

Environmental Management System and SMEs: EU Experience, Barriers and Perspectives

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1. Introduction

SMEs are defined as enterprises which employ less than 250 employees and which have an annual turnover not exceeding €50 million, and/or an overall balance sheet not exceeding €43 millions (European Commission 2003). There are some 23 million SMEs in the EU providing approximately 75 million jobs (66% of private employment and up to 80% in some industrial sectors such as textile, construction or furniture) (European Commission 2005). Moreover, micro enterprises¹ account for almost 93% of the total number of SMEs, 6% are small enterprises² and less than 1% are medium-sized enterprises. Small and medium-sized enterprises represent a large part of EU economy, being some 99% of all enterprises and 57% of economy value added (European Commission 2005), as such they also have a primary role to play in shifting the EU economy to more sustainable production and consumption patterns.

SMEs are active in a range of sectors across the EU: 22.2% in the service sector (i.e. business to business services); 20.4% in personal services (i.e. business to consumer services); 20% in retail distribution; 11.9% in manufacturing; 11.6% in construction; 8.1% in wholesale trade; 5.5% in transport and communication; and 0.2% in extraction and energy. The presence of SMEs in different economic sectors varies between Member States. SMEs are far from being a homogenous group. However they have a number of features in common, and do certainly encounter similar problems in relation to environmental compliance and performance.

Since they represent such a large percentage of economic activities, SMEs have a significant impact on the environment. The environmental problem does not fully emerge if one considers individual firms, although in some cases there can be significant impacts on local environments and communities exerted by a single SME, but pertains their combined and cumulative impact.

¹Within the SME categories, a microenterprise is defined as an enterprise that employs fewer than 10 persons, and whose annual overall turnover and/or annual balance sheet does not exceed EUR 2 million (European Commission 2003)

²Within the SME categories, a small enterprise is defined as an enterprise that employs fewer than 50 persons and whose annual overall turnover and/or annual balance sheet does not exceed EUR 10 million (European Commission 2003).

Source: Environmental Management, Book edited by: Santosh Kumar Sarkar, ISBN 978-953-307-133-6, pp. 258, September 2010, Sciyo, Croatia, downloaded from SCIYO.COM

Experience in applying and enforcing environmental legislation in the Member States has shown that it is too complex and burdensome for companies and public authorities to determine the detailed contribution made by SMEs to pollution (e.g. air pollution), in terms of the “environmental burden” from different types of pollutants (e.g. CO₂, SO_x, NO_x, etc.). The first and most relevant barrier is the inability to monitor the environmental performance of SMEs, owed to the lack of data (that in many cases does not even exist). There are many studies in literature attempting to provide ‘insights’ into environmental problems emerging from SMEs. These studies focus on specific environmental aspects. For instance, a recent report (Marshall 1998) estimated that SMEs account for 60% of total carbon dioxide emissions from businesses in the UK and concluded that there is substantial room for improvement in energy efficiency and emissions reductions to be carried out by these companies. Another survey carried out in France showed that SMEs are to be held responsible for 40-45% of all industrial air emissions, water consumption and energy consumption, as well as for 60-70% of industrial waste production (Daddi *et al.* 2010).

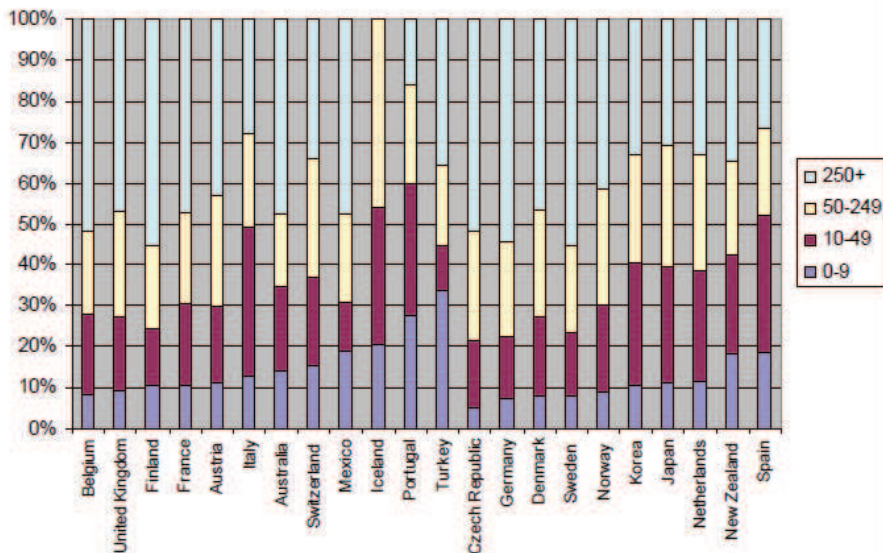


Fig. 1. Distribution of Employment by Firm Size Class, 1999 (Source: J.Labonne, 2006)

Although some smaller companies have taken the lead in managing their own environmental impacts in a well structured and effective way, the largest part of SMEs are still characterised by a lack of awareness on their environmental impacts and, especially, concerning the ways in which such issues can be effectively managed. A recent UK study (Netregs 2002) shows that only 7% of businesses in the UK believed they undertook activities that could harm the environment, but when prompted with a list of activities, this figure rose to 41%. This is a clear symptom of a low degree of knowledge by SMEs on what their environmental impacts can be. In many cases, SMEs are persuaded they do not have any impact at all on the environment. This emerges, for example, from a survey among Polish SMEs (Polish Environmental Partnership Foundation, 2007) emphasizing that 86% of the interviewees declare that their companies do not have a negative impact on the environment or that the impact was not significant at all.

Not only SMEs have a scarce knowledge on their environmental aspects, but the main problem is that most of them do not know enough about legislation applied on these aspects to ensure that they are compliant. The Institute of Directors (2006) carried out a survey reporting that members involved in sectors such as construction, mining, transport or manufacturing that are 'heavily exposed' to environmental regulation showed relatively low levels of awareness. It is quite surprising, for example, that 59% of members in manufacturing knew 'not much' or less of the environmental regulation applicable to their activities.

