

Environmental management practices in the manufacturing sector – Hungarian features in international comparison*

*Gábor Harangzó, Sándor Kerekes, Ágnes Zsóka***

The paper provides an overview of the state of corporate environmental management in Hungary compared to older EU and OECD states. It also explores the complex relationship between the implementation of environmental management practices and corporate environmental and business performance. Empirical evidence is taken from a comprehensive piece of research, carried out in OECD member countries, which explored motivation, decision-making procedures, and organisational structure of companies in relation to the design and implementation of environmental management tools and systems.

Der Artikel bietet einen Überblick über die Situation des betrieblichen Umweltmanagements in Ungarn im Vergleich zu den älteren EU- und OECD-Ländern. Weiterhin werden die komplexen Beziehungen zwischen der Implementierung von Umweltmanagement-Praktiken und der betrieblichen Umwelt- und Geschäftsperformanz analysiert. Die empirische Evidenz basiert auf umfangreichen Forschungen in OECD-Mitgliedsländern, wobei insbesondere Motivation, Entscheidungsprozesse und Organisationsstruktur von Unternehmen im Zusammenhang mit Design und Implementation von Umweltmanagement-Instrumenten und -Systemen erforscht wurde.

Key words: environmental management, corporate environmental performance, EMS, stakeholder orientation, environmental function, environmental impact, environmental measures

* Manuscript received: 28.11.07, accepted: 08.10.10 (3 revisions)

** Gábor Harangzó, Dr., Assistant Prof. Institute for Environmental Science, Corvinus University of Budapest, Hungary. Main research areas: Corporate environmental management, environmental performance and evaluation of companies. Corresponding address: gabor.harangzo@uni-corvinus.hu.

Sándor Kerekes, Dr., Prof., Institute for Environmental Science, Corvinus University of Budapest, Hungary. Main research areas: CEM, CSR and industrial ecology. Corresponding address: sandor.kerekes@uni-corvinus.hu.

Ágnes Zsóka, Dr. Senior Assistant Prof., Corvinus University of Budapest, Hungary. Main research areas: Corporate environmental management, pro-environment organisational and individual behaviour and sustainability.

1. Introduction

Corporate environmental management is the practice of utilising a broad voluntary toolset to improve the environmental performance of companies, help them achieve regulatory compliance and increase competitiveness. Hence, the paper focuses on corporate environmental management (EM) practices in attempting to identify the main drivers behind implementation, analyse the tools applied and evaluate the effectiveness of corporate environmental activity.

For the empirical background of the article, a database from a large OECD survey has been used. This research was carried out in 2003 with the participation of Germany, France, Norway and Hungary from Europe as well as the United States, Canada and Japan. The total international database was made available for deeper analysis in 2008. The aim of this paper is to provide an international overview of environmental management in reality, and a comparison between Hungary and the other surveyed OECD countries. Further qualitative interviews among corporate professional have been carried out in 2007 in order to provide a more complex interpretation of Hungarian features.

The most important fields of analysis are as follows:

1. Application of different environmental management practices. An exploration of how key (and more rarely-used) tools and environmental management systems are disseminated among Hungarian and other OECD firms is included, along with analysis of which factors influence the quality and effectiveness of corporate environmental management in general.
2. Role of stakeholders in corporate environmental activity. The main question is whether the rising importance of market players and intra-organisational stakeholders is supplanting the role of authority pressure regarding companies' environmental measures.
3. Effectiveness of EM practices regarding corporate environmental and business performance. EM practices can be useful marketing tools, but their impact on environmental load and the concrete corporate actions is in many cases controversial, reflecting in the results.

2. Conceptual framework

In order to explore the complex relationship between implementation of environmental management practices and corporate environmental and business performance, the paper starts with a literature review, focusing first on the effectiveness of environmental management systems, followed by the relationship and integration of barriers, drivers and organisation activities.

In their regression model, Feldman et al. (1997) explored a positive correlation between the level of environmental management and decreases in environmental emissions. There exists a remarkable statement positing that environmental

management tools lead to reduction of environmental load, particularly in those companies where environmental load has formerly been highest (Anton et al. 2004). Regarding the environmental activity of metal, chemical, paper and plastics industries, Radonjic and Tominc (2007) found that ISO 14001 certification seems to accelerate initiatives for adopting new and cleaner technologies and to help improve corporate environmental performance. Henri and Journeault (2008) claim the importance of environmental performance indicators in contributing to a properly working EMS via monitoring compliance, motivating continuous improvement, supporting decision making, and providing data for external reporting.

Regarding corporate performance as a whole, the question is often raised in the literature what kind of impact standardized environmental management systems have on the environmental load as well as economic performance of companies. Although there is no clear consensus on this issue, several authors argue that implementation of these systems increases the likelihood of an improvement in overall corporate performance. (Montabon et al. 2000; Hibiki 2004). Moneva and Ortas (2010) surveyed 230 European companies in order to analyse the potential link between environmental and financial performance of companies. Results show a positive, but retarded effect: enterprises that obtained higher rates of environmental performance show better financial performance levels in the future. For managers, these results may highlight the need for taking into account the environmental management factors when developing corporate strategy and show how environmental management may influence financial success of the firm. Additionally, Claver et al. (2007) found that the development of new organisational capabilities coming from environmental management resulted in better corporate environmental performance, competitive advantage and higher economic performance of the analysed companies (Čater 2005; Dögl/Holtbrügge 2010). The role of environmental management systems in Hungary has thoroughly been analysed by Málovics et al. (2007).

In spite of the positive empirical findings regarding the relationship between good environmental/social and financial performance of companies, several scholars argue with the inconsistency of these findings, as environmental and social performance are measured very differently. Callan and Thomas (2009) state that a lot of studies use unreliable environmental or social metrics, others do not have sufficient or any control variables, while further ones assume linear relationship without valid testing (about social performance see also Rozanova 2006).

Similarly, Freimann and Walther (2001) came to the conclusion that the existence of an environmental management system (EMS) did not correlate with better environmental performance. EMSs often seem to be “empty” organisational creatures which may increase procedural transparency but do not

induce radical changes towards a more environmentally sound operation. On the other hand, by introducing new (and therefore frequently cleaner) technologies, even companies completely lacking environmental orientation or having minor pro-environmental activities are able to achieve savings in terms of resource input and waste output. Accordingly, Freimann and Walther (2001) suggest that “the major winners will not be the ecologically pioneering, innovative or successfully-managed companies but those mostly lagging behind in terms of environmental protection“ (op. cit.:95). Based on research findings, the authors are convinced that, at least in the initial stages of implementing environmental management systems, short-term operational objectives dominate and environmental management systems appear to have only a very slight effect on the strategic dimensions of corporate policy (Dyllick 1999). Consequently, the majority of companies still opt for end-of-pipe technologies when selecting from instruments suitable for the purposes of environmental protection.

Ammenberg (2003) analysed to what extent the introduction of a standardised environmental management system (such as ISO14001 or EMAS) contributes to a decrease of negative externalities caused by companies. The author focused on the minimum results guaranteed by these systems, stating that the existence of an EMS in not-too-ambitious companies may help when it comes to keeping customers, for example, but probably will not lead to lower environmental load at all.

The cost factor of EMS implementation is also an important issue for companies when opting for or against adoption of the system. Darnall and Edwards (2006) discuss the role of capabilities, resources and ownership structure about predicting the costs of implementing environmental management systems. They claim that in spite of the growing number of EMS certifications there is little known about the actual adoption costs. Documentation is regarded to cause an increase in cost level, but the authors found significant cost differences according to capabilities, resources and ownership structure of companies. It is a relevant issue, as quite a number of firms argue with high costs when deciding not to implement an environmental management system. Companies with existing quality management system tend to spend less for EMS implementation, as a result of their more appropriate (complementary) organisational capabilities. The same is true for companies already possessing pollution prevention practices. Support from the parent company also seems to make the system adoption cheaper, as a result of better access to resources from the parent enterprise. The added value of external support, stemming basically from consultant companies tends to be higher than relating costs.

Research findings provide a variety of statements regarding the impact of environmental management systems on stakeholder orientation and relationships as well. Ammenberg (2003) detected a positive tendency toward customer retention, while Freimann and Walther (2001) discovered only a small increase

in the interest of companies' stakeholder groups as a result of environmental management system implementation. Managers who expected a general improvement of corporate image stemming from the introduction of EMS identified only slightly positive market benefits. However, relationship and cooperation with regulatory authorities appear to have been improved.

From the opposite point of view, stakeholder input is recognised to be a very important motivational factor for corporate environmental activities. According to Madsen and Ulhoi (2001), environmental measures of the company directly or indirectly depend on proper assessment of stakeholder pressure, value system of managers, as well as attitudes of top management concerning the influence of stakeholders. The pressure exerted by external and internal stakeholders on the organisation will finally become an organisational factor through the internalisation of these pressures and values, shaping corporate environmental awareness as well as reflecting in the responses towards the relevant stakeholders. Findings of de Abreu (2009) show that demands from stakeholders play a key role in increasing corporate commitment to the natural environment. This study defines four general strategic types of organisations, called sleepers, reactors, defenders and innovators, depending on their solutions to environmental issues. This characterisation serves as a roadmap for business decision makers to choose the appropriate environmental strategy for themselves in a global economy.

Further empirical results show that, reported and practiced values of managers influence environmental performance of the company to a high degree (Kerekes et al. 1999). Ramus and Steger (2001) surveyed leading European companies and found a strong relationship between supervisory support and organisational motivation, as well as supervisory support and employee willingness to generate environmental innovations. At the same time, top management generally appears to provide fewer incentives in the area of environmental activities than in the course of general business activities, even in companies expressing their commitment to environmental protection. This suggests that management has not fully recognised the place for proper incentives and motivation methods in the promotion of environmentally aware behaviour although a stronger environmental orientation in the organisational culture of companies would be able to increase corporate environmental consciousness and consistency in action (Nemcsicsné 2007).

Chinander (2001:287) states that there needs to be a very close link between each and every elements of the motivation model, because "the motivating factor is as strong as its weakest link". One of the major conclusions of her research is that corporate environmental performance improves if members of the organisation perceive the relation between their actions and their environmental consequences more precisely, and if they take higher responsibility for the environmental impacts of their actions.

Tilley (1999) identified constraints and incentives which influence the environmental attitude and behaviour of small enterprises and contribute to a better understanding of the gap between the two. The most important constraints she found are: low level of ecological intelligence (insufficient knowledge base), low perception level of environmental problems and risks, economic constraints, inappropriate institutional background (economic infrastructure, institutional system) and restricted economic support. On the other hand, training programmes, successful research (extending the knowledge base), regulatory framework (appropriate enforcement of the regulation, greater transparency), and institutional reform are listed as incentives. Tilley claims that in order to achieve the desired effect – namely changing the generally reactive attitude of small enterprises –, it is not enough to merely focus on incentives but strengthening the incentives and weakening the constraints should take place in tandem (op. cit.:243).

Zilahy (2002) identified constraints and motivations regarding the implementation of energy efficiency measures at companies. The main constraints laid in the decision-making processes, lack of knowledge, technological dependency as well as some working conditions. Motivating factors were financial rewards, "acquired" environmental awareness, performance motivation, competence motivation and interpersonal relationships.

Based on the literature, the relationship between environmental performance and business performance as well as the impacts of environmental management systems seems quite complex, making further research in this issue relevant and necessary.

