

Dynamic Aspects of Corporate Greening in Dutch Business

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Abstract

The need better to understand the pathways of corporate greening was highlighted as a key research issue in the early to mid-1990s (Gladwin, 1993; Shrivastava, 1995). Until then the literature on business and environment was dominated by conceptual papers, anecdotes, short case studies and cross-sectional analyses. However, understanding the pathways of corporate greening implied a need to track organizational changes for example through repeated surveys or longitudinal case studies which would reveal a series of events or a chain of causalities within a complex framework of interacting organizational and contextual dynamics. At this time the Dutch Social Science Research Council (NWO) brought together a range of government departments to co-finance a strategic social science research program on the theme - Environment and Economy. The strategic nature of the research program called for multi-centre research proposals of four-year duration. The DynEmics program was developed and funded under this call for strategic research. It ran over the period 1998-2001, involving four Dutch research groups in exploring the process of corporate greening from the vantagepoint of complex systems. Originally the program consisted of four research projects linked through a meta-project. The four projects examined the relationship between business strategy and environment, environmental marketing, the relationship between companies and regulators, and the influence on companies of stakeholder networks. A meta-project drew on material from each of the four projects.

During the past three Greening of Industry Network conferences the methodology and the preliminary results of the DynEmics program have been presented in dedicated workshops. This paper presents an overall scientific record of the DynEmics program.

1. Introduction

This paper discusses the DynEmics research program, a strategic research initiative of the National Social Science Research Council for the Netherlands (NWO). The background to the DynEmics program (Hafkamp & Roome, 1998) and the content of the projects that contribute to the program are described elsewhere (de Groene, Kolk, van der Veen and van der Woerd, 1998).

In synopsis, the DynEmics program is a four-year interdisciplinary, collaborative study designed to improve understanding of the dynamics of environmental management activities of companies in the Netherlands. The program was based on research conducted by groups in four Dutch Universities. It originally involved four projects, which examined business strategy and environment, environmental marketing, the relationship between companies and environmental regulators, and the influence of stakeholder networks on company environmental management. A meta-project was designed to draw on material from each of these four projects. Changes in personnel meant that the environmental marketing project was delayed and was no longer synchronous with the overall program. It is due to be completed by the end of 2002. It is not reported here.

The program's explicit intent was to support a more integrated perspective of the way that corporate environmental management develops over time. The overall program was designed to enable the participating research groups to undertake their own research projects while contributing to a more integrated view of the process of corporate environmental management.

This paper sets out the context of the DynEmics program and describes the research design that was used. The findings of the individual projects are presented together with an overall set of conclusions about the scientific results.

2. The DynEmics Program – Background and Methods

The DynEmics program was supported by a strategic research grant from NWO. It received support from NWO over the period 1998-2001. The grant was part of a larger initiative to promote the capacity in Dutch Universities to address social science aspects of environmental issues and their management. The DynEmics program is of interest because it is specifically concerned with the dynamics of environmental management in business. It also provides an example of a collaborative research approach designed to address corporate environmental management as a process.

Each of the research groups collaborating in the program undertook a self-contained project and distinct line of inquiry. This was coordinated so that research findings were shared and an overlapping research design used in which each team undertook a number of case studies to show how the practice of corporate environmental management unfolded in Dutch companies during the period of the research. This was possible because all the projects shared a common interest in how the interaction between different actors (individuals and organizations within the focal organizations and their context) contributed to the shape of environmental management practice. Two of the projects were more interested in understanding how actors, internal to the company, responded to environmental issues while, the other projects, were more interested in the way that external actors influence company practice.

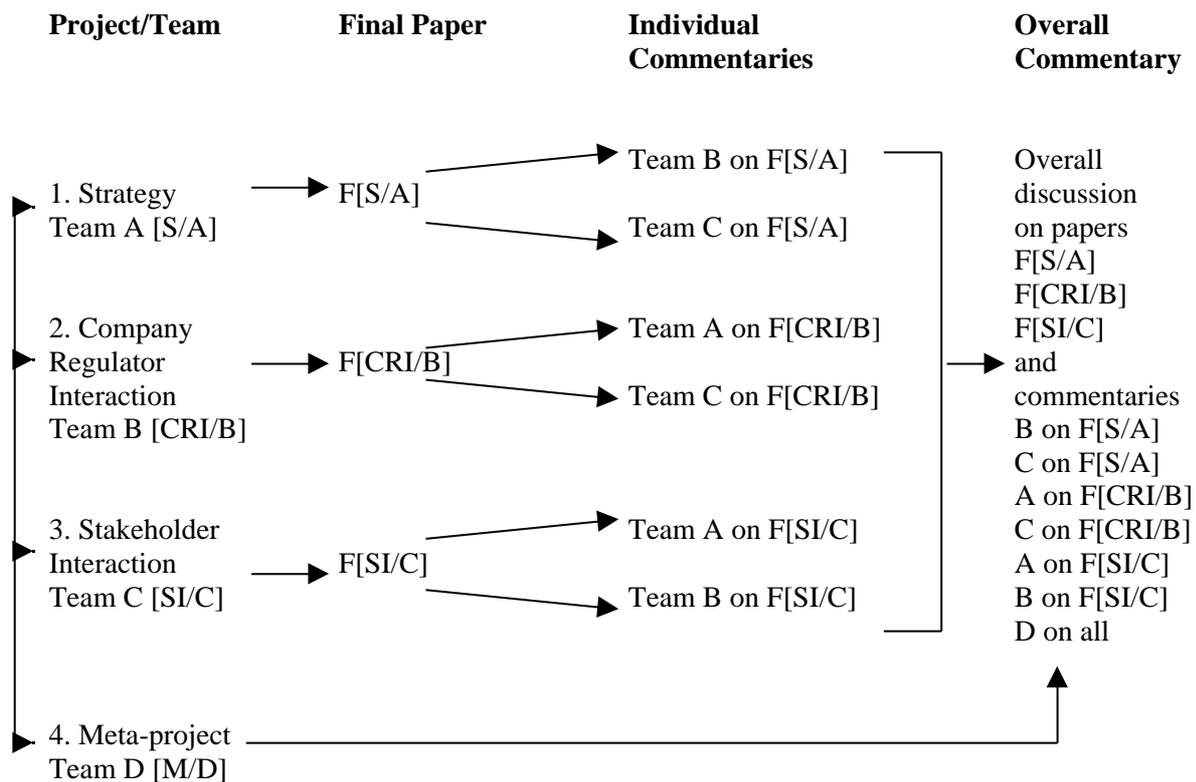
The commitment of research funding over a four-year period provided the opportunity to study the evolution of corporate environmental management in ‘real-time’. That is, to follow the way environmental issues (either generic or specific) unfolded, were translated into organizational responses, and led to organizational change.

Program coordination and integration drew these interests together in two main ways. First, there was regular contact between the research groups to develop a common research approach for those parts of their project that used case studies. As the program developed these meetings provided a venue for the regular exchange of findings, both as preliminary results and through the development of papers that outlined the overall results of the study. At the end of the program final papers were prepared. These were read and reviewed by a member of each of the research teams and a set of cross-cutting commentaries were developed (see Figure 1). The final papers and commentaries were discussed at a final meeting and a set of overall observations were constructed collectively.

Second, a meta-project sought to connect empirical evidence in the three remaining projects, through the construction of case-narratives that connected ‘events’ in corporate environmental management that affected strategy, company regulator interaction and company stakeholder interaction during period of the program (Dieleman and Roome, 2001). This empirical work still continues and is consequently not reported in this paper.

Case studies formed an integral part of the overall research strategy because they are consistent with the concern to understand “how or why questions being asked about a contemporary set of events over which the investigator has little or no control” (Yin, 1994: 9).

Figure 1 Cross-cutting Design of Research



The ‘real-time’ approach in the research, the uniqueness of context and experience of each of the companies, together with the distinctive perspectives and interests of the research groups, introduced considerable variation into study. The research strategy anticipated this empirical and scientific variation. It sought to take account of the fact that each research group was studying a system or sub-system from through their own epistemological lens, according to their own research protocol. At the same time there was a need to establish a more generic (overarching) picture of the process of corporate environmental management by drawing together the overall conclusions of the research groups.