All the above mentioned studies show that low environmental compliance by SMEs is due to lack of knowledge and awareness of their own activities, ignorance of environmental legislation, lack of capacity to tackle their environmental impacts, and sometimes the excessive administrative and financial burden of environmental compliance. Compliance is further hindered by the perception that environmental protection is costly and has little benefit for the business.

Many studies show that the majority of SMEs have little awareness of their own environmental impacts and of how to manage them (IEFE *et al.* 2006). Moreover, literature emphasises that most SMEs are 'vulnerably compliant', since they are not always able to achieve an environmental performance that is high enough to ensure that they are complaints.

Where environmental legislation is applicable to SMEs, they tend to presume that they are complying and, as a result, full compliance is often the outcome of external action following an inspection, rather than an on-going process of checking that legal requirements are being met (Fairman & Yapp 2005). At the same time, SMEs often do not have the necessary legal and environmental expertise to cope with environmental legislation.

As European Commission has recently emphasized in the recent Program ECAP (Environmental Compliance Assistance Programme - EC COM(2007) 379), the implementation of an environmental management systems (EMS) and explicit designation of responsibility for environmental matters may have a much more positive influence on the environmental engagement of the company than a single inspection or compliance check.

The EMS is an increasingly diffused tool among organisations operating in different sectors, thanks to the drive and impulse coming from the voluntary certification schemes (such as EMAS and ISO 14001) in which they are mainly applied. These schemes provide a third-party guarantee of environmental "excellence", which is able to give an advantaged position (with respect to their competitors) to those organisations that, by adopting EMAS or ISO 14001, commit themselves to improve the environmental performance.

A wide range of evidences from existing studies analyze the benefits of EMS adoption (Patton & Baron 1995, Watson 1996, Van Der Veldt 1997, Aragon 1998, Madsen & Ulhoi 1999).

Just to mention one of these studies, Biondi *et al.* (2000) identify in a better legal compliance and in the capability of continuously monitoring compliance one of the most relevant benefits of EMAS registration. This benefit is also connected with other forms of EMS certification. (Hamschmidt *et al.* 2001).

The EVER study, carried out on behalf of European Commission, also provided very consistent outcomes, as far as this benefit is concerned (IEFE *et al.* 2006). According to the results of this study, in fact, formal EMS (such as EMAS) provide considerable benefits in the area of legal compliance: quite interestingly, the three most important benefits perceived by the interviewed EMAS-registered organisations are connected with the monitoring and

management of legal compliance. Greater awareness of regulatory requirements was identified as a fairly or important benefit by 70% of the EMAS adopters, better compliance by 69% of them and better planning of actions for legal and regulatory compliance by 67%.

As we have emphasised, SMEs certainly have to struggle against their lack of resources and to fill a cultural gap as regards environmental matters. Several studies have highlighted the existence of several typologies of hindrances, heterogeneous in nature and forms, encountered by SMEs in the EMS implementation, such as internal or external, organisational or economic, general or category-specific (e.g.: SMEs), and so on. For instance, the cost of implementation and maintenance (in case of formal EMS implementation such as EMAS and ISO 14001), like external consulting and verification costs, seems to be a relevant barrier, especially for SMEs, where financial resources are more restricted (Biondi *et al.* 2000, Hillary 2004). Focusing on internal barriers, we can mention, for instance, the availability of management time, or the adequacy of human resources (e.g. personnel with proper skills, expertise and technical background (Biondi *et al.* 2000, Iraldo & Frey 2007). This is confirmed by the incessant call, emerging from many studies, of measures capable of simplifying and supporting the implementation and maintenance of EMSs by SMEs (e.g.: Ammenberg *et al.* 1999, Hillary 2004).

In the last years, an ever-increasing number of SMEs, are gaining interest in EMS. How are these SMEs facing the new challenge of environmental management? What difficulties and drawbacks do they have to tackle and what benefits and advantages should they expect from the implementation of an EMS?

The chapter aims at proposing some early answers to these relevant questions, that many SMEs are asking themselves before accepting the challenge. Managing the environmental aspects of their activities according to a systemic and preventive approach implies for most SMEs a considerable effort in terms of human, financial and technical resources, regardless of the specific industrial context or country in which they operate. Constraints and drawbacks as to resource availability could compromise SME participation in voluntary programmes, like the European Eco-Management and Audit Scheme (EMAS), as well as their adoption of the ISO 14001 standard. These kinds of voluntary schemes prove their efficiency and efficacy “on the field” by leading as many enterprises to a significant improvement of their environmental performance. This is the reason why, in order to correctly evaluate the implications of ISO 14001 and EMAS, we have to investigate their capability of involving SMEs.

The chapter “core” is the attempt both of evaluating these barriers on an empirical basis and of identifying favouring factors and efficient solutions to overcome them. Suggestions and indications for effective tools, feasible solutions, incentives, achievable benefits and advantages (which an improvement of ISO 14001 and EMAS diffusion among SMEs could base on) emerge from the first significant evidence ever gathered on EMS implementation by SMEs in Europe. A final focus will dedicate on networking approach called cluster approach and new opportunities for SMEs provided in the next version of EMAS Regulation (EC Regulation n. 1221/2009)

2. Barriers and constraints for SMEs

Barriers to EMS adoption are generally categorized into those that are external to the organization, and those that are internal (Milieu Ltd & Risk and Policy Analysis Ltd, 2009).

The present paragraph investigates the factors that prevent organizations from implementing an EMS.

Different “keys of interpretation” do exist for such a broad issue: indeed, barriers are heterogeneous in nature and forms: they can be broken down following different types of criteria, as hindrances can be either internal or external, organizational or economic, general or category-specific (e.g: SMEs), and so on.