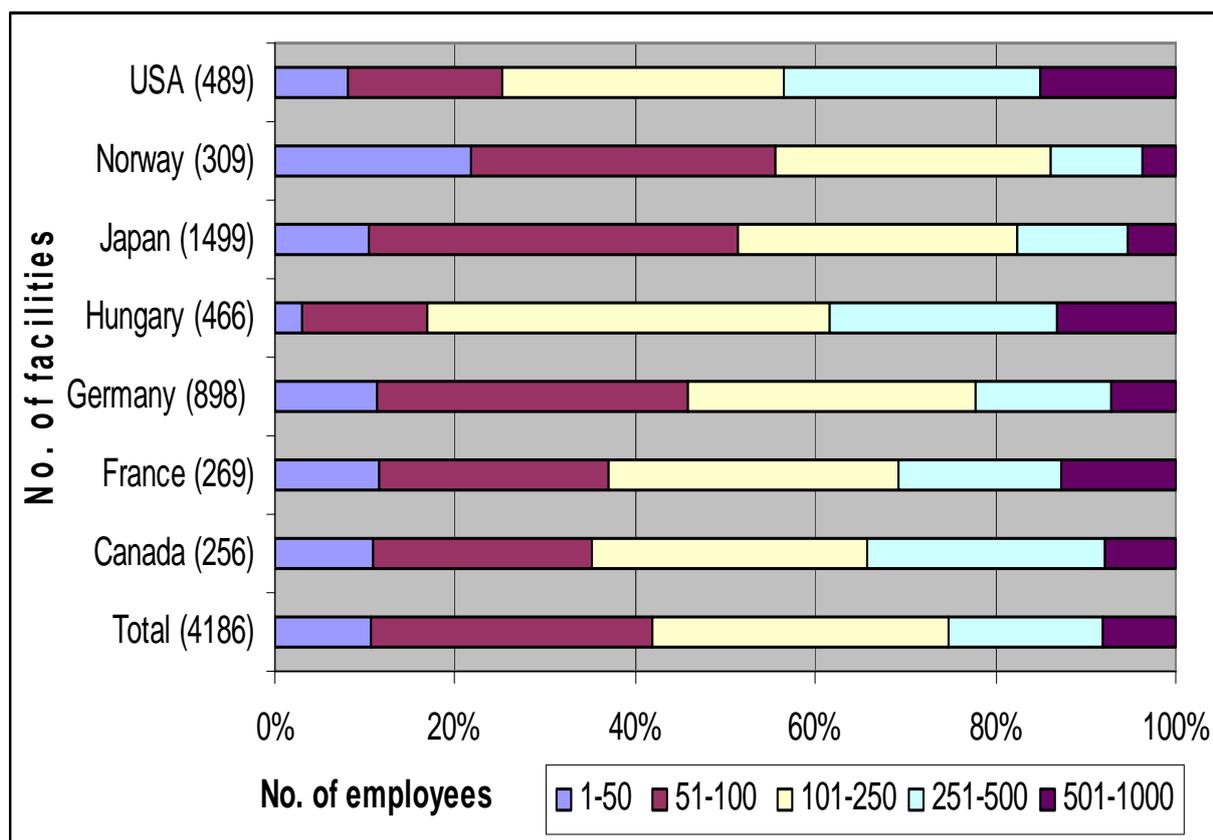
3. Sample characteristics and methodology

For the overview on EM practices of Hungary and other OECD states, information is derived from the database of the OECD survey (2003) on "Environmental Policy Tools and Firm-Level Management and Practices", carried out among manufacturing facilities in seven different countries: Canada, France, Germany, Hungary, Japan, Norway and the United States. Participating countries were picked by the OECD Environment Directorate in order to represent a variety of countries. The database provides international data on 4186 facilities, making it very suitable for a comparative study. The Hungarian national report was prepared by Kerekes et al. (2003). The international database became available for participating institutions only after the international report had been published (Johnstone et al 2007). The reason behind selecting these countries was to find regions (states) within the OECD with their own specificities regarding motivations and practices of corporate environmental management.

Figure 1 provides an overview of the sample distribution according to facility size. The tendency is similar in the countries surveyed, except in Hungary and the US where mid-size and bigger companies were overrepresented. This fact should be considered every time when statements are made about environmental management and environmental performance of the companies, as bigger facility size tends to mean a more advanced level of environmental management. Hence, results should be handled carefully from this point of view. However, facility size does not seem to be the only reason for differences observed in corporate environmental management and environmental activity in different OECD states, as explained below.

The transition process caused tremendous changes in the structure of the economy during the 90s in Hungary, but these changes have drastically slowed down, so the sample data and their representative feature of 2003 is still relevant to date. For more information on the sample, see the Hungarian and the international report (Kerekes et al. 2003; Johnstone et al 2007).

Figure 1. Facility size in the sample by country



To provide an international comparison, quantitative statistical methods were used. As questionnaire-based surveys make self-reporting bias possible, 'positive' results should be handled cautiously. On the other hand, any identified gap in pro-environmental behaviour of companies can be seen as even more significant in reality. In the questionnaire, facilities are the sample unit, not

companies. However, a precondition of the survey was to avoid multiple-site bias, and in the case of Hungarian firms, respondents often reported features about the whole company, not just at facility-level. To mention further limitations, questions in a questionnaire-based survey often suggest a sort of “right” answers which can a positive bias in responses and, additionally, quality aspects of environmental management (e.g. how a specific tool was implemented) are not easy to be measured precisely and effectively.

Limitations of the quantitative research made a deeper supplementary analysis in a smaller sample necessary. Based on the methodological guidance of Yin (1994) as well as Miles and Huberman (1994), qualitative techniques seemed to be the most appropriate for further analysis of corporate environmental performance. We used the method of interviews at several Hungarian firms selected from the sample, aiming to explore the personal opinion of the interviewees as detailed as possible about the environmental performance of their companies.

Main aspects of selection were the following: a) the company has responded the questionnaire; b) companies with good and weaker environmental performance should also be included into the sample (based on the questionnaires and other background information); c) the sample should contain companies of different size categories and of different industries (“heavy polluters like chemical industry and less “dirty” industries); d) as honest answers play a major role in research, companies were contacted which were expected to cooperate.

Altogether 13 interviews at five companies (in various industries) were accomplished. In order to increase validity and reliability, an additional document analysis was conducted as well. The most important corporate documents analysed were: a) written environmental policies; b) environmental and sustainability reports; c) annual reports; d) internal communication materials (wall newspapers, presentations etc.), e) company websites.

In the following chapters, international analysis will be carried out based on the quantitative survey, and special Hungarian features will be discussed based on interview findings, where there is relevant additional information.

4. EM tools in Hungary in an international context

As one aim of the paper is to highlight the use of different environmental management tools in Hungary compared to “older” EU and OECD countries, Table 1 provides the frequencies of applying 13 different environmental management practices in each country. Values highlighted in bold are significantly over the average ($p=0.05$), while those underlined are well below the mean value.

Table 1. Proportion of facilities (%) utilising different environmental management tools (significantly over average: bold, below average: underlined)

	Canada	France	Germany	Hungary	Japan	Norway	USA	Total
Written environmental policy	61	<u>47</u>	56	54	51	76	85	58
Environmental training program for employees	65	55	49	49	48	76	92	57
Internal environmental audit	49	40	63	42	41	42	88	52
Assessing env. Performance of suppliers	35	30	38	59	42	60	39	43
Informing buyers how to reduce env. impacts	<u>24</u>	<u>29</u>	39	33	58	<u>32</u>	28	42
Environmental performance indicators	46	54	43	43	<u>28</u>	42	68	41
Environmental evaluation of employees	43	50	30	42	36	39	62	40
Benchmarking of environmental performance	39	33	<u>17</u>	32	53	<u>20</u>	56	39
Requiring suppliers to undertake env. measures	27	29	33	53	40	<u>25</u>	33	36
Environmental accounting	23	29	68	<u>12</u>	<u>10</u>	<u>27</u>	42	30
Public environmental report	21	<u>15</u>	20	49	<u>16</u>	47	34	25
External environmental audit	19	<u>10</u>	15	15	14	11	31	16
R&D budget for environmental matters	10	11	4	7	11	15	11	9

Table 1 reflects the most striking characteristics of using environmental management tools. Obviously, some of the EM practices are quite commonly used (by over 50% of the facilities on average), such as written environmental

policy, environmental training program for employees or internal environmental audit. These instruments are crucial parts of certified environmental management systems. At the other extreme, companies appeared to have public environmental report, external environmental audit and separate R&D budget for environmental matters much more rarely.

Industrial sectors are represented in different proportion in the countries, but there was no evidence as to whether this would have caused significant bias regarding the application of different EM practices country by country.

US companies appeared to be well ahead in formalised environmental management tools such as written environmental policy, training program for and evaluation of employees (based on their personal environmental performance), using indicators and benchmarking, while supply chain-related issues seem to be less popular in America. In the Norwegian sample, a high percentage of companies reported to have written environmental policy and training programs; furthermore, they are eager to assess the environmental performance of suppliers and to prepare environmental reports for the public.

In general, Hungarian facilities seem to follow the international tendency with frequencies more or less close to the mean values. As pressures from different stakeholder groups emerged, environmental statements (such as environmental policies) have become more and more popular in Hungary and, corresponding to international trends, written environmental policy (at 54%) is one of the most often used of EM tools also in Hungary. Results from the interviews suggest that Hungarian company professionals regard the role of environmental policies and similar statements very differently. Some of them highlighted aspects like strategic importance of those documents, influencing company vision or mission statements. As one company representative indicated: “environmental protection and sustainability are getting very important for the industry ...these statements are very important for us and for the public to show that we are on the right side”. Others regarded such policies as a must to be able to fulfil other goals (“these are nice sentences on a piece of paper, but we primarily needed them to gain the ISO 14001 certification” or “of course we need them as otherwise our environmental activity would not be credible”). However, eight respondents agreed that this tool is much more important than it used to be earlier (in three other cases this issue was not covered).

As also shown by the interviews, Hungarian companies usually face higher environmental expectations from international stakeholders or when trading with Hungarian branches of Western European companies. Some examples in this field: “shares of the parent company are traded on the stock market of country X, so it is important for us to meet social expectations... in the end, the EM standard is a judgement of public opinion in that country rather than in Hungary”. Another corporate representative reported proudly that their company

is included in the Dow Jones Sustainability Index, while their main competitors are not, and that has evoked their shareholders' appreciation.

Hence, several companies have environmental objectives and standards drawn up by the company's headquarters. As it was also formulated: "Sometimes it is difficult to convince the management to approve certain arrangements but, if we manage to demonstrate that it is the practice of the headquarters they nod approvingly right away". Customer expectations can also be definitive. This consideration arose principally at two companies delivering in business to business relations.

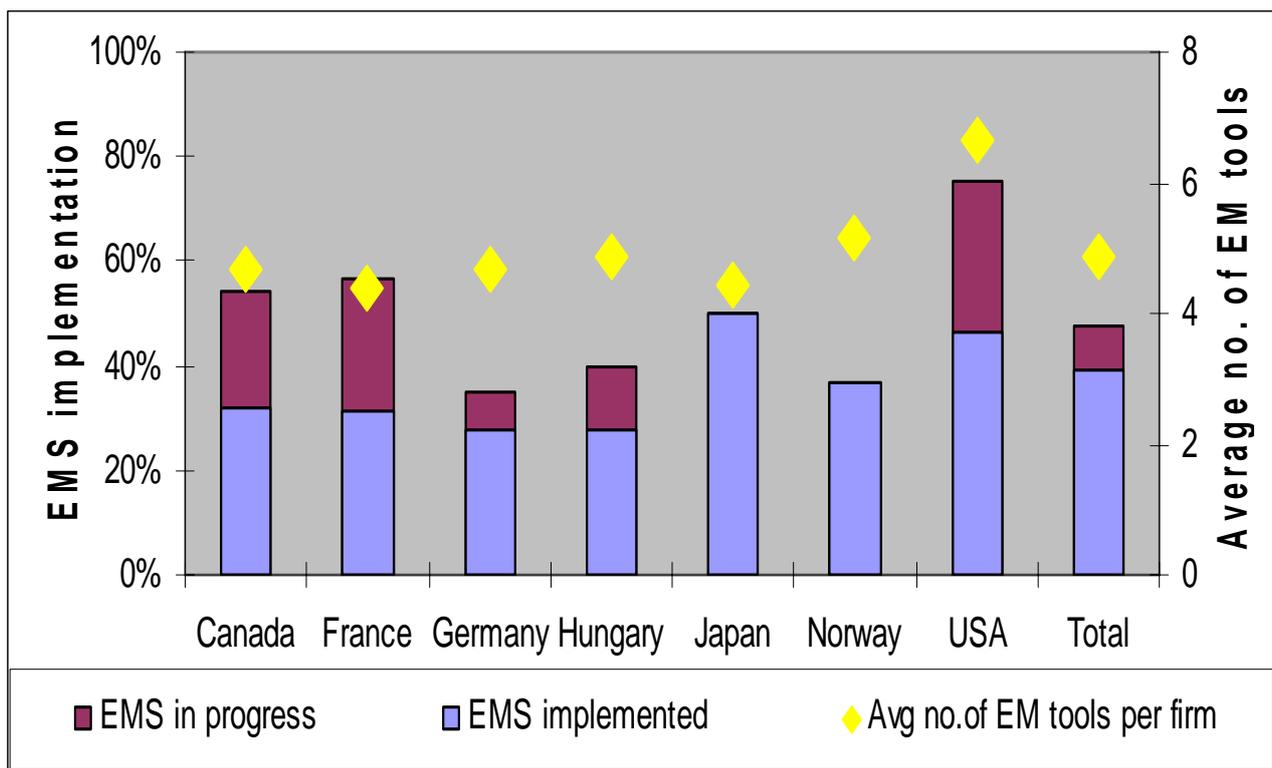
Mainly due to the export-orientation of the Hungarian economy, companies have to meet strict criteria in different fields of the supply chain resulting in spin off effects through the whole supply chain. This seems to be the main reason, why assessing the environmental practices of suppliers (59%) and setting requirements for them (54%) are more popular among Hungarian companies (indicated in bold) than in the international arena. Interestingly, the proportion of Hungarian public environmental reports exceeds the sample average. However, further research carried out by the authors (Nemcsicsné Zsóka 2005 and Harangozó 2007) indicates that several companies misunderstood what was meant by utilisation of this tool, interpreting it as an official statement for regulatory authorities. Consequently, these results have to be handled with caution.