3. Scientific Methods, Results and Findings

This section of the paper is divided into two sub-sections. Section 3.1 briefly outlines the methods, and, main results and findings of the three projects that contributed to the DynEmics program. These are presented separately as sub-sections 3.1.1 corporate environmental management strategy, 3.1.2 companies and environmental regulators, 3.1.3 company and stakeholder networks.

3.1 Project Results and Findings

3.1.1. Corporate Environmental Management Strategy

This project was conducted through members of the research team based at WIMM, University of Amsterdam. Ans Kolk headed the research project.

The original problem definition for the project assumed an evolutionary path in the adoption and integration of environmental concerns into company strategy rather than a complex, dynamic reality, which might include differences between companies/sectors. The project aimed to investigate the extent to which companies integrate environmental concerns in their strategies and business processes, examining the factors influencing this process, and developing metrics that might be able to assess the process.

Existing environmental management models and the literature on strategic management and organisational structure and culture were reviewed (Kolk & Mauser, 2002) and then related to a series of interviews involving companies from different sectors, environmental impacts, sizes and nationalities.

This underlined the limitations of environmental management models based on linear notions of the integration of environment into business policy and strategy. It was seen that

while typologies, or conceptually derived archetypes, help to identify the positions of companies they do not necessarily help to understand how or why company responses develop over time.

Typologies have also emphasized aspects of environmental *management* structures rather than environmental *performance*. While management structures such as environmental strategies, policies, communication and commitment are closely related to environmental performance, in practice, there is often a discrepancy. There are practical and theoretical reasons to separate outcomes from policies and measures.

Secondly, it was noted that types of strategy making and policy implementation differed between levels - corporate, business units and production. Strategic and operational management were usually separated, especially in large organizations. The interaction of these different levels and functions were seen to influence company strategy and practice. Moreover, companies are invariable part of networks, in which environmental problems in one part of the network can affect companies elsewhere. Organizations can have a prime function of facilitating or enabling other companies' environmental activities, or can be affected by other companies. These issues have organizational, managerial and strategic implications, as they relate to dependency and issues of control and responsibility.

These ideas informed the second phase of the project where empirical research was carried out in two ways. Through a cross-sectional study of the dairy industry (Mauser, 2001) and case studies of Dutch (main) ports. Only results of the study of the (main) ports are presented here because of it has a stronger longitudinal dimension. All of the (main) ports in the Netherlands participated in the study - the Port Authorities of Amsterdam

(GHA), Rotterdam (GHR), and Amsterdam Airport Schiphol (AAS) as well as Royal Dutch Airlines (KLM).

Three dimensions were examined in each case: the strategic significance of the environment, the external positions of the organizations in terms of competition, cooperation and consultation, and the internal organization of environmental management. It should be noted that these categories overlap.

Strategic significance of environment:

All the main ports had recently connected their environment orientation to their strategic positioning or objectives. For example at Amsterdam Airport Schiphol [AAS] their objective is to “develop into a leading international airport operator” (AAS, 2000a: 3) based on aspects such as punctuality, quality, customer service and baggage handling (AAS, 2000a: 12)¹. This view of leadership was extended when top management labelled environment as a sign of quality stating “..that a proactive environmental policy focusing on corporate social responsibility can make an essential contribution to this effort [of being a leading airport enterprise]” (AAS, 2000b: 12).

In the case of KLM’s their objective is “to be the first-choice passenger and cargo airline and provider of maintenance services while consistently enhancing shareholder value, providing a stimulating and dynamic working environment and participating in mutually beneficial relationships with its partners” (KLM, 2001b: 5). KLM positioned the environment in their strategy in the 1999 environmental policy declaration. “KLM is well aware that the issue of the environmental is crucial to the company’s continuity and to the

¹ In terms of air transport and passengers movements, and of cargo, Schiphol also ranks fourth after London, Paris and Frankfurt (AAS, 2000a: 69-70).

relationship it maintains with its customers and stakeholders. The environment will be an ongoing issue on the aviation industry's agenda. For this reason, KLM has chosen to take an active stance on the issue and, to this end, the company is assuming a pragmatic outlook with the aim to integrate the environment as an accepted and operational aspect of its business activities." (KLM, 2001a: 31).

The strategic orientation for Dutch seaports including Rotterdam and Amsterdam is stated in a recent document published by the Dutch seaport organization (NHR, 2001). To enable the ports' continued regional, national and European economic function, they request the removal of infrastructural and spatial bottlenecks. These include investments in road, rail, water and tubular infrastructure, the creation of new port terrains and, in view of repeated societal protests against expansion plans, promises of a restructuring and more intensive use of current areas.

A SWOT-analysis included in the seaport strategy document labels the environment as an opportunity and a threat (NHR, 2001: 23-37). It characterizes seaports as strong in quality and risk management. Therefore, parts of their areas are pre-eminently suitable for a concentration of activities that require much environmental attention. It is argued that "ecologies of scale" can be achieved, when companies utilize each other's waste material or by-products such as heat. These might be facilitated and enabled by seaports. Such an approach fits into their ambition to be 'quality ports', with its attention to environment, safety and quality of life ('liveability') as equal to economic objectives. The NHR designates safety and sustainability as increasingly important to the seaports' competitiveness. In this regard, Dutch ports are said to "play a pioneering role that is

sometimes difficult, but will also become commercially profitable” (translated from NHR, 2001: 24).

This orientation is reflected at the ports of Rotterdam and Amsterdam, which have generally abandoned the use of terms such as ‘environmental management’ and ‘sustainable development’. Rotterdam now stresses economic objectives combined with the broad concept of ‘liveability’. While Amsterdam port aims to optimize economic and societal performance, referring to both financial and stakeholder returns (including employment). These different orientations originate from the economic peculiarities of both ports, which are also relevant to the specific environmental (and societal) issues that are most salient to them.

All the main ports have a history of environmental issues and pressure that have led them to make these strategic statements. Environmental concerns for AAS have become strategic due to the public and political discussions about AAS’s societal acceptability and future. This includes questions over runway expansion and privatization. Citizens increasingly complain about AAS’s nuisance, with complaints filed from a wider region than the direct neighbourhood. These developments negatively affect AAS’s operations and future expansion possibilities. Previously, a lack of open communication and violations of the noise zone limits damaged the airport’s image. AAS adopted a new environmental policy declaration in 2000 marking a shift from environmental management to the broader concept of corporate social responsibility. AAS says it will “actively consider the wishes and responsibilities of its stakeholders when making relevant decisions, always working to find the best balance between environmental impact, social impact and economic growth” (AAS, 2000b: 12). The main impact of the environment on AAS’s market position

originates from the differentiation in airport fees based on aircraft noise and takeoff/landing time. Curiously by discouraging the noisiest aircraft and night flights, AAS's overall capacity increases. Earlier excesses in noise zone limits have been a barrier to further expansion (and gave rise to a fine by the government in 2000, amounting to euro 2.3 million). AAS successfully compelled these airlines to stop breaches in landing times in 2001.

At KLM the present position on environment was promoted in great measure by its own internal network of environmental coordinators/representatives. Representations to the responsible Board member resulted in the formulation of an environmental strategy group assisted by KPMG. KLM's strategic reorientation was based in part on an inventory of the opinions of environmental organizations, the government, Dutch air travellers, the general public and employees (KLM, 1999: 7). KLM's stated ambition is to "rank among the world's top airlines...as far as its environmental performance is concerned". "To achieve this, it will evaluate its position regularly through a process of benchmarking" (KLM, 2001a: 31). So far, however, such a benchmark has not taken place.² Since the adoption of the policy, KLM's environmental reports have mentioned activities to improve environmental reporting systems and to develop performance indicators. Despite the absence of an environmental benchmark, the most recent annual report asserts that "[t]he results of KLM's active environmental policy have made the company one of the industry leaders for environmental performance" (KLM, 2001b: 33).

² In the Fall of 2000, however, the Triodos Bank has, for its own purposes, carried out a benchmark of European airlines, in which KLM scored above average. In addition, SAS has published some comparative environmental performance figures for a limited number of airlines in its environmental report (SAS, 2000; see section 2).

AAS and KLM face a set of interconnected strategic and operational environmental concerns. AAS provides a context to KLM and vice versa. For example, AAS shares an interest with KLM to ensure the airport's expansion and undisturbed operations. Environmental limitations, such as noise, hamper the further growth of both AAS and KLM. As a consequence both companies are exploring other means of transport, such as high-speed rail lines, as a way to ease congestion, enable mobility and promote accessibility. AAS and KLM cooperate and exchange information.

