

Coherence in Industrial Transformation

Erik Hagelskjær Lauridsen, Ulrik Jørgensen

Department of Manufacturing Engineering and Management, Innovation and Sustainability, Technical University of Denmark, Denmark

Introduction

The most recent element on the South East Asian environmental agenda is the ISO series of international environmental management standards, i.e. the ISO 14000 series. These have recently been appropriated to use in a.o. the newly industrialized Thailand, but it is still an open question whether these will be able to function in a comparative way to the European situation. In the European context the ISO 14000 series standards have to some extent promoted a situation of industrial self governance by functioning as a platform for integrating enforcement control and environmental housekeeping concerns, as well as being a tool that brings environmental concerns to the level of the top management as it provides a framework for integrating environmental considerations into the business activities of the company as a permanent concern of the company management. In this manner the environmental management systems have worked to align the elements that constitute the context of the systems, thus promoting the coherence among these. It is evident that ISO 14000 can function as a catalyst of environmental change, but like with a chemical catalyst the necessary preconditions must be present in order for the desired reaction to take place.

The most radical objective of the ISO 14000 standard is its attempt to initiate and sustain continuous improvements of the environment related to the organization where it is implemented. By introducing an objective of continuous improvements a proper implementation of the standard requires more than just setting up a system of management procedures, but also for the establishment of a description of the environment, that can be used to prioritize the environmental activities of the company. Environmental management systems (EMS) develop different environmental objectives and acquire different regulatory meanings in changing contexts. The importance of the context which the EMS are implemented in, is described through elements, that have previously been identified in the literature as individually significant domains in relation to function of environmental management: regulatory regimes and available technology (Jørgensen 2001), the competence of the networks of environmental professionals that work in the environmental organisation, in consulting and regulatory enforcement (Simmons & Wynne 1993) and dominating business cultures. Our argument is, that the ability of the standard to achieve an impact is dependant on the constitution of 'coherent' environmental issues in the context, where the management system is applied. This is exemplified with comparative discussions on the function of environmental management systems in the different contexts of Denmark and Thailand.

The Thai context of a combination of a recent industrialization and a young democracy draws attention to the preconditions that in a western context often are taken for granted, when discussing the function of environmental management standards: Management culture, enforcement practices, regulatory structures, personal networks and last but not least the existence of a network of environmental professionals. Many of these elements have not undergone the mutual alignment processes which we commonly refer to as 'modernization'.

Based on findings from a research program on the comparative use of EMS¹, we argue that EMS have become a 'voluntary supplements and extensions to existing legislation' in the European setting, while EMS in the setting of recently industrialised countries like Thailand and Malaysia appear to function very differently as 'awareness creators and legislation enforcement'. As a result of this, EMS may over time due to other mechanisms create more homogeneous and standardized environmental performance between countries.

Reflections on recent theoretical development

In general the introduction of EMS like ISO14000 is expected to build and sustain trust in companies' environmental efforts and performance (Deegan, 2002). However, in specific cases the performance of environmental management has been shown to be dependant on a number of individually significant domains in relation to: regulatory regimes and available technology (Jørgensen 2001), the competence of the networks of environmental professionals that work in the environmental organisation, in consulting and regulatory enforcement (Simmons & Wynne 1993) and dominating business cultures.

The standard as such, although, is just a management standard, prescribing certain procedures to be followed by the certified company, which leaves a quite open agenda for the choice of environmental objectives and performance criteria. Previously a number of issues in the ISO14000 standard have been identified where the standard contains interpretative flexibility (Behrndt 2002). This has been followed up in more detail by identifying the implicit assumptions and contextual expectations of the standard (Jørgensen 2003). The standards leave open a number of 'hot spots' to be defined throughout the implementation process: the delimitation of the organisation and territory, the identification of significant environmental aspects (objectives), the extent to which design, planning and product chain management is included, the interpretation of what counts as legal requirements and the interpretation of continued improvements. The importance of the embedding of EMS becomes evident as this interpretative flexibility leads to the definition of different priorities concerning environmental objectives, even though the concept of environment may be shaped in similar ways.