Internal environmental audits (42%) are somewhat less frequently utilised in Hungary than in other countries of the sample. Their use seems to correlate with the implementation of EMS in Hungary (see reasoning later). Environmental accounting (12%) is not widespread in Hungary, although it is surprisingly popular in Germany and the United States, both countries exerting strong influence on the Hungarian economy. Low Hungarian activity in this field is a surprising finding, as the relatively low level of eco-efficiency in companies seems to offer great opportunities to increase, with the help of environmental accounting. This is especially true when noting that a significant fraction of Hungarian companies follow a cost-cutting competitive strategy. Based on the interviews, two reasons could be detected behind this phenomenon. On the one hand, some interviewees (from three companies) agreed that their accounting system is not flexible enough to integrate environmental aspects, As one interviewee reported: "our accounting system comes from the corporate headquarters, country X, and is relatively inflexible... We are working on a database that will be able to demonstrate the detailed environmental costs and benefits; it is expected to be ready in the near future". At the two other firms, cooperation between accounting and environmental function was reported to be inefficient: "we work at the same company but in some cases we speak a different language" and "we have very good professionals both in the financial and the environmental fields, although there would be a need for more

discussion in some cases”. Two further interviewees have mentioned that there was no expertise on environmental accounting in the company at the moment. Some companies seemed to rather focus on the external benefits of environmental management (marketing, communication etc.). In those cases cost cutting opportunities (e.g. through the application of proper environmental accounting) were regarded to be limited by the respondents. One example: “Decreasing environmental costs is not our main focus. Actually, there is not too much opportunity in this field any more. What we seek is to show that being green is not in contradiction with our image”.

After data collection on environmental management tools separately, the level of environmental management in the different countries was measured by the total number of different management tools used by the facilities on average, as well as implementation of EMS, which is a complex tool requiring the implementation of several specific practices. Results are illustrated in Figure 2 where the ratio of companies having fully implemented EMS is separated from those where EMS implementation is in progress.

Figure 2. EMS implementation and use of EM tools (in % of the sample country by country)



Regarding the average number of environmental management tools applied, Hungarian facilities are obviously very close to the sample average with a mean of 4.8 tools (although this seems to be an overestimation as small companies were underrepresented in the Hungarian sample compared to the average). The implementation of environmental management systems however is below the

total sample average. This is observable in the case of both implemented systems and system implementation in progress (28% implemented and 12% in progress in Hungary, compared to 39% and 6% of the sample average respectively). Consideration of the most common reasons for introducing an EMS in Hungary – mainly market aspects and less emphasised eco-efficiency – can provide an explanation for this phenomenon (see also Csutora-Kerekes 2004). Results are partly supported by the findings of the qualitative interviews. One company representative argued that “in the short run environmental protection and an ISO 14001-certified EMS do not increase our sales at all, but I hope that in the long run it may improve our industry’s image towards the society, which is important for the consumers’ side but also because of the change in regulation concerning our industry”. Another respondent stated that “the quality and the life-long energy consumption of our products (machine parts) are also affected by our ISO 14001 system, thus the system is a quality requirement and contributes to the competitiveness of our products”.

However, interviews with the experts of two different companies suggest that EMSs do deliver cost savings and other internal benefits either. At one of the firms, EMS serves to link cost savings and environmental education. “Since the implementation of our EMS, we collect our waste selectively, certain materials are to be recycled, others go to the landfill,... this means a significant cost reduction or rather income to us... The waste disposal containers in the factory bear inscriptions that also indicate the amount of money that every kilogram of that particular waste yields or the sum we have to pay for its disposal... This is a way to make our workers aware that a lot of money is at stake here”. At another company, EMS is reported to play a significant role in the organisation of internal environmental communication and thus in the establishment of environmental aspects in organisational culture: “environmental protection at our company was earlier characterised by ‘fire-fighting’... since we introduced ISO 14001 our environmental activity has become much more organized,... I think this is because people understand better why we do what we do, while earlier they had the feeling that we were picking at them”. In another interview at the same company it was highlighted that “at the beginning, participants’ attitude towards training was just to let themselves be ‘trained’ so that they get rid of us as early as possible, but now they see what it is all about and are much more cooperative”.

Regarding Hungary as an export-oriented economy (not being a member of the EU for a long time), one could expect that there would be more EMSs in Hungary in order to assist in penetrating new markets. Actually this is true, if only standardized and certified management systems (ISO 14001 for instance) are considered, where Hungarian facilities perform well above average, related to the total number of firms operating in the country. However, taking into account both certified and non-certified EMSs (as done in this research), internal

motivation (like higher eco-efficiency or transparency of environmental processes) appears not to have been high enough for Hungarian facilities. This may explain why internal audits are under-represented in Hungary; while external audits (which are necessary for EMS certification) correspond to the sample average (see Table 1).

As bigger facilities have usually more complex processes (i), higher levels of public scrutiny (ii), as well as better access to financial and human resources (iii), it is widely accepted in the literature that, on average, they implement a greater variety of environmental management practices and implement them more often compared to their smaller competitors (Johnstone 2007) This tendency can also be observed in the Hungarian sample.

As industrial sectors are different in their potential environment impacts, in regulation and public attention affecting them, and are not equally important for national economies, significant discrepancies were expected in the implementation of environmental management practices. The chemical sector has a leading position in almost every country and exerts significant impact on the environment, which is reflected in the fact that chemical facilities implement the most environmental management tools across the whole sample, including Hungary. The reason for the position of the chemical sector is that stakeholder pressure plays a key role. According to our findings, this sector perceives the highest pressure from the most relevant stakeholder groups (authorities, corporate headquarters, commercial and household buyers, management and non-management employees, etc.). Although qualitative interviews are not meant to judge statistical issues, interviewees from the chemical sector felt stakeholder pressure as the key factor behind their environmental activities. Example for that is an interviewed company where ISO 14001 was implemented in spite of company professionals not being convinced that this system would increase the eco-efficiency of their processes and provide added value to their previous environmental management practices.

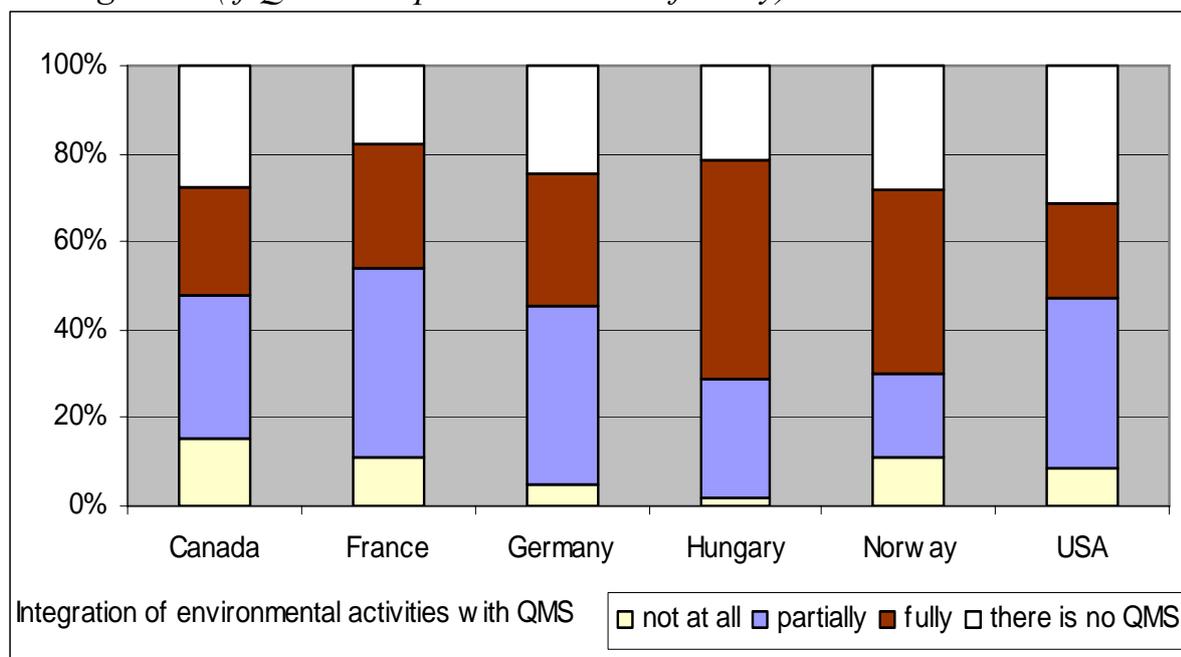
Laggards in this context are coming from more or less the same industries in the Hungarian and the international sample (production of wood, building materials, textiles and food). These industries are featured by a generally low stakeholder pressure and a lot of small facilities, which implies that legal compliance is in focus and facilities usually do not utilise further voluntary measures.

A key issue in the effectiveness of environmental management is whether EM tools are integrated with other management practices within facilities. When environmental thinking is integrated in traditional business fields of corporate management, environmental management is expected to be able to achieve far better results than in a situation when it is isolated from core company processes and management. Integration can happen at different levels (systems or processes for instance) and to different extents (Dyllick/Hamschmidt 2000).

Integration of environmental activities was analysed in relation to several management practices like quality management, health and safety management, activity based and management accounting, process control and inventory planning, but only the level of ‘integration with quality management’ appeared to be significantly different between Hungary and other countries (Figure 3).

According to Figure 3, a high proportion (80%) of Hungarian companies tends to have a quality management system (QMS), partially or fully, basically as a result of the export orientation of the Hungarian economy. While two thirds of those companies reported to completely integrate environmental management with QMS, the reason behind this is not straightforward. In several cases, presently used environmental management tools were implemented much later in Hungary than in other observed countries, mainly after quality management had already been institutionalized.

Figure 3. Level of integration of environmental activities with quality management (if QMS is implemented at the facility)



Furthermore, in Hungary it is common knowledge that most consultant companies which are specialised in environmental management have a quality management background. Most consultant companies have branches dealing with both QMS and EMS, and tend to promote both systems to their clients. Almost every interviewed company (in case they had an EMS) has worked with the same consultant company when implementing QMS and later EMS as well as they asked the same auditor company (different from the consultant company of course) to do the certification of their QMS and EMS. At one of the firms, regular internal and external audits have been carried out in an integrated way. This proved to require less time from the internal auditors, resulting in a

significant resource savings – although obtaining expertise for integrated audits needed extra trainings for employees. In places where external EM and QM system audits were carried out together significant cost reduction was reported (“in our company the external audit is carried out by XY, this means saving millions of HUF every year”).

Interviewees reported several times about the integration of management systems as resulting in definitely higher acceptance of environmental measures within the organisation since integration means less extra work for employees. Consequently, integration of environmental and other management systems can yield savings in resources (financial and human) for the companies and higher efficiency in operation. However, environmental performance is not explicitly proven to have been improved due to system integration. Main advantage of integration seems to be an increased organisational acceptance of environmental protection.