AAS labels strategic environmental issues 'environmental focal points'. These are: noise disturbance and air pollution (in the air, not on the ground), which fall outside Dutch environmental law covered by the national Aviation Act. Operational environmental issues are designated by AAS as 'good housekeeping' activities' and are covered by Dutch environmental law. Until 2000, a covenant stipulated energy-efficiency targets. After its expiration, AAS has investigated whether comparable agreements could be made part of a benchmarking covenant. Although AAS secured the participation of a considerable number of other airports in such an international benchmark, it has not obtained government guarantees on aspects such as a 'frozen' benchmark. At present AAS will not proceed with the covenant and will revert to an adjusted regular environmental licence. Energy remains an operational issue for the airport. If AAS decides to participate in an international benchmark, energy becomes strategic in nature because a comparison to other airports influences its image, and has implications for longer-term control of organizational processes, especially if the outcome necessitates changes.

For KLM air pollution from emissions turned out to be the main source of concern to their stakeholders, followed by noise disturbance, which appeared to be a concern to

residential neighbours of AAS. Interestingly neighbours tended to attribute this nuisance to AAS rather than to KLM. KLM seems to be more associated with the positive aspects of air transport. The composition of KLM's aircraft fleet largely determines its environmental performance; aircraft and engine manufacturers are crucial partners. KLM's relatively modern fleet achieves high energy efficiency and low noise disturbance levels. KLM also carries out many intercontinental flights, which benefits its per ton-kilometer performance, because it reduces environmentally-intensive takeoffs per kilometer travelled.

The Rotterdam and Amsterdam ports experience environmental issues related to congestion, as well as infrastructural and spatial constraints. In the case of Amsterdam, the competition with housing demands is notable. Both ports face complaints about noise disturbance and the clean up of polluted soils. The problem of sludge is especially urgent in Rotterdam, which also has to deal with the pollution of the Rhine and, in view of its large volume of trans-shipments, has greater problems with noise disturbance and dust. It also emphasizes safety and health, related to both crossing vessels and the industry located in the port region.

Competition, cooperation, and consultation

All the main ports display an extensive array of relationship that involve competition, cooperation and consultation. Despite its strategic character the environment is not a competitive issue for AAS. Airports do not use green performance to increase their market share. Instead the airports most active in environmental management cooperate to exchange and share know-how. Environmental conditions that limit expansion sometimes induce

companies to divest or expand elsewhere, or to land noisy aircraft on other airports with lower standards.

AAS has multi-lateral cooperation with airports through the Airports Council International Europe, especially with Frankfurt, London and Paris. Discussions have taken place to increase knowledge about the extent to which reporting on environmental issues can be harmonized. AAS and Malpensa [Milan] explored the possibilities for a uniform format for environmental management and reporting based on a variant of the European Eco-Management and Auditing Scheme (EMAS) in the 1990s. Harmonization efforts have been limited by lack of comparability.

AAS maintains relationships with government authorities and societal stakeholders, negotiating with national government about the future of the airport, including its ownership structure, and its role in the Dutch distribution network and regional infrastructure. These regional developments involve other parties, such as the Amsterdam Port Authority. A new system to calculate noise disturbance is highly strategic to AAS and KLM. It is supposed to take effect in 2003 in response to a long-standing controversy about the current system. Environmental licences involve AAS in contacts with the provincial authorities. In the years from 1993 to 1999, AAS published a voluntary environmental report. In 2000 Regional authorities expressed a demands for more extensive reporting, in which the airport would *inter alia* include the environmental activities of the companies located on the airport.

AAS's 2000 environmental report (its first so-called 'community report') was based on guidelines from the Global Reporting Initiative (GRI). This followed a suggestion from the CEO who had seen British Airways' environmental report.

KLM has worked with KPMG to benchmark its environmental performance against British Airways, Lufthansa and Swissair (KLM, 1999: 7) using the airlines' environmental reports and a series of interviews.

Noise is an important criterion when buying new aircraft as noise is the main barrier to the further expansion of AAS, where KLM is the main user. Commercial reasons have also inspired KLM's attempts to substitute European flights for rail transport. To this end, it cooperates in a consortium with the Dutch Railways to operate a high-speed railway in the Netherlands. KLM has begun an 'overnight express', a train that combines passenger and cargo transport in Europe, with a logistics company. Finally, KLM made a decision in 2000 to validate its air ticket for train travel to and from AAS to increase the attractiveness of flying the airline and reduce road congestion.

In relation to the global airline industry, KLM has positioned itself as a supporter of international attempts to adopt environmental policies with regard to emission trading and aviation performance standards. In the International Air Transport Association, the companies that share KLM's views are northwestern European airlines such as Lufthansa, British Airways, SAS and Swissair. Competitors from southern Europe and particularly the US oppose the proposals. In this split KLM finds itself in opposition to its own alliance partner Northwest Airlines.

In terms of dialogue with stakeholders, to date KLM's contacts with environmental organizations have focused on explaining KLM's policy and operational limits to the improvement of environmental performance. Responses to the reply card included in the airline's environmental report have been limited, and this enclosure may well be discontinued. In its latest environmental report, KLM announces its intention to explore the

concept of sustainability, by reference to the “contribution to the quality of the living, working, and residential surroundings and respect for human rights in other countries” (KLM, 2001a: 7). It is unclear what role sustainability will play in KLM’s future as the CEO put it in the annual report “[t]he nature of our activities prevents us from calling ourselves a ‘green’ company” (KLM, 2001b: 13). At the same time, in the preface to the environmental report, he “invites other parties to work with us on the common goal of sustainable aviation” (KLM, 2001b: 5), in order to find the right balance between environmental, social and economic aspects.

Port authorities manage and develop port facilities, their environmental impacts, then, mostly originate from their customers. In the past decade, ports have paid increasing attention to the environmental implications of ships and their cargoes. Rotterdam initiated a ‘Green Award’, giving ships the right to discounts and preferential treatment in those ports that have joined the scheme. This has recently been extended from tankers to dry-bulk carriers, and is planned for container ships.

Comparable efforts have been made with regard to the location issues. Amsterdam and Rotterdam have started to restructure their operational areas, clean up pollution, relocate environmentally-harmful and noisy companies, and cluster those that do not hinder, or are even complementary to, neighbouring companies. The ports argue that careful environmental behaviour avoids problems for companies in the future. The environment is seen to benefit the ports’ competitive situation. As the Rotterdam port authorities put it, “A good environmental quality produces competitive advantage: it is an increasingly important factor for location” (translated from GHR, 1998: 15).

On the other side Dutch seaports have historically taken the view that the government's environmental policy places them at a disadvantage relative to other European countries. This was expressed in a 1994 report (NHR, 1994: 10-15). The ports called for a level competitive playing field, yet at the same time Dutch seaports have actively taken environmental initiatives aimed at 'self-regulation' and information exchange between ports at the European level. In the framework of the European Sea Ports Organization, an environmental code of practice was adopted in 1994 to express the ports' collective commitment to environmental improvement. This recommended ports to "comply with the letter and spirit of environmental legislation and abide by internationally agreed conventions, directives and resolutions intended to protect the environment" and "to initiate steps to consider the potential for the improvement of environmental standards beyond those currently required under legislation".³

A follow-up to the code is found in a project to exchange information and to assess individual ports' environmental situation, co-funded by the European Commission's Transport Directorate. This exchange has primarily taken place between environmental staff from ports from all over Europe, creating a network of otherwise relatively isolated officials. The Eco-Information project (1997-1999), and its follow-up Eco-Ports (2001-2004), aims to increase the number of participating European ports to 150.⁴

Rotterdam and Amsterdam port authorities cooperate closely. In international cooperation Amsterdam has taken a coordinating role for these projects. Rotterdam has been an important player in the international port and maritime organizations. Participation has focused on an explanation of the competitive and financial implications of

³ <<http://www.espo.be/code.html>>

⁴ <<http://www.ecoport.com>>

environmental measures and deriving policies that benefit environment, health and safety, while respecting the different starting points and characteristics of the various ports.

The exchange of views and knowledge at the operational and strategic levels, through Eco-Information/Eco-Ports projects and international organizations has diminished the earlier concerns about the competitive disadvantages of the environment. Commitments to environmental improvement and (beyond) compliance policies, made through the 1994 code of conduct, played a role as well. From a Dutch, and particularly Rotterdam, perspective, the outcome of a comparative study between the strictness of environmental law in Belgium and the Netherlands was also important. The project, initiated in 1995 by the Dutch and Flemish ports organizations, showed that environment was not a competitive issue in the Antwerp-Rotterdam rivalry (NHR/SERV, 1998).

