

**Workshop - The DynEmics Research Program**

***A Meta-Theoretical Perspective on Organisational Learning and Change in  
Complex Business and Environmental Systems***

Professor Nigel Roome

Faculty of Economics and Business Administration

Tilburg University

PO Box 90153

5000 LE Tilburg

The Netherlands

Tel no: - (31) - 13 466 2337

Fax no: - (31) - 13 466 2875

e-mail: nigel.roome@kub.nl

Hans Dieleman

Environmental Studies

Erasmus University

3000 DR Rotterdam

**ABSTRACT**

The DynEmics Research Program is a collaborative effort by four University research groups to study the changes taking place in environmental management in Dutch businesses. The companies included in the study make up the program's business panel. The four studies focus on: the dynamics of the integration of environmental management in company strategy; the response of marketing functions to environmental pressures and innovations; the influence of stakeholder networks on business responses to environmental issues; the interaction between businesses and environmental authorities. The program involves the development of a meta-theoretical perspective based on organizational learning and change (OLC).

The meta-theory draws on recent ideas about the organizational capabilities for OLC that is mediated through the interaction of networks of actors which span focal organizations and their institutional and social fields (Roome and Bergin, 1998). This interaction takes place around 'learning and change events' and 'learning and change sequences', which are made up of series of events over time. Events involve stimuli, which bring into question current thinking and/or practice; conceptual responses, or reactions; and the development and implementation of tangible responses. The experience of these responses in turn informs the understanding within the focal organization and the network of the stimuli, the concepts and the organizational responses that define events.

The meta-theoretical research examines the link between organizational capabilities and environmental and organizational change. It focuses on the interaction between individuals, events and sequences of events that lead to organizational learning and change that in turn affects business processes, activities and interactions with other actors and the environment. Theoretical and methodological aspects of the meta-theory are discussed in the paper.

Roome, N. & Bergin, R. (1998) Action-learning Networks and the Sustainable Enterprise: The Case of Ontario Hydro. *American Academy of Management Meeting*, San Diego, California.

## **Introduction**

The purpose of this paper is to discuss the meta-theory being developed as the framework for the core project of the DynEmics research program. This program began in January 1998. It is a strategic research initiative of the National Social Science Research Council for the Netherlands (NWO). The background to DynEmics program (Hafkamp & Roome, 1998) and 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 organizational change taking place in response to environmental issues by companies in the Netherlands. The program is based on the work of research groups, based in four Dutch Universities. Each group has a track record of research on the response by businesses to environmental issues.

The aim of the program is to contribute to our understanding of corporate environmental management through the projects of the four research groups (de Groene et al, 1998). An explicit intent of the program is to contribute to a more integrated theory of the way that the practice of environmental management in business develops over time. The overall design of the program is being developed to enable the participating research groups to undertake their own research while contributing to this more integrated, core project and a (meta-) theory of the process of environmental management.

This paper considers the meta-theory being used in the DynEmics program and its position in the program's overall research strategy and research design. The paper begins by setting out the context of the DynEmics program. The research strategy and research design of the whole program is then discussed. This establishes how the overall research design relates to the individual projects, and, defines the ground for the core project and its associated meta-theory. The meta-theory is elaborated and the demands placed by that theory on the research design are detailed. It concludes with some observations about the critical aspects of the meta-theory in relation to the DynEmics program and the research design.

### **The DynEmics Program**

The DynEmics program is supported by a strategic research grant from NWO. This means that the program will receive support from NWO over the period 1998-2002. The grant is part of a larger initiative by NWO to promote research capacity in Dutch Universities to address social science aspects of environmental issues and their management. The DynEmics program is interesting because it is specifically concerned with the dynamics of environmental management in business and because it involves the development of a collaborative, longitudinal research approach designed to address corporate environmental management as a process.

While each of the research groups collaborating in the program is undertaking a self-contained project and distinct line of inquiry, all the projects share common characteristics. They all address aspects of how and why environmental management evolves within companies. They share a common interest in understanding how the

interaction between different actors contributes to the ultimate shape of environmental management practice within business. Although, two of the projects are more interested in understanding how actors, internal to the company, respond to environmental issues (the inside-out perspective) while, the other two projects, are more interested in the way that external actors influence company practice (the outside-in perspective).

