

Karl, Helmut; Möller, Antje; Matus, Ximena; Grande, Edgar; Kaiser, Robert

**Working Paper**

## Environmental Innovations: Institutional Impacts on Co-operations for Sustainable Development

Nota di Lavoro, No. 58.2005

**Provided in Cooperation with:**

Fondazione Eni Enrico Mattei (FEEM)

*Suggested Citation:* Karl, Helmut; Möller, Antje; Matus, Ximena; Grande, Edgar; Kaiser, Robert (2005) : Environmental Innovations: Institutional Impacts on Co-operations for Sustainable Development, Nota di Lavoro, No. 58.2005, Fondazione Eni Enrico Mattei (FEEM), Milano

This Version is available at:

<https://hdl.handle.net/10419/74007>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*

**Environmental Innovations:  
Institutional Impacts on  
Co-operations for Sustainable  
Development**

Helmut Karl, Antje Möller, Ximena Matus,  
Edgar Grande and Robert Kaiser  
NOTA DI LAVORO 58.2005

**APRIL 2005**

NRM – Natural Resources Management
------------------------------------

Helmut Karl, Antje Möller and Ximena Matus, *Ruhr-University Bochum*  
Edgar Grande and Robert Kaiser, *Technical University of Munich*

This paper can be downloaded without charge at:

The Fondazione Eni Enrico Mattei Note di Lavoro Series Index:  
<http://www.feem.it/Feem/Pub/Publications/WPapers/default.htm>

Social Science Research Network Electronic Paper Collection:  
<http://ssrn.com/abstract=712482>

The opinions expressed in this paper do not necessarily reflect the position of  
Fondazione Eni Enrico Mattei  
Corso Magenta, 63, 20123 Milano (I), web site: [www.feem.it](http://www.feem.it), e-mail: [working.papers@feem.it](mailto:working.papers@feem.it)

# **Environmental Innovations: Institutional Impacts on Co-operations for Sustainable Development**

## **Summary**

A suitable strategy for achieving sustainable development is to foster environmental innovations. Environmental innovations, however, suffer from so-called "double externalities", because apart from innovation spillovers they also improve the quality of public environmental goods, which can be used without cost by free riders. Those innovation spillovers can be avoided through co-operation. Furthermore co-operations can be considered as advantageous because environmental innovations often depend on interaction in research and development, production, selling and disposal. This paper analyzes as to what extent institutional factors impact co-operative arrangements of innovative organizations in the development of new environmental technologies. It applies a multi-dimensional institutional analysis focusing not only on institutional arrangements which exist among organizations but also on opportunities and constraints provided by the institutional environment in which these organizations are embedded. Expanding the existing research we will conclude what kind of policy measure may support the success within networks of environmental oriented innovators.

**Keywords:** Environmental innovation, Co-operation, Sustainability, Institutional analysis, Policy measures

**JEL Classification:** L14, O31, Q55, Q58

*An earlier version of the paper was presented at the International Conference on "Innovations, Sustainability and Policy", Kloster Seeon (Germany), 23-25 May 2004. The paper draws on research done within the project "Institutional design of co-operation for the promotion of environmental innovations" (CO-OPEI) financed by the German Ministry for Education and Research (BMBF) under the :[riw] program.*

*Address for correspondence:*

Helmut Karl  
Department Economics  
Ruhr-University Bochum  
Universitätsstraße 150  
Nordrhein-Westfalen  
44780 Bochum  
Germany  
Phone: +49 0 234 3225332  
Fax: +49 0 234 707716  
E-mail: Helmut.Karl@ruhr-uni-bochum.de

## **1. Introduction: Institutional Impacts on Co-operations for Environmental Innovations**

The long-term conservation of natural resources and environmental quality by promoting sustainable development requires a fundamental change in production and consumer patterns. An appropriate strategy for achieving a sustainable development is to foster environmental innovations. Environmental innovations can be described as innovations that aim at reducing resource inputs, decreasing the negative environmental impacts and/or substituting environmental goods by produced capital (Blazejczak et al. 1999). However, environmental innovations are not generated to the extent necessary for sustainable development. Given the specific character of environmental innovations, it can be assumed that the co-operation of different kinds of actors would increase the likelihood that those innovations can emerge. This is because many environmental innovations depend on coordinated work in research and development (R&D), production, selling and disposal. Furthermore those co-operations may reduce the high risks of R&D activities, increase R&D productivity and secure the access to resources, which can not be easily acquired from the market (Karl; Möller; Matus 2004: 4-7).

We argue, however, that the success of co-operations for environmental innovations depends to a significant extent on the institutional conditions under which those co-operations take place. Therefore, this study analyzes what kind of institutional structures in a market economy are able to foster the dynamics of environmental oriented technological development. Empirically we aim at evaluating firstly, what kind of incentives exist for co-operation partners, secondly which factors hinder or support the engagement in co-operations, and thirdly – based on these findings – how public innovation policy can promote those co-operations. We understand co-operations as exchange relations between economic agents, where the commitments of the transactions partners are not completely specified in the contract (Williamson 1987). Depending of the position of the partners in the valued added process, we differ between horizontal and vertical relations. Whereas horizontal co-operations take place among competitors, vertical co-operations cover interfirm-relations at different stages of the value added process (e.g. supplier-user relations). This definition includes not only business actors, but also universities and public research institutes. Cooperative activities between more than two partners are considered as networks.

Given the lack of knowledge about the population of cases, relevant factors and interrelations, which play a role in co-operations for the development of environmental innovations, our study has to be considered as an explorative case study analysis. Its main goal therefore is not to come to generally valid conclusions on the object of investigation. It rather aims at identifying individual factors, which affect those co-operations either in a supportive or obstructive way. Our results stem from 13 explorative case studies on environmental-oriented innovative co-operations in Germany, which concern different kind of innovation, different sectors and comprehend a wide spectrum of co-operations.

In the following we will firstly present the interdisciplinary and theory-based analytical approach, which we have developed on the basis of institutionalists theories applied by various academic disciplines. We will then present quantitative results on co-operations for environmental innovations,

which originate from a special data analysis of a German industry survey (Section 3). This analysis provides information about the occurrence of co-operations for the development of environmental innovations in different industrial sectors as well as about existing co-operation barriers. The quantitative results are assessed to get some insights into relevant criteria for the selection of the case studies. In section 4 we present our qualitative findings based on the explorative case studies. In the final section we systematically evaluate our research results and discuss policy recommendations.

## **2. Systemic-Integrative Approach**

Our systemic-integrative research approach has been designed in a way, which not only balances strengths and weaknesses of the different fields of institutionalist theory. Rather the approach provides a cross-disciplinary framework, which considers institutions both as a dependent variable (understanding institutions as the intentional result of targeted actions of innovative organizations) as well as an independent variable (understanding institutions as factors which influence the actions of organizations during their innovation processes). In this context, institutional analyses have shown that a variety of institutional factors have an impact on innovation, such as the respective regulatory framework, the organization of research and development and the characteristics of markets and firms (Grande; Kaiser 2003, Karl; Möller 2003).

Furthermore, our integrative approach considers innovation processes under a systemic perspective. A systemic view on innovation processes has been developed since the end of the 1980s as an attempt to establish a new understanding in innovation research, which was different primarily from so-called resource-based approaches (Lundvall 1992, Nelson 1993, Edquist 1997, Kaiser; Prange 2004). The latter ones stated that successful innovations were largely the result of the internal resources and capabilities of a firm while external factors were of only limited importance (Teece; Pisano 1994). However, resource-based approaches failed to explain why firms, which have similar resources at their disposal, show significant variations in innovative output. Against a firm-based perspective systemic approaches have argued that the technological capability of a firm is in a substantial way determined by the institutional environment in which the firm is embedded.

All in all, the integration of different institutionalist theories under a systemic perspective aims at understanding the framework conditions for innovative organizations and their modes of coordination, which exist under a given institutional environment. Therefore, an institutionalist approach to the study of innovative co-operations requires the consideration of institutional factors at different levels of analysis. In order to provide for such a multidimensional perspective our project referred to the work of J. Rogers Hollingsworth (2000) who proposed a structuring of the field of institutional analysis by differentiating five analytical levels. His concept does not only allow for accounting institutions as dependent and independent variables, it also provides guidance for the evaluation of institutional stability and the likelihood of institutional change (Hollingsworth 2000: 6 ff.). Figure 1 illustrates the different levels of analysis and their relation to institutional factors, which are important for the study of co-operations for environmental innovations.

**Figure 1: Levels of institutional analysis**

Levels	... HOLLINGSWORTH (2000)	... with reference to environmental innovations
1. Level	<i>Institutions</i> : Norms, Rules, Conventions, Habits and Values	Trust, Environmental Awareness
2. Level	<i>Institutional Arrangements</i> : market, states, hierarchies, etc.	Co-operational formations, contractual arrangements, security- and control mechanisms
3. Level	<i>Institutional Sectors</i> : financial systems, business systems, research systems etc.	Institutional framework conditions: regulation, public R&D and innovation policies
4. Level	<i>Organizational Structures</i>	Organizational Structures, esp. in view of different conditions that apply to small and large firms
5. Level	<i>Outputs and Performance</i> : administrative decisions, sectoral and societal performance	Evaluation: <ul style="list-style-type: none"> <li>▪ Innovative and co-operative success</li> <li>▪ Impact of state actions</li> </ul>

The first level refers to **basic societal norms, rules, and conventions** to which the largest stability can be attributed. These institutions reflect actors' preferences and thus impact for example – at the macro level – the outcomes of political decision-making processes or – at the micro level – the modes of coordination and information flows among individual actors. In view of inter-organizational relations these institutions effect the stability and durability of co-operations as well as the role of trust in such relations.

The second level concerns **institutional arrangements** between innovative organizations. Such relations exist on a continuum between hierarchies, networks and markets while associations or voluntary agreements can play a role in organizations which act within the same environment (Streeck; Schmitter 1985). For our analysis we focus here on inter-organizational modes of coordination, which reflect the motivation for co-operation and the allocation of resources and powers between actors.

**Institutional sectors** constitute the third level of analysis. For innovation processes the most relevant sectors are the education-, research-, the financial-, and the regulatory systems. Comparative systemic innovation studies have shown that these sectors differ across countries or regions in terms of the provision of resources for innovative organizations. Moreover there are variations in the modes of coordination, which exist between innovative organizations and the various sectors. This holds true, for example, for relations, which exist within the science and research system. For the study of co-operations for the development of environmental innovations, it can be assumed that institutional sectors are of high importance primarily in view of relations between actors who develop and produce environmental technologies and those who implement them.

The fourth level of analysis focusses on the **internal structure of innovative organizations**. Here we can assume that a change in societal norms, for example an increase of environmental aware-

ness, directly impact the strategic options of firms. Firms may react to this by implementing organizational innovations, such as the Eco-Management & Audit Scheme (EMAS), in order to optimize their products and processes. In terms of external relations of a firm, those certifications also signalize to partners and consumers that the firm takes into account the environmental effects of their activities.