Ports therefore continue to work on levelling the competitive playing field while at the same time attention shifts to the need for national and international cooperation to shape approaches that link environment and commercial activities.

In the Dutch context, where congestion is felt as a major problem, cooperation has also involved linkages with providers of transport, such as railways and airports. Amsterdam is participating in discussions about a second European transport 'corridor' north to the one that includes Rotterdam.

In spite of the complaints about Dutch environmental policy the relationships with the national, regional and local governments have been intensive and cooperative. The Dutch consensus approach, means that the ports undertake consultation at all levels with all possible parties. In the past decade, discussions have focused on the ports' desire to expand and improve infrastructure and transport facilities, and the environmental and societal

implications of these plans. Generally speaking, governments and business (associations) have expressed their support, based on the idea that distribution of bulk materials, goods and people through the main ports (including AAS) is crucial to the Dutch economy. This type of trading has an especially long history in the Netherlands. By contrast, environmental organizations have voiced concerns, emphasizing the extensive land area in use by the ports and strongly contesting the need for further expansion. In the case of Amsterdam, protests concentrated on the expansion of the port to residential, natural and agricultural areas, and the plan to improve access from the North Sea through the IJmuiden locks. In Rotterdam, it focused on the large-scale westward expansion of the port to the North Sea. These controversies have increased and intensified dialogue with stakeholders.

Interestingly, the environment has started to be used as an argument to justify expansion. These arguments include the relocation of disturbing activities from residential areas, and the creation of new nature and recreational facilities. In Rotterdam, this reasoning has contributed to a compromise between the port, the local and regional authorities, business associations and societal organizations. The parties reached consensus on a 1,000 hectare phased expansion of the port, accompanied by a more intensive use of the current area, an improvement of 'liveability' in the region and the creation of new natural areas (with a size of 750 hectares). The Dutch 'polder model' of stakeholder dialogue may be extended to another type of consultation that currently exists for the Rotterdam port, and which currently involves government authorities at all levels and business. Called ROM-Rijnmond, it focuses on the development of the main port while guarding the implications for environment and liveability.

Internal organization of environmental management

All the main ports have gone through a restructuring of their environmental management position consistent with the move toward a more strategic environmental orientation. At AAS a general reorganization in 1999 shifted coordination of environmental responsibilities to the business unit - Airlines. Previously, the environment was part of the corporate staff directly linked to the CEO. This recognized that AAS's environmental reputation was in main part determined by the airlines that used its facilities. From September 1999 to June 2001, the corporate environmental advisor was accountable to the director of the Airlines business unit, who reported directly to the Chief Operational Officer, one of the three members of the AAS's management board. Formal contacts were through two meetings annually, although there were informal occasions to communicate. The business unit guided environmental problems related to airlines together with those from other AAS business units, although the latter remained responsible for the implementation of policies concerning their own activities. Since June 2001, the corporate environmental advisor became directly accountable to the COO. These changes were facilitated by the continuity in staff: the corporate environmental advisor has served AAS in this position since 1995.

The corporate environmental advisor, responsible for the environmental report, cooperates with corporate communications staff. Compared to the annual report, where the CEO manages the process, responsibility for the environmental report is situated lower in the organizational hierarchy. According to GRI-guidelines an integrated sustainability report includes information on financial and social performance and in June 2001, it was decided that the COO would become responsible for the environmental/community

reporting process, mirroring the CEO's role in financial reporting. Again KLM's internal practices are subject to developments in the broader organizational field.

KLM's present active approach to environmental issues focuses on the operational level. Before 1998 a more reactive stance prevailed. KLM published two environmental reports in 1996/1997 and 1997/1998, claiming that "environmental policy formed an integral part of its business activities", and high priority was said to be given to environmental aspects in purchasing and acquisitions (KLM, 1998: 8). With hindsight, however, the company designated this as "lack of a clear environmental stance, both internally and externally" (KLM, 1999: 7).

At this time KLM adopted a 'linking pin' principle, with a central environmental function taking care of regular communications between the different department environmental coordinators and representatives from company divisions (KLM, 1998: 12). After the strategic reorientation, the airline strengthened its earlier central environmental function creating a Corporate Environmental Centre (CEC), of two persons. This staff department supports the line organization responsible for environmental management. CEC has a coordinating and advisory role, organizing regular meetings with department environmental coordinators, divisional representatives and the responsible Board member. All environmental activities are in practice authorized through CEC.

In the new structure, the CEC was included in the service department responsible for working conditions ('Arbo Services'), a freestanding unit within the KLM holding. This department's manager headed the environmental strategy group. There were ideas at the time to transform the CEC into a separate unit although this was not carried out. From

September 2001 CEC will move to the department of government and industrial relations at KLM's corporate headquarters.

Environmental management started to receive more systematic attention in the ports of Rotterdam and Amsterdam in the course of the 1990s. In Amsterdam, environmental initiatives (including the coordination of European activities) have traditionally been taken by the general manager of strategic development, while more specific tasks were assigned to a limited number of staff members in the operational parts of the organization.

In Rotterdam, a 1994 inventory of the environmental management system pointed at the need for a more systemic and integrated approach. One year later, a document was published that outlined the integration of environmental and safety policy in the management structure of the port authorities (GHR, 1995). Final responsibility rested with the management board, particularly with the director of port innovation, with more specific tasks for the two other divisions, Exploitation and Acquisition, and Shipping. In this period, the Rotterdam port authorities also drew up environmental reports, the last one covered 1996.

A general reorganization in 2000 was intended to prepare Rotterdam port for a possible overall change in ownership structure (privatization or a public limited company owned by the local and/or national government)⁵. This led to a new division of environmental tasks. One of the four staff departments, strategy and communication, deals with policy development, (inter)national cooperation and the longer-term implications of the environment. Of the five divisions, which are also responsible to the board of management, Infrastructure and Environment can be approached for more specific issues. This does not mean, however, that the other four divisions do not deal with the environment in their daily

activities. The commercial division, for example, takes care of environmental questions in their relationships with customers. Likewise, the port management division takes responsibility for the environmental aspects related to shipping, including monitoring and inspection.

3.1.2. Companies and Environmental Regulators

This project was conducted through members of the research team based at IVM at the Free University of Amsterdam. Frans van der Woerd headed the research project.

The IVM project investigated how governmental policies interact with the environmental performance of companies. It was based on case studies of company-authority interactions in relation to voluntary agreements [VAs]. The project aimed to formulate learning points for public authorities and companies to improve the effectiveness and efficiency of their policies. The IVM project addressed the following research questions:

1. How do specific policy instruments influence companies with divergent environmental performances?
2. How and why do interactions between companies and authorities develop over time?

The empirical part of the project focused on changes in business-government interactions as a result of sectoral Voluntary Agreements (VAs). Sectoral VAs are signed agreements between government and a sector of industry aimed at a broad range of environmental improvements within a specified time frame. Sectoral VAs were examined because they are a new, only partly tested, policy instrument. Here we provide an outline of

⁵ In this respect, the AAS situation and organization has served as an example.

the perspective of the research and method of embedded case studies, some background to Dutch sectoral voluntary agreements, and the findings from case studies in the paper, textile finishing and fertilizer industries.

Perspective and Embedded Case Method

The project was informed by a meta-theory of learning. This assumes that organizational learning and change is mediated through the interaction of actors both inside and outside focal organizations (Roome and Dieleman, 1998). Actor interactions take place around 'learning and change events' and 'learning and change sequences', which are made up of a series of events over time. At their simplest, events involve stimuli, which can act to question current thinking and/or practice; the emergence of conceptualized reactions to these stimuli; and the development and implementation of responses. At a more concrete level, Aggeri (2000) agrees that *resource development* is a crucial issue for both private and public partners in a VA. In a dynamic perspective, he considers resource development the predominant criterion for success.

VAs, then, can be considered as structural arrangements for *multi period* (=learning), *multi agency* (=integrating) arrangements. In VAs, both companies and authorities can be considered as focal organizations. VA-targets can be considered as stimuli for change. Conceptualized reactions to these events were developed by means of embedded case studies. Moreover the conclusions of the study can be seen as a learning event too in that it supports the development of 'good business practices'. The intent was that the conclusions of the study might foster learning.