Furthermore does the acceptance and influence of EMS in the business community rely on how they perform and contribute to develop environmental issues and to translate them into concrete problems in specific settings. It is EMS' ability to support the enactment of the environment which is crucial. This follows the argument that making environmental problems concrete requires that they are enacted and thereby given meaning in local settings (Georg & Füssel 2000). But also the more

¹ The chapter is based on studies of EMS in the context of the EMP project organised in LUCED. In this project EMS are seen as travelling concepts that pursue certain objectives and results, and as concepts that need to be identified, used and thereby constituted in the specific contexts, where they are implemented. E.g. ISO 14000 is as such a management prescription for taking up environmental issues. As this standard does not specify the specific conceptual understanding of the environment, the business and regulatory context become very important for the meaning and working of the system.

general understanding that these enactment processes involves the construction and attachment of social meaning and representations for negotiation and mediation (Latour 1999). The environmental objectives are shaped by the concrete activities which they are embedded in. This identification of the role ISO14000 underlines previous understandings of environmental management systems as human constructs (Roome 1991). EMS' are human constructs that are developed in relation to and intertwined with other human constructs like science and politics. And more important and consequential is that what we understand as nature and environment is shaped in these interactions (Braun & Castree 1998).

When EMS' travel to be used in new settings it is not only a management technology which is transferred. As the management technology is implemented it becomes a key element of the embedding of the environment and as such also a central contribution to the local constitution of the environment. How the performance of the EMS is sensitive to the context where it is implemented, may be less evident in many European cases where EMS operate under relatively comparable and homogenous regulatory conditions. But when EMS are implemented in new settings as e.g. recently industrialised Asian countries, greater variations in the agenda setting role and performance of the systems can be identified as results of the varying conditions. New conceptions of the environment piggy-back (Sørensen 2000) onto a number of the different initiatives that are introduced in order to facilitate the development of local environmental strategies; legislative norms, the Cleaner Production promotion programs and EMS. Thus travelling EMS is a case of both technology transfer and the appropriation of key conceptions of the environment.

The context of new regulatory elements in Thailand

EMS' are spreading relatively quickly in the recently industrialised countries in South East Asia. Outside Europe and Japan these countries have the third largest concentration of ISO 14000 certified systems (ISO 2002). The EMS' are commonly introduced either based on demands from trans-national corporations' headquarters or as a response to demands from major customers - also often involving trans-national corporations in the product and distribution chain. A third important reason for implementing EMS is as a preparation for export to European countries in competition on the international market. Some characteristics of the companies introducing ISO14000 systems in Europe and South East Asia are similar. It is typically the larger companies that first introduce EMS (Hansen 1999), but while the European companies see their EMS as a way to integrate environmental management in the overall management of the company and demonstrate that they are environmentally reliable to a large number of stakeholders, companies introducing EMS in South East Asia are oriented towards exports for the international i.e. European market and see EMS as a way to gain acceptance by their major industrial customers on these markets.

The present promotion of EMS is not the first attempt to make the Thai industry more environmentally friendly. The issue has most notably addressed through the concept of Cleaner Production, which has been attempted disseminated to the Thai industry through a number of programs². But CP has in general only been taken up by

² CP projects in Thailand include a.o.:

- The Industrial Environmental Management Project 1990-1995 (Federation of Thai Industries, FTI/ Institute of Environmental Management, IEM - supported by USAID).
- The CDG project on Industrial Pollution Control for SME's in Thailand 1992-1994 (AIT/CU/CMU/DIW).
- Promotion of Cleaner Technology in Thai Industries 1996-1998 (FTI/Thai Environment Institute, TEI - supported by DANCED).
- The Cleaner Technology Unit at TEI.

the single companies approached by the various programs. The programs have often been designed to provide knowledge of new technological alternatives, and in many instances these alternatives have been implemented in the production. However, the implementation of CP has not spread to other similar companies, nor has it spread into subsequent CP initiatives in the original company. There is only very limited uptake of the CP idea in industry. "Technology is not a problem or a barrier, but the lack of knowledge on how to practice CP is." (Zatz 2003). The CP development has always stopped once the consultants leave, as the companies don't develop new initiatives directed at their specific context by themselves.