The funding basis for the project and the explicit interest in the process of corporate environmental management enables a longitudinal dimension to be incorporated into projects of the four research groups. It means that the projects have 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) unfold, are translated into organizational responses, and generate organizational change.

The integrative, or core, project draws on these common interests and design aspects. The core project is designed to connect the empirical findings of the four projects to the program's overall meta-theory. This meta-theory has been developed to provide an overarching analytical framework that connect the four projects while at the same time not dominating the content or integrity of the four projects. The epistemological basis for the meta-theory enables this by drawing on ideas of complex systems, consequently the systems and subsystems studied by the four research groups are seen as operating in dynamic interaction. The key issue for the core-project, and meta-theory, is to understand how, and why, environmental management

develops as it does, during the period of the study. In empirical terms the core-project draws on a series of multiple case studies provided by the four research groups.

Case studies are an important part of the 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).

The ‘real-time’ approach to research, the uniqueness of the experience of each of the companies in the study, together with the distinctive perspectives and interests of the four research groups, introduces considerable variation into study. It is expected that the meta-theory must be able to account for the many different forms of environmental issue, actors, actor interactions and environmental management activities, outcomes and consequences encountered in the series of case studies. The meta-theory, and the research strategy and design, need to be sufficiently flexible to accommodate the variations that are expected between the practices of different companies and the different orientations of the research groups. In particular the research strategy needs to take account of the epistemological assumption of the meta-theory that systems and sub-systems are in dynamic interaction, while each research group is studying a system or sub-system in isolation.

The position of core-project in relation to the four research groups and the overall research design can be illustrated by reference to Figure 1. This figure identifies the extreme forms of multi-group research that range from closely controlled multi-group programs to patchwork research with little or no commonality.



well-stated ontological and theoretical positions, in line with well-formulated and clearly stated methodologies and research strategies. While a meta-level analysis of patchwork research is possible by synthesizing the findings of the contributing projects this needs to take into account the differences of ontology, theory and method used in the studies. This variation seriously limits the ability to draw out points of substantive comparisons and contrasts, or, to generalize from these studies. Common examples of this approach are found in literature reviews of empirically grounded studies.

The DynEmics program sits between the two extremes of Figure 1. It aims to provide a level of freedom so that research groups can develop their projects in ways that complements their existing research stream while building a common dimension to that research through elements of a coordinated research design limited to the meta-theory.

The research design involves the establishment of a program coordinating team to support the sharing of information between the four projects. The coordinating team is responsible for liaison between the research groups and for determining the research design and research protocol demanded by the meta-theory. It is concerned to identify and resolve inconsistencies that might arise between the research design of each of the four research groups and the design elements required by the core-project.

In practical terms, each research group within the DynEmics program is connected to a number of businesses (six to 15) through a company-based contact. A number of the research groups had established contacts with companies active in

environmental management before the DynEmics program began. These personal contacts offer the means to enlist the involvement of businesses in the study. One consequence of this approach is that the research design does not readily conform to a sampling logic. Indeed the DynEmics program is not designed to provide data about the extent of different forms of environmental management, extrapolated from a sample to a general population. Rather, the research design involves multiple case studies, which serve to illustrate the nature of the process of environmental management and to isolate the factors that influence the direction of corporate environmental management practice. Some research projects plan to reference the information from these case studies against quantitative and qualitative data obtained either from earlier work or from concurrent research on larger, statistically significant samples. But whether a research group decided to reference their case studies to the data obtained from research based on sampling logic is left to them to decide.

Each of the four research groups has agreed to prepare a set of case studies, for their focal organizations, to contribute to the core-project. These case studies will identify a set of research subjects (actors whose' interaction provides the ground for the case studies of that research group). The core project of the program will draw from the overall series of multiple case studies generated by the four projects. This overall series, or cohort, makes up the program's 'business panel' of between 24 and 40 companies.