Bottlenecks may occur in the learning of new routines and new institutional structures, which tend to be much more demanding (Van der Woerd, 1997). VAs provide a framework for action-learning. However, the organization, implementation and monitoring of VAs determine how effective this framework is. However, while VAs provide the focus of this project, VAs are only one of many governance structures, and do not have any intrinsic or universal efficiency *per se*.

An embedded case study approach was used in the empirical research. This drew on developments at sectoral level (especially VAs and annual progress reports) and case studies of individual companies. Through the sectoral framework it is possible to place the case company in their sectoral context. This enables the construction of a profile for the case company in relation to the continuum from pro-active to laggard. And, more specifically, to establish the relative scope of its environmental activities: for example is it pro-active in all VA targets or does it focus on specific targets. This helps to identify what a company is doing in absolute and relative terms. The case studies also provide evidence of how and why environmental performance is changing. These, how and why questions, were discussed with business and government actors in semi-structured interviews based on pre-sent questionnaires.

Dutch sectoral voluntary agreements

Since 1985, VAs have developed in a number of European Union countries. The Netherlands has taken a leading position with more than 100 VAs (Lieverink and Mol, 1998). The first [Dutch] National Environmental Policy Plan (NEPP) in 1990 introduced sectoral VAs as part of the target group approach that was meant to deal with industrial

pollution from specific industrial sectors. However, VAs vary widely in focus, ambition level and the parties involved.

During the 1990s, about 80 percent of Dutch industrial pollution was covered by 10 sectoral VAs. According to official policy documents, VAs establish a social contract between authorities and companies: authorities can rely on the cooperation of companies in the implementation of government policies, in return, companies will be informed about future environmental demands, in order to make their planning more efficient (VROM, 1989). Both parties can benefit from this arrangement, by supporting weak spots in the operation of market organizations, while know-how (technological and practical knowledge) is often a weak point for environmental authorities. In this sense VAs can be considered part of national environmental innovation systems improving the flow in formation and building competence and capability.

Sectoral VAs contain fixed targets for 2000 and indicative targets for 2010. All targets set at sector level are based on the National Environmental Policy Plan (NEPP). However, targets can be renegotiated if unexpected economic events appear. This wording implies that policy implementation agencies should not place demands on companies that risk business continuity.

Dutch sectoral VAs conform to the following pattern. At plant level, companies are obliged to make a four-yearly Business Environmental Policy Plan (BEPP) and produce annual progress reports. Within sectors, BEPPs are combined to see whether sector targets can be met. Progress reports are combined annually to monitor progress at national level (VROM, 1989). The basic elements of environmental management systems (EMS),

planning and reporting, form the basic elements of sectoral VAs. An operational EMS at signatory plants is necessary for the VA structure to work properly.

The first evaluations of sectoral VAs became available in 1997. In synopsis the findings suggest that the results for the environment are mixed. Industries dominated by large companies show demonstrable progress (e.g. chemical industry). In sectors dominated by small companies progress is more disappointing (e.g. metal construction) (Lieverink and Mol, 1998). Sectoral VAs should be considered as part of the regulatory context for companies.

Below the characteristics of the sectors from which the three case studies were drawn are described and this is followed by a synopsis of the results of the three case studies.

The Dutch paper industry

The Dutch paper industry is relatively small and consumer oriented. There is little production of virgin pulp, which is not surprising in a country with virtually no forest. In contrast, the reuse of waste paper is highly developed, as a result of concentration of population and high recycling rates. Imports of pulp for the Dutch paper industry are high. Paper manufacture in the Netherlands is 90% self-supporting.

In 2000, 27 paper plants operated in the Netherlands. Two of these paper plants used integrated processes for the production of virgin pulp, while 20 paper plants applied integrated processes to recycle waste paper. There were no separate wood pulping or recycling mills in the Netherlands.

Innovations in the paper industry focus on process improvements (Kearney, 1997). A process orientation dominates environmental issues as the manufacture of paper demands

large inputs of energy and water. The main environmental issues associated with pulp and paper manufacturing are:

Energy consumption and related emissions of CO₂ and NO_x (In the Netherlands SO₂ is less relevant, since natural gas is the common fuel and SO₂ emissions are negligible therefore);

Water consumption (some card board manufacturers use surface water, most plants use groundwater);

Discharges of COD (Chemical Oxygen Demand) and BOD (Biological Oxygen Demand) in waste water;

Discharges of micro pollutants, mainly AOX (chlorinated substances) that result from the use of chlorine chemicals in wood pulping and micro-pollutants that result from de-inking;

Solid waste.

In 1996 the government, representative organizations of the regional and local authorities and the business association of the Dutch paper industry concluded a voluntary agreement aimed at the reduction of environmental impacts resulting from paper production. The VA has been signed by all 27 paper plants in the Netherlands (Convenant papier, 1996).

The Dutch textile finishing industry

Textile finishing processes textiles in order to improve performance and appearance. Typical operations are bleaching, dyeing and printing. In most processes, textile products are submerged in water (European Commission, 1997).

The number of companies and the number of employees in the overall textile industry decreased in recent years in the Netherlands. However, in the textile finishing sub-sector employment increased, whereas the number of companies decreased.

Wastewater is the primary environmental concern in textile finishing. Important environmental pressures relate to the use of harmful auxiliaries and dyes in large quantities along the whole chain, i.e. in the production of raw fibres, in processing and in textile finishing. Environmental impacts from textile finishing mainly fall in three categories:

- Chemical substances (dyes, auxiliaries)
- Water consumption & wastewater
- Air pollution & energy consumption

In 1996 the Government and the textile and carpet industry signed a voluntary agreement to stimulate the reduction of environmental impacts resulting from textile finishing. The VA is signed by textile finishing companies with at least 20 employees.

The 1996-2000 VA contained sector targets for climate change (energy efficiency improvements), groundwater depletion, dispersion to air, dispersion to water (heavy metals and chlorinated organic compounds), eutrophication (N and P in wastewater) and waste. 2000 Targets are binding, 2010 targets are indicative. The VA mentions no objectives for the effluents from dyes (Convenant textiel, 1996).

The Dutch fertilizer industry

Fertilizers provide nutrients to crops in agriculture. There are three mono or straight fertilizers: nitrogen (N), phosphate (P) and potash (K). Multinutrient fertilizers contain a combination of N, P and/or K. In the EU, N fertilizers are most important (55%), while P (24%) and K (21%) score almost equal (European Commission, 1997).

Before 1999, 9 fertilizer plants operated the Netherlands: 4 N producers, 2 P producers and 3 multinutrient producers. In 2000, three plants closed completely, one N producer and two P producers. The Netherlands now has to import all its P and K fertilizers. The three plants that closed were all located in the Rotterdam area. The remaining six plants are located in other regions of the Netherlands. At the start of the 1990s, employment in the Dutch fertilizer industry showed a sharp decline. This decline continues.

Fertilizers are bulk commodities sold on a worldwide market. The combination of decreasing demands in EU markets and more competition from abroad has brought the EU fertilizer industry in a difficult position. Around 1990, the EU moved from being a net exporter into being a net importer. As a result, a significant restructuring, concentration and downsizing took place the production side of the EU fertilizer industry. One factor that contributed to this downturn was the move in EU agricultural policy away from its earlier emphasis on agricultural outputs brought about through intensive production. The Dutch fertilizer industry was part of this process of concentration.

Cost leadership is the only feasible strategy for the EU fertilizer industry. Only large, modern plants can survive or those plants at the end of their operational lives, which are operated as *cash cows*: Producing as much as possible with as little of investments as possible. However profits have been unsatisfactory in the 1990s because of falling demand.

The fertilizer industry is energy and capital intensive, and extensive in labour use. The main environmental issues associated with fertilizer production are:

Emissions of NO_x in nitric acid production;

Energy consumption in ammonia production;

Emissions of SO₂ in sulphuric acid production;

Emissions of cadmium into coastal waters (in waste gypsum from phosphoric acid production);

Emissions of radio active materials (from phosphoric acid production);

Gypsum as a waste material (from phosphoric acid production with sulphuric acid);

Fluoride emissions to air (phosphoric acid production).

The first two issues arise in the production of nitrogen (N) fertilizer, the other topics originate in production of phosphate (P) fertilizer.