An evident question is thus, whether EMS can overcome the problems that have appeared in the attempts to promote the use of Cleaner Production in Thailand? Will the implementation of EMS in Thai industry lead the companies to begin to develop their own significant environmental issues?

The general experiences from the European context on this issue are not clear. Certainly new environmental priorities are established in relation to the numerous operating EMS's, but as of present these environmental priorities are hardly ever tested, i.e. they are seldom used for real discussions on the environmental behavior of companies. Therefore it is hard to tell whether they are the right issues to take up. EMS have in their original European context avoided ending up in discussions on whether they are dealing with the right problems because they have been directed at dealing with problems that were already well-established as coherent issues in relation to an accepted environmental legislation and a network of professionals. However, this does not imply that the general establishment of priorities is unproblematic. Experiences show, that this is only the case as long as it can be kept as an implicit decision among professionals. Public disputes have demonstrated that these questions are very difficult to handle when they are stated explicitly. Examples of these kinds of discussions range from attempts to evaluate a single event (the Brent Spar incidence) to technological systems (the GMO debate) to the overall state of the environment (the Lomborg debate).

The local context of implementation with regards to the general conditions for economic and environmental development hold significant differences as the regulatory situation and enforcement, the production processes and equipment, the available competences of local professionals and the predominant management culture in general show important differences. These contrasting points are detailed in the following:

The regulatory situation

While a number of European countries have been through a crisis and strengthening of the enforcement of environmental legislation in the late 1980s, most Asian countries have a strong regulation as expressed in words and legislation, but still very weak and uneven enforcement. A change in this situation would include improving the competencies of regulatory officials, but there is resistance from industry towards empowering officials with improved environmental knowledge, as this may function as one more instance for corruption and becoming critical counterparts to the companies. At the same time a number of different programs on

-
- First Asia Pacific Roundtable on Cleaner Production 1997 (Pollution Control Department, PCD).
 - CP in municipalities 2000-2001 (PCD/TEI).
 - Cleaner Production for Industrial Efficiency, CPIE (PCD/Environment of the Royal Thai Government).
 - Cleaner Technology Capacity Building at DIW 1998-2003 (Department of Industrial Works - supported by DANCED).

cleaner technology, efficient production and environmental management have been promoted. But while these programs have been part of actions trying to make companies go beyond regulatory requirements, government agencies and foreign donor organisations promote other separate programs that introduce cleaner technology as technology transfer options in order to initiate companies' environmental activities on a business opportunity basis. These programs also typically operate with only brief knowledge of the existence of other similar initiatives. Different from the situation in e.g. Europe these programs have primarily been promoted as technology transfer actions while in the European context typically had a strong element of technological innovation and process improvements.

Often the implementation of an ISO 14000 system will be the first time the environmental legislation is applied to a company's activities - at least in a systematic way. The norms of the Thai environmental legislation are rather strict and quite comparable to European standards. But these norms are not fully enforced. Rigorous enforcement of the legislation would probably be a major problem to industry, and it might even be economically critical for some part of the production seen in relation to the dominant business culture and investments. Case studies in the EMP project revealed, that many big and respectable companies have obvious problems in complying with the legislative standards³. This does not appear to be a large problem in relation to the relevant authorities⁴. Several of these companies are ISO 14001 certified even without actually complying with existing legislative demands. Interviews with environmental auditors and consultants revealed that this is due to a widespread practice among auditors of accepting strategies to achieve regulatory compliance rather than demanding this as a prerequisite of acquiring a certificate: "We got our certificate for having good intentions"⁵. There appears to be an obvious parallel between these auditors lack of pursuing the norms of the ISO 14001 standard and the authorities weak enforcement of the norms of the environmental legislation.