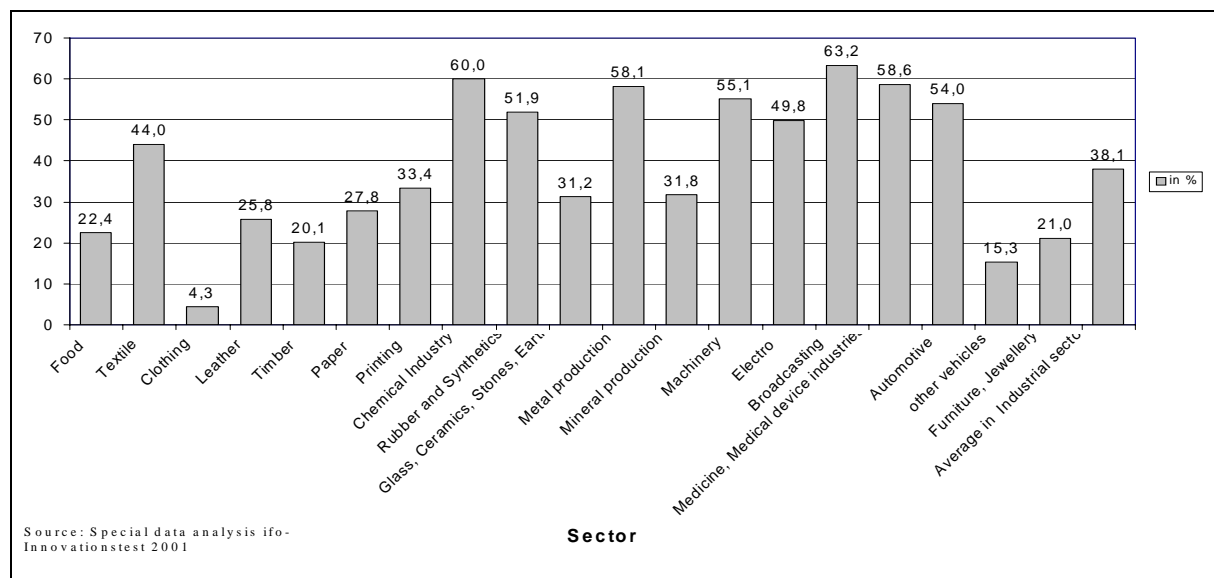
At the fifth level the analysis turns to outputs and performance of institutions and organizations. For the purpose of our study we evaluate the performance of co-operations. Moreover, we evaluate as to what extent public policies had an impact on the course and results of the co-operations.

### 3. The quantitative findings: the special data analysis of the “ifo-Innovationstest”

In 2001, we commissioned a special data analysis of the “ifo-Innovationstest” in order to get information about the frequency and forms of co-operations for the development of environmental innovations and about the existence of barriers to co-operative firms within the manufacturing industries identified in different sectors.<sup>2</sup> The main findings of this analysis can be summarized in the following way:

- The frequency of co-operations differs significantly among industrial sectors. As figure 2 shows, the number of firms that have been involved in at least one co-operation (without specific environmental objective) was highest in the broadcasting-, chemical and medical device industries (between 58 and 63 percent) and lowest in the textile and clothing industries (only 4 percent).

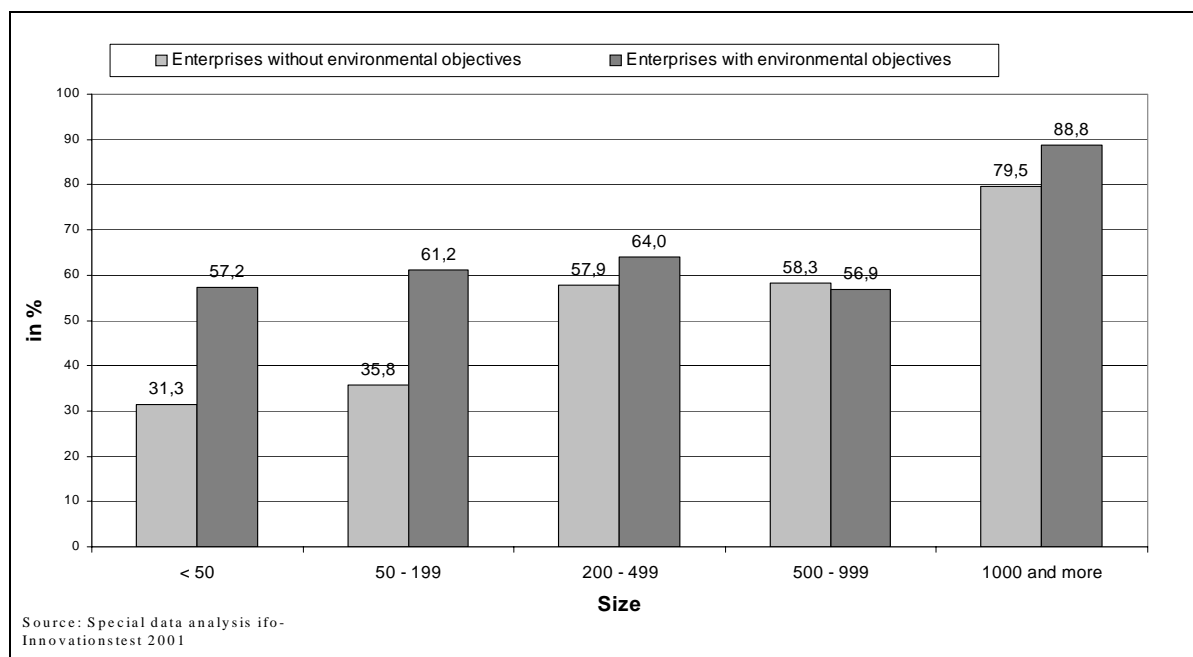
**Figure 2: Intensity of co-operation of firms in different sectors 1995 bis 1999**



<sup>2</sup> The analysis is based on data surveyed in 2000 for the years 1995 to 1999. They refer to the frequency of co-operations between firms according to different industrial sectors (NACE code), different firm size and different organizational forms of co-operation. Co-operations targeted at environmental innovations are defined as innovation processes, which aim to reduce ecological damage. Ifo-Innovationstest (2001).

- The intensity of co-operation is further determined by the size of the firm. The engagement of firms with more than 200 employees is significantly above the average while that of small and medium-sized companies is slightly below the average. Between 1995 and 1999, three quarters of the firms with more than 1,000 employees were involved in a co-operation. However, if co-operations are targeted at environmental innovations the engagement of small and medium-sized companies increases substantially. This might point to the fact that SMEs either try to compensate their lack of resources through co-operations or they consider environmental innovations as a mean of market differentiation (cf. figure 3).

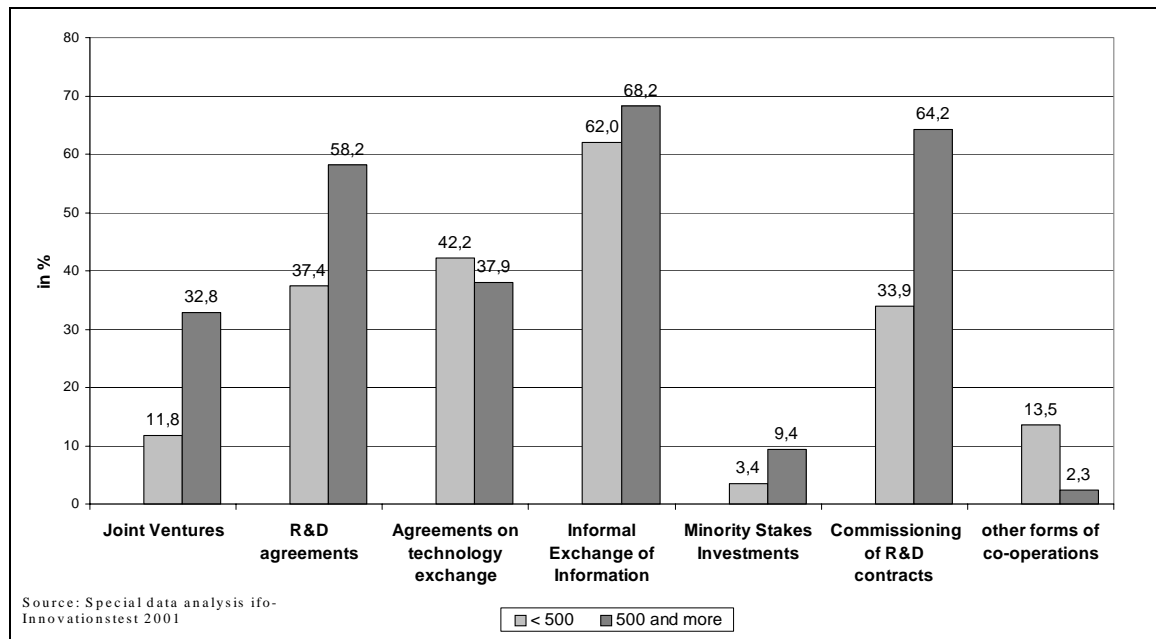
**Figure 3: Intensity of co-operation of firms with different size 1995 bis 1999  
(with and without environmental objectives)**



- Both the size of the companies as well as the objective of the co-operation has an impact on the organizational form of the co-operation. Basically, the most common forms of co-operation are the informal exchange of information, the commissioning of R&D contracts and the R&D co-operation. The latter one, along with joint ventures, is however most common between larger firms. Independent of the size of the firms, minority stakes investments play only a minor role in Germany. As figure 4 shows, this dominant forms of co-operation also hold for relations aimed at the development of environmental innovations, whereby firms with up to 499 employees more strongly engage in agreements on technology exchange, informal information exchange and R&D agreements. Technology exchange is also more important for smaller than for larger firms, while larger firms are again more often involved in joint ventures.

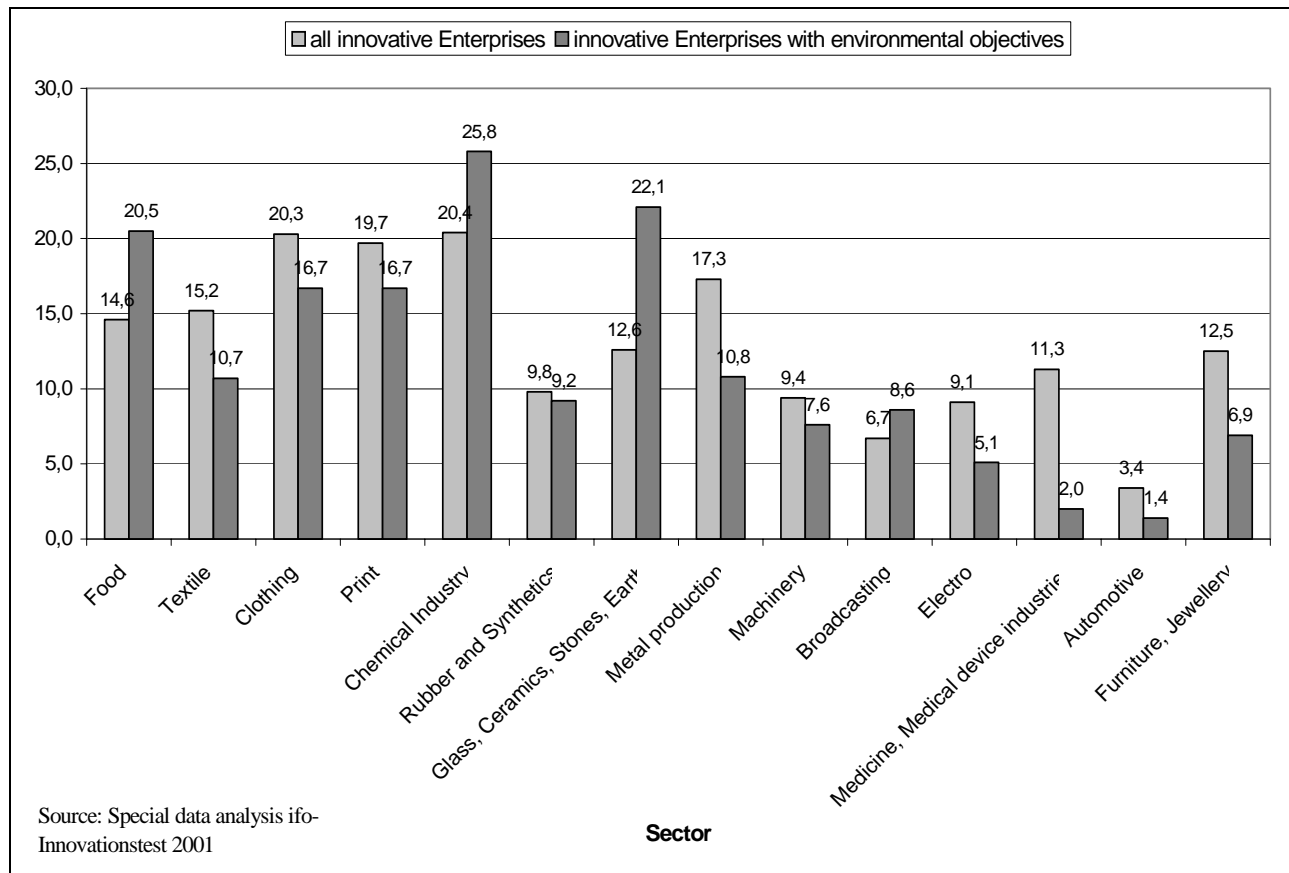


**Figure 4: Organizational forms of co-operation with environmental objectives between firms of different size 1995-1999**



- In view of the existence of barriers to co-operation the data analysis shows that a high frequency of co-operations in a given sector does not indicate that there are no significant burdens. On the contrary, in the chemical industry, for example the number of co-operations is above average. Nonetheless, firms in this sector also more often reported barriers to co-operation which actually increase in co-operation aimed at the reduction of ecological damage. As figure 5 also shows, firms with co-operation problems vary in terms of the perceptions of barriers to co-operation across sectors. Firms producing medical devices, measurement instruments, electronic goods or textiles reported fewer co-operation problems if the innovation refers to environmental goals.