This paragraph is structured in two sub-paragraphs, the first analyzing external barriers, and the second focusing on internal ones. However, in the analysis of the evidence emerging from the literature review we provide a broad, multi-dimensional picture of the issue, highlighting useful distinctions between organizational and economic, generic or SME-tailored barriers, etc.

2.1 External barriers

External barriers encompass a wide set of factors, ranging from the cost of implementation (and other economic factors) to the lack of support and guidance, from hindrances linked to the institutional framework and the verification/registration process to the lack of market recognition, and so on.

Most of the evidence gathered within the review of existing literature on these issues regards the relevance of economic factors, scarce customer awareness/interest and lack of recognition by public institutions as factors hindering the will of organizations to adopt an EMS and in particular a formal EMS such as ISO 14001 or EMAS .

The cost of implementation, for instance, seems to be a relevant barrier, especially for SMEs where financial resources are more limited (Hillary 1999, Biondi et al. 2000).

SMEs certainly have to struggle against their lack of resources and fill a cultural gap as regards environmental matters. At a first glance, the main problem for SMEs seems to be that of finding money to invest in the improvement of environmental performance. Therefore, costs connected with the implementation of an EMS and with the adoption of a voluntary scheme could represent a first kind of barrier for SMEs.

The widespread agreement over the importance of such a barrier is confirmed by many studies, like a survey on the uptake of EMAS and ISO 14001 (ISO, 2005) showing how the lack of financial resources (33%) and the costs of certification (23%) are among main barriers for the implementation of an EMS.

In detail, we can distinguish the financial costs basically in three categories: costs relating to the necessary technical measures for guaranteeing the improvement of environmental performance, costs relating to the EMS implementation and costs to be sustained for obtaining a third party certification.

As to the first cost category, we refer, only in the case of ISO 14001 and EMAS, to the costs that many participating enterprises have to face in order to comply with the environmental regulations that is a requirement of both schemes. Moreover, in the adoption of an EMS, most of SMEs’ financial efforts connected with “technical measures” regard the costs of equipment and the cost relating to plants management, control and maintenance. The commitment to continuous improvement implies that plant investments should not be over with the EMAS registration or the ISO 14001 certification, but instead means that environmental improvement must, from that moment on, be considered in all the decisions regarding investment and maintenance scheduling.

Costs sustained by the SMEs in structuring their EMS represents another significant financial effort. For instance Delmas (2002) states that “the annual cost of maintaining ISO

14001 is a more important constraint than are design and registration costs”; this might be an explanation of the “crisis” of certifications in some countries characterizing recent years, as many organizations drop EMSs as costs overweight benefits. These costs are often due to the lack of expertise and trained personnel capable of performing the necessary measurement and analyses, which implies the need to rely on external technicians and consultancies. Cost of management time is another relevant cost whereas costs connected with personnel information and training as well as with environmental auditing (reported as specific items) were not considered relevant. It is important to highlight that the EMS “degree of maturity” is a relevant variable which most influences the steps which the enterprise will have to take, and consequently the additional costs. A production site where a management system has already been structured and a systematic auditing activity is regularly performed (but this rarely is the case of an SME) will obviously have considerably lower costs compared to a site which has still to take some of the organisational-managerial steps required by EMAS or ISO.

Finally, we consider the financial costs strictly connected with the adhesion to one of the formal voluntary standards such as ISO 14001 and EMAS.

The evidence gathered (Biondi *et al.* 2000, Cesqa & Sincert, 2002) suggests that external consulting and verification costs are those with a stronger impact on organizations, and are felt like a heavier burden compared to other costs such as those related, for instance, to the necessary modifications regarding production processes, or linked to product innovations (see Figure n. 2).

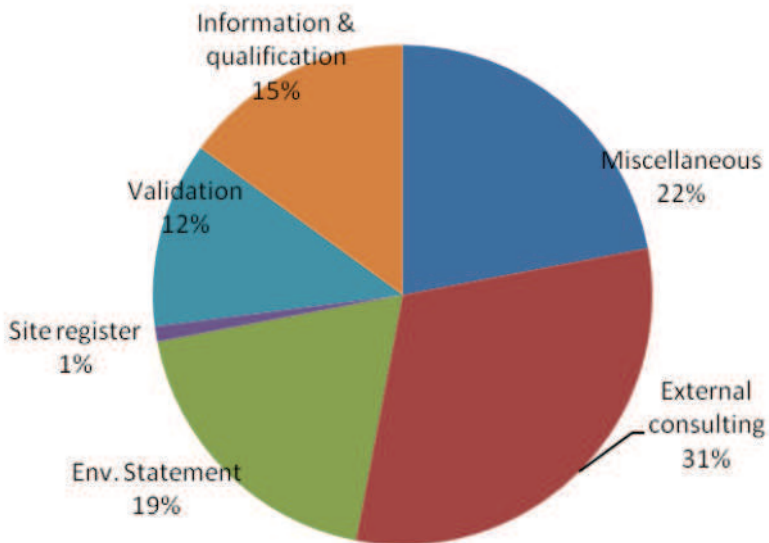


Fig. 2. Cost Categories for EMAS implementation

The costs relating to EMAS registration, for example, are generally low, although this depends on each national Competent Body. In some countries the cost depends on site dimension and turnover, representing a positive attempt to knock down a financial barrier

for SMEs. For example, in Italy the cost varies from 50 €, for small firms, to 1500€ , for large firms.

On the one hand, to give an idea of the financial resources required, we can mention the “EMAS toolkit” (European Commission, 2000), which provides figures with the average expenditures for different size-categories of organisations:

€ 10,000 for very small companies (< 10 employees)

€ 20,000 for small companies (< 50 employees)

€ 35,000 for medium companies (50 <250 employees)

€ 50,000 for large companies (> 250 employees)

On the other hand, studies on EMS costs (Hamschmidt & Dyllick 2001, Milieu Ltd & Risk and Policy Analysis Ltd, 2009) suggest that the above mentioned figures might be underestimated. The discrepancies in the outcome of different investigations are due to many factors, not least the fact that most organizations do not have a system for the accounting of environmental costs. The table below collected evidence from previous studies on the costs of EMAS implementation in different countries.