As a result of integration, the implementation of environmental management tools (policies, trainings, audits and specifically standardized EMS) have often been based on and have been connected to the respective quality management tool (for instance, the environmental policy is an additional passage in the quality management policy, etc.). This finding supports the statement of Darnall and Edwards (2006) about the utilisation of organisational capabilities gained from existing quality management system.

The OECD survey did not provide further data on the consequences of system integration but the interviewees reported that administrative burden and organisational resistance against further systems could be decreased by common manuals, handbooks, audits and trainings, and cost cutting opportunities were provided – especially relating to consultants and auditors. According to the experience of the interviewees, the interconnection took place in several cases in course of implementation and operation of standardized management systems (ISO 14001, ISO 9001 and OHSAS 18001), but it also happened that the internal management practices were coordinated primarily, not the standardized systems. This meant revision of the usually already existing quality management manual, supplementing it with environmental protocols relating to processes. As expressed by a company expert: “this way we pay more attention to environmental protection ... otherwise it would only be a pain in the neck for everyone”.

On the other hand, overly strong integration with quality management threatens to narrow down the (ideal) sustainability focus of environmental management to the customer focus of quality management (Hamschmidt 2001).

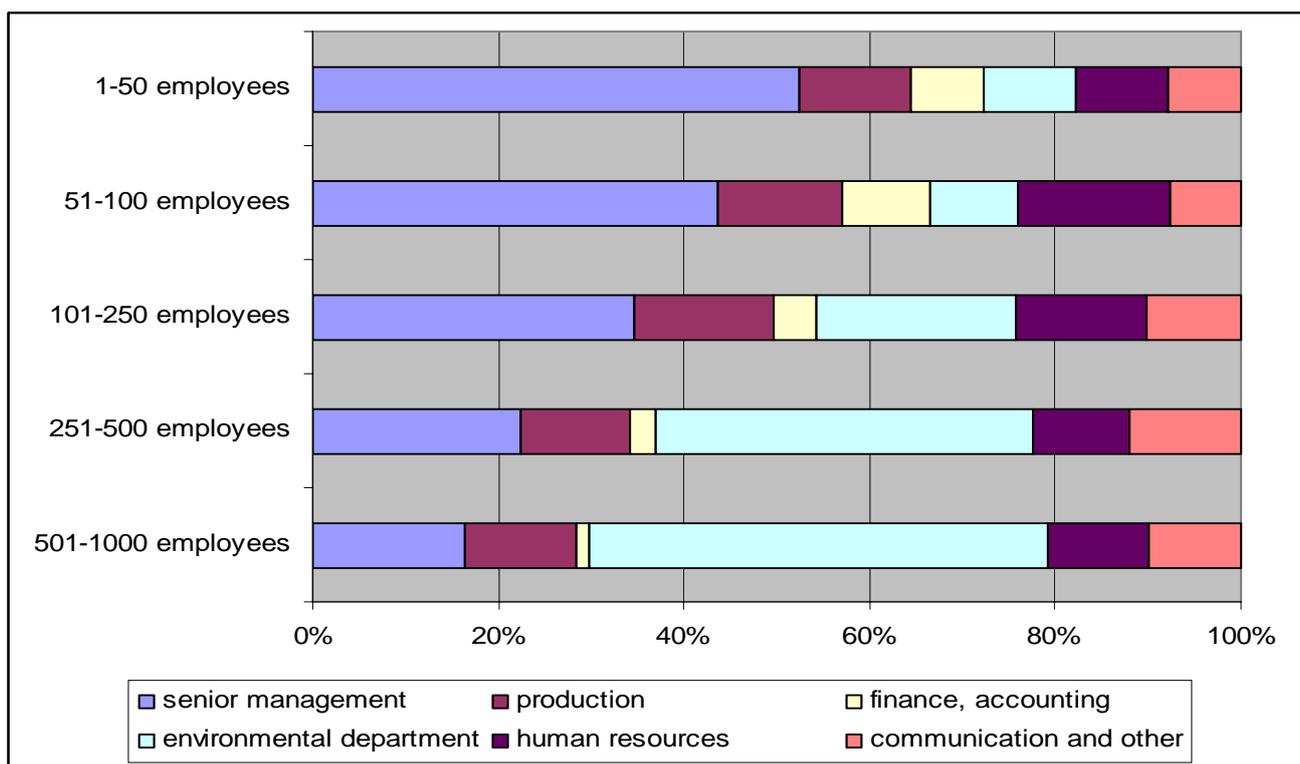
The importance of environmental matters is also reflected in how companies allocate the tasks and competences within the organisational hierarchy. According to the data, 70% of the total sample has employed at least one person

with environmental responsibilities. It varies between countries, as in the US almost every company (95%) has posed at least one responsible person for environmental issues while at the other extreme, this proportion was 60% in the Japanese sample. The sample average is 70% , which reflects a basically positive attitude towards these issues, as 70% of respondents deal with environmental matters “officially” within the organisation.

A separate environmental department could only be found at 21% of Hungarian companies, while the average in the total sample was 48% (Japan and Germany are around the average). In the US, most companies manage environmental matters through an environmental department where the responsible persons (indicated above) are employed (82%).

Regarding the total sample, small and medium size companies tend to locate environmental function at the level of senior management; facilities with over 250 employees predominantly establish separate environmental departments.

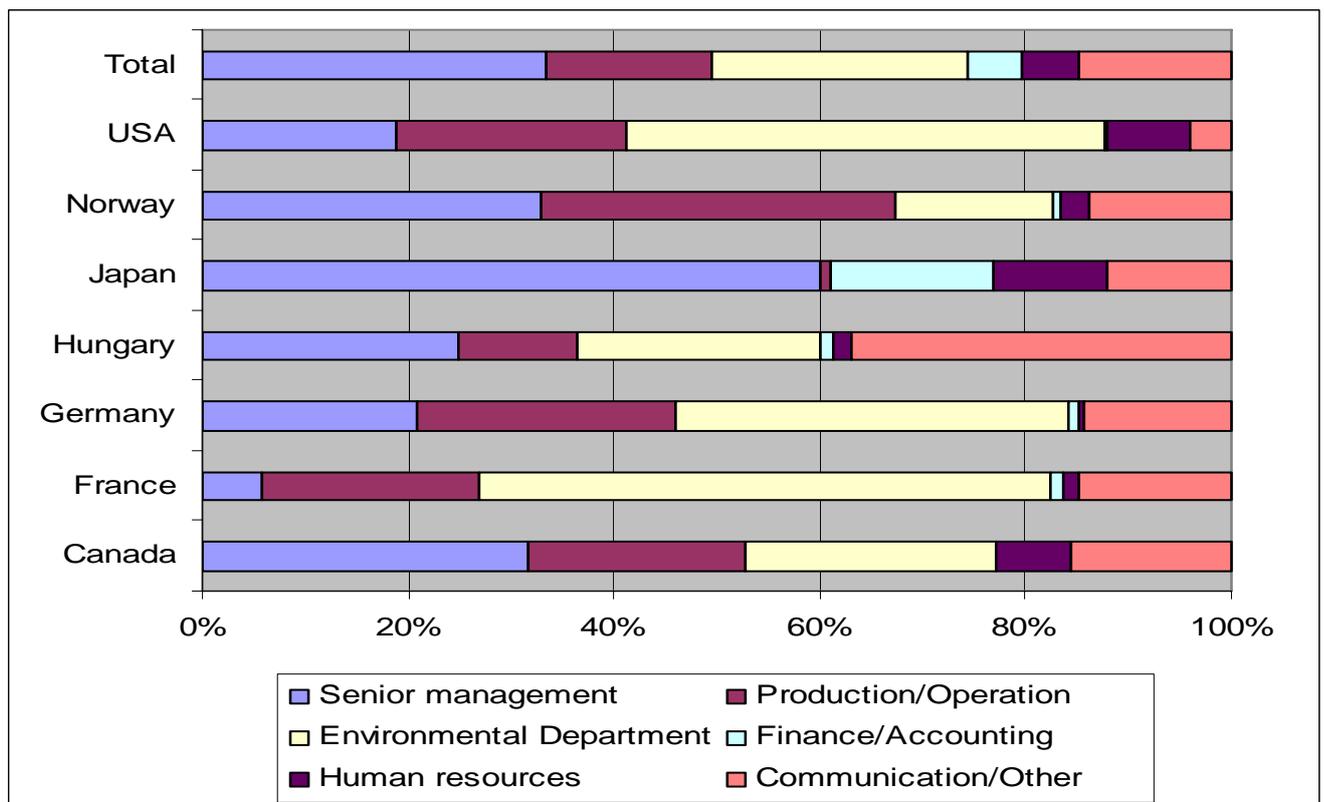
Figure 4. Location of the person responsible for environmental matters by company size



However, there are remarkable differences to observe in the practice of individual countries. In Germany, Canada and Norway, the responsible individual most often belongs to senior management, while American and French companies tend to create a specialised environmental department. This phenomenon is rooted in the characteristics of the relationship between companies and regulatory authorities which tends to be much more cooperative

in Germany than in France or the USA, as well as in the degree of bureaucracy. In Japan, human resource management is the prevailing function; Hungarian firms in turn show a variety of organisational solutions (senior management, production, environmental department, communication, other). As the size structure of companies in the sample is more or less similar in all countries (except Hungary and the US) those features can be attributed to country-level practice differences. In the case of Hungary, companies with fewer than 100 employees tend to locate the responsible person at senior management level (and production), while those employing more than 100 people display a wide variety of solutions.

Figure 5. Position of the person responsible for environmental matters



In the Hungarian research work, the influence of location of the responsible person on the efficiency and effectiveness of environmental measures had also been analysed (Nemcsicsné Zsóka 2005). Environmental measures (which are in line with the environmental risks and impact of the firm) were observed to be satisfactory only at companies that placed the responsible person(s) in the 'right' organisational function meaning the position best corresponding to the perceived environmental risks of the firm. So, the organisational background appears crucial to proper environmental activity. According to Kerekes et al. (1996), if both internal and external environmental risks are high then the level of senior management may be a justifiable place for environmental representatives. In the case when significant internal risks prevail, environmental problems should be

dealt with at division management level. Small internal and high external risks lead to the most interesting variety of organisational solutions, as in this case, the nature and strength of pressure coming from external stakeholders of the company seems to determine the position. Companies which disregarded their environmental load and the sources of their environmental risks have taken significantly less environmental measures than what would have been necessary and satisfactory.

5. Factors influencing the choice of EM tools

Implementation of environmental management tools is driven by several factors of varying relevance. The most important motivations appeared to be regulatory compliance, pollution prevention and control, cost savings and image improvement. These results are not surprising in the light of recent research, but individual country characteristics stand out (see Figure 6 and Figure 7).