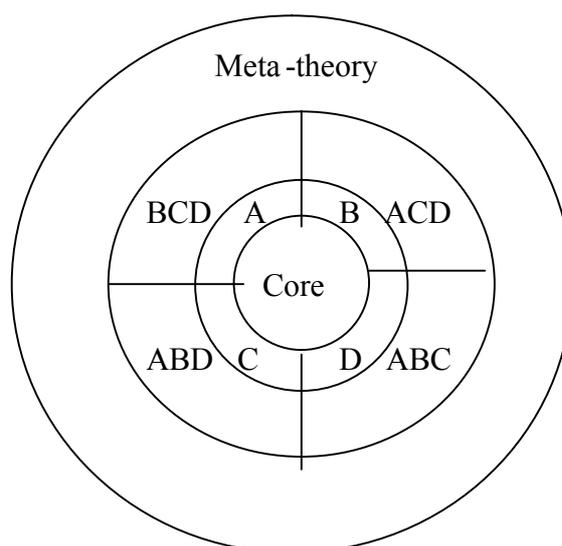
It is planned that during the course of the program employees of the companies in the business panel will be brought together with members of the research groups in a series of research workshops. These workshops offer a point of liaison between the

program's coordinating team, the individual projects and the participating businesses. It also provides a mechanism for feedback, new information and well as insight and ideas on which the research groups can draw.

Each research group will collect primary research information from its set of case study companies in relation to its own research projects and will also collect information for other research groups and the meta-project. It is intended that each group will prepare a limited number of case studies, which will be subject to written review and analysis by the other research groups. The overall set of case studies and these commentaries will provide a common frame of analysis, which transcends ontological and epistemological differences between groups.

The overall program research design is represented diagrammatically in Figure 2.

**Figure 2:** Components of the Research Design



The core area on Figure 2 is provided by the shared properties of the four projects that make up the program. The core includes the commitment to research that is concerned with:

1. business responses to environmental concerns;
2. the dynamics of these responses in real-time;
3. the interaction between different actors;
4. the relationship between the processes and outcomes;
5. trying to explain responses, their dynamics, the interaction of actors and the link between processes and outcomes.

In addition, the core area is defined by the agreement of the research groups to common elements of research method. These include:

1. development of a series of case studies on focal organizations;
2. identification of the actors who contribute to the process of environmental management described in the case studies;
3. participation in and management of the business panel;
4. development of a series of workshops with the business panel;
5. the agreement to prepare and review a series of case studies to develop insights about the different perspectives of the four research groups.

The four quadrants of the second circle represent the projects undertaken by each research group. These research fields are defined by the unique epistemological positions and focus of each research group, which define their research questions and lead to the methods each group proposes to use to provide answers to those questions. In the case of the research focus the groups are concerned with:

Group A - the processes of integration of environmental concerns in company strategies and practices;

Group B – role of marketing in environmental practices of companies;

Group C - the influence of stakeholder dynamics and networks on environmental practices in companies;

Group D - dynamic interaction between companies and environmental authorities.

The four quadrants of the third circle represent the ground provided by the business panel and the research material amassed from the overall set of case study companies. This material includes the information gained by each research group on their specific research questions from their immediate case study companies. It also includes material collected by each research group from their case study companies on behalf of the other research groups. It also includes the material derived through interaction between all the research groups with the business panel during seminars and workshops.

The final circle represents the meta-theoretical ground. It spans the overall research through the core project. It is defined by an ontological perspective that unifies the work of the four research groups through the notion of complex systems. The meta-theory is directly informed by the research program's fundamental research questions:

*How and why does the process of corporate environmental management practice develop over time in relation to the interaction of drivers, forces and actors within and around companies .....how can this be understood within the framework of a meta-theory on organizational learning in complex systems.*

In terms of the overall logic of case research method Yin (1994: 49) suggests that case research method normally involves theory development which leads to case selection which in turn leads to the detailed specification of the research design and data collection protocols. However, this logic implies a well-developed theory and alternate theoretical models, which are then tested through the careful selection of case studies and the design of a research protocol which generates evidence linked to that model. In this way multiple case studies are comparable to a series of experiments. Where these experiments provide evidence against which to test propositions derived from the theory in question. Case studies can be developed to cover whole organizations (holistic case studies) while others may focus on sub-organizations or projects (embedded case studies). This means that an overall series of multiple case studies will serve to illustrate the extent to which alternate propositions are robust across different levels of decision making.