In 1993 the Dutch government and the chemical industry signed a voluntary agreement to reduce environmental impacts resulting from the production processes of this branch. The VA has been signed by the corporations that operate fertilizer plants (Convenant chemie, 1993).

Target subjects of the VA for the chemical industry, which also includes the fertilizer industry, are changes in climate, acidification, dispersion, eutrophication, waste disposal, disturbance and groundwater depletion of priority substances. All targets related to phosphate production (SO_2 , fluoride to water, cadmium to water and gypsum waste) have been more than accomplished, because the two phosphate plants in the Netherlands closed in 2000. Energy efficiency and NO_x emissions to air remain dominant themes in the production of nitrogen fertilizers. At national level for the whole chemical industry, 2000 targets for energy efficiency and NO_x have been accomplished (FO-Industrie, 2000). In our interviews we obtained more information about the contribution of fertilizer plants to these overall results.

Synopsis of Results

Strategic significance of environment:

The environment has little strategic significance for the Dutch paper companies that were investigated, as they have not elaborated any strategic vision on future environmental objectives. Moreover, VA targets do not provide an impetus for companies to come up with technological breakthroughs.

The main strategic concerns of textile companies are market development and cost effectiveness, which is used as a criterion to test technical improvements. VAs do not have a positive influence on this strategy unless process innovations are cost effective or drive down costs. VAs do not contribute to the development of markets. What was observed as strategic was the increasing effort placed on R&D, resulting in innovative projects at the few large plants in the sector. They had begun experiments in advanced water purification and closed water loops, which could bring process of improvements to the whole sector. This will unfold over the next five years.

The one textile SME included in the case study was unable to implement improvements mentioned in its BEPP because it was too busy surviving economically. In fact during a reorganization the environmental co-ordinator was to lose his position.

The market conditions in the fertilizer sector lead to strategies based on cost leadership or milking strategies. In terms of environmental issues this translates into minimum cost compliance.

Competition, Cooperation and Consultation

In the paper industry the experiments with closed water loops and the recycling of reject product are not attributed to the VA, rather, some innovative companies have taken

initiatives in these areas. Since 1996, the paper industry has experienced a diffusion of state-of-the-art technology among its members. A well-organized trade association, resulting in effective two-way information at the sector level and plant level supports this.

A major contribution of VAs has been in forcing annual contacts between companies and authorities. This has speeded up the lag time between authorities' demands and the reaction by corporate planners. Contacts, which were previously governed by 'events', are now changed into regular 'sequential' contacts. Companies and authorities in all three sectors appreciate the value of these regular, structured contacts. Regular contacts have long been a tradition in the chemical industry. Therefore, these changes are probably less pronounced for the chemical industry than for the paper or textile finishing industries.

These contacts improve accountability and transparency as well as creating an action learning framework for those devising policy and those implementing policy.

Not one of the companies in the textiles sector has a certified EMS although the larger companies have a formal record of regulations and procedures or, in some cases, an EMS that is ready to be certified. Slow progress is caused by a lack of incentives from the authorities and customers. With this background contacts between companies and authorities have increased as a result of BEPP procedures. These contacts have become regular. All companies and half of the authorities note that contacts have become more open and better informed. Two institutional networks have begun pilot projects on environmental technologies and the dispersal knowledge among members. These are the project groups for environment of the *KRL* trade association and the VA contact group of the Water Authorities. They have given substantial impetus to the topic of 'dyes and waste

water'. It must be acknowledged that availability of technology subsidies assisted this endeavour.

The Overall Role of VAs

The project suggests that while VAs speed up the time between regulators' needs and company implementation and provide an arena for regular contacts they do not really affect the strategies of companies. This applied to all three sectors.

However, differences between sectors were observed which appear to be due to sector structure, market conditions, company strategies and the disposition of companies to innovation. In the two sectors dominated by large companies (paper and fertilizers) VA targets were achieved. In the SME dominated textile-finishing sectors they were not achieved. This seems to imply that VAs and SMEs are not compatible. However, the detailed cases suggest that this situation arises not because of any innate lack of innovation in the companies that make up the textile sector rather it is because the textile sector has to date less experience of environmental management practice. In fact textile finishing shows evidence of innovations and initiatives that might translate into relative improvements in environmental performance in the near future. Of course, this assessment will only be judged over time.

There is positive evidence that VAs stimulate learning and action where it was least expected, in textile finishing. In the fertilizer sector and, to a lesser extent, in the paper industry technical development was mediated by a business-as-usual attitude. In the paper industry a rather homogeneous learning effect influenced all companies. Whereas in textile finishing fairly rapid learning and innovation by some companies took place from a

relatively poor starting point. This meant there was considerable variation between companies as they responded to the demands of the VA, as they innovated and learned or didn't learn from others. However, this innovation is not yet fully implemented.

The fertilizer sector was able to shelter from the introduction of technological innovations because the targets for the VA targets also covered the larger chemical sector, which had achieved significant improvements in environmental performance. This enabled fertilizer companies to avoid investment as they confronted difficult market conditions.

From an environmental perspective VAs contribute to an acceptable or good level of performance against targets. After four years, most VA targets had been accomplished. However, the sense is that VA targets do not require the introduction of state-of-the-art technology and therefore do not challenge pre-existing business strategies for investment in technology and innovation.

The more subtle effects of VAs are found in the learning effects arising from regular contact between companies and authorities. These contacts revolve around the VA obligations in terms of planning and reporting, and the negotiation of VAs at sector level, which improves focus on environment related communication between companies. VAs lead to the standardization of environmental performance through the dissemination of state-of-the-art technology and the establishment of Environmental Management Systems (EMS) needed for a basic level of compliance.

From the regulator's perspective VAs do not appear to stimulate environmental leaders in a sector of industry. What they do is bring new knowledge to those companies which are most in need of environmental knowledge but for whom innovation is probably weakest.

Two findings deserve particular attention. The active innovation in the textile sector through pilot projects to solve their most pressing problem of wastewater pollution by dyes. While it was not surprising, given the market conditions they face, to find that few fertilizer plants made investments in state-of-the-art technology. It was more surprising that these companies did not have even have EMSs in place. This was even more important given the established position of the responsible care program in the chemical industry.

3.1.3. Company and Stakeholder Networks

This project was conducted through members of the research team based at Tilburg University. It formed the subject of a Ph.D. undertaken by Frank Wijen under the Guidance of Nigel Roome.

The project highlighted the role of different internal and external stakeholders in corporate environmental management practice. The focus of the study was on companies and the networks of actors [individual and organizational] that influenced these companies' learning about environmental management. The central question of the study was how and why do stakeholders influence the processes of organizational learning with respect to environmental management in business organizations.

The research considered the relationship between the influence of stakeholders on organizational learning as mediated through a set of actor roles that have been associated with learning and innovation. These roles are: idea generators who craft creative new ideas. Internal entrepreneurs or champions who implement these ideas as concrete products or processes. Boundary spanners, or gatekeepers, who transfer information between otherwise disconnected actors. Sponsors, coaches, or mentors, senior managers who

provide support by allocating resources to innovative activities (Tushman and Nadler (1996). This conforms to ideas of Senge (1999: 10-21) who argues three types of leaders realize successful organizational change. Local leaders who take unprecedented concrete actions. Internal networkers or network leaders who diffuse new insights across organizations and executive leaders, senior managers, who provide the necessary means to and examples of change.

These roles assume that these actors are sufficiently powerful or influential to exert their role. Indeed this power and influence is likely to increase as organizations accumulate learning about environment-related issues, and as their relationships with stakeholders becomes operational and stable.

Methods

Case studies were chosen as the method of choice to reveal how and why stakeholders influenced company environmental learning. A pilot study was conducted on a large chemical business.⁶ This demonstrated the possibilities of the empirical method. A main study was then conducted on six large business organizations. The organizations were selected as having some shared characteristics: large size and relatively complex stakeholder interactions; relatively significant environmental issues; and diversity of influence. They were also selected to cover a range of characteristics in terms of products these ranged from material goods to services; position in the product chain; ownership structure; local to global market orientation; and recent to long term concern about environmental issues.

⁶ For the pilot study, 13 interviews were conducted with internal and external stakeholders. Secondary sources provided complementary information.

