the strategies of MNEs. Environmental regulations may affect an MNE's overall FSA–CSA configuration as depicted in Figure 3. Senior MNE managers must decide to what extent specific environmental regulations weaken or strengthen the MNE's present CSA configuration on the horizontal axis and its present FSA configuration on the vertical axis. In this context, it should be remembered that MNEs may need to cope with environmental regulations at the five institutional levels, developed by Rugman *et al.* (1997).

We shall now proceed to consider the principal

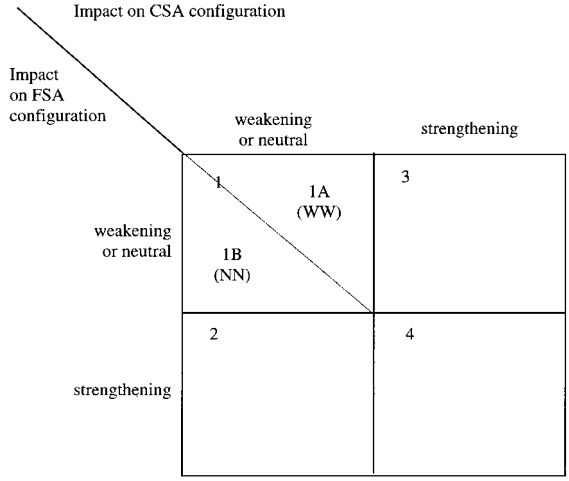

Figure 3. The impact of environmental regulations on strategies of multinational enterprises

issues in the environmental policy literature (especially the pollution haven and Porter hypotheses) in terms of their impact on the FSA–CSA configuration of Figure 3. In doing so, we shall be able to discuss further the four MNE cases raised above. Firstly, we shall consider how the declustering case can arise when environmental regulations change the CSAs and FSAs.

Jaffe *et al*. (1995) analyzed the results of more than 100 empirical studies on the possible linkages between environmental regulations and the competitiveness of U.S. manufacturing firms. They found the overall effects of domestic environmental regulations to be largely neutral on both CSAs and FSAs, i.e., positioned in cell 1B (neutral–neutral, or NN) of quadrant 1 of Figure 3, rather than in 1A (weakening–weakening, or WW) for most firms.

From an MNE perspective, the Jaffe *et al*. empirical evidence was surprising for two reasons. First, U.S. environmental regulations often impose the use of specific control processes and technologies, rather than merely setting particular emission levels to be respected, in contrast to practices prevailing in most other nations. This should have led to a weakening of the affected MNEs' FSA–CSA configuration. Second, business–government relations in the United States are often adversarial, as compared to European countries (Vogel, 1986). Consequently, regulators would ultimately pay little attention to the affected firms' potential for developing green FSAs. These U.S. environmental regulations, again relative to foreign firms, would suggest a weakening of U.S. MNEs' FSA configuration.

The combination of the two elements discussed above would ultimately lead MNEs to shift to cell 1A of Figure 3. As a result, U.S.-based MNEs could change their strategy by a shift to offshore production, i.e., an increase of outward FDI. This would allow U.S. MNEs to avoid production in environmentally regulated industries in the United States. There would be an increase of imports into the United States from areas with low environmental regulation. This is the declustering case (a) discussed above, where the CSAs of the United States are weakened, as perceived by MNEs.

The 'pollution haven' case (b) is in quadrant 3 of Figure 3. Here MNEs operating in pollution havens enjoy a strengthened CSA configuration, as compared to firms operating in countries with increasingly strict environmental regulations. However, there is little empirical evidence supporting the pollution haven case. The empirical work of Grossman and Krueger (1993) on the activity levels in Mexico and the maquiladora areas along the U.S.–Mexico border demonstrates that U.S. MNEs have not shifted production activities there in order to avoid environmental regulations in the United States. Furthermore, other empirical evidence also fails to support the claim that international trade flows are affected by environmental regulations (Walter, 1982; Pearson, 1987; Leonard, 1988; Tobey, 1990).

Environmental regulations could also be expected to have effects on inward FDI at the subnational level as they could affect the CSA configuration faced by foreign MNEs, weakening the location advantages of some regions and strengthening those of others. For example, a difference in environmental regulation among states within the United States could lead to institutional competition to attract FDI. However, here again, the empirical evidence on the location of new branch plants in the United States by foreign MNEs suggests no such effect (Friedman, Gerlowsky, and Silberman, 1992).