In some ways the strict but not enforced legislation perform very well. The strict norms produce legitimacy for the formal environmental regulation created by government. From the governments perspective it is thus better to have a strict legislation, which lacks enforcement, than a less strict but enforced legislation which reflects the actual conditions of industry. The strict norms may also function as a basis for bringing up environmental problems as scandals in the press or as issues of NGO's and thereby shaping a ground for public environmental enquiries without the need of government and state authorities to secure and enforce the policies in detail.

In some incidences, where government offices have been too eager to pursue the enforcement of the legislation, these offices have even been closed. As a result of this subjugation of enforcement, even the Pollution Control Department, PCD of MOSTE⁶ will not necessarily include private industry in their initiatives. A program established by the Pollution Control Department of to support the implementation of CP program in municipalities is e.g. directed only at the internal activities of the municipalities. The program involves schools, hospitals and markets run by the municipality, but no initiatives towards private companies, that contribute to a much larger extent to the local environmental problems (In-na 2003).

³ A big car manufacturer had e.g. evident problems with VOC vapours from gluing and painting. A metal rack producer was also producing deaf employees. A battery company had too much dispersed solids in its waste water.

⁴ Thai companies are regulated by a number of different authorities according to their location, size and production.

⁵ Environmental manager at the car manufacturing company.

⁶ Ministry Of Science Technology and Environment

The industrial processes and technology

In most Thai companies the production technology has been imported or transferred and not developed locally. This leaves the Thai companies like many other companies in South East Asia with a lack of basic knowledge of the technical principles of the production and too little capacity for product development and improvements. Product requirements and standards are typically defined in the industrialised countries leaving only little space for local improvements and local competence building in the supplying company.

This lack of local knowledge on specific details in the production also makes it difficult to establish specific environmental initiatives that are closely related to the actual production. Thus concrete initiatives as e.g. waste management may be implemented in a manner where it is hardly related to the actual production. Given the current problems of the institutional waste handling in Thailand this appears to be a very relevant issue. However in the brochure presenting the company's ISO14000 system to the public, the waste separation process is not presented as an issue which is related to the main activity of the company, i.e. the manufacturing of automobiles and parts for automobiles. On the tour of the shop floor, the guide likewise does not point to any waste separation activities in the production⁷. Rather the waste management appears to be a concern related to the offices of the administration⁸, where they use paper, cardboard boxes and printer cartridges. Colored bins for sorting office waste at the car factory show a kind of visible beauty and also superficial understanding of the environmental agenda for voluntary actions at the same time as it shows a visible and for company management easy example of environmental response.

This is also the case for the car manufacturing company's focus on heavily regulated waste water outlets that can be rather easily monitored and controlled. The focus on waste water discharge conditions is in general showing the role of EMS in bringing the legislative requirements onto the companies' agenda. Again the car manufacturing company is illustrative for their focus on BOD-related discharges from the employee's canteen instead of factory based outlets from production.

The examples demonstrate that there is only a weak relation between the actual environmental performance of the production and the concrete environmental monitoring and relief activities that are established in relation to the implementation of ISO 14001 on the factory. There appears to be a lack of knowledge on both environment and production issues which could unite these elements and put them into a broader framework of prioritisation and negotiations of environmental importance, which seem to be crucial to the vision of continued improvements.

Similar patterns of environmental initiatives that were hardly related to the content of the actual production were observed at other factories. In one place brooms were decorated with ribbons in honor of H.M. the King's birthday: The workers would

⁷ This is in contrast to the tour of the Danish company, where several waste management initiatives were pointed out even though waste management was not a priority. Waste management is normally a very visible feature of the company's environmental initiatives compare to e.g. the substitution of solvents.

⁸ In the car manufacturing company this was shown in the introduction of waste bins, with an obvious visual impact, but questionable in their environmental overall impact besides their contribution to employees knowledge.