Size Country	Small < 100 emp	Medium < 500 emp.	Large >500 emp.	Average
Austria (BMUJF 1999)	109.000€	225.000€	153.000€	
Denmark (Kvistgaard, 2001)				62.000€
Germany (UBA 1999)	37.000€	84.000€	85.000€	59.000€
Switzerland (Dyllik & Hamschmidt, 2000)	56.000€	93.000€	322.000€	172.000€
Hungary (INEM 2001)	3.200€-6.2.00€	5.800€-11.000€	>11.000€	
EU member States (Ec, 2009) ³	21.000€-38.000€	17.000€-40.000€	38.000€-66.000€	26.000€-48.000€

Table 1. Studies on the costs of EMAS implementation

Moreover, the previously mentioned Cesqa Sincert study shows how the average annual investment for the implementation of an EMS amount to about 1,9% of sales revenue for SMEs, and 5,2% for larger organisations. The problem rises from the coupling of two factors like the relevance of the costs for a business activity and the uncertainty of their precise entity. This is consistent with the evidence emerging from the EVER study, which argues that one of the main problems faced by SMEs when considering the possibility of registering in EMAS is the existence of “a priori” undefined costs, mostly related to the implementation phase (IEFE *et al.* 2006).

One of the few variables that are indirectly “linked” to the evaluation of the costs of registration, that can be gathered from literature, concerns the time-length organizations take to implement or to maintain an EMS

³The second amount refers the first year cost; the first amount refers the yearly cost after the first year.

In a recent study on the costs and benefits of EMAS (Milieu Ltd & Risk and Policy Analysis Ltd, 2009), registered organizations were asked to indicate the number of person-days (of either their own staff or outside contractors) required to first implement EMAS. The range of responses was quite varied. External consultancy was used by most respondents to implement EMAS (59%). There may be a trade-off between the complexity of the EMAS system (lower in smaller organizations) and the expertise available (also likely to be lower in smaller organizations). The most time-consuming tasks for internal staff are the environmental review, EMS development and internal audit. A summary of the person days required to maintain and implement EMAS by each task is provided in Figures 3 and 4.

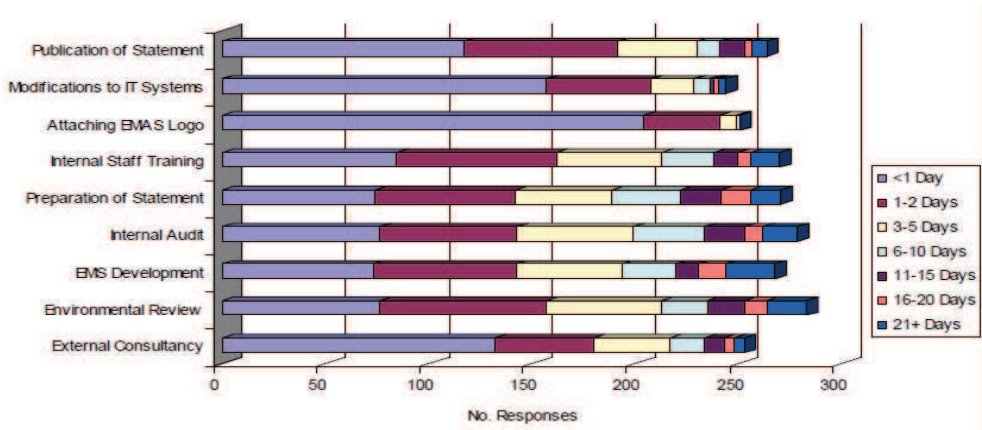


Fig. 3. Person Days to Maintain EMAS by Task (Source: Milieu Ltd & Risk and Policy Analysis Ltd, 2009)

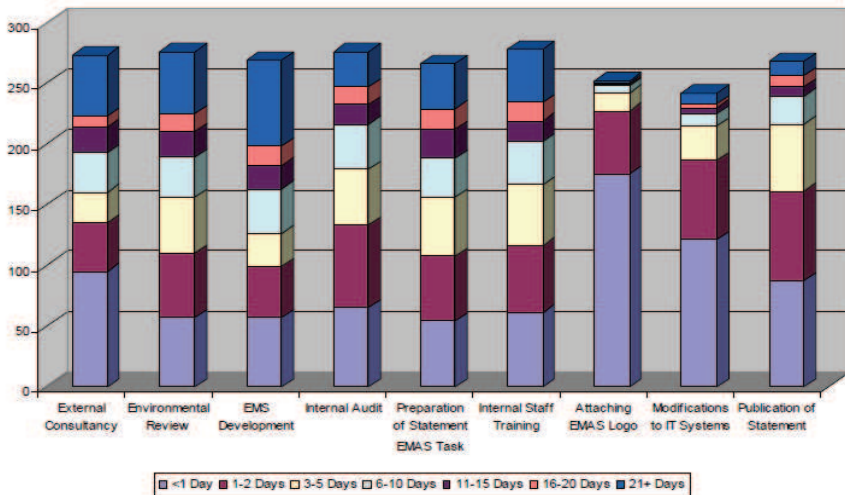


Fig. 4. Person Days to Implement EMAS by Task (Source: Milieu Ltd & Risk and Policy Analysis Ltd, 2009)

Focusing on EMAS scheme, but in some cases we can extend these considerations also to ISO 14001 certification, costs related to the implementation and maintenance of EMS, however, are not the only barriers singled out by the literature review, as most of the studies analyzed identify as main hindrances also the lack of customer interest and awareness (Kvistgaard et al. 2001, Brouhle 2000, DG Enterprise 2004), with the subsequent need to promote EMAS and its logo and the lack of recognition and positive rewards by public institutions (Carnimeo et al., 2002).