To summarize, our analysis of the pollution haven hypothesis reveals that environmental regulations at present appear to have little effect on the FSA–CSA configuration and the location decisions of MNEs. In turn, this suggests that MNEs design their production processes according to best global practices. MNEs operate in

accordance with the most stringent environmental regulations prevailing in the relevant countries where they operate (Magretta, 1997). This is consistent with Levy's (1995) empirical results on the environmental performance of MNEs. He finds that a higher degree of multinationality is associated with superior environmental performance, probably because external pressures from international environmental regulations increase more rapidly than the firm's bargaining power.

In the remainder of this section we shall consider the Porter hypothesis. Porter's claim is that strict environmental regulations may actually strengthen the location advantages associated with the country imposing them, and may lead to a joint strengthening of the affected MNEs' CSA–FSA configuration (in quadrant 4 of Figure 3). Using the analysis of Figure 3 we can see that Porter's hypothesis is our case (3) of an environmental innovation cluster. Yet quadrant 4 of Figure 3 is not realized by most MNEs. Why is this?

Porter's view builds upon the assumption that strict domestic environmental regulations can correctly anticipate international regulation trends and thereby stimulate domestic firms to rethink and redesign products and manufacturing processes. This will give these home-based firms a first mover advantage internationally and may contribute to upgrading an entire cluster of industrial activity, including the different determinants of a national or local 'diamond' (Porter, 1990). While a number of real-life examples suggest the relevance of quadrant 4 thinking (including the international competitive advantages of German firms in water pollution control technologies and U.S. firms in hazardous waste management), there are three main reasons why Porter's hypothesis is not a general case.

First, it is unrealistic to assume that a national government could systematically shift profits to domestic firms or create spillover effects to domestic clusters at the expense of rival companies through environmental regulations. Such regulations are unlikely to fit with the relevant firms' histories of strategic choice and their distinctive internal resources and capabilities. The same problems arise with the use of strategic trade policy (Rugman and Verbeke, 1990). Such policies (including Porter's hypothesis) unrealistically assume that government agencies possess and are able to correctly interpret information on: (i) international environmental regulation trends, (ii) the reaction patterns in domestic MNEs building upon specific bundles of FSAs, taking into account the balance between compliance costs and innovation benefits, (iii) the innovation diffusion processes in domestic industrial clusters, and (iv) barriers to the international diffusion of new innovations to foreign MNEs, etc. Yet, the work of Verbeke and Coeck (1997) demonstrates that government agencies face major bounded rationality problems in environmental policy formulation and implementation and have little insight into managerial reaction patterns.

Second, Porter's views are only valid for countries with very large domestic markets where governments have sufficient power to significantly influence international regulation trends. In contrast, the small country case of Rugman (1995) is positioned in cell 1A of Figure 3. Even large MNEs in smaller countries do not benefit from tight domestic environmental regulations, according to Rugman, since the relevant environmental regulations are those of their foreign customers. These firms from smaller countries need to monitor the environmental regulations of host countries, rather than those of the home country. Only rarely will a small country home government (like Canada) be able to anticipate international environmental trends for the benefit of home-based MNEs. Virtually all of Canada's larger MNEs sell far more abroad than at home. The average ratio of foreign to total sales for Canada's largest 20 MNEs is over 70 percent (Rugman, 1996). Thus, if the Canadian government were to impose tight new environmental regulations, Canadian-based MNEs would be faced with a substantial weakening of their FSA–CSA configuration and would have to invest and restructure for a market which takes a minority of their sales. These firms would prefer to adapt their manufacturing and possibly increase outward FDI to suit the environmental regulations of their major customers abroad (especially when the big market for Canadian firms is the United States). In short, as far as Canadian MNEs are concerned, the management reality is in cell 1A of Figure 3. In contrast, if the U.S. government incorrectly anticipated consistency between its own standards and Canadian standards, this would be an inconsequential mistake for most U.S. MNEs (cell 1B of Figure 3), given the relatively small size of the Canadian market compared to the U.S. one.