"Waste management:

1. Yellow bins are for common waste as food, fruit peels, dust, paper scrap and used diskettes.
2. Green bins are for reusable waste as plastic bottles, cardboard boxes, steel wire scrap, soda cans and newspapers.
3. Red bins are for hazardous waste as all kinds of batteries, printer ink, chemical markers, correction markers and glue."

sweep the floors of the factory to show their commitment to protect the environment. Another company would use treated waste water to sprinkle their greens on the factory site, thus both maintaining literally 'green' surroundings while also reducing the amount of waste water produced and discharged.

The focus seem to be on separating waste, reduce energy consumption and treating waste water, which already are in the focus of environmental legislation – and this is not specific for car factories alone. Other environmental aspects typically relevant for a car manufacturing company such as e.g. substituting specific organic solvents by alternate processes to reduce air pollution and improve health and safety conditions include change of processes and use of other materials, were typically recognized by the employees working with environmental topics in the company but at the same time seen as very complicated, at a change of practices would demand very specific, new production knowledge.

The competences of environmental professionals

Consultants are not widely used in Thailand as they are conceived by business management to be too expensive. This leaves the certifying companies with a rather difficult task, as they often become involved as part time consultants for the companies they certify. The often strict division between consultants and certifying companies found in Europe is therefore less obvious in Thailand.

Also, the overall purpose of implementing e.g. ISO 14001 is not to improve the environmental capacity and competence of the organisation, but rather to achieve certification⁹. The process of ISO 14001 implementation, is a process which then has to very specific and specialised in-house knowledge and routines of production with rather abstract descriptions of what is the environment¹⁰. Here it appears that many companies lack the necessary competences. To some extent this weak competence can be seen as a side effect of the weak legislative enforcement. The lack of a proper practice of enforcement in the every day activities of the environmental authorities has been counterproductive to building competencies on the environmental problems of industry among the staff of the authorities. This tendency is further supported by the lack of use of environmental consultants as a way of distributing a common interpretation and practice concerning the criteria for enforcing the general requirements in the legislation.

When EMS' are implemented it is therefore often done by in-house technicians or more frequently quality assurance managers that only have general knowledge of current environmental issues and discussions. This gives the certifying companies an opportunity to focus their advice on management issues and to limit their demands to the companies' environmental competence or to their use of environmental consultants. Many of the certifying companies offer a range of different management certificates, especially different varieties of quality management, and health and safety management systems. Therefore their knowledge of the specific environmental issues needed to control the environmental performance of their clients may be limited.

The competence of the professionals in industry have been developed by previous promotion programs of cleaner technology, cleaner production and other programs in relation to the environmental agendas of industry, and through the distribution of

⁹ Whereas uncertified EMS are not unusual in Danish companies, no examples of such practice have been encountered in the EMP project, nor in the litterature in general. As a part of a focus group interview in the EMP project it was even stated directly by 8 Thai car manufacturing companies as the common reason for engaging in EMS activities.

¹⁰ The ISO 14001 standard does provide suggestions for where to identify the environment as general lists as "emissions to air, ground and water".

EMS through business and management networks. But these projects are reported to have had virtually no lasting effect (Zatz 2003). Specific technologies are implemented at specific factories during the project period, and in some instances these technologies are also spread in similar companies. But it is only the specific technologies that are spread. The cleaner technology thinking itself is not anchored in the companies, and no new activities on further cleaner technological development are seen afterwards. The experience of the cleaner technology projects is to a lesser extent than in the Danish context spread through discussions in networks of related professionals. For knowledge on environmental issues it appears to be personal networks - the extended group of friends and family that serves as the dependable source of good advice.

Business culture

The business culture in South East Asia often reflects a traditional paternal family structure of ownership and control. While managerial professionalism is part of the promotion of EMS in Europe supporting the involvement of employees and the spreading of knowledge in the organisation, the paternal structure of management is very dependent of centralised decision making and may not in the same way support the spreading and development of knowledge in companies. Knowledge on diverse matters as economy, organisation, technical equipment and environment is the privilege of central management. At the same time poor knowledge on environmental issues in general and viewing the environment issue as a 'luxury' problem that is predominantly taken up by the 'rich' countries and that should only be dealt with when more basic necessities have been taken care of does still play a major role both in the rhetoric and practices of companies in developing countries.