**Figure 5: Barriers to co-operation among firms and between firms and public research organizations, 1997 bis 1999 (for different sectors)**



Recapulating the results of the data analysis it can be stated that different industrial sectors vary significantly in terms of the intensity of co-operation and the perception of barriers to co-operation. Therefore, the project considered sectoral variations in the case study selection process taking into consideration sectors with high co-operation intensity (such as the chemical insdustry) as well as sectors with lower intensity (such as the food industry). We also considered sectoral variations in the perception of barriers to co-operation and the role the size of a firm plays for co-operations for environmental innovations.

## **4. The qualitative results: the analysis of the case studies**

### **4.1 Criteria of the case studies**

The results of our research project are derived from 13 explorative case studies on environmental-oriented innovative co-operations, which concern different kind of innovation, different sectors and comprehend a wide spectrum of co-operations (see figure 6).

On the one hand, we consider co-operations, which are directly affected by existing or forthcoming environmental regulation (PRINT-SME, RECYCLING and PRINT-MNE) and as in the case of RECYCLING with high co-operation need. While the case study PRINT-SME is focusing on co-operations with small and medium size enterprises (SME), the case study PRINT-MNE comprises also multinational enterprises (MNE).

Similar to the case studies in the print industry, we analyse two case studies in the food sector which are based on different incentive mechanisms (CHOCO, BEER). While CHOCO was mainly driven by rationalization potentials, BEER was initiated by a threatening regulation in this sector. Both case studies are in a sector, which is indicated by a relatively low co-operation intensity in which, at the same time, insufficient co-operation possibilities are, however, often named by environmental-oriented innovators as an innovation barrier. This co-operation problem is also relevant in the chemical industry albeit high co-operation intensity can be observed here. At the same time the regulation intensity is very high in the chemical industry. In this sector we analyse the case study ORGA. The research object refers here particularly to the collaboration between multinational enterprises and research organizations for the development of organizational environmental innovations. Organizational or institutional innovations are also of interest in CERTIFICATE, a case study, which is characterized by a heterogeneous structure of the partners involved and a high number of co-operation partners. This case study contains interesting aspects for the diffusion of environmental innovations. The co-operations here and in other co-operations have been endogenously developed (e.g. RECYCLING, PRINT-SME). In contrast to all other case studies the government doesn't play a role in this co-operation, neither in form of regulation nor in form of promotion or coordination.

The PATENT case study analyses co-operation partners who are not directly concerned by environmental regulation for whom, however, a research or market potential can be established by the development of environmental technologies. Against the background of surpassing high patent activities of German enterprises in the area of environmental technology (Legler et al. 2002: 16f.) the PATENT case study reflects an innovation area, in which the German economy takes a leading position (measured against the Europe-wide patented inventions) and thus simultaneously ensures potential markets by its trade mark rights. The PATENT and the WATER case study as well concentrate on technologies for the prevention of water pollution and with it on a field of environmental protection where German environmental technology suppliers achieve almost the half of the total sales volume (Legler et al. 2002: 40). While the PATENT case study concentrates on the development of

new environmental technologies, the WATER case study contains interesting aspects for the diffusion of environmental technologies. The WATER-co-operation is less important for the development of new technologies but rather interesting for the problem-specific implementation of new environmental technology that requires cooperative action.

The co-operation of enterprises of different size is considered among others in the case studies AUTO and IPP-AUTO. Both case studies are established in the automotive industry, which is characterized by high co-operation intensity. Compared to other sectors co-operation problems are with only 1.4% of the environmental innovative enterprises significantly seldom seen as barrier for environmental innovation in the automotive sector. Against this background interesting information about favorable co-operation constellations could be expected here.

While the promoting aspect is relevant for the realization of cooperative innovation projects in most case studies (with the exception of CERTIFICATE and PRINT-SME), the coordination function of the government is particularly significant in the case studies IPP-HOUSEHOLD, WATER, IPP-AUTO, and IPP-SME. Accordingly, the co-operations WATER, IPP-AUTO, and IPP-SME include not only enterprises but also ministries or local authorities to a certain extent. With the concept of Integrated Product Policy (IPP) which is object of the co-operation in the case studies IPP-HOUSEHOLD, IPP-CAR, and IPP-SME a new policy approach has been analysed. Policy measure focus more on moderation than on regulation here and therefore one can expect special challenges with regard to cooperative behavior of the partners involved. Finally our case studies consider constellations of co-operation that comprise intermediary partners in the function of initiators, coordinators and moderators respectively. The intermediaries show different characteristics and vary from research organization (PRINT-SME, CHOCO, IPP-SME, BEER) and independent organization of public law (IPP-AUTO) to private companies with or without profit interest (RECYCLING, CERTIFICATE).

**Figure 6: Survey of case studies**

<i>Case study</i>	<i>Sector</i>	<i>Innovation</i>	<i>Role of the Government (Regulation, Promotion, Coordination)</i>	<i>Cooperation partners</i>
<b><i>Print-MNE</i></b>	Printing machine	Process Innovation	- Regulation for the protection of Environment and Health	- MNE, SME, RO <sub>private</sub>
<b><i>Print-SME</i></b>	Printing Sector	Process optimization	- Regulation for the protection of Environment and Health - Promotion	- SME, RO <sub>private</sub>
<b><i>Recycling</i></b>	Recycling Management (different Sectors)	Organizational Innovations, Product und Process Innovationen	- Announcement of environmental Regulation - Promotion	- esp. SME, RO <sub>public</sub>
<b><i>Choco</i></b>	Food Sector	Process Innovation	- Promotion	- MNE, SME, RO <sub>private</sub>
<b><i>Beer</i></b>	Food Sector	Process Innovation	- Forthcoming Regulation - Promotion	- SME, IO
<b><i>Patent</i></b>	Environmental Technology	Process Innovation	- Promotion	- RO <sub>public</sub> , RO <sub>private</sub> , SME
<b><i>Water</i></b>	Public Water Provisions	Process Innovation	- Promotion - Coordination	- SME, MPA, local authorities
<b><i>Certificate</i></b>	Forest Management	Organizational Innovation	- No role	- MNE, SME, IO, local authorities
<b><i>Orga</i></b>	Chemical Industry	Organizational Innovation	- Promotion	- MNE, RO <sub>public</sub> , RO <sub>private</sub>
<b><i>Auto</i></b>	Automotive Industry	Product Innovation	- Promotion	- MNE, SME, RO <sub>public</sub>
<b><i>IPP-Auto</i></b>	Automotive Industry	Organizational Innovation	- Promotion - Coordination	- MNE, SME, IO, MPA
<b><i>IPP-SME</i></b>	Engineering	Product Innovation	- Promotion - Coordination	- SME, RO, MPA
<b><i>IPP-Household</i></b>	White goods (household appliances)	Product Innovation	- Promotion - Coordination	- SME, RO <sub>public</sub>

\*Abbreviation: MNE (Multinationale Enterprises), SME (Small and medium Enterprises), RO<sub>private</sub> (Private Research Organizations), RO<sub>public</sub> (Public Research Organizations), IO (Intermediary Organizations), MPA (Ministry or public authority)

To analyze the different case studies systematically, a structured criterion pattern was developed which takes into account both the factors derived from the theory and the empirical results of the case studies (figure 7). The system permits the evaluation of all case studies according to consistent criteria.

**Figure 7: Structure for the analysis of the case studies**

<b>Partner Configuration and Project Background</b>	<b>Characteristics of Environmental Innovation</b>	<b>Co-operation Needs and Objectives</b>	<b>Institutional Conditions of Co-operation</b>	<b>Evaluation</b>
<ul style="list-style-type: none"> <li>▪ Type of co-operation partners (Size, intermediaries), NGOs etc.)</li> <li>▪ situational Factors (Industry and market structure)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Type of Innovation and Technology (Product, process, organizational innovation; additive or integrated technology)</li> <li>▪ Innovation conditions (R&amp;D intensity, complexity)</li> <li>▪ Innovation risks (Market potential, specificity, diffusion of the innovation)</li> </ul>	<ul style="list-style-type: none"> <li>▪ Resources</li> <li>▪ Network aspects</li> <li>▪ Sizes and specialization advantages (critical mass effects)</li> </ul>	<p>Institutional levels:</p> <ul style="list-style-type: none"> <li>(1) Norms, values, rules (Confidence, trust, environmental awareness)</li> <li>(2) Institutional Arrangements (Co-operation and contract structure, safeguarding and control mechanisms)</li> <li>(3) Institutional Sectors (Regulation, promotion, coordination)</li> <li>(4) Internal structure of the organization</li> </ul>	<ul style="list-style-type: none"> <li>▪ Co-operation success</li> <li>▪ Innovation success</li> <li>▪ Effects of state governance</li> </ul>

Altogether, the systematics above include the institutional conditions, partner configuration considering situational factors, co-operation needs derived from the characteristics of the environmental innovation as well as the co-operation aims and the incentive and barrier structures. The partner configuration reflects the type of co-operation partners and particularly the different size and function of the partners. Situational features like industry and market structure provide information to the project background. The characteristics of the environmental innovation include the type of technology (product-, process, organizational innovation), the specific innovation conditions (research intensity and complexity) and the innovation risks such as specificity or market potentials of the innovation. The resources and network aspects as well as the sizes and specialization effects reflect the co-operation needs and the aims of the co-operation and illustrate in this way relevant incentive and barriers factors of the co-operation. The analysis of institutional aspects orientates at the multi-dimensional institutional model represented in chapter 2 and also contains trust aspects, co-operation and contract structures, safeguards and control mechanisms as well as state institutions in form of regulation, promotion or coordination. Each co-operation case results in a short evaluation with respect to the co-operation and innovation success as well as to the effects of the state governance.

## 4.2 Results of the case studies

The results of the case studies show three institutional factors that are particularly interesting.<sup>3</sup> The focus is on the role of intermediary organizations, the meaning of trust in cooperative relations as well as the effects of different governance mechanism in environmental policy. Related to the case studies the following indications can be derived:

### INTERMEDIARY ORGANIZATIONS

As the case studies demonstrate, intermediary organizations have a positive effect on the co-operation behavior for the development of environmental innovations. Intermediary organizations are characterized by a neutral position within the co-operation structure. They follow no special own interest except the success of the co-operation or have only such interests in mind which do not negatively affect other partners or the performance of the co-operation. Intermediary organizations have an important meaning in overcoming different kind of resource bottlenecks. On the one hand, they play an important role in environmental oriented co-operation if co-operation barriers has to be overcome that are based on uncertainties about appropriate co-operation possibilities or partners and insufficient resources for the organization of co-operations. On the other hand, intermediaries are particularly important for cooperative development of environmental innovations if rationalization and market potentials are not sufficient or uncertain and co-operation advantages are to low in relation to the resources that need to be invested. In addition to the information and resource problems (BEER, PRINT-SME) intermediaries may take over an important function if power asymmetries between the co-operation partners have to be compensated (IPP-AUTO). And finally intermediaries are of importance if trust affects the co-operation behavior, as it is the case particularly in the co-operation with competitors (e.g. PRINT-SME, PRINT-MNE, CHOCO). In these cases intermediaries can help to overcome barriers for enterprises and research organization in co-operation for sustainable development.