For example, theory could include alternate propositions about the nature of decision making in relation to environmental management in business organizations. One perspective would be to see the firm as a pure form of rational economic machine whereas the other would view the firm as a complex human system subject to the vagaries of sub-optimal decision-making. This would give rise to competing propositions about the nature of environmental management decision-making. One proposition could be that:

P0: Environmental management choices involving significant levels of capital allocation are routinely subject to investment appraisal analysis before decisions are made.

While the alternate proposition could be:

P1: Environmental management choices involving significant levels of capital allocation are determined through complex processes which are subject to the influence of organizational power and advocacy as much as the information derived from investment appraisals.

Testing these propositions through multiple case studies implies the careful selection of cases that either predict similar results or offer contrasting results for plausible reasons. For example, all the case studies should involve business entities. Including publicly listed and privately owned companies in the study design which have made public statements about their environmental management practices would enable the research to examine the extent to which propositions P0 and P1 explain choice in companies with different governance and power structures.

The data collection protocol would need to examine the decision system used in the case study companies in relation to environmental management decisions that involved significant capital expenditure. This protocol might reveal the sequence of events that led to decisions, identifying the actors involved and the arguments and evidence they used to inform or frame choices. These data would be provided through interviews, review of formal documentation (such as the minutes of meetings) and informal documentation (e-mails, memos and notes) and possible participant-

observation. Data could be selected in relation to decisions at the corporate and plant level or both.

The DyEmics Program meta-theory does not conform to this case research logic. The core research question at the root of the meta-theory implies a complex sequence of causes, effects that evolve over time. In relation the power, advocacy and influence of different actors. Moreover the four research groups in the DynEmics program are involved in selecting case study companies and using research protocols that are relevant to their own projects. For these reasons a case research logic that runs from theory, to define case selection and research design and data collection protocols can not be determined with precision.

Rather, the root question of the meta-theory, the epistemological assumptions of the core (meta-) project and the research logic must fit these constraints. The meta-theory and core-project is therefore exploratory and explanatory. It aims to reveal (explain) the nature of complex chains of events over time rather than to rigorously test alternate theories. The core-project is concerned with hypothesis generating (Glaser & Strauss, 1967: 110) rather than hypothesis testing and the meta-theory is regarded as framework through exploration and explanation can take place.

A final issue raised by the research design in relation to the meta-theory concerns the close connection between researchers and research subjects. The overall research design has the effect of bringing the research groups and the overall program into close connection with the focal organizations of the research. The research team is aware that the DynEmics program itself has the potential to act as an agent in the change that is being observed through the research. These contacts include the relationships between research groups and company contacts, the focus on case studies and the use within those case studies of direct observation methods and the establishment of the business panel, as a form of participant observation. Consequently the DynEmics program itself is an actor in the environmental management practices of the focal organizations during the course of the overall program. What remains to be determined is how important it becomes as an actor. This point is discussed in the conclusion.

### **The DynEmics Meta-Theory**

The previous section has discussed the background to the DynEmics program and the overall research strategy and research design within which the program's collaborative projects fit. This establishes that the meta-theory is better seen as a framework for the meta-aspects of the DynEmics program rather than as a basis for hypothesis testing. This is consistent with the two parts of the core research question.