Figure 6. Companies considering drivers for EMS implementation as “very important” – 1

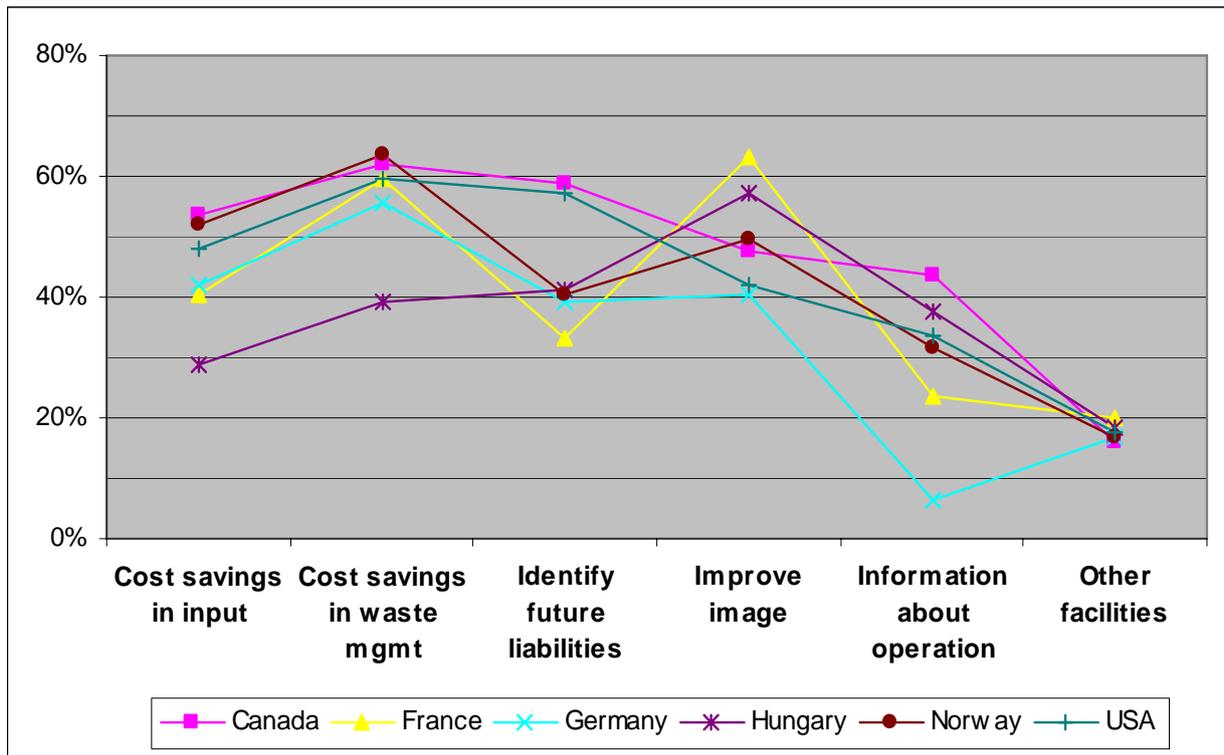
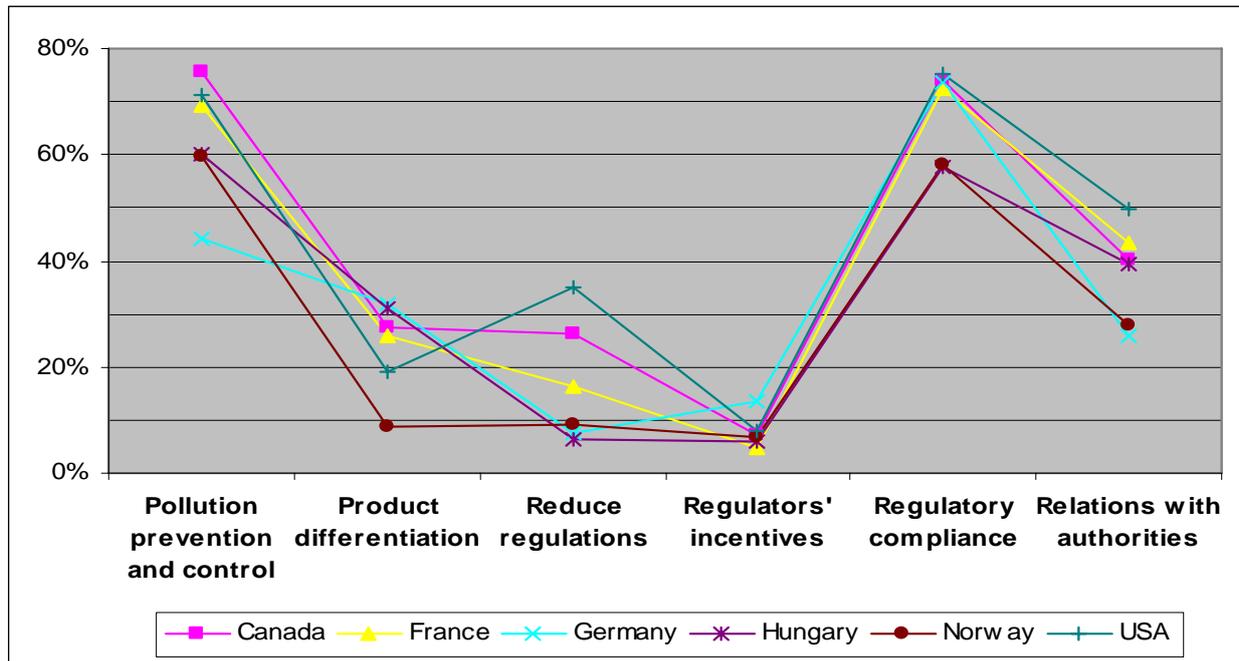


Figure 7. Companies considering drivers for EMS implementation as “very important” – 2



Although regulatory compliance is the most important driver for implementing an extensive environmental management toolkit, companies in the Norwegian and Hungarian samples seemed to be less motivated than others. Regarding Hungary, interviews have also shown that companies miss both transparency and dialogue in the legislation process. Companies believed that they could have achieved regulatory targets easier, if they had been included in the planning process. This not necessarily means softening of the targets (“what to achieve”) but rather taking into account companies’ technological rationality on their tools and processes (“how to achieve”). Hungarian companies also reported to miss stability in environmental regulation. A typical example was a company that carried out an extensive cost-benefit analysis on a wastewater treatment facility in order to fulfil the new legislation and started a serious investment. Soon after, the legislation was changed again and they did not need the plant any longer.

Corporate professionals did not doubt the justification and importance of environmental legislation, whereas they raised several critical issues in actual practice. In most cases, they missed transparency and dialogue in legislation process but this did not necessarily refer to the difficulties occurring in the course of lobbying against the aggravation of regulations. Instead, company representatives missed their involvement into the preparation process as a result of which objectives drawn in the regulations would have been attainable in a less „painful” way for companies: “feedbacks from the industry and technical rationality are not considered, although cooperation would be much better that way”.

This complaint mostly occurred in case of authority regulations like the issuance or prolongation of operating permissions. Since corporate professionals perceived themselves as the ones who are most familiar with their own processes; they would have expected to get involved in the preparation of regulations as 'best choice' from environmental point of view. Although it is a common remark from the environmentalists' side that companies keep on adducing technical rationality in order to explain why some things cannot be done in order to persuade those who are not so well prepared in technical issues, but in particular cases it can be useful to have company professionals' opinion in the decision-making.

The contrary also occurred: one of the companies regularly received drafts of the respective regulations from the local authorities, and in this case representatives of the company at least had the right to express their opinion.

However, current Hungarian legislation in many cases rather seems to motivate for fire-fighting than for implementing an extensive and strategy-focused EMS.

Pollution prevention proved to be a very important motivation for EMS implementation in every country except Germany. Regarding eco-efficiency, Hungarian companies seemed not to recognise cost saving opportunities in waste management and in input use which means that Hungary has a lot to do in the field of eco-efficiency in the future. As seen, Hungarian firms did not even have the necessary internal information systems to reveal cost saving opportunities, although this situation would make potential financial-environmental 'win-win' scenarios obvious. The interviews evoked the impression that several companies still believe in the old wisdom of "if there were any return opportunities in the improvement of eco-efficiency, we would already have realised it". Similarly, interviewees regarded cost saving opportunities as minimal ("it appeared in our energy bill at the 23rd decimal place" or "our industry is very special, our hands are tied by the technology... of course if everybody turned off the lights after leaving the room it would reduce our energy use, but this would be insignificant" etc.). On the other hand, Hungarian companies believed in image improvement (so did the French ones), while German and American firms seemed to be motivated by other factors instead. Perhaps due to the scandals resulting from environmental incidents during the 70s and 80s, US companies hoped they would be able to better identify future liabilities as well as achieve better relationship with authorities and a reduction in regulatory requirements as a result of implementing an EMS. Realising eco-efficiency is obviously very important for American, Canadian and Norwegian companies.

Respondents in Canada and Hungary expect to gain more information about their operations through using EMS, while German companies seem not to need this information so strongly. The reason Germany looks different may be language and translation, while the US might attach higher importance to legal

standards because of the litigious nature of regulation there. Norwegian respondents do not require environmental management systems to help achieve product differentiation. As seen, Hungarian companies under-evaluated the motivation of cost savings (input, waste) and pollution prevention, while over-evaluated the importance of image-related issues and product differentiation when compared to the average. Hungarian companies seem to regard EMS as a marketing tool primarily rather than an instrument to inspire improvements in eco-efficiency. Interviews with Hungarian company professionals also suggest that in most cases the motivation is not direct, but rather indirect (“if they do not lay enough emphasis on environmental protection they will be crowded out from the market bit by bit”). The EM practices of other facilities were reported to be of low importance for all sub-samples, which may not be hundred percent realistic, as interviews suggest that competitor practices also raise significant incentive, even if respondents of the survey did not state that directly. According to one interviewee, a certain level of environmental management – in comparison to competitors – is rather a minimum factor: “the relationship between environmental management and competitiveness was aptly described by our former technical director and I think many of us still agree that ... our objective is to turn the product into marketable merchandise, or rather, profits, ... and to achieve this, environmental protection is essential, because else no-one would buy our products after a while, but environmental management in itself does not raise our sales at all”.

As Figures 6 and 7 and the previous discussion suggest, the importance of different factors varied a lot country by country. On average, there is a slight, but significant country gradient: companies those considering different factors as “very important” are overrepresented in Canada and the US while underrepresented in the Hungarian and German sample. The link between the importance of EMS motivation factors and sector has been also analysed in this regard, but there was no significant relationship detected.

Regarding the total sample, two third of companies exerting moderate or remarkable environmental impacts have implemented an EMS or are in progress of implementation. In the case of negligible environmental impacts, company practice is just the opposite.

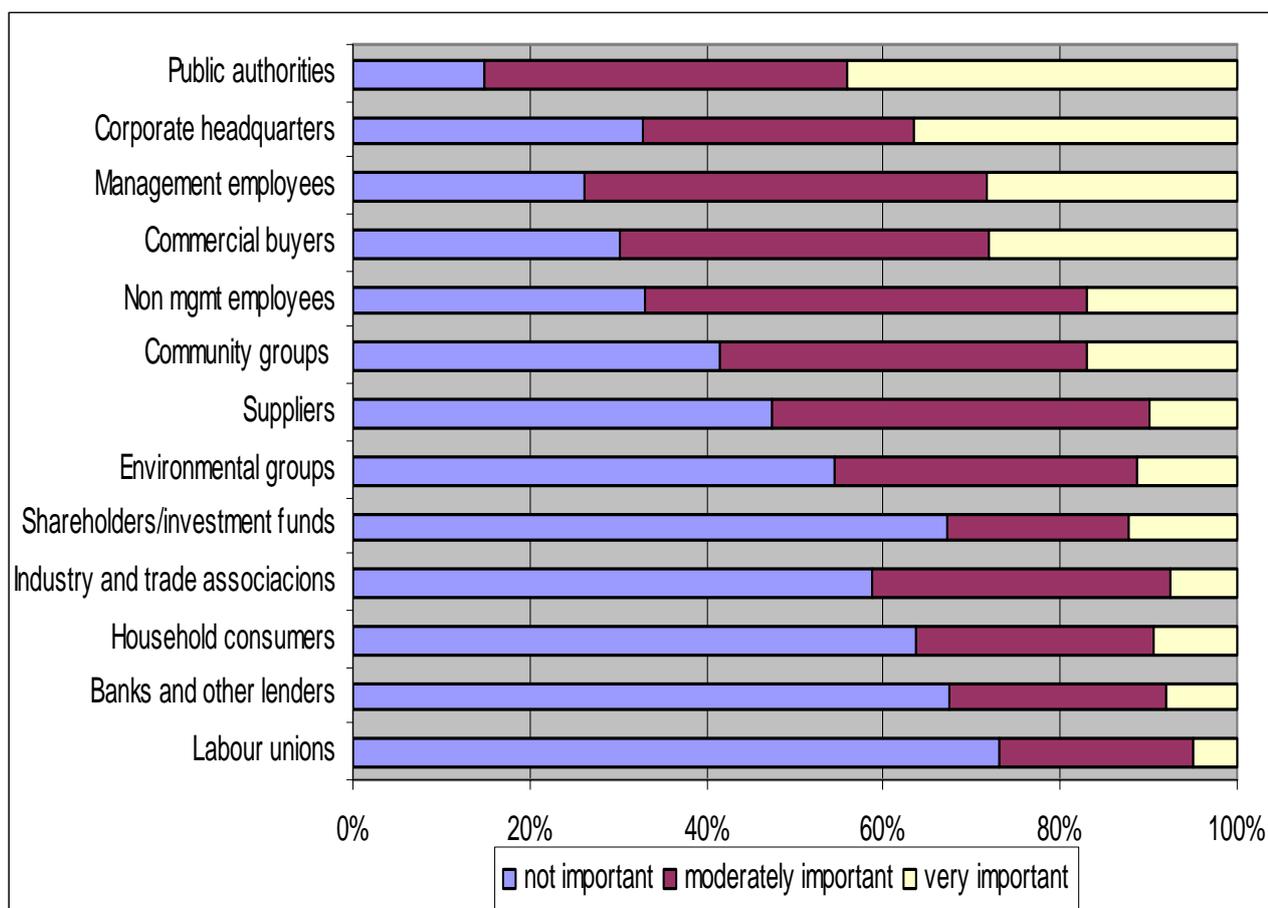
Canadian and American companies seem to be very risk-conscious (mainly due to liability and compensation issues as well as their complex relationship to regulatory authorities): the vast majority of companies with potentially severe environmental impacts have considered and implemented an EMS over the recent years.