The implementation of management systems as ISO 14001, but also more dominantly ISO 9001 can be seen as a sign of emerging change in the paternal management strategy. Following the economic crisis of 1997 where the personal networks of the paternal business culture showed to be insufficient, there has been a need for building new mechanisms of trust. The management standards including ISO 14001 can be seen as such trust devices that are introduced in order to demonstrate reliability. Thus the focus on the certificate rather than the certification processes. But it also supports an implicit understanding of the environment as a distinct and separate problem for companies, being of a type that can be handled and 'solved'. As such the environment is seen as objective and as a problem that can be addressed in ways that give companies the opportunity to manage their own processes in a sustainable way.

The environmental policy of the Car manufacturing company states: "The company shall see to that every single production process is not harmful to the environment". This phrasing establishes the environment as something, which is only an issue if something goes wrong. Whereas, in a European context the environment is considered as a continuous concern, like the ISO 14001 standard mentions continuous improvements. The similar objective would her talk of "minimizing the environmental impact" instead of avoiding environmental harm as this recognizes the inevitable impact of production on environment and maintains this as a permanent issue of the company.

Discussion

Perspectives from science- and technology studies provide us with a framework to conceive the regulatory elements that have appropriated from their western origins as

artefacts which are constituted and used in a specific context (Latour 1999; Sørensen 2000). The intentions and impacts delegated to the working of these artefacts are complex and not based on consensus among all involved actors, although certain impacts on industrial behaviour and impacts on environmental performance are supposed to be the outcome. Understanding these artefacts, e.g. EMS as an integrated part of and in continuous exchange with their surroundings, stresses how they will identify and pursue different objective depending on the context in which they function. In the description above the conditions of EMS are described as 4 domains. A description such as this provides an analytical background for understanding how the practitioners manage the earlier mentioned interpretative flexibility of the 'hot spots' of the written ISO 14001 standard. The domains provide the 'social' setting which provides a number of taken for granted issue that serve to limit the interpretative flexibility of the standard in the specific case, which is a prerequisite for making it operational. The four domains can as such function as a model of the embedding of EMS which will show the specific differences in the components and the path of change to be expected and to promote.

The local conditions are thus more than just a backdrop onto which the environmental regulation is performed. Rather the environmental activities are embedded in this setting. Both the conditions created by the historical past and the present context of implementation play an important part in the working and impact of the regulatory elements. The historical context of implementation is crucial for what has to be taken into consideration and which roles have been delegated to the different elements and aspects of the system. This supports the idea that environmental regulation consists of historic and setting specific roles to be delegated to different elements. With regards to EMS, it is a predominant model to conceive environmental management systems as a response to independently existing environmental problems and knowledge of these.

In this manner the EMS exposes a common implicit assumption of environmental regulation, i.e. the underlying existence of a number of underlying facts about nature and the environment. The four previously described domains each contribute in a different manner to the production of this pre-existing environment. Thus, the environmental outcome of EMS can be understood as the interaction of previously existing environments. The separate domains produce environment with distinctly different cognitive and practical features:

- The environment as object of legislation (e.g. norms)
- Environment as specific technical measures (e.g. machinery and equipment)
- Environment as management objective (e.g. statements and policies)
- Environment as knowledge and experience of professionals (e.g. exemplary references)

These in turn exist on the background of a dominating public environmental discourse which however only in a few cases gives an expression of its own, typically through the press or local action groups.

In order to understand the performance of the individual regulatory artefacts as EMS in the newly industrialised countries of South East Asia, the interaction of these four domains must be analysed. Apparently the environmental agenda is transformed in the newly industrialised countries. The most noticeable effect of this transformation is an increasing focus on legislative compliance as a result of the poor existing enforcement activities. In some instances this is followed by low priority on the more advanced continuous cleaner technology development.