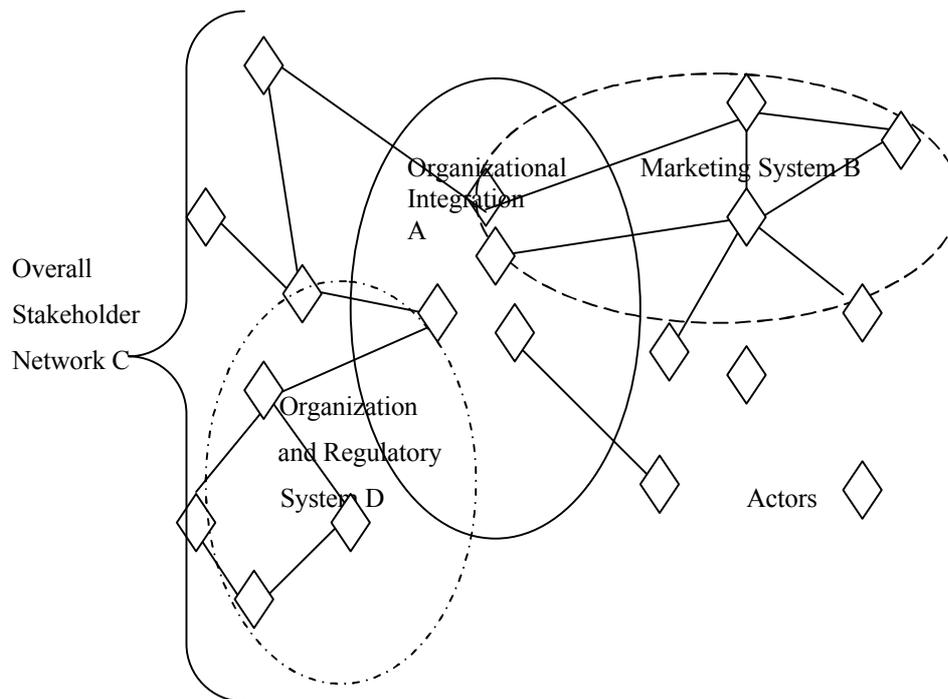
*How and why does the process of corporate environmental management practice develop over time in relation to the interaction of drivers, forces and actors within and around companies?*

And,

*How can this be understood within the **framework** of a meta-theory on organizational learning in complex systems?*

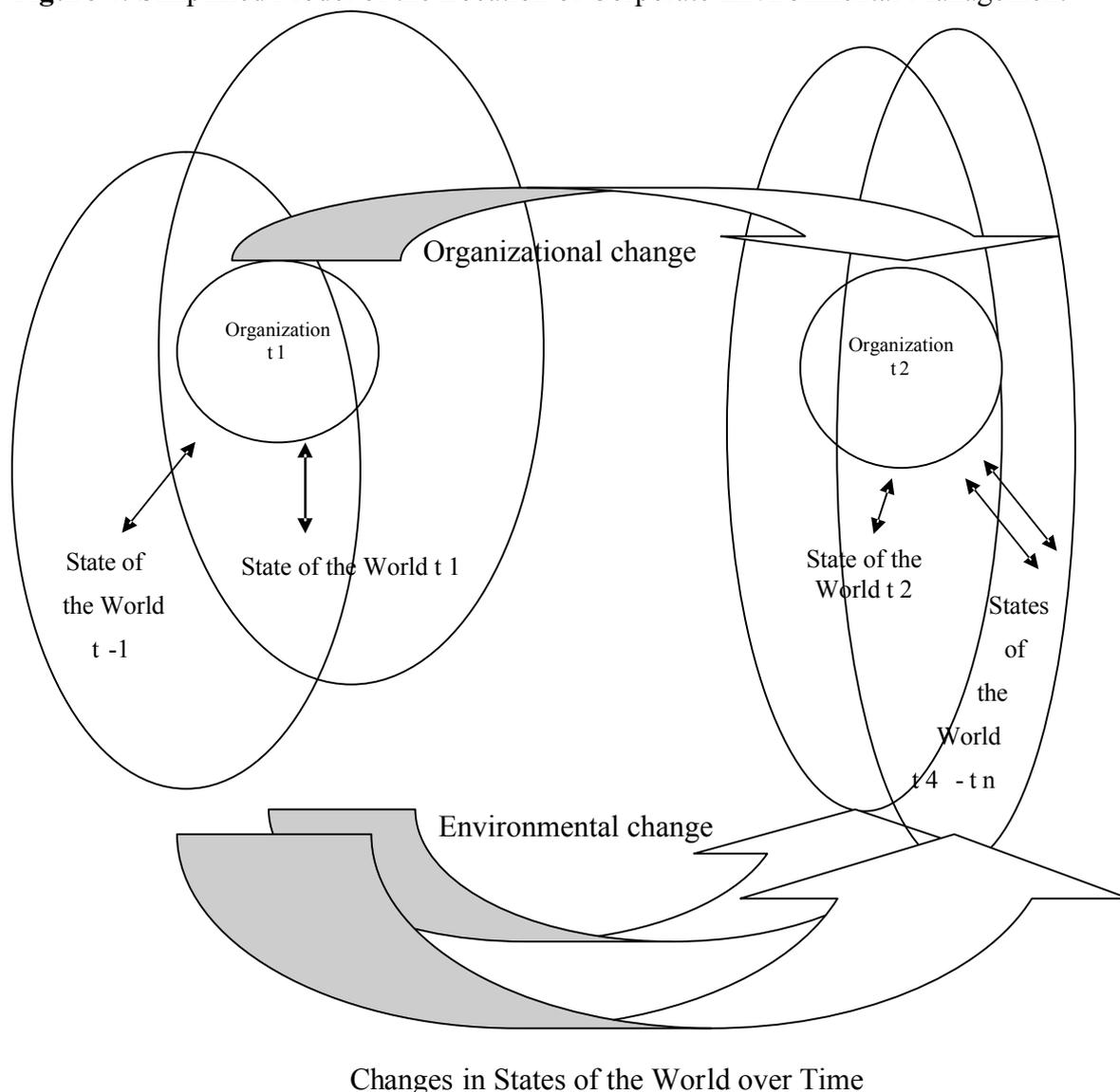
The aim then of this section is to define meta-theoretical framework and specify the research design and research protocol necessary to advance the meta-theory through empirical research. The meta-theoretical framework operates in the domain determined by the research fields of the four projects that contribute to the DynEmics program. This domain is represented diagrammatically in Figure 3.