The organizations were major players in the fields of electronics, financial services, food, health care, power, and waste. All organizations (or at least their headquarters) were based in the Netherlands. Their annual sales ranged from about EUR 250 million to 40 billion EUR, employing between 2,000 and 200,000 persons. Three companies marketed material goods, the other three offered services. The whole product chain was covered in three cases, while the remaining three were situated at the consumer end of the chain. Three companies were in public hands, the three others were privately owned. Two organizations were oriented towards regional markets, two companies were nationally oriented, and two were global. At the outset of the study, two organizations had been involved in selected issues of environmental management for less than five years. The other four companies had relevant experience of one or more decades.

A semi-structured interview format was used with open-ended questions. Questions were first submitted to central actors (who had a pivotal role in environmental management). They were asked to name internal and external actors whom they perceived as important. Through this snowballing method (Scott 1991), the major internal and external actors were identified. These actors were subsequently interviewed about their perception of the relation with the central actors (using basically a mirror version of the questions asked to the central actors). 55 interviews were conducted, 6 with central actors, 20 with other internal actors, and 29 external actors. Over 200 secondary sources (annual environmental and financial reports, policy plans, brochures, newspaper and magazine articles, and websites) were interrogated for additional information on the focal organizations and their external stakeholders. A further round of interviews was conducted

with central actors one-and-a-half to two years after the first round of interviews as a way to provide for the dynamic aspects.

Case Studies

Case stories were developed on each organization. These were structured according to themes: antecedents; environmental management structure; overview of stakeholders; stakeholder influences; organizational learning; compatibility or unavoidability of stakeholder inputs; stakeholder roles in learning; evolution and focus of stakeholder relations. Companies and interviewees participating in the research were assured on anonymity in return for their candid information.⁷

At this stage final results have still to be compiled. Preliminary results suggest that five organizations displayed a high learning capacity in relation to environmental management practices (such as cleaning up internal production processes; the marketing of green products; local socio-economic developments in a restrictive environmental settings; and global sustainability. There was evidence verbal, and through actions, and/or environmental performance that these companies understood important stakeholder demands and were capable of responding to those demands in an effective way. One organization had a high learning capacity in green marketing but insufficient behavioural repertoires to meet regulatory demands. When these high learning capacities were evident, major stakeholder inputs were either compatible with the organization's strategic orientation or were unavoidable, or both.

⁷ This was done not only to encourage respondents to respond in an open-hearted way to sensitive questions, but also to avoid biased responses (in case names would appear, information with a possibly negative connotation would not have been easily communicated).

In four cases unavoidable claims were made by government bodies and in one case by the organization's CEO.

In the five organizations with a high learning capacity influential stakeholders met all the four learning roles that were identified earlier. In three of these cases, all four roles were present but were not always provided by internal actors. In the two other cases only three key roles were evident. In the organization that had a well-developed green marketing approach but poor performance in meeting regulatory demands, the boundary-spanning role was clearly absent.

Two of the organizations with a high learning capacity had a long history of involvement in environmental management although this had been interpreted in different ways during this period. Their stakeholder relations were established and relatively homogeneous around operational issues. Another had recently been involved in an environmental project and had established a set of heterogeneous contacts at the strategic level.

In the other cases, however, the networks of actors were not stable. Two organizations with medium to long-standing experience of environmental issues had reshuffled their actor networks as a result of a take-over (in one case) and a merger (in the other case). The remaining company had been involved with environmental issues for a long time, but experienced important changes of its stakeholder relations after a strong commercial expansion process and a crisis due to the failure to meet environmental regulatory demands.

These findings suggest that discontinuities in the established pattern of actor networks disrupt the process of environmental learning and change. While in one case this

disruption was linked to an environmental management issue – regulatory failure – in the other cases it arose from causes not connected with environmental management. What remains unclear is whether learning for environmental management is more fragile to these discontinuities than other areas of corporate innovation in practice and performance.

4. Discussion and Conclusions

The overall results of the DynEmics program provide some useful insights into the nature and process of organizational change as it relates to corporate environmental management practice. It also raises questions about some of the conventional assumptions, models and theories about corporate environmental management as a self-contained issue that evolves within corporate practice.

A priori every company has an impact on the environment in some way or another. It follows that knowing what those impacts are and understanding their relevance and significant to an organization is a strategic concern. Knowing how to respond to those issues appropriately and efficiently is a strategic and operational concern. Consequently, the environmental issues and the risks they generate potentially affect all managerial levels, functions, structures and processes. They have the potential to impact all of a company's activities – its products, services, sourcing of resources and materials, manufacturing and distribution processes and markets.

In contrast to this view, the way environmental issues are understood and managed by companies has evolved rather differently. Environmental management began as something of an all embracing concept [container concept] in the 1980s [although what was in the container was normally associated with waste, pollution, and hazardous substances

connected with production]. Environmental management was founded on the notion that some of these ‘external effects’ were subject to regulations and controls which had to be complied with in broad degree. Yet, few companies had in place corporate values that stated their environmental responsibilities and fewer companies adopted the ‘3M approach’ which argued that innovation could contribute to reduced, and more efficient, material use and new products with environmental attributes.

From this beginning the scope of the issues subject to corporate environmental management has expanded. Moreover, thinking about environmental management has advanced with the development and implementation of concepts and techniques such as industrial ecology, ISO 14001, LCA and so on. These have often merged with other concepts [total quality, organizational learning], and perspectives [corporate responsibility, leadership, quality of life] and practices [new product development, stakeholders engagement and innovation]. In addition, we observe increasing complexity in environmental management as new concepts and practices emerge and become embedded within different levels of large organizations, the different types of organization that make up sectors or supply-chains, and among actors in the institutional field of any focal organization.

When this is considered from the viewpoint of individual actors who contribute to, and influence, corporate environmental management practice a range of conceptual and communications issues arise in negotiating routes to improve environmental and business performance within companies, within sectors, within voluntary agreements, within supply-chains or most broadly within society. Add to this the countervailing issue that not everyone within a focal organization necessarily shares the view that the improvement of

environmental performance is an appropriate organizational goal and it becomes obvious that the way corporate environmental management practice evolves is extremely complex. It is also dependent on pre-existing organizational structures, systems and values and the capacity of individuals to undertake and steer change within the organization, or, a set of organizations.

The DynEmics program sought to make some contribution to understanding these processes.

However, it is equally clear that corporate environmental management is understood and analyzed by academics in different ways. These differences arise from the ontological positions that provide the perspective from which the phenomenon of corporate greening are studied and the choice of theories used to explain or model practice. We see this in the DynEmics program through the selection and use of theories, based on institutional economics, learning and influence and methodological approaches that draw on larger quantitative sampling, case-studies as well as events, narratives and change. Moreover, we also have to take into account that academics have accumulated different insights as their understanding and experience of corporate environmental management has developed over time, either gaining or diffusing focus. This is found in the observation that during the period of the DynEmics program the state of theoretical insight has moved on from where it was when the program began.

From a perspective of organizational capabilities and learning this implies that capabilities are developed, framed and reframed by emerging concepts. Some processes of reframing are more difficult. For example, we see a shift in environmental management from the accumulation and deployment of technical and scientific knowledge to the

accumulation and deployment of behavioural and interpersonal, and interorganizational capabilities. This arises as environmental issues become more strategic and as there is more need to integrate business and environment issues, together with strategic and operational concerns. We observe a shift of emphasis as some environmental management approaches begin as operational issues, are taken on board at a strategic level and then begin to change in the light of separate strategic and operational responses which draw on different clusters of capabilities.

With this background it is possible to detect a number of trends revealed through the DynEmics research.

First the conceptual frame of corporate environmental management has expanded over time. What we observed was an increasing strategic conceptualization of environmental management as it became less a collective term for issues such as recycling, waste auditing and management and pollution control, to become components of EHS and the basis for environmental management systems. This situation is now splitting as some companies see the environment as part of their strategic agenda for corporate citizenship or social responsibility or sustainability, while others do not.

This is shown in the case studies on main ports. It is certainly the experience at AAS, KLM and the ports of Rotterdam and Amsterdam.

We also detected environmental management as a response to regulations, as the management of processes and products, the adoption of management systems [which raise new concerns about how now to integrate business processes with environmental management systems]. Now to we see evidence of a gap opening up between environmental performance in operations and environment as a strategic issue. This raises

issues about the quality of integration between the levels of an organization. The recognition by some companies that the environment is a strategic concern also gives rise to a split between those that are innovators and leader [companies] and those that are followers. In this division, leading companies become more and more like regulators pushing for high standards within VAs or making demands on their supply chains or sector.