When EMS promotes a focus on abiding to the legislations demands, the necessary investments in cleaning technology in order to live up to these demands

takes resources from continued development. Also they may function as sunk costs in relation to the existing production technology, e.g. in the shape of an expensive waste water treatment facility. In some instances it even appears as these sunk costs function as a barrier to the further implementation of cleaner production elements. This is the case when heavy investments in filtering technologies provide a continued technological dependency on more dirty production processes and thus blocks an updating of production facilities. In the EMP project this appeared to be the case for the Battery manufacturing company that would invest heavily in reducing emissions from a production of second grade batteries that can no longer be exported.

The importance of coherence

It is not evident how to evaluate the success of EMS implementation in new settings such as the recently industrialised countries of South East Asia. Counting the number of implemented systems is not in itself representative to environmental achievements. But also more qualitative assessments of i.e. the environmental priorities of the implemented systems can be misleading without relating these to the rest of the context.

The implementation of EMS in these countries is often supported by various promotion programs. These are financed by foreign donor organisations. The transfer of new technology as EMS is based on the idea of supporting 'progress'. Development is seen as the linear path of history, and development aid as attempts to boost the progress in order to move more quickly through the earlier stages of this line. This concept of linearity is also prevailing in the field of environmental regulation. Newly industrialised countries in Southeast Asia are considered to be 'lagging' behind on environmental protection and should be brought up to common western standards. To the promotion programs EMS is such a technology which is expected to be transferred to work in similar ways that it did in e.g. Europe.

However, the development of an environmental agenda depends not only on any of the single features above, but also on the combination of these. A well performing environmental effort requires for these features to be interrelated, for the involved actors to be able to transfer knowledge elements and have some common references for good performance, and to share visions of environmental improvements and the routines and everyday practice of engineering and management. The individual elements of environmental governance/regulation may all be present, but they will not manage to work together to accomplish a self sustaining basis for continuous improvements. As a manner of providing an analytical understanding and evaluation of the success of EMS in new settings we suggest to include a discussion of the matter bringing the different elements together, i.e. the coherence of the context into which the environmental agenda is embedded. Coherence is a possibility of investigating and even evaluating the success of EMS in new settings. The description of the embedding of EMS suggests that the potential of EMS lies in achieving better relations and as such more coherence among the different domains. The potential for industrial transformation through improved environmental management is limited by the lack of relatedness, i.e. coherence

The question of coherence is not only a question of bringing different environmental issues together, but also a way of analyzing whether different interested parties are committed to maintain a discussion of environmental problems in relation to specific issues. The concept of coherence draws on the actor-network theory understanding of 'alignment' processes (Latour 1999). Alignment is the element of bringing actants together to establish a new network. As different actants are engaged, enrolled and committed the network gradually gains strength and undergoes a process of translation. Heterogeneous elements as legislative norms,

regulatory practice (e.g. enforced legislation, corruption practices), 'natures' response, production facilities, workers practice, individual concerns, management practice, environmental management standards, customer demands, supplier capacity, competence of consultant and sector structure are combined to contribute to new entities of environment - well performing environmental problems. Coherent environmental issues are 'good', i.e. manageable environmental problems that are recognized by a wide group of actors and associated with commonly accepted practices of representation. The concept of coherence adds a normative element to the description of alignment processes by referring to environmental issues, which are embedded in well-aligned actor-networks.

Coherence is an attempt at conceptualizing the combination of different aspects and perspectives, and thus as source of further development. Coherence also addresses, that there may appear as a high level of awareness of individual environmental problems, while these are still not interconnected in a manner that would accommodate a future development of the problems. In a situation with coherent environmental problems these will function as a frame for the discussions. This does not imply that the different interested parties necessarily agree about the state of the environment, but that there is a limit to how far the conflict may spread as the different actors are engaged to keep these representations at the centre of their discussions. The coherent environment functions as a boundary ordering devices (Sluijs et al. 1999) that keep actors obliged to discuss the environment within the same frame, thus avoiding conflicts to 'spill over' and develop into situations that are difficult to control and without democratic mechanisms of solution. These unhappy situations can be recognized by their combination of physical violence, corruption and prolonged conflict resulting in a general waste of resources¹¹.