**Figure 3:** The research fields of the four DynEmics projects in organizational space (A; B; C and D)



However the representation of the domain of the meta-theory in Figure 3 does not advance our understanding of the important dimensions of a meta-theoretical framework. To identify these dimensions it is necessary to define the process of corporate environmental management and from that to isolate the fundamental dimensions of the process that are important to the meta-theory framework. A simplified model of the process of corporate environmental management is set out in Figure 4.

**Figure 4:** Simplified Model of the Location of Corporate Environmental Management



This simplified model allows us to define corporate environmental management relative to organizational and environmental changes represented in past, present and future states of the world. It also enables us to determine the main dimensions of the meta-theory framework that are needed to operationalize how and why the process of corporate environmental management changes over time.

Corporate environmental management as seen in this model is the process, which involves a sequence that originates when business activities and decisions contribute to environmental changes. These changes (may) trigger events that arise through the interaction between the focal organization and the stakeholders in its

institutional field. These events give rise to responses by the organization and its institutional field that lead to changes in the environment that are both intended and unintended. These changes together lead to future states of the world. In reality this simple chronology is continuously influenced by other events and interventions and outcomes arising within and beyond the domain of environmental management.

Five dimensions of the framework of the meta-theory integrate systems and systems change, with the dimensions of learning identified (among others) by Simon (1991) and recent work on learning networks by Clarke & Roome (1996) Roome & Bergin (1998) and Clarke (forthcoming) that develop on ideas of cybernetic strategy (Morgan, 1978). This suggests that:

- Organizational space: the space defined by the form and properties of the network of interactions between actors (organizations and individuals). These interactions are mediated through formal (designed) and informal systems and structures, which involve aspects such as rules, routines that are connected to the distribution of power and authority and access to resources at any point in time.
- Environmental and physical space: the space defined by the systems, processes and distribution of resources in natural and semi-natural systems at any point in time.
- Change: variations in organizational and/or environmental space observed over time. Time and change mutually dependent dimensions of the same phenomenon. For example, time is determined by reference to change -- changes in the earth's seasonal cycle, determined by the movement of the earth around the sun, defines a year). In the same way change is dependent on time – change is the difference between the state of organizational space or environmental space that arises over time.
- Learning: a process of change that involves individuals in the acquisition and processing of information (about changes), interaction (between sets of individuals and/or between individuals and their object world) that leads to an outcome (which provides evidence of learning). Here learning is seen as change, and, change as the opportunity from which to learn or not to learn.