The lack of public recognition and interest affecting EMAS (and its logo) is well known, and most studies and surveys are in line with such assumption (Ends surveyed that only 6% of respondents admit EMSs being the main environmental factor orientating purchasing habits). Obviously, scarce awareness means scarce market response.

This goes for all kinds of organizations, but is probably more tackling for SMEs, which have to put a greater effort to implement the scheme, due to their limited resources. Participants of a workshop on SMEs and EMAS arranged during the EVER project argued that *“an important proportion of SMEs who have invested the effort and resources to register in EMAS do not receive any relevant benefits or appreciation... and finally drop out with a negative impression of the scheme”*.

Brouhle (2000) goes a step forward analyzing the scarce level of EMAS knowledge that characterizes firms themselves, as well. He mentions a research study by UNI/ASU, establishing that over one quarter of executive managers did not know about EMAS (Freimann and Walther, 2001), and another study by the Institute for Research in Social Choices, which identified 33% who had no knowledge of EMAS and another one third who claimed to know it only partly.

As far as rewards provided by public institutions are concerned, such incentives can be either of regulatory nature or aiming to promote a wider uptake of the scheme through public procurement, funding support and technical and information support (IEFE et al. 2006). However, to date, the business community is particularly critical about the lack of external incentives.

The evidence emerging from the literature review clearly shows how in those national contexts (e.g. Germany in a first phase of the development of the scheme, Italy in more recent times) where the public sector is more keen on supporting the diffusion of EMAS through promotional campaign or incentives for registered organizations, the uptake of the scheme is much higher compared to other countries where such positive institutional framework does not exist. We can mention, for instance, a study carried out by De Leo (De Leo et al, 2003) on Italian and German sites. De Leo states that among chief reasons of the success of the German policy we have: i) an effective program of information and technical assistance to companies; ii) information to the public; iii) financial aid, iv) administrative simplification and deregulation.

In the abovementioned EVER study, the point of view of the organizations that are not participating in the EMAS scheme was analyzed in order to investigate the barriers preventing organizations from adopting EMAS. From the carried out interviews, it clearly appears how the role of public institutions is crucial: the lack of external incentives and the lack of recognition by the public institutions are perceived as the most relevant hindrances. Moreover, a scarce interest by consumers and the subsequent lack of competitive rewards is indicated as a strong barrier, as well, being this consistent with the findings of the literature review. The interview phase, however, provided some surprises, such as the scarce

importance given to the cost of implementation. Despite high costs associated with activities such as external consulting, most organizations suggested these being not the reason why non-participants decide not to implement EMAS.

2.2 Internal barriers

Analyzing the results mentioned in the previous paragraph, we can realise that the most significant barrier for SMEs is not the direct financial effort, but the indirect costs implied by, on the one hand, the deal of time that the management has to devote to the EMS implementation and, on the other, by the lack of human and technical resources that SMEs suffer when tackling environmental management problems. Time and knowledge therefore emerge as the most significant constraints. The smaller is the enterprise, the stronger time constraints seem to be. This is evident especially in those small firms where the management team has multiple roles and commercial pressures must take priority. The smaller is the enterprise, the higher is the probability an EMS cannot be implemented by relying only on internal expertise and technical capabilities.

Internal barriers can be defined as obstacles that arise within the firms and prevent or impede EMSs implementation or the adoption of EMSs (Hillary, 2004). They are a vast category, comprehending factors such as lack of resources (time and human capital), difficulties in the understanding and perception of the EMS scheme, drawbacks in its implementation process, the culture itself of organizations, and so on.

For instance, a first relevant hindrance met on the way for EMAS registration, according to the relevant literature (Biondi et al. 2000), is represented by the difficulties in effectively understanding the scheme and its requirements and identifying relevant environmental aspects. Indeed, it appears that many organizations are unable to accurately understand EMAS, especially as far as the Initial Environmental Review and the EMS are concerned, and to identify relevant aspects. The difficulties met in correctly identifying relevant aspects is highlighted by many studies (Hillary et al 1999, Hillary 2004). Zackrisson *et al.* (2000) shows that 49% of companies find it challenging to identify relevant environmental aspects, and more than 1 out of 4 fail to identify some significant environmental aspects. Moreover, it has been assessed by some studies that many companies evaluate the relevance of environmental aspects by the so-called "rule of thumb", and not by an objective and reproducible method (IEFE *et al.* 2006). The drafting and the diffusion of the EMAS statement represent other difficult requirements in the EMAS implementation process for many companies to understand and correctly implement. This is often due, especially as concerns SMEs, to a lack of competences and knowledge within the organization (Biondi et al., 2000).

However, other studies assert how this is not merely a matter of lack of competences. The problem can assume a different connotation: MacLean (2004) defines it a matter of "harmony" within an organization (e.g: interaction between business executives and EHS managers) on business priorities. No surprise if, given such situation, it is very difficult to set performance objectives and to hence recognize relevant aspects within EMAS to be dealt with.

The evidence collected also shows that another relevant internal barrier is represented by the lack of resources. It is clear that, besides financial resources, there are other resources that organizations need for the achievement and implementation of an EMS.

Among them, we can mention, for instance, the availability of management time, or the adequacy of human resources, being these personnel with proper skills, expertise and technical background (Kvistgaard *et al.*, 2001, Bonora & Sondermeijer, 2001).

This is, once again, felt as a relevant problem for SMEs. This is confirmed by the incessant call, emerging from many studies, for measures capable of simplifying and supporting the implementation and maintenance of EMSs by SMEs (e.g.: Ammenberg et al. 1999, Hillary 1999, Hillary 2004).

We can report, as one of the most recent example, the findings of the study carried out by the Strategic SME group (ISO, 2005) in which lack of time was identified as one of the top three most important barriers when implementing an EMS) by 36% of SME respondents. Secondly, the respondents identified lack of staff resources (31%) and thirdly lack of know-how in the enterprise (21%).