Depending on the context of the emergence and position of the intermediaries within the co-operation "internal" and "external" intermediaries can be distinguished. While "internal" intermediaries mean agents which endogenously emerge in the co-operation, "external" intermediaries are partners who are exogenous, i.e. arisen independently of the co-operation and implemented into the co-operation consciously. The latter can further distinguish between intermediaries who initiate the co-operation and such who were included in the co-operation due to their aptitude to overcome certain co-operation problems (resource problems, power asymmetries, trust problems).

Furthermore intermediary organizations can improve the conditions for the (state) governance of environmental oriented innovation co-operations at least in two different ways. First, they facilitate the initiation of co-operations and help to stabilize them (e.g. IPP-AUTO). In these cases, state governance can build on established co-operation and coordination structures without having to establish these by considerable resource effort. Second, intermediary organizations facilitate the use of

---

<sup>3</sup> For a detailed discussion of the research results, see Karl / Möller / Matus / Grande / Kaiser (2004).

alternative non-order regulation instruments. As the example of PRINT-MNE shows, the success of voluntary self-binding agreements can be improved by such organizations even if the initial conditions (a comparatively high number of enterprises as well as high competitive intensity between vital economics agents) seem to be unfavorable. In this case this kind of self-regulation led to a considerable relief of the state, because

- a faster adaptation of norms to the respective state of the art of technology could be achieved,
- the government was not directly involved in conflicts of interest between manufacturers of printing machine and suppliers of solvents,
- the government could count on the standardization performance of a private intermediary (Ronge/Körber 1996: 13).

### TRUST IN CO-OPERATIONS

Trust plays an essential role in all case studies.<sup>4</sup> The rationales behind this are different depending on co-operation constellation and especially on

- the partner configuration (e.g. competitors),
- the object of the co-operation (e.g. marketability, competitiveness),
- the extent of information asymmetry between the partners and
- the degree of mutual dependence.

A definite correlation of trust with regulations or safeguards within the co-operation derived from the theory couldn't be approved by the case studies. The reason can be seen in the conception of trust. The analysis should differentiate more exactly between the kind of the respective regulation and control mechanisms on the one hand and their effects on the different dimension of trust (personal, organizational trust and system trust) on the other hand. Despite of the uncertain multidimensional effects the importance of trust for compensating incomplete contracts and safeguards has been approved by all case studies.

Furthermore the distinction of trust in personal-related, organizational and system/institutional trust has been affirmed by our explorative case studies. The relevance and the relation of personal-related and organizational trust diverge depending on the size, structure and business or research orientation of the co-operation partners (organization purpose). The importance of personal-related trust increases with the increasing size of the enterprise (RECYCLING). Personal-related trust is parallel to organizational trust in small enterprises; particularly if the management is actively involved in the collaboration. The larger the enterprises are the more trust is focused on persons (e.g. PRINT MNE in form of environmental protection officer, ORGA). If the personal-related trust takes over an important function in the co-operation, then personnel discontinuities (fluctuation) of the co-operation

---

<sup>4</sup> For more details on the trust concept used in this research project, see Möller (2004).



partners can have a negative effect on the collaboration and the innovation effort within the co-operation.

There is no systematic assertion derived from the case studies to explain what kind of trust plays a dominating role depending on the co-operation phase. Despite of this most of our case studies shows that such a distinction is feasible. So it can be recognized that personal-related trust primarily plays a role to initiate co-operations. This also explains why most of the co-operations are based on already existing contacts (e.g. BEER, WATER, IPP-AUTO, PRINT-MNE, IPP-HOUSEHOLD). If reputation based on previous project plays a role for the co-operation, it should be further analyzed whether such recourse to well-known partners is caused by trust or by an ignorance of alternative partners or even exogenously influenced by public financier. Taking these factors into account, we could identify constellations where information deficits or exogenous factors haven't been relevant (e.g. WATER and PRINT-MNE). System trust plays an important role for initiating co-operation projects if these projects are started to fulfill announced regulation in time. In this case it is of decisive importance that these announcements are reliable because they often induce considerable investments particularly for SME. Though return on investments can only be achieved if the enterprises can manage to differentiate their performance on the market once the regulation has been coming into force.

The significance of organizational trust increased in the course of the co-operation. That can be seen among others in the comparatively limited coverage of contracts (e.g. IPP-AUTO, IPP-SME, ORGA, PRINT-SME, BEER). Such contractual rules often played no more role in the course of the co-operation. Sanction mechanisms have not been coming into force if the projects failed or problems arose. In the IPP-Auto case study a contract was signed after project end at all. In this context the role of system/institutional trust should be considered ambivalently. On the one hand, contracts offered by the public funding institution have been sufficient in most cases. On the other hand, the partners in a co-operation proceeding problematically have been conscious that they didn't have any real chance to enforce their co-operation agreements without endangering the co-operation.

Finally depending on the expectation that trust is refer to (competence trust, intentional trust) we could derive some first results. All indications are that the importance of intentional trust dominates in collaboration with competitors while competence trust has a special relevance in co-operation where know-how and technological knowledge play a central role. Contractual arrangements for the marketing of research results (e.g. property rights, patents rights) are not a sign for the lack of intentional trust between the partners if it serves as protection, particularly against third parties.

## **ENVIRONMENTAL POLICY INSTRUMENTS**

Our case studies show that actors who produce or implement environmental innovations are increasingly affected by environmental regulations originating primarily from the European level. As a consequence, a delay in transferring European regulations in national law as well as the non-implementation of announced regulation has a negative impact on the willingness of innovative organizations to engage in respective co-operations. Moreover both scenarios are likely to reduce actors' institutional trust in the political and regulatory system. Environmental regulations certainly

have the potential to raise firms' awareness for environmental problems and their willingness to engage in co-operations (PRINT-MNE, RECYCLING). In case that a firm anticipates new market opportunities it is not even necessary that the firm is directly affected by the regulation.

For this reason, environmental policy can positively impact the innovative behaviour of firms especially through the improvement of framework conditions, for example through intermediaries that support the firms' engagement in co-operations (Print-MNE, CHOCO, PATENT), while public R&D funds determine, inter alia, the constellation of actors and the targeting of co-operations.

Integrated Product Policy (IPP) can be characterized as a new concept of environmental policy at the regional, national, and the European level (Rennings et al. 2004). Its main advancement is the consideration of negative environmental impacts of products along the whole life cycle. This however requires that all relevant actors – producers, supplier, consumers and recycling firms - have to be involved in the process in order to reveal potentials for environmental improvement. Our case studies have shown that in practice those actor constellations are very complex and therefore difficult to establish. Nevertheless, even in cases in which only some of the relevant actors have become involved, it was possible to optimize the respective product (see esp. IPP-SME). Contrariwise the success of an IPP project can be at risk if one important link is missing. As shown in IPP-HOUSEHOLD, a consumer-oriented environmental innovation is likely to fail if the project does not involve producers and distributors. This points to the fact that even outside regulation state intervention is an ambitious task. In the respective case it would have been beneficial if environmental policy had tried to improve the marketing conditions, probably by using labelling instruments.

In some cases our studies indicate that the governance of environmental innovations increases the demands for horizontal and vertical policy coordination. This holds true, for example, in cases in which public organizations aim at fostering environmental goals with public procurement procedures. Primarily vertical policy coordination is also important in view of the introduction of new policy instruments. Integrated Product Policy, for example, has been strongly promoted by the European Commission since the end of the 1990s while actual IPP related projects have been financed primarily at national and regional levels.

## **5. Conclusions: Implications for innovation policy**

Although our cases studies have an explorative character, we can draw at least some conclusions of how public policies can foster active participation in environmental co-operation. We again focus here on the three dimensions, which have proven to be the most yielding indicators: intermediary organizations, the role of trust in co-operations, and the impact of environmental policy instruments.

We found that **intermediaries** generally have a favorable effect on co-operations for the development of environmental innovations. They help to overcome co-operation barriers through initiation, coordination or management of co-operations. However, the support of environmental co-operations through intermediaries has to be examined in the individual case. It seems that interme-

diaries are of special importance in cases in which the co-operations advantage cannot be completely realized on the firm level.

In terms of **institutional arrangements** our case studies showed that it is crucial already in the phase of conception of projects to consider also the phase after the termination of projects in order to establish sustainable or durable networks. This is important because from the beginning on the basis is set for a durable and independent cooperative structure, capable to survive also without public support. Informal co-operation structures favor the cooperative development of environmental innovations. However it is difficult to identify this form of co-operation and therefore, it is hardly to be directly influenced. Economic policy measures may affect indirectly, in which corresponding framework conditions, e.g. in the form of working groups or the formation of forums, are developed. This type of actions can help to develop informal relations and in this way the exchange of relevant (environmental) knowledge can be supported.

Measures supporting **trust** can be at the centre of the institutional framework of environmental oriented co-operations, besides the possibility to establish contact structures (working groups, forums) above described. State institutions have a great influence on the so-called institutional trust. The expectations of the economic agents respect to credibility, consistency and transparency of governance measures are directly based on their own experience and indirectly on those experiences of others. This primarily applies to implementation of announced regulatory measures.

In the area of **governance measures**, at least one of the case studies (PRINT-MNE) demonstrates that specific inter-industry conditions are favorable for the successful implementation of self-binding agreements. In such types of cooperation it seems that self-binding agreements is the favor regulation form to be considered. Furthermore pilot projects initiated by public authority can also foster the diffusion of new environmental technology, particularly if they are related to leading technology, motivating further actors to invest in such technology. Besides this, pilot project seem to be suitable to promote environmental oriented co-operations if through them a sufficient reputation can be built and durable (network) structures can be established. The developed reputation can serve as a base of trust for future co-operations and attract other transaction partners (Karl; Möller 2003: 207)

## References

- Blazejczak, Jürgen / Edler, Dietmar / Hemmelskamp, Jens / Jänicke, Martin (1999): Environmental Policy and Innovation – an International Comparison of Policy Frameworks and Innovation Effects, in: Paul Klemmer (eds.), *Innovation and the Environment*, Berlin 1999, pp. 9-30.
- Edquist, Charles (ed.) (1997): *Systems of Innovation. Technology, Institutions, and Organizations*, London: Pinter.
- Grande, Edgar / Kaiser, Robert (2003): Die Analyse kooperativer Umweltinnovationsprojekte: Organisationen, institutionelle Arrangements und institutionelles Umfeld, in: Jens Horbach und Joseph Huber (Hrsg.), *Rahmenbedingungen für Innovationen zum nachhaltigen Wirtschaften*, München 2003, pp. 219-234.
- Hollingsworth, J. Rogers (2000): *Doing Institutional Analysis: Implications for the Study of Innovations*. ICE-Working Paper Series, No. 9, Juni 2000; Wien: Österreichische Akademie der Wissenschaften.
- Ifo-Innovationstest (2001): Sonderauswertung des Ifo-Innovationstests im Rahmen des Forschungsprojektes „Institutionelle Ausgestaltung von Kooperationen zur Förderung von Umweltinnovationen“, gefördert durch das Bundesministerium für Bildung und Forschung (BMBF).
- Kaiser, Robert / Prange, Heiko (2004): The reconfiguration of National Innovation Systems – the example of German biotechnology. In: *Research Policy* 33, pp. 395-408.
- Karl, Helmut / Möller, Antje (2003): Kooperationen zur Entwicklung von Umweltinnovationen – Marktendogene Kooperationsdynamik und wirtschaftspolitische Kooperationsförderung, in: Jens Horbach und Joseph Huber (Hrsg.), *Rahmenbedingungen für Innovationen zum nachhaltigen Wirtschaften*, München 2003, pp. 191-218.
- Karl, Helmut / Möller, Antje / Matus, Ximena (2004): Umweltinnovationen durch Kooperation: Gut für die Umwelt, schlecht für den Wettbewerb?, in: *Zeitschrift für Umweltpolitik & Umweltrecht*, 1/2004, pp. 1-26.
- Karl, Helmut / Möller, Antje / Matus, Ximena / Grande, Edgar / Kaiser, Robert (2004): Institutionelle Ausgestaltung von Kooperationen zur Förderung von Umweltinnovationen, Endbericht zum Forschungsprojekt im Rahmen des BMBF-Förderschwerpunkts :[riw] „Rahmenbedingungen für Innovationen zum nachhaltigen Wirtschaften“, Bochum / München 2004.
- Legler, Harald / Schmoch, Ulrich / Gehrke, Birgit / Krawczyk (2002): *Innovationsindikatoren zur Umweltwirtschaft, Studien zum deutschen Innovationssystem Nr. 2-2003*, Studie des Niedersächsischen Instituts für Wirtschaftsforschung (NIW) und des Fraunhofer-Instituts für Systemtechnik und Innovationsforschung (FhG-ISI) für das BMBF, Hannover, Karlsruhe, 2002
- Lundvall, Bengt-Åke (ed.) (1992): *National Systems of Innovation. Towards a Theory of Innovation and Interactive Learning*, London: Pinter.
- Möller, Antje (2004): *Ökonomische Analyse von Vertrauen in umweltorientierten Innovationskooperationen*. Volkswirtschaftliche Beiträge, Ruhr-Universität Bochum, Discussion Paper 03-04, Bochum 2004.
- Nelson, Richard R. (ed.) (1993): *National Systems of Innovation. A Comparative Analysis*. Oxford: Oxford University Press.