The lack of coherence between the different domains of the South East Asian context reflects how the different elements in some instances have been developed in parallel as separate entities that are otherwise not related. The coherence that may have existed between the separate elements in their western origins seems to be lacking after the individual implementation and transformation to the South East Asian context. Rather than developing and improving individual elements as legislative norms or management programs, it seems to be the mutual connections that need to be developed and strengthened. The EMS in the European context does function by using these relations. However, the transformation to newly industrialised countries demonstrates that these relations and the coherence they constitute is not necessarily present in countries that have different histories. As a result of this development, the predominant picture of EMS is presently a situation where EMS is left to function as procurement of enforcement. It does not look as if the EMS will in themselves support a development towards continuous improvements beyond the definitions of the existing legislation.

¹¹ A well known example of this kind of situation is the current state of the Klong Dang waste water treatment plant in Samut Prakarn. This mega project based on investments from the Thai government, ADB (and Danish development aid) is now physically 95% finished, but cannot be connected to the appropriate pipelines because of local protests. Meanwhile a former vice-minister is connected to a corruption scam in relation to the land, where the facility has been constructed. But even without the corruption element, the incoherent environment is a cost.

References

- Behrndt K. 2002. 'Hot spots' in the interpretation of the ISO 14001 standard to ensure continual improvements, Paper for *Greening of Industry Network Conference*, Göteborg June 2002.
- Braun B, Castree N (eds.) 1998. *Remaking Reality: Nature at The Millennium*. Routledge: London.
- Deegan C. 2002. The legitimising effect of social and environmental disclosures - a theoretical foundation. *Accounting, Auditing & Accountability Journal* 15 (3): 282-311.
- Georg S, Füssel L. 2000. Making Sense of Greening and Organizational Change. *Business Strategy and the Environment* 9(3): 175-185.
- Hansen MW. 1999. Environmental management in transnational corporations in Asia: Does foreign ownership make a difference? *Occasional paper no. 11*. Copenhagen Business School: Copenhagen..
- In-na, Yawaree et al (2003): "CP in Municipalities : A Demonstration Project in Thailand", Paper for The 4th Asian Pacific Roundtable on Cleaner Production, Chiang Mai.
- ISO 2002. The ISO Survey of ISO 9000 and ISO 14000 Certificates. Eleventh cycle: Up to and including 31 December 2001. URL: <http://www.iso.org>.
- Jørgensen U. 2001. Cleaner Technology in Denmark - Support measures and regulatory efforts. In *Shared Responsibilities and Reinvention: New Roles for Industry in European and US Environmental Policy*. Forthcoming in book, MIT Press.
- Jørgensen U. 2003. The hidden networks of practice in ISO 14000. Paper for the GIN conference in San Francisco, October 2003.
- Latour B. 1999. *Pandora's Hope: Essays on the Reality of Science Studies*. London: Harvard University Press.
- Rojanapaiwong, Sukran (ed) (2000): "State of the Thai Environment 1997-1998". The Green World Foundation, Amarin Printing and Publishing Company.
- Roome N. 1992. Developing environmental management systems. *Business Strategy and the Environment* 1(1): 11-24.
- Suayasom, K. 2003. Interview with Kanjana Suayasom of the MOSTE Pollution Control Department, Thailand.
- Simmons P, Wynne B. 1993. State, market ... and mutual regulation? Socio-economic dimensions of the environmental regulation of Business. *The fifth annual international conference of The Society for the Advancement of Socio-Economics*, New York March 1993.
- Sluijs, J. v. d. et al (1998): "Anchoring devices in science for policy", Social Studies of Science, Vol. 28.
- Sørensen K, Aune M, Hatling M. 2000. Against linearity. In *Between understanding and trust - The Public, Science and Technology*, Dirkes M, von Grote C (eds.) Harwood Academic Publishers: Amsterdam; 237-257.
- Zatz, Mike (2003): "From Technology to Management: The Evolution of CP Technical Assistance Programs", Paper for The 4th Asian Pacific Roundtable on Cleaner Production, Chiang Mai.