The lack of resources can be even worsened by the high demands of documentation. The risk is that of focusing all (limited) resources on documentation, instead of following and developing the environmental objectives and the environmental performance. Moreover, employees in charge of the EMS might feel demotivated believing the documentation requires too much of their time, and "instead of documenting the problems, they pretend not to see them" (Malmborg 2006).

A final internal barrier is "indirect" and can be identified in the fact that the implementation of an EMS might have backlashes, for instance, by disclosing certain "environmental non compliances" that had otherwise remained uncovered, with the subsequent legal proceedings and additional costs. Therefore, the fear of having to sustain higher costs, instead of saving money as a consequence of the implementation of the EMS, may prevent many firms from adopting EMAS, ISO 14001 or other similar systems. With this respect, the only empirical evidence is related to a non-EU context: a survey in the US on the uptake of ISO 14001, shows how 40% of firms consider potential legal penalties from voluntary disclosure as a constraint to the adoption of the EMS while other studies show even higher figures for such barrier (Delmas, 2002).

Focusing on EMAS, the recent study coordinated by Bocconi University (IEFE et al. 2006) supports the idea that barriers preventing organizations from joining EMAS are mainly external. The table below shows that none of the internal ones achieves a score higher than 3 both for EMAS adopters and non-adopters (The likert scale is from 1 - not at all important, to 5 very important). Only stakeholders signaled some internal barriers as moderately important.

3. Difficulties encountered by SMEs in implementing an EMS

If an SME decides to undertake actions and activities to implement an EMS, some constraints will undoubtedly hinder this process at the operational, technical and organisational levels.

The lack of eco-management-targeted skills is the first constraint in terms of human resources which SMEs have to face when they decide to implement an EMS according to EMAS or ISO 14001.

Understanding, interpretation and application of these standards is not always simple and easy, and sometimes requires a technical knowledge of environmental issues. For instance, the troubles many SMEs experience in fully understanding and satisfying some EMAS requirements (e.g.: evaluation of the effects, definition of criteria for selecting significant aspects, measurement of continuous improvement) are partially due to their lack of technical expertise in environmental management (Biondi et al. 2000).

Both EMAS and ISO 14001 were conceived to give indications for a correct implementation of an EMS to a wide range of enterprises, including very articulated and large

sites/organisations. This is the reason why their requirements tend to be as exhaustive and complete as possible, sometimes resulting too detailed, complex and over-dimensioned with respect to a SME. On the other hand, owing to the different kinds of enterprises they address to, neither EMAS nor ISO 14001 could have been tailored to the needs and specificities of each single site/organisation, leaving room for a flexible and agile implementation. This implies a lack of explanations, clarifications and details about what is exactly required to an EMS to work effectively and efficiently in specific conditions.

	Non participants	Stakeholders	Participants
Difficulties originating from the set up and functioning of the EMAS scheme	2,5	3,1	2,7
Difficulties in implementing the requirements	2,3	3,2	2,6
Difficulties related to disclosure through the Environmental Statement	2,2	3	2,3
Difficulties in involving, motivating or obtaining the commitment of personnel	2,2	2,6	2,8
Lack of human resources and competence	2	3,5	2,9

Table 2. The most relevant internal barriers (source: IEFE Bocconi et al. 2006)

If we consider these difficulties in understanding the standards together with the scarce human and technical resources of an SME, we can realise the kind of operational and practical difficulties these enterprises meet in applying EMAS or ISO 14001 to their site/organisation.

Usually, the most relevant difficulties met by SMEs in implementing an EMS are the initial environmental review and the definition of objectives and programmes. If we consider the whole process leading to participation in EMAS, these two difficulties are overcome only by the environmental statement (this is probably due to the scarce SME confidence with external communication tools).

Difficulties met during the initial review prove that SMEs usually have to make a great effort from the very beginning of the process leading to the implementation of an EMS. Most SMEs, in fact, have never carried out an accurate and complete analysis of the environmental effects connected with their activities. They have to focus on technical aspects before implementing an environment-targeted management framework.

Project experiences show that in many cases personnel operating in the SMEs involved is composed of specialised technicians who possess a very good knowledge of the production process (Biondi et al. 2000). These technicians are also aware of the main environmental problems connected with the process and are capable of managing them from the technical point of view. Relevant difficulties were instead encountered by SMEs as to *knowledge regarding environmental effects and availability of technical instruments* to perform all the necessary analyses. Even though several SMEs were acquainted with instruments and methodologies for environmental impact measurement and assessment, often *they did not have time and technical resources* to carry out an in-depth analysis on their own (Hillary, 2004). In order to obtain a complete environmental review, most SMEs relied on consultants that in the past used to support them in dealing with compliance with environmental legislation.

As we above mentioned, difficulties are encountered by SMEs also in defining their environmental policy and programmes. This was due both to the lag in environmental

culture previously described, and to the fact that SMEs are not generally acquainted with explicitly programming and planning in detail their activities, especially with respect to issues outside their “core-business” (like environmental ones). Fixing specific environmental objectives and defining programmes for achieving them is an entirely new way of operating in this field for many SMEs, and this causes practical difficulties: what is an environmental policy? What must it include? How should programmes be decided, formulated and drafted? What must they focus on?

There is no doubt that, from the organisational point of view, most SMEs are lagging behind with respect to the eco-management frontier. Small enterprises often have neither a quality system nor a defined and formalised management system, so they have to start from scratch in structuring their EMS. The little confidence they have with formalisation in general and, in particular, with management tools like procedures, operational instructions, working protocols, registers, reporting instruments and, finally, with an “advanced” tool like auditing, often prevents SMEs from implementing an efficient, useful and “handy” EMS. The existing references for structuring an EMS (such as EMAS and ISO 14001) may result too detailed and complex for an SME. As we have seen, they may also result over-dimensioned or too vague with respect to an SME practical needs. These enterprises need clearer indications for defining a simple and agile organisational structure that enables them to easily manage the environmental aspects of their activities. According to the new indication included in the new revision of EMAS Regulation (EC, 2009), the only way for SMEs to effectively undertake the implementation process is understanding that they can satisfy ISO 14001 and/or EMAS with a “slim” EMS, tailored to their features. An “overwhelming” documentation of the EMS, for instance, can be a burden (and not a support) for SMEs, and therefore can be the hardest difficulty at the implementation stage.