- Rennings, Klaus / Kemp, Réne / Bartolomeo, Matteo / Hemmelskamp, Jens / Hitchens, David (2004): Blueprints for an Integration of Science, Technology and Environmental Policy (BLUEPRINT), Mannheim 2004.
- Ronge, Volker / Körber, Stefan (1996): Moderierte prozedurale Steuerung des Staates – im Falle der Gefahrstoffregulierung. In: Swiss Political Science Review 2(4), pp. 1-29.
- Streeck, Wolfgang/Schmitter, Philippe C. (eds.) (1985): Private Interest Government: Beyond Market and State, Beverly Hills: Sage.
- Teece, D., Pisano, G. (1994): The Dynamic Capabilities of Firms: an Introduction, Industrial and Corporate Change 3, pp. 537-556.
- Williamson, Oliver E. (1987): The economic institutions of capitalism: firms, markets, relational contracting, New York 1987.

# NOTE DI LAVORO DELLA FONDAZIONE ENI ENRICO MATTEI

## Fondazione Eni Enrico Mattei Working Paper Series

Our Note di Lavoro are available on the Internet at the following addresses:

<http://www.feem.it/Feem/Pub/Publications/WPapers/default.html>

<http://www.ssrn.com/link/feem.html>

<http://www.repec.org>

## NOTE DI LAVORO PUBLISHED IN 2004

IEM	1.2004	Anil MARKANDYA, Suzette PEDROSO and Alexander GOLUB: <u>Empirical Analysis of National Income and So2 Emissions in Selected European Countries</u>
ETA	2.2004	Masahisa FUJITA and Shlomo WEBER: <u>Strategic Immigration Policies and Welfare in Heterogeneous Countries</u>
PRA	3.2004	Adolfo DI CARLUCCIO, Giovanni FERRI, Cecilia FRALE and Ottavio RICCHI: <u>Do Privatizations Boost Household Shareholding? Evidence from Italy</u>
ETA	4.2004	Victor GINSBURGH and Shlomo WEBER: <u>Languages Disenfranchisement in the European Union</u>
ETA	5.2004	Romano PIRAS: <u>Growth, Congestion of Public Goods, and Second-Best Optimal Policy</u>
CCMP	6.2004	Herman R.J. VOLLEBERGH: <u>Lessons from the Polder: Is Dutch CO2-Taxation Optimal</u>
PRA	7.2004	Sandro BRUSCO, Giuseppe LOPOMO and S. VISWANATHAN (lxv): <u>Merger Mechanisms</u>
PRA	8.2004	Wolfgang AUSENNEGG, Pegaret PICHLER and Alex STOMPER (lxv): <u>IPO Pricing with Bookbuilding, and a When-Issued Market</u>
PRA	9.2004	Pegaret PICHLER and Alex STOMPER (lxv): <u>Primary Market Design: Direct Mechanisms and Markets</u>
PRA	10.2004	Florian ENGLMAIER, Pablo GUILLEN, Loreto LLORENTE, Sander ONDERSTAL and Rupert SAUSGRUBER (lxv): <u>The Chopstick Auction: A Study of the Exposure Problem in Multi-Unit Auctions</u>
PRA	11.2004	Bjarne BRENDSTRUP and Harry J. PAARSCH (lxv): <u>Nonparametric Identification and Estimation of Multi-Unit, Sequential, Oral, Ascending-Price Auctions With Asymmetric Bidders</u>
PRA	12.2004	Ohad KADAN (lxv): <u>Equilibrium in the Two Player, k-Double Auction with Affiliated Private Values</u>
PRA	13.2004	Maarten C.W. JANSSEN (lxv): <u>Auctions as Coordination Devices</u>
PRA	14.2004	Gadi FIBICH, Arie GAVIOUS and Aner SELA (lxv): <u>All-Pay Auctions with Weakly Risk-Averse Buyers</u>
PRA	15.2004	Orly SADE, Charles SCHNITZLEIN and Jaime F. ZENDER (lxv): <u>Competition and Cooperation in Divisible Good Auctions: An Experimental Examination</u>
PRA	16.2004	Marta STRYSZOWSKA (lxv): <u>Late and Multiple Bidding in Competing Second Price Internet Auctions</u>
CCMP	17.2004	Slim Ben YOUSSEF: <u>R&amp;D in Cleaner Technology and International Trade</u>
NRM	18.2004	Angelo ANTOCI, Simone BORGHESI and Paolo RUSSU (lxvi): <u>Biodiversity and Economic Growth: Stabilization Versus Preservation of the Ecological Dynamics</u>
SIEV	19.2004	Anna ALBERINI, Paolo ROSATO, Alberto LONGO and Valentina ZANATTA: <u>Information and Willingness to Pay in a Contingent Valuation Study: The Value of S. Erasmo in the Lagoon of Venice</u>
NRM	20.2004	Guido CANDELA and Roberto CELLINI (lxvii): <u>Investment in Tourism Market: A Dynamic Model of Differentiated Oligopoly</u>
NRM	21.2004	Jacqueline M. HAMILTON (lxvii): <u>Climate and the Destination Choice of German Tourists</u>
NRM	22.2004	Javier Rey-MAQUIEIRA PALMER, Javier LOZANO IBÁÑEZ and Carlos Mario GÓMEZ GÓMEZ (lxvii): <u>Land, Environmental Externalities and Tourism Development</u>
NRM	23.2004	Pius ODUNGA and Henk FOLMER (lxvii): <u>Profiling Tourists for Balanced Utilization of Tourism-Based Resources in Kenya</u>
NRM	24.2004	Jean-Jacques NOWAK, Mondher SAHLI and Pasquale M. SGRO (lxvii): <u>Tourism, Trade and Domestic Welfare</u>
NRM	25.2004	Riaz SHAREEF (lxvii): <u>Country Risk Ratings of Small Island Tourism Economies</u>
NRM	26.2004	Juan Luis EUGENIO-MARTÍN, Noelia MARTÍN MORALES and Riccardo SCARPA (lxvii): <u>Tourism and Economic Growth in Latin American Countries: A Panel Data Approach</u>
NRM	27.2004	Raúl Hernández MARTÍN (lxvii): <u>Impact of Tourism Consumption on GDP. The Role of Imports</u>
CSRM	28.2004	Nicoletta FERRO: <u>Cross-Country Ethical Dilemmas in Business: A Descriptive Framework</u>
NRM	29.2004	Marian WEBER (lxvi): <u>Assessing the Effectiveness of Tradable Landuse Rights for Biodiversity Conservation: an Application to Canada's Boreal Mixedwood Forest</u>
NRM	30.2004	Trond BJORN DAL, Phoebe KOUNDOURI and Sean PASCOE (lxvi): <u>Output Substitution in Multi-Species Trawl Fisheries: Implications for Quota Setting</u>
CCMP	31.2004	Marzio GALEOTTI, Alessandra GORIA, Paolo MOMBRINI and Evi SPANTIDAKI: <u>Weather Impacts on Natural, Social and Economic Systems (WISE) Part I: Sectoral Analysis of Climate Impacts in Italy</u>
CCMP	32.2004	Marzio GALEOTTI, Alessandra GORIA, Paolo MOMBRINI and Evi SPANTIDAKI: <u>Weather Impacts on Natural, Social and Economic Systems (WISE) Part II: Individual Perception of Climate Extremes in Italy</u>
CTN	33.2004	Wilson PEREZ: <u>Divide and Conquer: Noisy Communication in Networks, Power, and Wealth Distribution</u>
KTHC	34.2004	Gianmarco I.P. OTTAVIANO and Giovanni PERI (lxviii): <u>The Economic Value of Cultural Diversity: Evidence from US Cities</u>
KTHC	35.2004	Linda CHAIB (lxviii): <u>Immigration and Local Urban Participatory Democracy: A Boston-Paris Comparison</u>