Third, if environmental policy is captured by

inefficient domestic firms, seeking shelter against foreign rivals, a quadrant 3 scenario will occur in Figure 3. Here, an artificial strengthening of CSAs for domestic firms is created which, however, does not lead to domestic innovation in FSAs. For example, Vogel and Rugman (1997) reviewed 10 cases of environmentally related trade disputes between Canada and the United States and found that in nine of these cases environmental regulations were used to obtain shelter. This occurred in two ways: (i) by imposing discriminatory policies against imports as part of environmental regulations; (ii) by enforcing product standards that either completely restrict or place a significantly higher cost burden on foreign producers. Often, shelter is disguised as an environmental conservation measure (Rugman and Soloway, 1997). From a dynamic perspective, the logic of Figure 3 suggests that if MNEs are negatively affected by a foreign rival's shelter policy (and thereby positioned in quadrant 1A) then the MNEs should attempt to move to quadrant 2 by developing new FSAs to compensate for the capture of foreign environmental policy and the weakening of their CSA configuration. This is the strategic environmental policy case (4) discussed above.

From the analysis of FSA–CSA configurations arising from Figure 3 we can conclude that environmental regulations building upon the Porter hypothesis, and intended to generate a quadrant 4 scenario, may, in fact, lead to a cell 1A outcome. In addition, given the possible dynamics involved, some MNEs from smaller countries denied market access by shelter-type environmental policies may have to build up FSAs to offset weaker CSAs, as in quadrant 2. These unforeseen complexities of proposed environmental policy initiatives, such as the Porter hypothesis, should lead to second thoughts by policy-makers and environmentalists who do not anticipate the full impact of changes in the FSA–CSA configuration on MNE strategy.

CONCLUSIONS

Our primary contribution in this paper is to organize and integrate the literature on the impact of environmental regulations at the firm level from the viewpoint of managers making corporate strategy decisions. We do this through the development of an organizing framework consisting of three related and sequential parts. The resulting integrated framework helps us to advance the present debate on corporate strategy, trade and environmental regulations by providing a resource-based view of the interaction between firm-level competitiveness and environmental regulations.

In the first section of this paper we develop a framework to organize the literature on environmental regulations and corporate strategy. In Figure 1, this framework sets out, from the manager's perspective, the impact of environmental regulations on industrial performance, whether it is conflicting or complementary. It also takes into account the time horizon of the managerial response. This provides an integrating framework for the differing views of researchers on the synergy (or lack thereof) between environmental regulations and corporate strategy. We position the large, existing literature on the impact of environmental regulations on corporate strategy within this framework.

In the core of the paper we develop a resource-based view of firm-level green capabilities. In Figure 2, two parameters are relevant and important: first, the leveraging potential of the firm's resources allocated to improve environmental performance; second, the flexibility of resource commitments. This framework illustrates how managers, when making critical decisions about the development of green capabilities, can best balance the potential contribution of an increase in resources devoted to environmental performance against the risks involved with such a decision. We illustrate each case with examples from the relevant literature.

In the final part of our conceptual framework, we examine the impact of environmental regulations on an MNE's strategy. In Figure 3, we do this in terms of the MNE's relative configuration of country-specific advantages, CSAs (the location advantages specific to the country in which the unit of the MNE is located), and firm-specific advantages, FSAs (the strategic advantages specific to a firm regardless of location). Using this FSA–CSA configuration of MNEs, we examine various hypotheses on environmental regulations, competitiveness and corporate strategy found in the literature, including the pollution haven hypothesis and the Porter hypothesis. We do not find empirical support for the former, nor

unambiguous conceptual support for the latter. Both are special cases within the more general FSA–CSA framework of MNE strategy towards environmental regulations.

ACKNOWLEDGEMENTS

Helpful comments have been received from John McGee, Chris Coeck, Joel Baum, and Julie Soloway. Professor Rugman is pleased to acknowledge financial support from the Social Science and Humanities Research Council of Canada when he was working on this paper at the Joseph L. Rotman School of Management, University of Toronto.

REFERENCES

Arora, S. and T. N. Cason (1996). 'Why do firms volunteer to exceed environmental regulations? Understanding participation in EPA's 33/50 Program', *Land Economics*, **72**(4), pp. 413–432.

Barney, J. (1991). 'Firm resources and sustained competitive advantage', *Journal of Management*, **17**(1), pp. 99–120.

Barrett, S. (1991). 'Environmental regulations for competitive advantage', *Business Strategy Review*, **2**(1), pp. 1–15.

Barrett, S. (1992). 'Strategy and the environment', *Columbia Journal of World Business*, **27**(4), pp. 413–432.

Bavaria, J. L. (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), p. 40.

Cairncross, F. (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), pp. 40–41.

Clarke, R. A. (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), pp. 37–38.

Conner, K. R. (1991). 'A historical comparison of resource-based theory and five schools of thought within industrial economics', *Journal of Management*, **17**(1), pp. 121–154.