Finally, the environmental audit usually implies a great effort for a small enterprise that may not possess the technical expertise and capability to perform such an activity. According to evidence emerged in the literature, the environmental audit is the tool which the SMEs involved were less acquainted with. Even if SMEs certified according to ISO 9001 standards are quite familiar with the audit tool, they previously applied it strictly to quality management and encountered relevant difficulties in applying it to environmental performance. Introducing the environmental auditing in these SMEs means a radical change in the management of their environmental aspects. They had to shift from a “spot” and compliance-targeted check to a systematic, continuous and improvement-targeted control, conceived to be a “management tool” that enables the SME both to verify the EMS effectiveness and to identify improvement opportunities.

A last drawback is the uncertainty surrounding the effects of external communication and, for EMAS, the Environmental Statement diffusion to the public. SMEs are not used to conduct activities for continuously interacting with the stakeholders and often consider the environmental aspects as a delicate and “confidential” matter. They generally have normal or good relations with public authorities, but SMEs are afraid the local community can negatively react to information regarding potential or real damages to the environment. This is the reason why SMEs are rather sceptical (when not scared) about diffusing such an information with the Environmental Statement. Strictly connected with the above-mentioned drawback is the difficulty SMEs find in writing the Statement, selecting its contents and choosing a format that can satisfy the stakeholders’ expectations, without generating worries and preoccupation.

4. EMS implementation by SMEs: motivations and driving factors

In spite of the abovementioned difficulties, a significant number of SMEs has been able to register their sites under EMAS and/or to obtain certification according to ISO 14001. In fact, many SMEs are positively responding to environmental management voluntary schemes as long as they develop.

What reasons are motivating these enterprises to implement an EMS and to seek a third-party recognition of their efforts? In this paragraph we will try and identify the main motivations that may prompt a small enterprise to take these steps towards a sound environmental management, despite the relevant constraints and barriers. In the next paragraph we will analyse the benefits that SMEs can achieve by implementing an EMS, basing on the main finding emerging in the literature.

Scholars have identified several factors that could induce an organization to adopt an EMS (either certified or not), and other "pro-active" environmental strategies. In efforts to increase resource productivity while abating costs, an EMS could be adopted to bring about rationalization in the use of inputs (resources) such as energy and raw materials, and at the same time, to reduce outputs such as waste (Khanna & Anton, 2002). Moreover, the adoption of an EMS can improve the reputation and image of a company and, consequently, its relations with customers, investors, local communities and other stakeholders (Biondi *et al.*, 2000; Bansal & Roth, 2000; Khanna & Anton, 2002; Bansal & Hunter, 2003).

Research findings also demonstrated that the regulatory obligations and other external pressures may stimulate pro-active behaviour at a managerial level and induce the implementation of an EMS (Darnall *et al.* 2008; Gavronski, *et al.*, 2008). In a recent study, Darnall *et al.* (2008), relying on aspects of institutional theory and on a resource-based view of the firm, determined that institutional pressures (i.e. regulatory, market and social pressure), resources and capabilities (i.e. employee commitment and environmental R&D) both encourage a more comprehensive EMS adoption. Moreover, overcoming information asymmetries (King *et al.*, 2005) and complying with increasing legal requirements (Biondi *et al.*, 2000), represent other specific determinants

A first indication drawn from the literature review regards the extreme heterogeneity of factors "driving" companies towards EMSs (and, specifically, towards EMAS). These vary significantly in connection with different aspects, like the size of the organization (SMEs vs large companies), its sector (e.g. manufacture vs Public Administration), the national or regional contexts, and so on.

For instance, drivers can be either economic/strategic or "environment-led"; they can deal with the internal sphere of an organization (e.g. optimization of organizational activities), or be "external" such as the desire to gain a competitive advantage or benefit from fiscal/normative incentives and facilitations.

The following table summarizes some of the motivations behind the adoption of EMS that have been identified in literature.

The evidence gathered by researchers shows that economic and strategic drivers seem to prevail in spurring companies towards the EMS adoption in particular formal EMS such as EMAS. We can mention, for example, the outcome of a German UBA research (Clausen *et al.*, 2002): economic and competitive motivations (such as energy/resources savings, better image, etc.) are very important.

As far as EMSs are concerned, the Best Project (DG Enterprise, 2004) stresses that the reasons for adopting an EMS (including EMAS) mostly encompass other strategic factors, not directly linked to competitiveness or the market response, such as the hope to get benefits

from local authorities: public recognition, material advantages (cheaper insurance, easier access to finance, privileges in public procurement), regulatory relief/deregulation and so on (even when these benefits are not available yet).

Reduction of environmental impacts
Savings from energy and resources consumption
Image improvement
Legal compliance
Satisfy requests by customers
Obtain competitive advantages
Regulatory and monetary incentives (de-regulation, tax relief)
Better organization and management of activities
Keeping up with competitors
Improve relationship with stakeholders and local communities
Better risk management
Satisfaction of requests from corporate headquarters
Improve rating in access to public funding and procurement procedures

Table 3. Motivation of EMS adoption

In addition, Perkins and Neumayer (2004) agree that the cost-reductions, benefits and profitability of EMAS are major drivers, but he adds that they are unlikely to be the only ones, as firms often adopt organizational innovations for managers' quest for external legitimacy, and specifically, the need to conform to widely held beliefs of rational and efficient management practice. Hence, the participation in EMAS is likely to be shaped by two sets of factors: those influencing the financial costs, benefits and profitability of the scheme, and "ideational forces" such as the requirements of external stakeholders.