KTHC	36.2004	<i>Franca ECKERT COEN and Claudio ROSSI (Ixxviii): <u>Foreigners, Immigrants, Host Cities: The Policies of Multi-Ethnicity in Rome. Reading Governance in a Local Context</u></i>
KTHC	37.2004	<i>Kristine CRANE (Ixxviii): <u>Governing Migration: Immigrant Groups' Strategies in Three Italian Cities – Rome, Naples and Bari</u></i>
KTHC	38.2004	<i>Kiflemariam HAMDE (Ixxviii): <u>Mind in Africa, Body in Europe: The Struggle for Maintaining and Transforming Cultural Identity - A Note from the Experience of Eritrean Immigrants in Stockholm</u></i>
ETA	39.2004	<i>Alberto CAVALIERE: <u>Price Competition with Information Disparities in a Vertically Differentiated Duopoly</u></i>
PRA	40.2004	<i>Andrea BIGANO and Stef PROOST: <u>The Opening of the European Electricity Market and Environmental Policy: Does the Degree of Competition Matter?</u></i>
CCMP	41.2004	<i>Micheal FINUS (Ixxix): <u>International Cooperation to Resolve International Pollution Problems</u></i>
KTHC	42.2004	<i>Francesco CRESPI: <u>Notes on the Determinants of Innovation: A Multi-Perspective Analysis</u></i>
CTN	43.2004	<i>Sergio CURRARINI and Marco MARINI: <u>Coalition Formation in Games without Synergies</u></i>
CTN	44.2004	<i>Marc ESCRIHUELA-VILLAR: <u>Cartel Sustainability and Cartel Stability</u></i>
NRM	45.2004	<i>Sebastian BERVOETS and Nicolas GRAVEL (Ixxvi): <u>Appraising Diversity with an Ordinal Notion of Similarity: An Axiomatic Approach</u></i>
NRM	46.2004	<i>Signe ANTHON and Bo JELLES MARK THORSEN (Ixxvi): <u>Optimal Afforestation Contracts with Asymmetric Information on Private Environmental Benefits</u></i>
NRM	47.2004	<i>John MBURU (Ixxvi): <u>Wildlife Conservation and Management in Kenya: Towards a Co-management Approach</u></i>
NRM	48.2004	<i>Ekin BIROL, Ágnes GYÓVAI and Melinda SMALE (Ixxvi): <u>Using a Choice Experiment to Value Agricultural Biodiversity on Hungarian Small Farms: Agri-Environmental Policies in a Transition al Economy</u></i>
CCMP	49.2004	<i>Gernot KLEPPER and Sonja PETERSON: <u>The EU Emissions Trading Scheme. Allowance Prices, Trade Flows, Competitiveness Effects</u></i>
GG	50.2004	<i>Scott BARRETT and Michael HOEL: <u>Optimal Disease Eradication</u></i>
CTN	51.2004	<i>Dinko DIMITROV, Peter BORM, Ruud HENDRICKX and Shao CHIN SUNG: <u>Simple Priorities and Core Stability in Hedonic Games</u></i>
SIEV	52.2004	<i>Francesco RICCI: <u>Channels of Transmission of Environmental Policy to Economic Growth: A Survey of the Theory</u></i>
SIEV	53.2004	<i>Anna ALBERINI, Maureen CROPPER, Alan KRUPNICK and Nathalie B. SIMON: <u>Willingness to Pay for Mortality Risk Reductions: Does Latency Matter?</u></i>
NRM	54.2004	<i>Ingo BRÄUER and Rainer MARGGRAF (Ixxvi): <u>Valuation of Ecosystem Services Provided by Biodiversity Conservation: An Integrated Hydrological and Economic Model to Value the Enhanced Nitrogen Retention in Renaturated Streams</u></i>
NRM	55.2004	<i>Timo GOESCHL and Tun LIN (Ixxvi): <u>Biodiversity Conservation on Private Lands: Information Problems and Regulatory Choices</u></i>
NRM	56.2004	<i>Tom DEDEURWAERDERE (Ixxvi): <u>Bioprospection: From the Economics of Contracts to Reflexive Governance</u></i>
CCMP	57.2004	<i>Katrin REHDANZ and David MADDISON: <u>The Amenity Value of Climate to German Households</u></i>
CCMP	58.2004	<i>Koen SMEKENS and Bob VAN DER ZWAAN: <u>Environmental Externalities of Geological Carbon Sequestration Effects on Energy Scenarios</u></i>
NRM	59.2004	<i>Valentina BOSETTI, Mariaester CASSINELLI and Alessandro LANZA (Ixxvii): <u>Using Data Envelopment Analysis to Evaluate Environmentally Conscious Tourism Management</u></i>
NRM	60.2004	<i>Timo GOESCHL and Danilo CAMARGO IGLIORI (Ixxvi): <u>Property Rights Conservation and Development: An Analysis of Extractive Reserves in the Brazilian Amazon</u></i>
CCMP	61.2004	<i>Barbara BUCHNER and Carlo CARRARO: <u>Economic and Environmental Effectiveness of a Technology-based Climate Protocol</u></i>
NRM	62.2004	<i>Elissaios PAPYRAKIS and Reyer GERLAGH: <u>Resource-Abundance and Economic Growth in the U.S.</u></i>
NRM	63.2004	<i>Györgyi BELA, György PATAKI, Melinda SMALE and Mariann HAJDÚ (Ixxvi): <u>Conserving Crop Genetic Resources on Smallholder Farms in Hungary: Institutional Analysis</u></i>
NRM	64.2004	<i>E.C.M. RUIJGROK and E.E.M. NILLESEN (Ixxvi): <u>The Socio-Economic Value of Natural Riverbanks in the Netherlands</u></i>
NRM	65.2004	<i>E.C.M. RUIJGROK (Ixxvi): <u>Reducing Acidification: The Benefits of Increased Nature Quality. Investigating the Possibilities of the Contingent Valuation Method</u></i>
ETA	66.2004	<i>Giannis VARDAS and Anastasios XEPAPADEAS: <u>Uncertainty Aversion, Robust Control and Asset Holdings</u></i>
GG	67.2004	<i>Anastasios XEPAPADEAS and Constadina PASSA: <u>Participation in and Compliance with Public Voluntary Environmental Programs: An Evolutionary Approach</u></i>
GG	68.2004	<i>Michael FINUS: <u>Modesty Pays: Sometimes!</u></i>
NRM	69.2004	<i>Trond BJØRNDAL and Ana BRASÃO: <u>The Northern Atlantic Bluefin Tuna Fisheries: Management and Policy Implications</u></i>
CTN	70.2004	<i>Alejandro CAPARRÓS, Abdelhakim HAMMOUDI and Tarik TAZDAÏT: <u>On Coalition Formation with Heterogeneous Agents</u></i>
IEM	71.2004	<i>Massimo GIOVANNINI, Margherita GRASSO, Alessandro LANZA and Matteo MANERA: <u>Conditional Correlations in the Returns on Oil Companies Stock Prices and Their Determinants</u></i>
IEM	72.2004	<i>Alessandro LANZA, Matteo MANERA and Michael MCALEER: <u>Modelling Dynamic Conditional Correlations in WTI Oil Forward and Futures Returns</u></i>
SIEV	73.2004	<i>Margarita GENIUS and Elisabetta STRAZZERA: <u>The Copula Approach to Sample Selection Modelling: An Application to the Recreational Value of Forests</u></i>

CCMP	74.2004	<i>Rob DELLINK and Ekko van IERLAND</i> : <u>Pollution Abatement in the Netherlands: A Dynamic Applied General Equilibrium Assessment</u>
ETA	75.2004	<i>Rosella LEVAGGI and Michele MORETTO</i> : <u>Investment in Hospital Care Technology under Different Purchasing Rules: A Real Option Approach</u>
CTN	76.2004	<i>Salvador BARBERÀ and Matthew O. JACKSON</i> (lxx): <u>On the Weights of Nations: Assigning Voting Weights in a Heterogeneous Union</u>
CTN	77.2004	<i>Àlex ARENAS, Antonio CABRALES, Albert DÍAZ-GUILERA, Roger GUIMERÀ and Fernando VEGA-REDONDO</i> (lxx): <u>Optimal Information Transmission in Organizations: Search and Congestion</u>
CTN	78.2004	<i>Francis BLOCH and Armando GOMES</i> (lxx): <u>Contracting with Externalities and Outside Options</u>
CTN	79.2004	<i>Rabah AMIR, Effrosyni DIAMANTOUDI and Licun XUE</i> (lxx): <u>Merger Performance under Uncertain Efficiency Gains</u>
CTN	80.2004	<i>Francis BLOCH and Matthew O. JACKSON</i> (lxx): <u>The Formation of Networks with Transfers among Players</u>
CTN	81.2004	<i>Daniel DIERMEIER, Hülya ERASLAN and Antonio MERLO</i> (lxx): <u>Bicameralism and Government Formation</u>
CTN	82.2004	<i>Rod GARRATT, James E. PARCO, Cheng-ZHONG QIN and Amnon RAPOPORT</i> (lxx): <u>Potential Maximization and Coalition Government Formation</u>
CTN	83.2004	<i>Kfir ELIAZ, Debraj RAY and Ronny RAZIN</i> (lxx): <u>Group Decision-Making in the Shadow of Disagreement</u>
CTN	84.2004	<i>Sanjeev GOYAL, Marco van der LEIJ and José Luis MORAGA-GONZÁLEZ</i> (lxx): <u>Economics: An Emerging Small World?</u>
CTN	85.2004	<i>Edward CARTWRIGHT</i> (lxx): <u>Learning to Play Approximate Nash Equilibria in Games with Many Players</u>
IEM	86.2004	<i>Finn R. FØRSUND and Michael HOEL</i> : <u>Properties of a Non-Competitive Electricity Market Dominated by Hydroelectric Power</u>
KTHC	87.2004	<i>Elissaios PAPYRAKIS and Reyer GERLAGH</i> : <u>Natural Resources, Investment and Long-Term Income</u>
CCMP	88.2004	<i>Marzio GALEOTTI and Claudia KEMFERT</i> : <u>Interactions between Climate and Trade Policies: A Survey</u>
IEM	89.2004	<i>A. MARKANDYA, S. PEDROSO and D. STREIMIKIENE</i> : <u>Energy Efficiency in Transition Economies: Is There Convergence Towards the EU Average?</u>
GG	90.2004	<i>Rolf GOLOMBEK and Michael HOEL</i> : <u>Climate Agreements and Technology Policy</u>
PRA	91.2004	<i>Sergei IZMALKOV</i> (lxv): <u>Multi-Unit Open Ascending Price Efficient Auction</u>
KTHC	92.2004	<i>Gianmarco I.P. OTTAVIANO and Giovanni PERI</i> : <u>Cities and Cultures</u>
KTHC	93.2004	<i>Massimo DEL GATTO</i> : <u>Agglomeration, Integration, and Territorial Authority Scale in a System of Trading Cities. Centralisation versus devolution</u>
CCMP	94.2004	<i>Pierre-André JOUVET, Philippe MICHEL and Gilles ROTILLON</i> : <u>Equilibrium with a Market of Permits</u>
CCMP	95.2004	<i>Bob van der ZWAAN and Reyer GERLAGH</i> : <u>Climate Uncertainty and the Necessity to Transform Global Energy Supply</u>
CCMP	96.2004	<i>Francesco BOSELLO, Marco LAZZARIN, Roberto ROSON and Richard S.J. TOL</i> : <u>Economy-Wide Estimates of the Implications of Climate Change: Sea Level Rise</u>
CTN	97.2004	<i>Gustavo BERGANTIÑOS and Juan J. VIDAL-PUGA</i> : <u>Defining Rules in Cost Spanning Tree Problems Through the Canonical Form</u>
CTN	98.2004	<i>Siddhartha BANDYOPADHYAY and Mandar OAK</i> : <u>Party Formation and Coalitional Bargaining in a Model of Proportional Representation</u>
GG	99.2004	<i>Hans-Peter WEIKARD, Michael FINUS and Juan-Carlos ALTAMIRANO-CABRERA</i> : <u>The Impact of Surplus Sharing on the Stability of International Climate Agreements</u>
SIEV	100.2004	<i>Chiara M. TRAVISI and Peter NIJKAMP</i> : <u>Willingness to Pay for Agricultural Environmental Safety: Evidence from a Survey of Milan, Italy, Residents</u>
SIEV	101.2004	<i>Chiara M. TRAVISI, Raymond J. G. M. FLORAX and Peter NIJKAMP</i> : <u>A Meta-Analysis of the Willingness to Pay for Reductions in Pesticide Risk Exposure</u>
NRM	102.2004	<i>Valentina BOSETTI and David TOMBERLIN</i> : <u>Real Options Analysis of Fishing Fleet Dynamics: A Test</u>
CCMP	103.2004	<i>Alessandra GORIA e Gretel GAMBARELLI</i> : <u>Economic Evaluation of Climate Change Impacts and Adaptability in Italy</u>
PRA	104.2004	<i>Massimo FLORIO and Mara GRASSEN</i> : <u>The Missing Shock: The Macroeconomic Impact of British Privatisation</u>
PRA	105.2004	<i>John BENNETT, Saul ESTRIN, James MAW and Giovanni URG</i> : <u>Privatisation Methods and Economic Growth in Transition Economies</u>
PRA	106.2004	<i>Kira BÖRNER</i> : <u>The Political Economy of Privatization: Why Do Governments Want Reforms?</u>
PRA	107.2004	<i>Pehr-Johan NORBÄCK and Lars PERSSON</i> : <u>Privatization and Restructuring in Concentrated Markets</u>
SIEV	108.2004	<i>Angela GRANZOTTO, Fabio PRANOVI, Simone LIBRALATO, Patrizia TORRICELLI and Danilo MAINARDI</i> : <u>Comparison between Artisanal Fishery and Manila Clam Harvesting in the Venice Lagoon by Using Ecosystem Indicators: An Ecological Economics Perspective</u>
CTN	109.2004	<i>Somdeb LAHIRI</i> : <u>The Cooperative Theory of Two Sided Matching Problems: A Re-examination of Some Results</u>
NRM	110.2004	<i>Giuseppe DI VITA</i> : <u>Natural Resources Dynamics: Another Look</u>
SIEV	111.2004	<i>Anna ALBERINI, Alistair HUNT and Anil MARKANDYA</i> : <u>Willingness to Pay to Reduce Mortality Risks: Evidence from a Three-Country Contingent Valuation Study</u>
KTHC	112.2004	<i>Valeria PAPPONETTI and Dino PINELLI</i> : <u>Scientific Advice to Public Policy-Making</u>
SIEV	113.2004	<i>Paulo A.L.D. NUNES and Laura ONOFRI</i> : <u>The Economics of Warm Glow: A Note on Consumer's Behavior and Public Policy Implications</u>
IEM	114.2004	<i>Patrick CAYRADE</i> : <u>Investments in Gas Pipelines and Liquefied Natural Gas Infrastructure What is the Impact on the Security of Supply?</u>
IEM	115.2004	<i>Valeria COSTANTINI and Francesco GRACCEVA</i> : <u>Oil Security. Short- and Long-Term Policies</u>