Cropper, M. L. and W. E. Oates (1992). 'Environmental economics: A survey', *Journal of Economic Literature*, **30**(2), pp. 675–740.

Dixit, A. and R. Pindyck (1994). *Investment under Uncertainty*. Princeton University Press, Princeton, NJ.

Dunning, J. H. and A. M. Rugman (1985). 'The influence of Hymer's dissertation on the theory of foreign direct investment', *American Economic Review*, **75**(2), pp. 228–232.

Elkington, J. (1994). 'Towards the sustainable corporation: Win–win–win business strategies for sustainable development', *California Management Review*, **36**(2), pp. 90–100.

Esty, D. C. (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), pp. 41–42.

Fischer, K. and J. Schot (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), pp. 47–50.

Florida, R. (1996). 'The move to environmentally conscious manufacturing', *California Management Review*, **39**(1), pp. 80–105.

Friedman, J., D. A. Gerlowsky and J. Silberman (1992). 'What attracts foreign multinational corporations? Evidence from branch plant location in the United States', *Journal of Regional Science*, **32**(4), pp. 403–418.

Fri, R. W. (1992). 'The corporation as a nongovernmental organization', *Columbia Journal of World Business*, **27**, pp. 91–95.

Ghemawat, P. (1986). 'Sustainable advantage', *Harvard Business Review*, **64**(5), pp. 53–58.

Gladwin, T. N., J. J. Kennelly and T. S. Krause (1995). 'Shifting paradigms for sustainable development: Implications for management theory and research', *Academy of Management Review*, **20**(4), pp. 874–907.

Gray, R. (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), pp. 46–47.

Greeno, J. L. (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), pp. 39–40.

Grossman, G. M. and A. B. Krueger (1993). 'Environmental impacts of a North American Free Trade Agreement'. In P. Garber (ed.), *The U.S.–Mexico Free Trade Agreement*. MIT Press, Cambridge, MA, pp. 13–56.

Hart, S. L. (1995). 'A natural-resource-based view of the firm', *Academy of Management Review*, **20**(4), pp. 986–1014.

Henriques, I. and P. Sadorsky (1996). 'The determinants of an environmentally responsive firm: An empirical approach', *Journal of Environmental Economics and Management*, **30**, pp. 381–395.

Hutchinson, C. (1996). 'Integrating environment policy with business strategy', *Long Range Planning*, **29**(1), pp. 11–23.

Jaffe, A. B., S. R. Peterson, P. R. Portney and R. N. Stavins (1995). 'Environmental regulation and the competitiveness of U.S. manufacturing: What does the evidence tell us?', *Journal of Economic Literature*, **33**, pp. 132–163.

James, P. (1994). 'Business environmental performance measurement', *Business Strategy and the Environment*, **3**(2), pp. 59–67.

Klassen, R. D. and C. P. McLaughlin (1996). 'The impact of environmental management on firm performance', *Management Science*, **42**(8), pp. 1199–1214.

Leonard, H. J. (1988). *Pollution and the Struggle for the World Product*. Cambridge University Press, Cambridge, UK.

Leonard-Barton, D. (1992). 'Core capabilities and core rigidities: A paradox in managing new product development', *Strategic Management Journal*, Summer Special Issue, **13**, pp. 111–125.

Levy, D. L. (1995). 'The environmental practices and performances of transnational corporations', *Transnational Corporations*, **4**(1), pp. 44–67.