Secondly, the ground of corporate environmental management is shifting as it is institutionalized within companies. It has moved from being part of EHS, to the function of an environmental co-ordinator, then on to being part of the company's vision, mission or strategy [linked to CEO responsibilities] while still part of operations. It is subject to choices about centralizing or decentralizing authority as well as the extent to which it has support at top level or with the root and branch of an organization. Again there is experience to draw on from AAS and KLM.

Part of the process of institutional arises from the link observed between strategic issues like expansion and legitimacy as is the case with AAS, and the ports of Rotterdam and Amsterdam. At a strategic level what is interesting are the connection made recently by some companies between environmental management and abstract ideas such as leadership, quality of performance or liveability and innovation.

We observe a process in which more and more people within companies are engaged and interested in corporate environmental management as these threaten the company and its interests. However, maintaining this level of involvement is difficult when the original threats to the organization dissipate or the organization is threatened by difficult financial circumstances, as was the case with the fertilizer industry or the textile company.

We see that as environment management is institutionalized within companies the number of actively involved actors inside and outside the company increases and then this slows or stops growing. The research on stakeholder networks implies that there may be a maximum size for an active network – moreover as the intensity of contacts increase between members of a network, so the network becomes more stable and interaction more routine. With that the character of the network changes from source of ideas to source of relationships [a club]. Possibly there is also pressure on the network of actors to become more closed too outsiders and new ideas. A mitigating factor appears to be the extent to which innovation is a shared ambition of the focal organization and the members of its network. In some cases this trend it was disrupted by discontinuities of various kinds.

Third there is an important role for active [individual] actors. It seems clear that during the period of the DynEmics program there was a general trend in which more and more companies became involved in environmental management and with that developed a richer set of ideas from which to draw, mimic and learn. The routes and processes through which this diffusion happens are interesting. We see, for example, a role for knowledge networks and actor networks as companies cooperate and learn together with other companies the arguments, policies and practices of corporate environmental management.

Different types of knowledge networks were observed. The ports have a knowledge network involving 150 European ports [to share experiences]. AAS and KLM learn from one another and engage in multilateral and bilateral learning with other companies in their supply chains. Consulting companies, such as KPMG, use a benchmarking approach to reference as an indirect network approach to help improve their client's performance and promote change. Consulting companies cross-pollinating ideas from one client to another. Learning also takes place through international initiatives such as those for European ports or the airline industry. It occurs through initiatives such as the Global Reporting Initiative. However, in these networks individual actors can play important roles. Whether it is the CEO of KLM asking the company to follow the example of British Airways or the set of roles found by Frank Wijen to support learning and innovation in organizations.

Environmental regulators and trade associations also have a role in setting the stage for learning networks as in the case of VAs although these may be subsidiary to the main aims of this policy. Indeed, it seems that bringing companies together with regulators through VAs may be more important than the content of the compact itself, especially when those compacts lack ambition.

These relationships and the knowledge they distribute do not always bring direct results. For example, the failure of AAS and Malpensa to develop an airport environmental management system or the fact that VAs supported companies with lower standards rather than pushing companies with an existing potential for innovation. A number of paradoxical positions and relationships were observed as companies work simultaneously to oppose regulations while promoting higher standards, as is the case with the ports of

Rotterdam and Amsterdam. Or, when KLM is found in opposition to its own alliance partner Northwest Airlines.

There is also a question of whether these learning networks are operational, strategic or both. A fairly weak link in many of the cases seems to be the ability of companies to connect their strategic positions with their operational activities and to place technological and organizational R&D and innovation at the heart of their environmental and commercial performance. In a general sense environmental management as strategy and operationalisation rarely seem to connect. So too business strategy and environmental strategy have only recently begun to connect. It seems that companies may have better developed external than internal networks for environmental management

Indeed there is evidence that environmental management is played out in a strategic sphere and in an operational sphere with different constellations of actors involved in each sphere. These actors appear to view the environment differently and use different language, which further hampers the connection between levels. [Although this may be no different from any other sphere of business].

There is also evidence of 'critical event - strategic attention' cycles which involve companies in environmental shocks. These provoke both attention and responses, including strategic policy making and company positioning – followed by institutionalization and operationalization. In this scheme, policy may autonomously be ratcheted-up from pre-existing environmental responses to higher levels of strategic consciousness and/or higher levels of performance. However, strategic attention is not necessarily linked to performance in terms of reduced environmental impacts. When environmental management is being ratcheted up as a strategic concern there is also a

tendency toward 'strategic' rhetoric based on statements or positions, which may not necessarily lead to, or connect with, operational practices.

An alternate cycle arises when companies respond to environmental issues and institutionalizing them at a sub-strategic level. While environmental issues may receive strategic attention, this may drop away without the new strategic agenda affecting operationalization in any significant way. The new strategic agenda is simply used to legitimize what has and is being done at an operational level.

Rhetoric, then, is often found in strategy and has implications for strategy and operations. As when KLM enabled internal actors to push for renewed environmental performance or as external stakeholders are brought into engagement with companies and are then not so easily dismissed. Once companies build relationships with outside stakeholders they are difficult to abandon. Rhetoric, then, provides a spur to organizational development, change, learning or innovation as well as serving as legitimating for internal actions and positions of environmental managers. Alternately, rhetoric may serve as a masque of deception behind which there is little substance.

We also note that the companies studied were not monolithic entities. They were populated by individual managers, who had the potential for influence under certain circumstances and subject to contextual conditions. This has implications for the processes through which key actors learn from others and act together to support and catalyze change. This relates to the capabilities that organizations are able to call on to match their strategic ambitions with sound operational practices. The evidence seems to suggest that the best companies were those where strategy and operations were together connected with context

and external actors and this arose when companies were able to draw on a set of skilled actors playing supporting roles.

Finally, we should address the experience of discontinuities and disruptions. It appears that disruption trigger either a reorientation away from corporate environmental management positions [as found in the case stories conducted by Frank Wijen at Tilburg University] or provides a basis for a new or renewed learning phase [as at KLM or in the textile industry faced by VAs]. It is clear from the research that discontinuities have potentially profound impacts on the pathway of corporate environmental management. The observations above suggest that we can distinguish two different categories of events. There are environmental events and environmental stories, which propel organizations to give a higher level of attention to the environment. There are other events - ranging from mergers and acquisitions, through routine reorganizations to much smaller changes of personnel - that can seriously influence or disruptive environmental management practices and thinking.

This reinforces the earlier point about the importance of individuals and their capabilities in the organization and design of a company, their seniority, length of service and experience and their mastery of technical and interpersonal skills. It identifies the importance of a set of individual actors with complementary capabilities – connectors, catalysts of ideas and action, and resource providers.

While little is known about the effects of these disruptions on environmental management practice even less is known about what makes environmental management practice in organizations resilient to these disruptive factors. For example, what is the role of organizational culture, the effect of formal systems and structures, or the informal

interaction between actors [the characteristics of environmental managers and co-ordinators interacting with a set of other actors with whom they need to work] that contribute to the development of environmental management practice and its integration with business processes? How do these factors contribute to the retention of organizational knowledge, experience and capabilities in dealing with environmental concerns?

Our suggestion is that understanding these processes is critical for those interested in corporate environmental management practice and performance – whether managers, regulators, policy makers or citizens. But this type of study needs necessarily to embrace different levels and the interaction between levels, because they all affect the dynamics of corporate environmental practice. What appears to shape practice are compelling ideas that play out through the interaction of institutional context, organizational structures and designs, organizational strategies, products, processes and technologies and the capabilities of individuals acting in sets and networks. What our study shows is that it is not possible to bring about policies and actions that link environmental and competitive performance without innovation and change of a strategic and operational kind. Not surprisingly our study shows much more how difficult it is to achieve success in this field than it does in providing a pathway to success.

What we can conclude is that a range of factors act in concert to support and/or obstruct the development of environmental management as a strategic concern and through that contribute to a high level of environmental and business performance. Above all it appears that the need for innovation in this area is rather higher than the capacity of most organizations and their managers to embrace innovation, to learn and take action with others, and to stand back from this process and deal with the paradoxes it creates. In that

sense innovation for corporate environmental management and business performance is more complex than innovation simply aimed at competitiveness on its own and that innovation for competitiveness is itself a difficult processes consistently to reproduce.

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