In Hungary, there is a clear difference in the evaluation of motivations regarding companies which implemented EMS already and those just considering implementation. Firms with EMS attached significantly higher importance to the primary motivation factors – pollution prevention, regulatory compliance and

image improvement – than companies only considering EMS implementation. It means that the importance of the strongest motivational factors is reflected in real behavioural change (action), while weaker stimuli result only in positive attitudes. In the case of other countries this phenomenon was not observable.

6. The influence of stakeholders on the environmental activity of companies

Figure 8. Perceived influence of stakeholders on the environmental practices of the company in the total sample



The importance attached to different stakeholder groups for their potential to exert high influence on corporate environmental activities is justified. Regarding motivations behind EMS implementation, the requirements of regulatory compliance could be strongly detected. As Figure 8 illustrates, public authorities were considered to exert the highest pressure on companies to take environmental measures, throughout the whole international sample. It means that, even in the case of companies that enact voluntary measures, the strongest incentive is legitimacy and compliance, as overwhelmingly measured by the approval of authorities.

Some internal stakeholders like corporate headquarters or management employees (sometimes even non-management employees) were also perceived as being very important in corporate environmental decision-making, which is not surprising. Furthermore, commercial buyers in the supply chain clearly expressed their requirements to suppliers regarding environmental performance. External stakeholders such as environmental organisations, banks, trade associations and labour unions seemed to exert much less influence on companies and, unfortunately, household consumers did not appear to articulate power over the use of corporate environmental tools either. Shareholders were regarded as not very interested in the environmental measures of companies.

Table 2 indicates the proportion of companies attaching high importance to stakeholder groups with regard to environmental matters country by country.

Table 2. Perception of high influence from stakeholders in the surveyed countries (% of responses, bold means statistically significant positive extremes ($p=0.05$))

“Very important” stakeholders	Canada	France	Germany	Hungary	Japan	Norway	USA	Total
public authorities	69	63	27	78	27	27	83	44
corporate headquarters	50	46	50	39	18	19	66	37
management employees	56	43	25	37	14	26	47	28
commercial buyers	25	12	22	38	32	20	32	28
non-management employees	40	16	15	15	11	15	33	17
neighbourhood/community groups	26	12	8	24	17	10	28	17
shareholders and investment funds	29	17	4	24	5	7	31	12
environmental groups	21	21	7	25	4	8	21	11
suppliers	12	5	10	19	8	5	13	10
household consumers	14	7	6	15	10	3	12	9
banks and other lenders	27	4	4	14	2	3	26	8
industry and trade associations	16	9	5	9	3	8	17	7
labour unions	12	5	2	4	2	9	12	5

Regulatory pressure on environmental activity is perceived to be the highest by companies in the USA, Hungary, Canada and France, while other countries feel only a moderate influence from authorities. As interviews have also shown, because of its instability and unpredictability, Hungarian legislation has seriously pushed companies to comply, even if it does not always inspire them

for long-term-focused strategic environmental management. Corporate headquarters are reported as very important in the US, Canada and Germany. German companies attached significantly less importance to other stakeholder groups. Stakeholders in general seem to play an average or sometimes insignificant role in corporate environmental decision-making in Norway and Japan and even Germany, while Canadian, American and Hungarian companies reported to have experienced the highest stakeholder pressure in the total sample, to implement environmental measures.

In Hungary, only the three most important stakeholder groups (regulatory authorities, corporate headquarters, and management employees) seem to have influenced the frequency of environmental measures significantly, in terms of nearly all environmental problems. As foreign ownership of Hungarian firms shows an increasing tendency, the importance of corporate headquarters and top management seems justifiable, while regulatory authorities are traditionally very important for companies, in every surveyed country. Other stakeholder groups (non-management employees, suppliers, community groups, environmental organisations, trade associations, banks, shareholders, etc.) however, have no determining role in influencing corporate environmental actions usually.

The importance accorded by companies to various stakeholder groups has a strong influence on the implementation of environmental management practices vis-à-vis those stakeholders in the total sample. Companies expressing suppliers' influence to be "very important" tend to assess suppliers' performance and environmental measures. On the contrary, those who do not perceive a high influence from this stakeholder group do not implement EM practices to meet their demands. The same is true for informing consumers and community buyers about environmental issues, launching training programs for employees or evaluating the environmental performance of employees, as well as disseminating public environmental reports to community and environmental organisations.

Interviews have added another – personal – aspect to the discussion as some environmental professionals expressed their personal motivation. At one company, as a result of innovation, one of the 'zero-emission' objectives that involved several environmental elements was also adopted by the parent company which then obligated the rest of the subsidiaries to do the same ("in the beginning this was not a central requirement at all, ... then, in sight of the success the initiative achieved, it was included in the directives of the (parent) company, ... I think, we can be proud of that"). Some other examples also illustrate the importance of personal inspiration: "I did not feel good at my previous workplace ... to most of our ideas we only got the feedback of 'oh well, environmental protection'..." or "we are in a lucky situation, our management can be generally described with 'positive lack of interest'... if we demonstrate

that something is good for the environment and does not imply economic disadvantages, then it is usually approved”.

7. Effectiveness of corporate environmental activity

Researchers often discuss whether environmental management tools themselves are enough to achieve sufficient environmental performance or sustainability (Kolk/Mauser 2002).

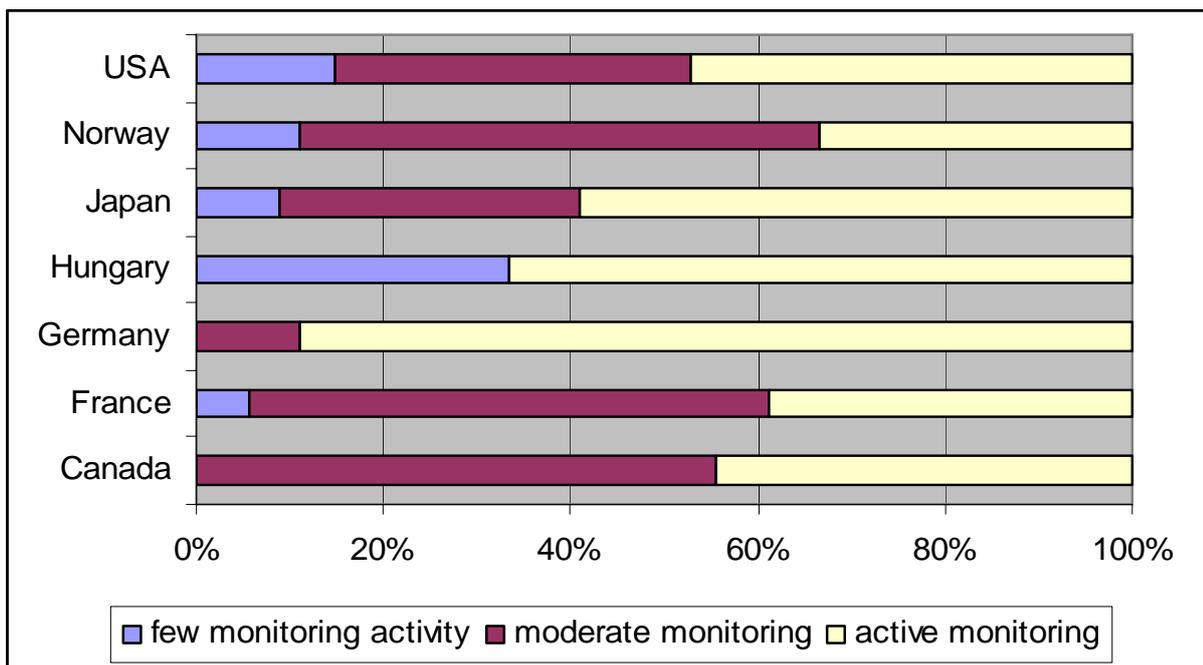
The effectiveness of corporate environmental activity can be measured by the consistency of companies’ behaviour in terms of environmental impacts, monitoring activity and concrete environmental measures.

In the survey, the gravity of environmental impacts, intensity of monitoring activity and intensity of environmental actions were measured in three-level ordinal scales, based on the self-reporting of respondents. The results reflect perceived values and may be expected to include self-reporting bias in a positive direction. Hence, gaps between negative environmental impacts and the necessary monitoring activity as well as environmental actions must then be considered even more striking in reality than presented here. Due to the survey technique, the opportunities for an in-depth comparison between companies’ specific environmental measures, monitoring activity and environmental impacts are limited, but an overview can still be provided on how consistent firms reported to be in their monitoring activity and environmental measures as a consequence of their perceived environmental impacts.

Figure 9 shows how companies with environmental impacts perceived as significant reacted to those negative impacts and whether this is consequently reflected in their (active) monitoring activity.

As a precondition, in the case of significant negative environmental impacts, companies would be expected to pursue active monitoring, while for companies with insignificant environmental load a low level of monitoring would be sufficient. Figure 9 indicates that from “dirty” companies (those with severe (perceived) environmental impacts) only German ones reported to monitor their operations to the necessary extent, Hungarian and Japanese ones are more or less satisfactory, but all other countries lag behind in this field, including one third of Hungarian companies. On the other hand, companies in the USA and Hungary seem to be strictly regulated, as even firms loading the environment insignificantly or moderately pursue a moderate or active monitoring regime.

Figure 9. Monitoring activity in the case of environmental impacts perceived as 'severe'



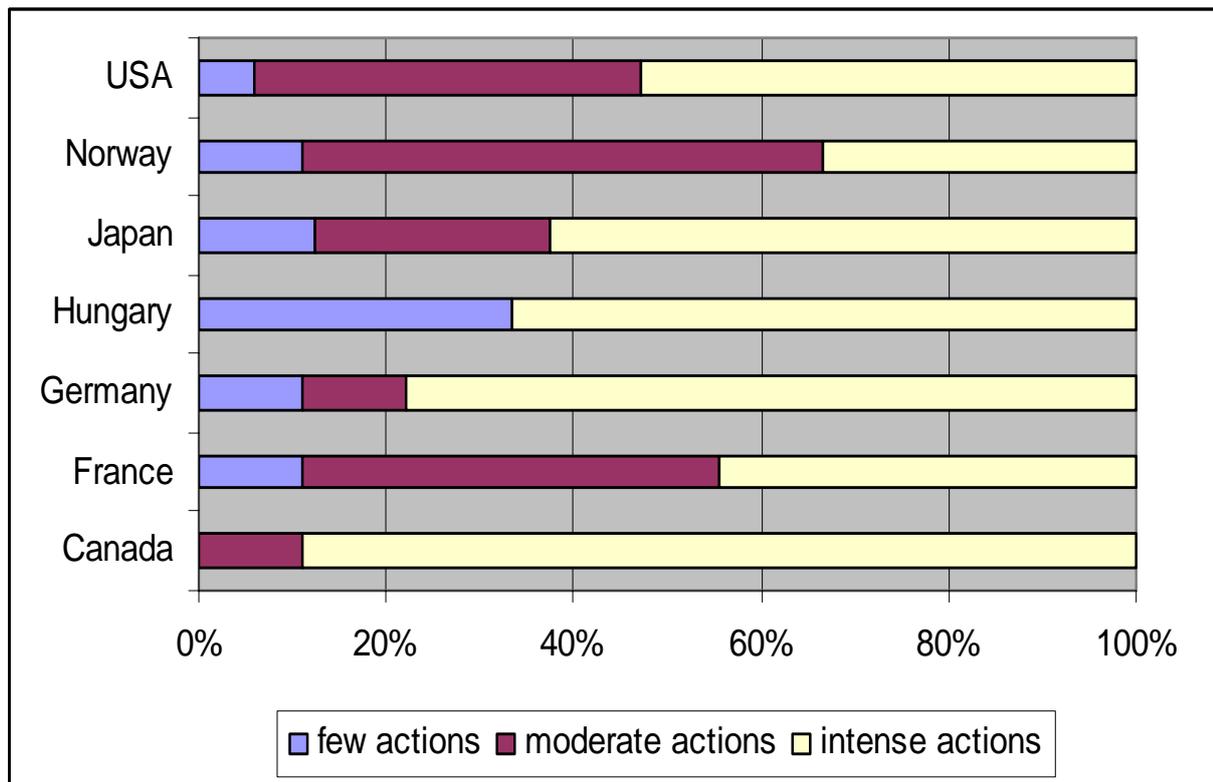
Similarly, evaluation was made on the relationship between the gravity of negative environmental impacts and concrete environmental measures taken to reduce those impacts.