Magretta, J. (1997). 'Growth through global sus-

tainability: An interview with Monsanto's CEO, Robert B. Shapiro', *Harvard Business Review*, **75**(1), pp. 78–88.
Medhurst, J. (1993). 'Environmental costs and industry competitiveness', *Environmental Policies and Industrial Competitiveness*, OECD Documents, pp. 37–47.
Nehrt, C. (1996). 'Timing and intensity effects of environmental investments', *Strategic Management Journal*, **17**(7), pp. 535–547.
Newton, T. and G. Harte (1996). 'Green business: Technicist kitsch?', *Journal of Management Studies*, **34**(1), pp. 75–98.
Ostlund, S. (1994). 'The limits and possibilities in designing the environmentally sustainable firm', *Business Strategy and the Environment*, **3**(2), pp. 21–33.
Pearson, C. S. (ed.) (1987). *Multinational Corporations, Environment, and the Third World*. Duke University Press and World Resources Institute, Durham, NC.
Penrose, E. (1959). *The Theory of the Growth of the Firm*. Basil Blackwell, London.
Piet, J. (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), p. 43.
Porter, M. E. (1990). *The Competitive Advantage of Nations*. Free Press–Macmillan, New York.
Porter, M. E. (1991). 'America's green strategy', *Scientific American*, April, p. 168.
Porter, M. E. and C. van der Linde (1995a). 'Green and competitive: Ending the stalemate', *Harvard Business Review*, **73**(5), pp. 120–134.
Porter, M. E. and C. van der Linde (1995b). 'Toward a new conception of the environment–competitiveness relationship', *Journal of Economic Perspectives*, **9**(4), pp. 97–118.
Rivoli, P. and E. Salorio (1996). 'Foreign direct investment and investment under uncertainty', *Journal of International Business Studies*, **27**, pp. 335–357.
Rugman, A. M. (1981). *Inside the Multinationals: The Economics of Internal Markets*. Columbia University Press, New York.
Rugman, A. M. (1995). 'Environmental regulations and international competitiveness: Strategies for Canada's forest products industry', *The International Executive*, **37**(5), pp. 97–118.
Rugman, A. M. (1996). *The Theory of Multinational Enterprises: Volume One of the Selected Scientific Papers of Alan M. Rugman*. Edward Elgar, Cheltenham, U.K.
Rugman, A. M. and J. A. Soloway (1997). 'Corporate strategy and NAFTA: When environmental regulations are barriers to trade', *Journal of Transnational Management Development*, **3**(1), forthcoming.
Rugman, A. M. and A. Verbeke (1990). *Global Corporate Strategy and Trade Policy*. Routledge, London.
Rugman, A. M. and A. Verbeke (1992). 'A note on the transnational solution and the transaction cost theory of multinational strategic management', *Journal of International Business Studies*, **23**(4), pp. 761–771.
Rugman, A. M. and A. Verbeke (1993). 'Generic strategies in global competition'. In A. M. Rugman and A. Verbeke (eds.), *Research in Global Strategic Management, Vol. 4, Global Competititon: Beyond the Three Generics*. JAI Press, Greenwich, CT, pp. 3–15.
Rugman, A. M. and A. Verbeke (1995). 'Transnational networks and global competition: An organizing framework', *Research in Global Strategic Management, Vol. 5, Beyond the Diamond*. JAI Press, Greenwich, CT, pp. 3–24.
Rugman, A. M., J. Kirton and J. A. Soloway (1997). 'NAFTA, environmental regulations and Canadian competitiveness', *Journal of World Trade*, **31**(4), pp. 129–144.
Rumelt, R. P. (1984). 'Towards a strategic theory of the firm'. In R. B. Lamb (ed.), *Competitive Strategic Management*. Prentice-Hall, Englewood Cliffs, NJ, pp. 556–570.
Salop, S. C. and D. T. Scheffman (1983). 'Raising rivals' costs', *American Economic Review*, **73**(2), pp. 267–271.
Shrivastava, P. (1995). 'The role of corporations in achieving ecological sustainability', *Academy of Management Review*, **20**(4), pp. 936–960.
Shrivastava, P. and S. Hart (1994). 'Greening organizations—2000', *International Journal of Public Administration*, **17**(3/4), pp. 607–635.
Smart, B. (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), pp. 42–43.
Stavins, R. N. (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), pp. 38–39.
Tobey, J. A. (1990). 'The effects of domestic environmental policies on patterns of world trade: An empirical test', *Kyklos*, **43**(2), pp. 191–209.
Verbeke, A. and C. Coeck (1997). 'Environmental taxation: A green stick or a green carrot for corporate social performance?', *Managerial and Decision Economics*, **18**, forthcoming.
Vogel, D. (1986). *National Styles of Regulation: Environmental Policy in Great Britain and the United States*. Cornell University Press, Ithaca, NY.
Vogel, D. and A. M. Rugman (1997). 'Environmentally related trade disputes between the United States and Canada', *American Review of Canadian Studies*, **27**(2), forthcoming.
Walley, N. and B. Whitehead (1994). 'It's not easy being green', *Harvard Business Review*, **72**(3), pp. 46–52.
Walter, I. (1982). 'Environmentally induced industrial relocation to developing countries'. In S. J. Rubin and T. R. Graham (eds.), *Environment and Trade: The Relation of International Trade and Environmental Policy*. Allanheld, Osmun, Totowa, NJ, pp. 67–101.
Wells, R. P. (1994). 'The challenge of going green', *Harvard Business Review*, **72**(4), pp. 43–44.