Change provides ‘learning spaces’: the spaces where we can learn how to learn. It is also possible to view learning either as change within an existing mental model or paradigm, or learning which is more reflective and leads to the questioning of assumptions that enable alternate mental models or paradigms to be constructed (see for example Bateson, 1972; Argyris & Schon, 1974; Foldy and Creed, 1997)

- Events: relatively discrete and intense periods of time in which individuals (in focal organizations) encounter and are engaged in change. This involves an awareness of change and the motivation to learn. Events give rise to intent (acts that cause change). Events lead to emergent outcomes that are seen as change in organizational and environmental space. Emergent outcomes are determined by the process of learning and by the complex interactions within and between organizational and environmental space. The gap between intent and emergent outcomes provides opportunity for learning.

This view of corporate environmental management identifies it as a process of learning that takes place around a series of series of events that impact the focal organization. These events are generated by change that arises through the interaction of organizational and environmental space and they bring about change in organizational and environmental space. How and why the process of corporate environmental management develops over time as it does is determined by the interaction of these five dimensions. The model identifies ‘events’ as a way to structure empirical analysis of the overall process of corporate environmental management.

These five dimensions of the meta-theory framework can be translated into a preliminary research protocol for the core-project. The protocol involves a minimum of three case studies undertaken by each research group. Each case study will focus on at least two environmental management events that arise in each focal organization during the period of the research 1998-2002. These events can concern any environment management related activity – the introduction of a product with environmental attributes; the establishment of an environmental policy and management system; change in environmental training; a community oriented

environment program; the introduction of pollution control equipment; participation in an industry-regulator compact and so on. Events will be selected by the individual research groups because they have significance for their research and meaning for their research subjects.

Case studies will trace and describe each event. This will involve an ‘event story’. This will include a brief statement of the event together with a fuller description of the principal actor(s) (responsible for managing the event within the company); the other main actors identified by the principal actor as contributing to the response to the event (these contributions include ideas, creative contributions as well as blocks and barriers); the environmental issue(s) the event connects with; and the organizational change that was designed and accomplished. The various departments or project teams within the organization involved in the event will be identified together with their role. The event story will be developed through ‘real-time’ interaction with the principal actor responsible for the event within the focal organization.

Case studies will also develop an ‘information and ideas map’ and an ‘actor network map’ for the event. The information and ideas map will identify the types of information, ideas, tools, techniques and concepts used by the focal organization to understand and interpret the event. For example this will involve identifying what types of information was used in analyzing the options available to the company – for example whether information was developed about costs/benefits; the environmental consequences of change, the organizational implications of change, information about stakeholders’ perspectives or concerns through focus groups, polls etc. It will also assess whether decisions were based on concepts such as pollution prevention or product stewardship. This map will seek to establish the sequence in which that information was acquired or developed. It will also identify a chronology of the important decision-stages in the history of the event.

An ‘actor network map’ will be developed for each event between three and six months after the event began. The actor network map will be constructed from the responses of the actors involved, beginning with the principal actor associated with each event. (This approach derives from the method used by Clarke (forthcoming) to

investigate networks of learning in relation to the environmental and sustainable development dimensions of technology management). The principal actor will be asked to identify who inside or outside the organization was most important in shaping the response to the event and why (providing information, ideas, resources, blocking action etc). For ease no more than five people can be identified. These five people will be contacted and told that the principal actor had identified them as playing a significant role in the “.....” event. They will be asked to identify what role they saw themselves playing and who was important in shaping their contribution (through ideas, tools, information, resources, instructions and so on). Again up to five people can be identified. The exercise will be repeated up to two further rounds.