Figure 10 reflects Canadian and German companies to have been rather consistent in their responses and activity; two thirds of Hungarian and Japanese firms meet the expectations, while French and Norwegian companies seem to take fewer actions than necessary, based on the severity of their perceived environmental impacts. This latter is also true for the remaining one third of Hungarian companies.

The importance of regulatory pressure can be captured again in Hungary and the US (as in the case of monitoring activity), since even insignificant environmental impacts evoke moderate or intense responses in environmental measures of the companies.

Regarding sector-specific behaviour, the following statements can be made. It is true for every sector that facilities polluting more implemented significantly more environmental measures than those with small or moderate negative environmental impacts. Figure 11 indicates the effectiveness of actions in different sectors regarding only facilities with high perceived environmental load.

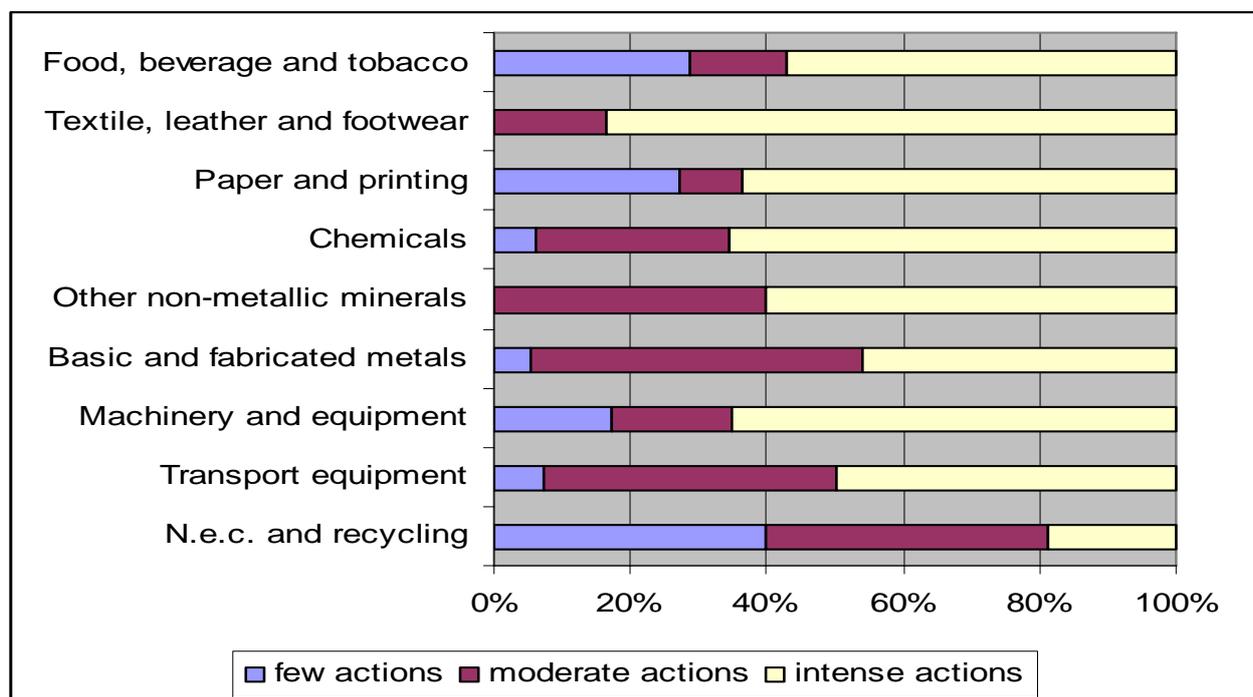
Figure 10. Environmental actions taken in case of environmental impacts perceived as 'severe'



In the textile, leather and footwear industry, the intensity of environmental actions seems to fit the perceived high environmental risks of the observed facilities throughout the total sample. Even in the sectors of chemicals, non-metallic minerals, basic and fabricated metals as well as transport equipment, the vast majority of facilities indicate that they employ intense or at least moderate environmental action. In other sectors like food, beverage and tobacco, paper and printing, machinery and equipment, as well as recycling, the situation is more ambiguous: there are a number of facilities which only took little action although they reported to exert a high load on the environment.

Not surprisingly, the severity of environmental impacts increases with the size of surveyed facilities. Obviously, there is a gap between expected and realised corporate environmental performance and efficiency. 75% of companies with very high perceived environmental load detected no change or even an increase in their environmental impacts, while companies with moderate environmental impacts overwhelmingly (85%) observed no changes or a decrease in environmental risks. With the help of moderate or intense actions, companies could achieve at least some decrease or no change in their environmental impacts over the years.

Figure 11. Environmental actions in different sectors at facilities which reported to have severe environmental impacts



The importance of factors motivating the environmental practices of companies (e.g. prevention of environmental incidents, regulatory compliance, image, cost savings, product and technology development, etc.) strongly correlate with the intensity of actions taken to manage environmental problems. However, a change in environmental impact seems to be independent of these motivations, which reflects a discrepancy in company behaviour. In the Hungarian sample, prevention of incidents and the opportunity for cost savings as motivations significantly affected the efficiency of actions in a positive way.

Table 3 includes the Spearman-correlation coefficients between the number of different environmental management tools in practice, and the relative changes in environmental impacts in different fields of environmental problems over a three-year period.

Results indicate scepticism: although in most cases there is a significant ($p=0.01$), positive correlation between environmental management and eco-efficiency, this relationship however is very weak in most cases. If we also consider that improvements in eco-efficiency can be overshadowed by increasing production, the link between environmental management and negative impacts may even be negative (considering that fast-growing companies have more EM tools than stagnating ones – see later).

As is shown in Table 3, this phenomenon is experienced in the Hungarian sample as well. Furthermore, regarding local air pollution and risk of accidents,

relationships are even weaker. It can be argued that, in Hungary, these two fields are even more compliance-driven, and voluntary management tools do not have much influence. In this case, the sample of interviewed companies is too small to give any statistical evidence pro or contra. However, as mentioned before, there were many sceptic impulses and ideas coming from interviewees regarding the cost-cutting and eco-efficiency perspectives in environmental management. On the other hand, environmental management tools seem relatively often mentioned as answers to stakeholder expectations, or as answer to a specific expectation. In this case it may be concluded that the success factor of environmental management tools is not their efficiency or effectiveness, but rather their existence. In such a framework it can easily happen, that these tools are not effective and only lead to minor improvements regarding environmental impacts. A serious and ambitious environmental policy and eco-audit for instance can help in reducing the quantity of wastes, but these tools will not affect the activities of the company seriously if the target is merely to achieve an EMS certification.

Table 3. Correlation between the number of EM tools and relative changes in different fields of environmental impacts

	Change in environmental impacts per unit of output regarding				
	use of natural resources	solid waste generation	local or regional air pollutants	global pollutants	risk of severe accidents
Canada	0.297	0.324	0.352	0.299	0.275
France	0.231	0.213	0.164	0.172	0.250
Germany	0.227	0.221	0.173	0.177	0.242
Hungary	0.241	0.200	0.031	0.239	0.155
Japan	0.269	0.327	0.173	0.234	0.361
Norway	0.215	0.309	0.187	0.295	0.311
USA	0.167	0.192	0.131	0.175	0.324
Total	0.231	0.270	0.168	0.222	0.287

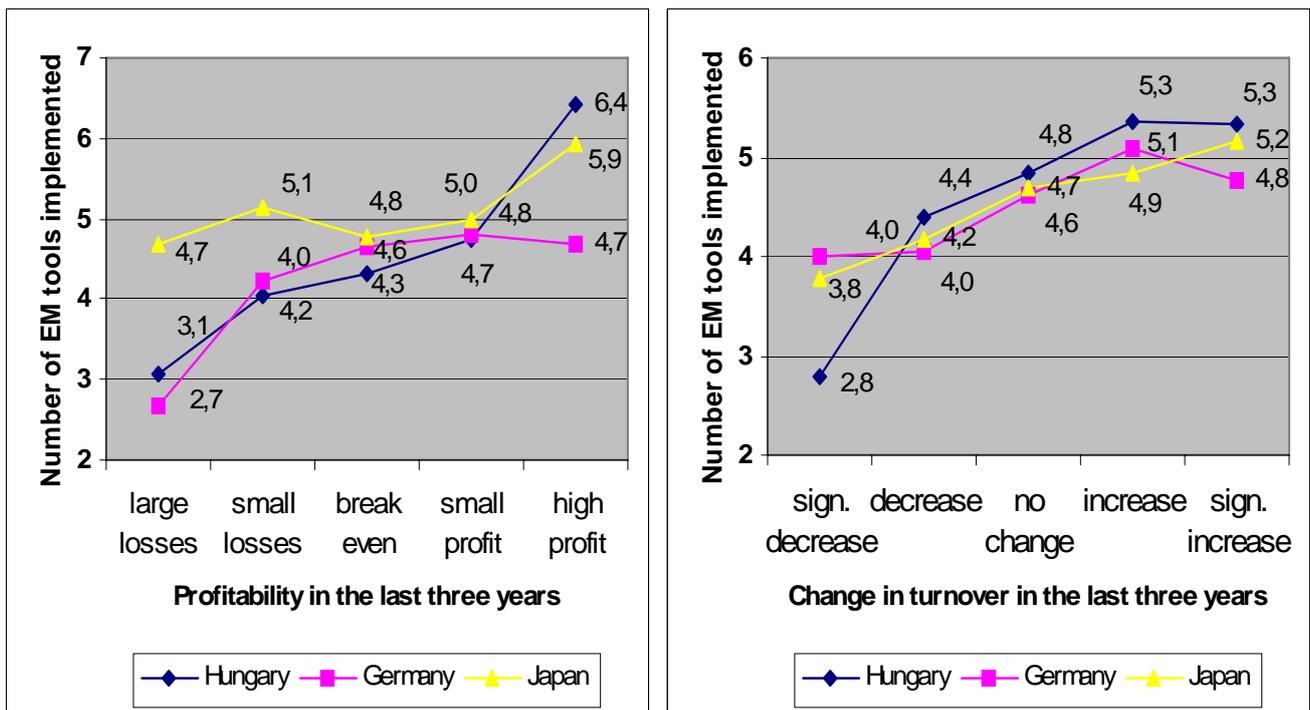
The relationship between environmental management tools and improvements in eco-efficiency was also analysed by size and sector features, but there were no significant differences found in this regard.

Extensive research has been carried out on whether there exists an evidently positive relationship between good environmental management and corporate success (Russo and Fouts 1997, Havemann and Webster 1999, Whittaker and Kiernan 1999, Schaltegger and Figge 2000). To answer this evergreen question is not the focus of the current paper, but it is worth making a comparison between Hungarian and international tendencies in this field.

It is a general tendency that profitable companies have more resources to implement different environmental management practices than ones with

financial problems (Figure 12 compares Hungary and two other selected countries, Germany and Japan). This is true not only for the Hungarian, but also for the German and the Japanese (as well as for the total) sample, but in Hungary this issue is even more polarised: highly profitable firms implemented significantly more and loss-making ones significantly less EM tools than respective firms in other countries, especially in Japan. Similarly, fast-growing Hungarian companies slightly over-perform compared to their Japanese and German counterparts, but declining ones significantly under-perform compared to them. The average values are more or less similar in the Hungarian and the total sample, regarding both profitability and change in turnover; however, extreme values differ significantly. Figure 12 also indicates that regarding the number of EM tools implemented, the difference between the highly “successful” and “not unsuccessful” companies is 3.3 (profitability) and 2.7 (growth) in Hungary, while these differences are only 2 and 0.8 for Germany, while 1.2 and 1.4 for Japan respectively (level of significance: $p=0.01$).