ITEM	116.2004	<i>Valeria COSTANTINI and Francesco GRACCEVA: <u>Social Costs of Energy Disruptions</u></i>
ITEM	117.2004	<i>Christian EGENHOFER, Kyriakos GIALOGLOU, Giacomo LUCIANI, Maroeska BOOTS, Martin SCHEEPERS, Valeria COSTANTINI, Francesco GRACCEVA, Anil MARKANDYA and Giorgio VICINI: <u>Market-Based Options for Security of Energy Supply</u></i>
ITEM	118.2004	<i>David FISK: <u>Transport Energy Security. The Unseen Risk?</u></i>
ITEM	119.2004	<i>Giacomo LUCIANI: <u>Security of Supply for Natural Gas Markets. What is it and What is it not?</u></i>
ITEM	120.2004	<i>L.J. de VRIES and R.A. HAKVOORT: <u>The Question of Generation Adequacy in Liberalised Electricity Markets</u></i>
KTHC	121.2004	<i>Alberto PETRUCCI: <u>Asset Accumulation, Fertility Choice and Nondegenerate Dynamics in a Small Open Economy</u></i>
NRM	122.2004	<i>Carlo GIUPPONI, Jaroslav MYSLAK and Anita FASSIO: <u>An Integrated Assessment Framework for Water Resources Management: A DSS Tool and a Pilot Study Application</u></i>
NRM	123.2004	<i>Margaretha BREIL, Anita FASSIO, Carlo GIUPPONI and Paolo ROSATO: <u>Evaluation of Urban Improvement on the Islands of the Venice Lagoon: A Spatially-Distributed Hedonic-Hierarchical Approach</u></i>
ETA	124.2004	<i>Paul MENSINK: <u>Instant Efficient Pollution Abatement Under Non-Linear Taxation and Asymmetric Information: The Differential Tax Revisited</u></i>
NRM	125.2004	<i>Mauro FABIANO, Gabriella CAMARSA, Rosanna DURSI, Roberta IVALDI, Valentina MARIN and Francesca PALMISANI: <u>Integrated Environmental Study for Beach Management: A Methodological Approach</u></i>
PRA	126.2004	<i>Irena GROSFELD and Iraj HASHI: <u>The Emergence of Large Shareholders in Mass Privatized Firms: Evidence from Poland and the Czech Republic</u></i>
CCMP	127.2004	<i>Maria BERRITTELLA, Andrea BIGANO, Roberto ROSON and Richard S.J. TOL: <u>A General Equilibrium Analysis of Climate Change Impacts on Tourism</u></i>
CCMP	128.2004	<i>Reyer GERLAGH: <u>A Climate-Change Policy Induced Shift from Innovations in Energy Production to Energy Savings</u></i>
NRM	129.2004	<i>Elissaios PAPYRAKIS and Reyer GERLAGH: <u>Natural Resources, Innovation, and Growth</u></i>
PRA	130.2004	<i>Bernardo BORTOLOTTI and Mara FACCIO: <u>Reluctant Privatization</u></i>
SIEV	131.2004	<i>Riccardo SCARPA and Mara THIENE: <u>Destination Choice Models for Rock Climbing in the Northeast Alps: A Latent-Class Approach Based on Intensity of Participation</u></i>
SIEV	132.2004	<i>Riccardo SCARPA Kenneth G. WILLIS and Melinda ACUTT: <u>Comparing Individual-Specific Benefit Estimates for Public Goods: Finite Versus Continuous Mixing in Logit Models</u></i>
ITEM	133.2004	<i>Santiago J. RUBIO: <u>On Capturing Oil Rents with a National Excise Tax Revisited</u></i>
ETA	134.2004	<i>Ascensión ANDINA DÍAZ: <u>Political Competition when Media Create Candidates' Charisma</u></i>
SIEV	135.2004	<i>Anna ALBERINI: <u>Robustness of VSL Values from Contingent Valuation Surveys</u></i>
CCMP	136.2004	<i>Gernot KLEPPER and Sonja PETERSON: <u>Marginal Abatement Cost Curves in General Equilibrium: The Influence of World Energy Prices</u></i>
ETA	137.2004	<i>Herbert DAWID, Christophe DEISSENBERG and Pavel ŠEVČIK: <u>Cheap Talk, Gullibility, and Welfare in an Environmental Taxation Game</u></i>
CCMP	138.2004	<i>ZhongXiang ZHANG: <u>The World Bank's Prototype Carbon Fund and China</u></i>
CCMP	139.2004	<i>Reyer GERLAGH and Marjan W. HOFKES: <u>Time Profile of Climate Change Stabilization Policy</u></i>
NRM	140.2004	<i>Chiara D'ALPAOS and Michele MORETTO: <u>The Value of Flexibility in the Italian Water Service Sector: A Real Option Analysis</u></i>
PRA	141.2004	<i>Patrick BAJARI, Stephanie HOUGHTON and Steven TADELIS (lxxi): <u>Bidding for Incomplete Contracts</u></i>
PRA	142.2004	<i>Susan ATHEY, Jonathan LEVIN and Enrique SEIRA (lxxi): <u>Comparing Open and Sealed Bid Auctions: Theory and Evidence from Timber Auctions</u></i>
PRA	143.2004	<i>David GOLDREICH (lxxi): <u>Behavioral Biases of Dealers in U.S. Treasury Auctions</u></i>
PRA	144.2004	<i>Roberto BURGUET (lxxi): <u>Optimal Procurement Auction for a Buyer with Downward Sloping Demand: More Simple Economics</u></i>
PRA	145.2004	<i>Ali HORTACSU and Samita SAREEN (lxxi): <u>Order Flow and the Formation of Dealer Bids: An Analysis of Information and Strategic Behavior in the Government of Canada Securities Auctions</u></i>
PRA	146.2004	<i>Victor GINSBURGH, Patrick LEGROS and Nicolas SAHUGUET (lxxi): <u>How to Win Twice at an Auction. On the Incidence of Commissions in Auction Markets</u></i>
PRA	147.2004	<i>Claudio MEZZETTI, Aleksandar PEKEČ and Ilia TSETLIN (lxxi): <u>Sequential vs. Single-Round Uniform-Price Auctions</u></i>
PRA	148.2004	<i>John ASKER and Estelle CANTILLON (lxxi): <u>Equilibrium of Scoring Auctions</u></i>
PRA	149.2004	<i>Philip A. HAILE, Han HONG and Matthew SHUM (lxxi): <u>Nonparametric Tests for Common Values in First-Price Sealed-Bid Auctions</u></i>
PRA	150.2004	<i>François DEGEORGE, François DERRIEN and Kent L. WOMACK (lxxi): <u>Quid Pro Quo in IPOs: Why Bookbuilding is Dominating Auctions</u></i>
CCMP	151.2004	<i>Barbara BUCHNER and Silvia DALL'OLIO: <u>Russia: The Long Road to Ratification. Internal Institution and Pressure Groups in the Kyoto Protocol's Adoption Process</u></i>
CCMP	152.2004	<i>Carlo CARRARO and Marzio GALEOTTI: <u>Does Endogenous Technical Change Make a Difference in Climate Policy Analysis? A Robustness Exercise with the FEEM-RICE Model</u></i>
PRA	153.2004	<i>Alejandro M. MANELLI and Daniel R. VINCENT (lxxi): <u>Multidimensional Mechanism Design: Revenue Maximization and the Multiple-Good Monopoly</u></i>
ETA	154.2004	<i>Nicola ACOCELLA, Giovanni Di BARTOLOMEO and Wilfried PAUWELS: <u>Is there any Scope for Corporatism in Stabilization Policies?</u></i>
CTN	155.2004	<i>Johan EYCKMANS and Michael FINUS: <u>An Almost Ideal Sharing Scheme for Coalition Games with Externalities</u></i>
CCMP	156.2004	<i>Cesare DOSI and Michele MORETTO: <u>Environmental Innovation, War of Attrition and Investment Grants</u></i>

CCMP	157.2004	<i>Valentina BOSETTI, Marzio GALEOTTI and Alessandro LANZA: <u>How Consistent are Alternative Short-Term Climate Policies with Long-Term Goals?</u></i>
ETA	158.2004	<i>Y. Hossein FARZIN and Ken-Ichi AKAO: <u>Non-pecuniary Value of Employment and Individual Labor Supply</u></i>
ETA	159.2004	<i>William BROCK and Anastasios XEPAPADEAS: <u>Spatial Analysis: Development of Descriptive and Normative Methods with Applications to Economic-Ecological Modelling</u></i>
KTHC	160.2004	<i>Alberto PETRUCCI: <u>On the Incidence of a Tax on PureRent with Infinite Horizons</u></i>
IEM	161.2004	<i>Xavier LABANDEIRA, José M. LABEAGA and Miguel RODRÍGUEZ: <u>Microsimulating the Effects of Household Energy Price Changes in Spain</u></i>