At each stage the person who is contacted will be told who had identified them as having a role in the event. At each stage the actors (who operate within the focal organization) will be invited to identify what aspects of the company’s activities and practices, structures, systems and routines, culture or organization design most supported and/or inhibited the outcome of the event.

The ‘information and ideas map’ and the ‘network map’ for the event will be developed using a semi-structure interview protocol designed to be used in face to face or telephone interviews. The method will rely heavily on the actor’s interpretation of who and what mattered in their understanding of the event as this is regarded as the closest source to the process of environmental management

The protocol will be followed for a second event in the same company. This may or may not involve a different principal actor.

## **Conclusions**

This paper describes the DynEmics program and the position of the meta-theory within the program’s overall research strategy and research design. It addresses a number of the practical and methodological issues in conducting multi-group projects within a semi-structured research design. A important issue arising from the overall research strategy and design is that this establishes the DynEmics program itself as a (potentially important) actor influencing the shape of the process of corporate environmental management, which is the subject of research. The establishment of a

business panel and the use of a longitudinal research design means that the overall program creates the potential problems inherent in ‘participant observer’ research. However, this design is developed as a means to investigate environmental management ‘as process’ and acknowledge that the research is also part of the complex system of interactions that the research studies.

The paper also specifies a research strategy for the meta-theory in terms of exploratory and explanatory research. It goes on to specify the meta-theory as a meta-theoretical framework which is define in relation to five principal areas: organizational space; environmental space; change; learning and events. This framework is used to outline a preliminary research design and research protocol for the meta-theory which will seek to elaborate our understanding of *‘How and why does the process of corporate environmental management practice develop over time in relation to the interaction of drivers, forces and actors within and around companies .....how can this be understood within the framework of a meta-theory on organizational learning in complex systems.’*

The research design suggests a multiple case study approach in which the four participating research groups together contribute a total of a minimum of 12 case studies covering 24 events. These events will be in the field of research of each research group. Each case study will involve three main elements an ‘event story’, an ‘information and ideas map’ and a ‘actor network map’ as way of revealing the process of corporate environmental management. This material will be gather through ‘real-time’ contact with the principal actor(s) involved in the event, mainly through observations involving semi-structured interviews to a standard format, conducted either in person or by telephone.

## References

- Argyris, C. & Schon, D. (1974) *Theory in Practice*. Jossey-Bass: San Fransisco.
- Bateson, G. (1972) *Steps to an Ecology of Mind*. Ballantine Books: New York.
- Clarke, S. & Roome, N. (1995) Management for Environmentally Sensitive Technology: Networks for Collaboration and Learning, *Technology Analysis and Strategic Management*, 7, (2), 191-215, with Clarke, S.
- Clarke, S. (forthcoming) *Unraveling Networks of Learning: An International Study of Sustainable Technology Management*. Ph.D. Dissertation. York University: Ontario.
- Foldy, E. & Creed, D. (1997) *Action learning, fragmentation and interaction: A case of gay and lesbian workplace advocacy*. Paper presented at the annual meeting of the Academy of Management, Boston.
- Glaser, B. & Strauss, A. (1967) *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine: Chicago.
- de Groene, A., Kolk, A., van der Veen, M. & van der Woerd, F. (1998) The Dynamics of Environmental Management a DynEmics Approach. Greening of Industry Network Conference. Rome.
- Hafkamp, W. & Roome, N. (1998) *The DynEmics Program: A Collaborative, Strategic Research Initiative*. Greening of Industry Network Conference. Rome.
- Morgan, G. (1986) *Images of Organization*. Sage: Newbury Park..
- Roome, N. & Bergin, R. (1998) Action-learning Networks and the Sustainable Enterprise: The Case of Ontario Hydro. *American Academy of Management Meeting, Seminar on Major Organizational Change*. San Diego: California, Aug 9-12.
- Simon, H. (1991) Bounded Rationality and Organizational Learning. *Organizational Science*, 2, 1, 125-134.
- Yin, R. (1994) Case Study Research: Design and Methods. Applied Social Research Methods Vol. 5 (second edition). Sage: London.