Figure 12. Number of EM tools applied according to the profitability and changes in turnover of facilities



Based on survey data, the application of EM tools seems to strongly correlate with profitability, while there was no sign of any relationship between profitability and improvements in eco-efficiency. This also suggests that successful companies are using EM tools to improve their image but not necessarily to improve their environmental performance.

Experiences gained from interview design also support this findings to some extent. Some examples: “if we really have to, we take part in this survey, but I

do not think we could say much...”. The authors tried to include companies with significant losses or difficulties in the sample. Many of them denied cooperation by arguing that they do not have financial resources for environmental matters. “Our company faces serious difficulties, environmental protection consists of trying to observe the regulations in the cheapest possible way” or “it has happened that there was not enough money for some, otherwise necessary environmental investments ... we had to make a cost-benefit analysis to find out whether the fine is cheaper”. Of course, there were several other reasons like lack of interest or lack of time: “in our firm the environmental protection officer is from abroad, he comes to Hungary once a month, but then he is very busy”. In this specific case, the same person was responsible for environmental and communication affairs (although the company was a significant and very successful manufacturing company with serious production capacities in Hungary), which made the interviewer a bit suspicious about the seriousness of environmental goals at this company. Of course, in some cases personal interest and motivation was missing, for instance: “look, I am an architect ... they dumped environmental protection on me as well, but to tell the truth I do not know why we need this at all”.

If this is true, then EM tools seem not to have belonged to the core practices of company management in Hungary when surveyed. Successful companies have implemented such tools, but those creating losses simply disregarded them.

8. Conclusions

The paper focused on the features of corporate environmental management in Hungary compared to former EU and OECD states to explore the complex relationship between implementation of environmental management practices and corporate environmental as well as business performance. The analysed database provided international data for 4186 facilities. Findings regarding Hungarian characteristics have been supplemented with the experience of 13 qualitative interviews with corporate professionals.

According to the results, Hungarian companies mainly follow similar trends to the wider sample. Most and least frequently used environmental management tools were the same in all surveyed countries, although supply chain requirements seem to be stricter in Hungary due to export-orientation of the Hungarian economy. Most commonly used EM practices were: written environmental policy, environmental training program for employees and internal environmental audit. These instruments are crucial parts of certified environmental management systems. The least popular tools appeared to be provision of a public environmental report, external environmental audit and separate R&D budget for environmental matters.

Considering only standardized and certified management systems, Hungarian facilities perform very well according to the ratio of the total number of firms operating in the country. When including both certified and non-certified EMSs, internal motivation like higher eco-efficiency seem not to be compelling enough for Hungarian facilities compared to other Western countries. The whole sample attached high importance to regulatory compliance, pollution prevention and control, and image improvement, including Hungary. However, a lot of Hungarian companies have only considered the implementation of an environmental management system.

A key issue in the effectiveness of environmental management is whether EM tools are integrated with other management practices within facilities. Hungarian companies tend to have quality management systems at above-average proportions (80%) which can be explained both by the export-orientation of the Hungarian economy and by the fact that most consultant companies specialised in environmental management have a quality management background in Hungary.

Hungarian companies reported to have experienced very high stakeholder influence when implementing environmental measures. However, in practice, three main stakeholder groups – regulatory authorities, company management and corporate headquarters – seem to have been really influential. This appears to be an Eastern European phenomenon: environmental protection is not yet an immense part of corporate culture but may follow suit in the future. Similarly, EM tools seem to be mainly implemented by more successful companies in Hungary; loss-making ones simply disregard them.

70% of the total sample employs at least one person with environmental responsibilities. In Germany, Canada and Norway, the responsible person most often belongs to senior management, while American and French companies tend to create a specialised environmental department. This phenomenon is rooted in the features of relationship between companies and regulatory authorities. In Japan, human resource management is the prevailing function; Hungarian firms, in turn, vary among organisational solutions (senior management, production, environmental department, communication, other).

Regarding monitoring and environmental actions, Hungarian (and US) facilities seem to be strictly regulated, although – similarly to other respondents – their behaviour was far from fully consistent.

The sample as a whole showed a significant disconnection between expected and realised corporate environmental performance and efficiency. Regarding the relationship between profitability and environmental management practices, Hungarian companies produced extremely polarised results. Although voluntary management tools have rapidly spread among Hungarian and other OECD firms, in many cases corporate behaviour is still reported to be compliance-driven and

the effectiveness of environmental management tools is ambiguous. While the application of EM tools seems to strongly correlate with profitability, there was no sign of any relationship between profitability and improvements in eco-efficiency. This also suggests that successful companies are using EM tools to improve their image but not necessarily to improve their environmental performance.

Based on the results of the survey and interviews, the main challenge for research seems to find the main drivers which could motivate companies to be more consistent in their environmental behaviour and recognise the positive links between their environmental and business performance. The trend in corporate practice seems to be a wider scale and more sophisticated application of environmental management tools as stakeholder pressure becomes increasingly multi-faceted, with higher expectations for companies from the point of view of sustainability and responsible operation.

References

- Ammenberg, J. (2003): Do Standardised Environmental Management Systems Lead to Reduced Environmental Impacts? Dissertation, Linköping University, Environmental Technology and Management, Sweden.
- Anton, W. (ed.) (2004): Incentives for environmental self-regulation and implications for environmental performance. *Journal of Environmental Economics and Management*, 48, 632-654.
- Callan, S.J./Thomas, J.M (2009): Corporate financial performance and corporate social performance: an update and reinvestigation. *Corporate Social Responsibility and Environmental Management*. Chichester, 16, 2, 61-78.
- Čater T. (2005): Interweaving of the Sources and Forms of a Firm's Competitive Advantage: A Critical Review of the Adequacy of Existing Schools of Thought, *Journal of East European Management Studies*, 10, 1, 7-36
- Chinander, K.R. (2001): Aligning accountability and awareness for environmental performance in operations, *Production and Operations Management*, 10,3, 276-291.
- Claver, E.(ed.) (2007): Environmental management and firm performance: A case study, *Journal of Environmental Management*, 84, 4, 606-619.
- Csutora, M./Kerekes, S. (2004): The role of environmental function at the company in the light of changing environmental risks of company activity (in Hungarian), in: *A környezetbarát vállalatirányítás eszközei (Environmental management practices)* Budapest:KJK, 137-140.
- Darnall, N./Edwards, J.R. (2006): Predicting the cost of environmental management system adoption: the role of capabilities, resources and ownership structure, *Strategic Management Journal*, 27, 301-320.
- De Abreu, M.C.S. (2009): How to define an environmental policy to improve corporate sustainability in developing countries. *Business Strategy and the Environment*. Chichester, 18, 8; 542-556.

- Dögl C./Holtbrügge, D. (2010): Competitive advantage of German renewable energy firms in Russia – An empirical study based on Porter’s diamond, *Journal of East European Management Studies*, 15, 1, 34-58.
- Dyllick, T. (1999): ‘Wirkungen und Weiterentwicklungen von Umweltmanagementsystemen’, in: Seidel, E.: *Betriebliches Umweltmanagement im 21. Jahrhundert*, Berlin/Heidelberg : Springer, 117-130.
- Dyllick, T./Hamschmidt, J. (2000): *Wirksamkeit und Leistung von Umweltmanagementsystemen Eine Untersuchung von ISO 14001-zertifizierten Unternehmen in der Schweiz*. Zürich: Hochschulverlag.
- Feldman, S. (ed.) (1997): Does improving a firm's environmental management system and environmental performance result in a higher stock price? *Journal of Investing*, 6, 4, 87-97.
- Freimann, J./Walther, M. (2001) ‘The impacts of corporate environmental management systems: a comparison of EMAS and ISO 14001’, *Greener Management International* 36, 91-103.
- Hamschmidt, J. (2001): *Wirksamkeit von Umweltmanagementsystemen*. Bamberg.
- Harangozó, G. (2007): *What makes a company green? – Environmental performance of manufacturing companies*, PhD dissertation, Corvinus University of Budapest, Budapest.
- Havemann, R./Webster, P. (1999): *Does Ethical Investment Pay? - EIRIS research and other studies of ethical investment and financial performance*, London: EIRIS.
- Henri, J-F./Journeault, M. (2008): Environmental performance indicators: An empirical study of Canadian manufacturing firms, *Journal of Environmental Management*, 87, 1, 165-176.
- Hibiki, A. (2004): *Determinants of adoption ISO 14001 by a Japanese publicly-held manufacturer and the market valuation of a certified firm*. EAERE conference, Budapest.
- Johnstone et al (2007): *Environmental Policy and Corporate Behaviour*, OECD, Northampton: Elgar Publishing.
- Kerekes, S. (ed.) (2003): *Environmental policy tools and firm-level management practices – OECD National Report: Hungary* (Budapest). Also available on OECD website: <http://www.oecd.org/dataoecd/26/17/31685533.pdf>, downloaded 10th September, 2008.
- Kerekes S.(ed.). (1999): *Evaluation of environmental performance of Hungarian companies, Green Entrance Program*, Corvinus University of Budapest, Budapest.
- Kerekes S. (ed.) (1996): *Evaluation of Corporate Environmental Management Approaches: A Framework and Application*, *International Journal of Production Economics*, 13, 2-3, 193-211.
- Kolk, A./Mauser, A. (2002): The evolution of environmental management: From stage models to performance evaluation. *Business Strategy and the Environment*, 11, 14-31.
- Madsen, H./Ulhoi, J.P. (2001) ‘Integrating environmental and stakeholder management’, *Business Strategy and the Environment*, 10, 77-88.

- Málovics Gy./Rácz G./Kraus S. (2007): The role of environmental management systems in Hungary – Theoretical and empirical insights, *Journal of East European Management Studies*, 12, 3, 180-204.
- Moneva, J. M./Ortas, E. (2010): *Industrial Management and Data Systems*, Wembley, 110, 2, 193-210.
- Montabon, F. (ed.) (2000): ISO 14000: Assessing its perceived impact on corporate performance, *Journal of Supply Chain Management*, 36, 2, 4-16.
- Nemcsicsné Zsóka Á. (2005): Consistency and awareness gaps in pro-environmental corporate behaviour. Ph.D. dissertation, Corvinus University of Budapest, Budapest.
- Nemcsicsné Zsóka, Á. (2007): The role of organisational culture in the environmental awareness of companies, *Journal of East European Management Studies*, 12, 2, 109-131.
- Radonjic, G./Tominc, P. (2007): The role of environmental management system on introduction of new technologies in the metal and chemical/paper/plastics industries, *Journal of Cleaner Production*, 15, 15, 1482-1493.
- Ramus C.A./Steger U. (2000): The roles of supervisory support behaviours and environmental policy in employee “ecoinitiatives” at leading-edge European companies, *Academy of Management Journal*, 43,4, 605-626.
- Rozanova J. (2006): Portrayals of corporate social responsibility: A comparative analysis of a Russian and a Canadian newspaper, *Journal of East European Management Studies*, 11, 1, 48-71
- Russo, M./Fouts, P. (1997): A resource-based perspective on corporate environmental performance and profitability. *Academy of Management Journal*, 40, 3, 534-559.
- Schaltegger, S./Figge, F. (2000): Environmental Shareholder Value: Economic Success with Corporate Environmental Management. *Eco-Management and Auditing*, 7, 1, 29-42.
- Tilley F. (1999): The gap between the environmental attitudes and the environmental behaviour of small firms, *Business Strategy and the Environment*, 8, 4, 238-248.
- Whittaker, M./Kiernan, M. (no year indicated): *Environmental Performance in Industry: Hidden Risks and Value Potential for Strategic Investors*. Canada: Innovest Strategic Value Advisors.
- Zilahy Gy. (2000): Role of motivation of organisational members in the emergence of “energy efficiency gap”, Ph.D. dissertation, Corvinus University of Budapest, Budapest.