#### NOTE DI LAVORO PUBLISHED IN 2005

CCMP	1.2005	<i>Stéphane HALLEGATTE: <u>Accounting for Extreme Events in the Economic Assessment of Climate Change</u></i>
CCMP	2.2005	<i>Qiang WU and Paulo Augusto NUNES: <u>Application of Technological Control Measures on Vehicle Pollution: A Cost-Benefit Analysis in China</u></i>
CCMP	3.2005	<i>Andrea BIGANO, Jacqueline M. HAMILTON, Maren LAU, Richard S.J. TOL and Yuan ZHOU: <u>A Global Database of Domestic and International Tourist Numbers at National and Subnational Level</u></i>
CCMP	4.2005	<i>Andrea BIGANO, Jacqueline M. HAMILTON and Richard S.J. TOL: <u>The Impact of Climate on Holiday Destination Choice</u></i>
ETA	5.2005	<i>Hubert KEMPF: <u>Is Inequality Harmful for the Environment in a Growing Economy?</u></i>
CCMP	6.2005	<i>Valentina BOSETTI, Carlo CARRARO and Marzio GALEOTTI: <u>The Dynamics of Carbon and Energy Intensity in a Model of Endogenous Technical Change</u></i>
IEM	7.2005	<i>David CALEF and Robert GOBLE: <u>The Allure of Technology: How France and California Promoted Electric Vehicles to Reduce Urban Air Pollution</u></i>
ETA	8.2005	<i>Lorenzo PELLEGRINI and Reyer GERLAGH: <u>An Empirical Contribution to the Debate on Corruption Democracy and Environmental Policy</u></i>
CCMP	9.2005	<i>Angelo ANTOCI: <u>Environmental Resources Depletion and Interplay Between Negative and Positive Externalities in a Growth Model</u></i>
CTN	10.2005	<i>Frédéric DEROLAN: <u>Cost-Reducing Alliances and Local Spillovers</u></i>
NRM	11.2005	<i>Francesco SINDICO: <u>The GMO Dispute before the WTO: Legal Implications for the Trade and Environment Debate</u></i>
KTHC	12.2005	<i>Carla MASSIDDA: <u>Estimating the New Keynesian Phillips Curve for Italian Manufacturing Sectors</u></i>
KTHC	13.2005	<i>Michele MORETTO and Gianpaolo ROSSINI: <u>Start-up Entry Strategies: Employer vs. Nonemployer firms</u></i>
PRCG	14.2005	<i>Clara GRAZIANO and Annalisa LUPORINI: <u>Ownership Concentration, Monitoring and Optimal Board Structure</u></i>
CSRM	15.2005	<i>Parashar KULKARNI: <u>Use of Ecolabels in Promoting Exports from Developing Countries to Developed Countries: Lessons from the Indian LeatherFootwear Industry</u></i>
KTHC	16.2005	<i>Adriana DI LIBERTO, Roberto MURA and Francesco PIGLIARU: <u>How to Measure the Unobservable: A Panel Technique for the Analysis of TFP Convergence</u></i>
KTHC	17.2005	<i>Alireza NAGHAVI: <u>Asymmetric Labor Markets, Southern Wages, and the Location of Firms</u></i>
KTHC	18.2005	<i>Alireza NAGHAVI: <u>Strategic Intellectual Property Rights Policy and North-South Technology Transfer</u></i>
KTHC	19.2005	<i>Mombert HOPPE: <u>Technology Transfer Through Trade</u></i>
PRCG	20.2005	<i>Roberto ROSON: <u>Platform Competition with Endogenous Multihoming</u></i>
CCMP	21.2005	<i>Barbara BUCHNER and Carlo CARRARO: <u>Regional and Sub-Global Climate Blocs. A Game Theoretic Perspective on Bottom-up Climate Regimes</u></i>
IEM	22.2005	<i>Fausto CAVALLARO: <u>An Integrated Multi-Criteria System to Assess Sustainable Energy Options: An Application of the Promethee Method</u></i>
CTN	23.2005	<i>Michael FINUS, Pierre v. MOUCHE and Bianca RUNDSHAGEN: <u>Uniqueness of Coalitional Equilibria</u></i>
IEM	24.2005	<i>Wietze LISE: <u>Decomposition of CO2 Emissions over 1980–2003 in Turkey</u></i>
CTN	25.2005	<i>Somdeb LAHIRI: <u>The Core of Directed Network Problems with Quotas</u></i>
SIEV	26.2005	<i>Susanne MENZEL and Riccardo SCARPA: <u>Protection Motivation Theory and Contingent Valuation: Perceived Realism, Threat and WTP Estimates for Biodiversity Protection</u></i>
NRM	27.2005	<i>Massimiliano MAZZANTI and Anna MONTINI: <u>The Determinants of Residential Water Demand Empirical Evidence for a Panel of Italian Municipalities</u></i>
CCMP	28.2005	<i>Laurent GILOTTE and Michel de LARA: <u>Precautionary Effect and Variations of the Value of Information</u></i>
NRM	29.2005	<i>Paul SARFO-MENSAH: <u>Exportation of Timber in Ghana: The Menace of Illegal Logging Operations</u></i>
CCMP	30.2005	<i>Andrea BIGANO, Alessandra GORIA, Jacqueline HAMILTON and Richard S.J. TOL: <u>The Effect of Climate Change and Extreme Weather Events on Tourism</u></i>
NRM	31.2005	<i>Maria Angeles GARCIA-VALIÑAS: <u>Decentralization and Environment: An Application to Water Policies</u></i>
NRM	32.2005	<i>Chiara D'ALPAOS, Cesare DOSI and Michele MORETTO: <u>Concession Length and Investment Timing Flexibility</u></i>
CCMP	33.2005	<i>Joseph HUBER: <u>Key Environmental Innovations</u></i>
CTN	34.2005	<i>Antoni CALVÓ-ARMENGOL and Rahmi İLKILIÇ (Ixxii): <u>Pairwise-Stability and Nash Equilibria in Network Formation</u></i>
CTN	35.2005	<i>Francesco FERI (Ixxii): <u>Network Formation with Endogenous Decay</u></i>
CTN	36.2005	<i>Frank H. PAGE, Jr. and Myrna H. WOODERS (Ixxii): <u>Strategic Basins of Attraction, the Farsighted Core, and Network Formation Games</u></i>

CTN	37.2005	<i>Alessandra CASELLA and Nobuyuki HANAKI</i> (lxxii): <u>Information Channels in Labor Markets. On the Resilience of Referral Hiring</u>
CTN	38.2005	<i>Matthew O. JACKSON and Alison WATTS</i> (lxxii): <u>Social Games: Matching and the Play of Finitely Repeated Games</u>
CTN	39.2005	<i>Anna BOGOMOLNAIA, Michel LE BRETON, Alexei SAVVATEEV and Shlomo WEBER</i> (lxxii): <u>The Egalitarian Sharing Rule in Provision of Public Projects</u>
CTN	40.2005	<i>Francesco FERI</i> : <u>Stochastic Stability in Network with Decay</u>
CTN	41.2005	<i>Aart de ZEEUW</i> (lxxii): <u>Dynamic Effects on the Stability of International Environmental Agreements</u>
NRM	42.2005	<i>C. Martijn van der HEIDE, Jeroen C.J.M. van den BERGH, Ekko C. van IERLAND and Paulo A.L.D. NUNES</i> : <u>Measuring the Economic Value of Two Habitat Defragmentation Policy Scenarios for the Veluwe, The Netherlands</u>
PRCG	43.2005	<i>Carla VIEIRA and Ana Paula SERRA</i> : <u>Abnormal Returns in Privatization Public Offerings: The Case of Portuguese Firms</u>
SIEV	44.2005	<i>Anna ALBERINI, Valentina ZANATTA and Paolo ROSATO</i> : <u>Combining Actual and Contingent Behavior to Estimate the Value of Sports Fishing in the Lagoon of Venice</u>
CTN	45.2005	<i>Michael FINUS and Bianca RUNDSHAGEN</i> : <u>Participation in International Environmental Agreements: The Role of Timing and Regulation</u>
CCMP	46.2005	<i>Lorenzo PELLEGRINI and Reyer GERLAGH</i> : <u>Are EU Environmental Policies Too Demanding for New Members States?</u>
IEM	47.2005	<i>Matteo MANERA</i> : <u>Modeling Factor Demands with SEM and VAR: An Empirical Comparison</u>
CTN	48.2005	<i>Olivier TERCIEUX and Vincent VANNETELBOSCH</i> (lxx): <u>A Characterization of Stochastically Stable Networks</u>
CTN	49.2005	<i>Ana MAULEON, José SEMPERE-MONERRIS and Vincent J. VANNETELBOSCH</i> (lxxii): <u>R&amp;D Networks Among Unionized Firms</u>
CTN	50.2005	<i>Carlo CARRARO, Johan EYCKMANS and Michael FINUS</i> : <u>Optimal Transfers and Participation Decisions in International Environmental Agreements</u>
KTHC	51.2005	<i>Valeria GATTAI</i> : <u>From the Theory of the Firm to FDI and Internalisation: A Survey</u>
CCMP	52.2005	<i>Alireza NAGHAVI</i> : <u>Multilateral Environmental Agreements and Trade Obligations: A Theoretical Analysis of the Doha Proposal</u>
SIEV	53.2005	<i>Margaretha BREIL, Gretel GAMBARELLI and Paulo A.L.D. NUNES</i> : <u>Economic Valuation of On Site Material Damages of High Water on Economic Activities based in the City of Venice: Results from a Dose-Response-Expert-Based Valuation Approach</u>
ETA	54.2005	<i>Alessandra del BOCA, Marzio GALEOTTI, Charles P. HIMMELBERG and Paola ROTA</i> : <u>Investment and Time to Plan: A Comparison of Structures vs. Equipment in a Panel of Italian Firms</u>
CCMP	55.2005	<i>Gernot KLEPPER and Sonja PETERSON</i> : <u>Emissions Trading, CDM, JI, and More – The Climate Strategy of the EU</u>
ETA	56.2005	<i>Maia DAVID and Bernard SINCLAIR-DESGAGNÉ</i> : <u>Environmental Regulation and the Eco-Industry</u>
ETA	57.2005	<i>Alain-Désiré NIMUBONA and Bernard SINCLAIR-DESGAGNÉ</i> : <u>The Pigouvian Tax Rule in the Presence of an Eco-Industry</u>
NRM	58.2005	<i>Helmut KARL, Antje MÖLLER, Ximena MATUS, Edgar GRANDE and Robert KAISER</i> : <u>Environmental Innovations: Institutional Impacts on Co-operations for Sustainable Development</u>

(lxv) This paper was presented at the EuroConference on “Auctions and Market Design: Theory, Evidence and Applications” organised by Fondazione Eni Enrico Mattei and sponsored by the EU, Milan, September 25-27, 2003

(lxvi) This paper has been presented at the 4<sup>th</sup> BioEcon Workshop on “Economic Analysis of Policies for Biodiversity Conservation” organised on behalf of the BIOECON Network by Fondazione Eni Enrico Mattei, Venice International University (VIU) and University College London (UCL), Venice, August 28-29, 2003

(lxvii) This paper has been presented at the international conference on “Tourism and Sustainable Economic Development – Macro and Micro Economic Issues” jointly organised by CRENoS (Università di Cagliari e Sassari, Italy) and Fondazione Eni Enrico Mattei, and supported by the World Bank, Sardinia, September 19-20, 2003

(lxviii) This paper was presented at the ENGIME Workshop on “Governance and Policies in Multicultural Cities”, Rome, June 5-6, 2003

(lxix) This paper was presented at the Fourth EEP Plenary Workshop and EEP Conference “The Future of Climate Policy”, Cagliari, Italy, 27-28 March 2003

(lxx) This paper was presented at the 9<sup>th</sup> Coalition Theory Workshop on "Collective Decisions and Institutional Design" organised by the Universitat Autònoma de Barcelona and held in Barcelona, Spain, January 30-31, 2004

(lxxi) This paper was presented at the EuroConference on “Auctions and Market Design: Theory, Evidence and Applications”, organised by Fondazione Eni Enrico Mattei and Consip and sponsored by the EU, Rome, September 23-25, 2004

(lxxii) This paper was presented at the 10<sup>th</sup> Coalition Theory Network Workshop held in Paris, France on 28-29 January 2005 and organised by EUREQua.

**2004 SERIES**

<b>CCMP</b>	<i>Climate Change Modelling and Policy</i> (Editor: Marzio Galeotti )
<b>GG</b>	<i>Global Governance</i> (Editor: Carlo Carraro)
<b>SIEV</b>	<i>Sustainability Indicators and Environmental Valuation</i> (Editor: Anna Alberini)
<b>NRM</b>	<i>Natural Resources Management</i> (Editor: Carlo Giupponi)
<b>KTHC</b>	<i>Knowledge, Technology, Human Capital</i> (Editor: Gianmarco Ottaviano)
<b>IEM</b>	<i>International Energy Markets</i> (Editor: Anil Markandya)
<b>CSRM</b>	<i>Corporate Social Responsibility and Sustainable Management</i> (Editor: Sabina Ratti)
<b>PRA</b>	<i>Privatisation, Regulation, Antitrust</i> (Editor: Bernardo Bortolotti)
<b>ETA</b>	<i>Economic Theory and Applications</i> (Editor: Carlo Carraro)
<b>CTN</b>	<i>Coalition Theory Network</i>

**2005 SERIES**

<b>CCMP</b>	<i>Climate Change Modelling and Policy</i> (Editor: Marzio Galeotti )
<b>SIEV</b>	<i>Sustainability Indicators and Environmental Valuation</i> (Editor: Anna Alberini)
<b>NRM</b>	<i>Natural Resources Management</i> (Editor: Carlo Giupponi)
<b>KTHC</b>	<i>Knowledge, Technology, Human Capital</i> (Editor: Gianmarco Ottaviano)
<b>IEM</b>	<i>International Energy Markets</i> (Editor: Anil Markandya)
<b>CSRM</b>	<i>Corporate Social Responsibility and Sustainable Management</i> (Editor: Sabina Ratti)
<b>PRCG</b>	<i>Privatisation Regulation Corporate Governance</i> (Editor: Bernardo Bortolotti)
<b>ETA</b>	<i>Economic Theory and Applications</i> (Editor: Carlo Carraro)
<b>CTN</b>	<i>Coalition Theory Network</i>