Moreover, Anton *et al.* (2004) found that also the prevention of "negative" strategic factors is often a powerful driver for EMS adoption (in particular EMAS and ISO 14001), such as liability threats and pressures from consumers, investors and the public.

Even if the prevalence of economic and strategic factors is a general trend characterizing most studies, there are cases where also environmental aspects seem to play a crucial role. As an example, we can cite a survey carried out on French EMAS registered organizations (Schucht, 2000): the results, reported below, evidence how the improvement of environmental performance is regarded as the main motivation for EMAS adoption, more important than improvement of image, legal compliance and so on.

As reported by the relevant literature on environmental reporting and EMAS statements (e.g.: Grafé 1996, Gorla & Iraldo 1998, Jones *et al.* 1999, etc.), the willingness to communicate with the stakeholders can be a powerful driver for EMAS participation. Some of the analyzed studies put an emphasis on the fact that, in some cases, EMAS has been preferred over ISO 14001 thanks to the possibility to use and diffuse credibly validated environmental information (Gorla & Iraldo 1998).

The analysis of existing evidence was not limited to the (however prominent) EU context, being for instance inclusive of the uptake of the ISO standard and its drivers in different contexts such as the US and China (Fryxell and Szeto 2002, Delmas 2002 etc.), for comparative purposes.

As in the case of EMAS for the EU context, it emerges that economic and strategic drivers play a key-role, even if their relative importance varies according to the study, the geographical context, etc.

For instance, the main drivers for Iso-certification in China (Fryxell and Szeto 2002) were reported to be to ensure regulatory compliance, to enhance the firm's reputation, and to improve environmental performance, in that order, while motivation to achieve cost reductions is less emphasized.

A key finding emerging from the literature review is that of the prevalence of "external" drivers over "internal" ones.

For instance, we can report the Cesqa Sincert research, carried out in 2002 in Italy: main motivations for the uptake of ISO are image improvement and legal compliance (53% and 55% of respondents, respectively, rate such drivers as "very important"), while a better organization and rationalization of activities is regarded as less important (Cesqa & Sincert, 2002).

Again, Hamschmidt & Dyllick (2001) asserts that the principal driver for the uptake of an EMS (including EMAS) is external (enhancement of the corporate image), while internal factors such as the systemization of existing activities and risk minimization follow in lower positions.

Focusing on SMEs, there is a lot of evidence on the analysis of drivers of EMS adoption (Biondi et al. 2000, Goodchild 1998, ISO 2005, etc), most of which is gathered in a 1999 and 2004 studies by Ruth Hillary.

It emerges that one of the driving forces spurring SMEs towards EMAS and other EMSs is the specific request of important and large customers, as small firms are more dependent on precise demands by clients representing an important share of their activities (Testa & Irado, 2010). Moreover, other important drivers emerging in most of the studies and research being analyzed regard legal compliance, improvement of public image and the possibility of benefiting from special funding or incentives from the legislation and the Public Administration. Overall, external and economic/strategic factors maintain their prevalence even in the "sub group" of SMEs.

Most SMEs are aware that maintaining a continuous compliance to environmental legislation is problematic and implies a great managerial effort. This is particularly true in countries where environmental aspects are dealt with in a relevant number of legal provisions, applied at different levels (national, regional, local...). Moreover, environmental laws are subjected to frequent and sudden updating and tightening, which are difficult to keep up with for SMEs. In fact, these enterprises are often cut off from flows of information regarding these issues. Finally, SMEs face problems in "translating" environmental legislation requirements at the operational level, as well as in understanding their implications for the site/organisation activities. Many SMEs involved in the pilot projects believe that an EMS can be, first of all, *a useful instrument to manage, control and monitor the legal compliance.*

According to Biondi et al. (2000) other drivers should probably be attributed to the willingness to anticipate or to respond to the request of important customers. International behemoths are increasingly asking suppliers to guarantee for the environmental efficiency of their activities by adopting an environmental management standards. The relationship

between “proactive” large companies and supplier SMEs represents one of the most powerful springs for favouring the diffusion of EMS. This is already happening in many industrial sectors and in many countries. In Italy, for example, one of the first SMEs to move towards EMAS in the food-processing sector was prompted to do so by its main customer (the Swiss retailer MIGROS).

Potential improvements of the relations with the stakeholders are not a relevant motivation (Biondi et al. 2000). This is probably due to the fact that SMEs are not eager to adopt a communication strategy towards external stakeholders and, consequently, they do not consider this as an environmental improvement opportunity. Small enterprises are not used to diffuse to the public information regarding potential or real environmental impacts. Symmetrically, local communities still lack in stimulating SMEs to communicate on these issues. The bottom line is that few SMEs decide to adopt an active communication strategy, for example by diffusing the environmental statement foreseen by EMAS, because they are afraid to provoke alarmism.

A last motivation should be mentioned, although definitely less emphasized than the others. Environmental management standards is increasingly being adopted by SMEs the more they understand that these schemes require an organizational, technical and financial effort which is proportioned to the needs and possibilities of the enterprise. For example, small enterprises do not need to highly formalise the EMS procedures and prepare a wide and detailed documentation, and they can decide the “speed” and the stages of the continuous improvement according to its innovation capability.

The driving factors described in this paragraph can convince an SME to undertake the implementation of an EMS. There are some benefits which are not evident when this decision is taken, but may emerge “ex-post”, once the first actions to improve environmental management are carried out. We should emphasise these benefits to make SMEs realise and correctly evaluate all the opportunities connected with a sound environmental management. Once SMEs will be aware of benefits, these could become a powerful incentive to adopt an environmental management standard.

5. EMS positive implications and benefits for the SMEs

Empirical evidence emphasizes that relevant benefits and possible advantages for smaller enterprises can be achieved by implementing an EMS. Diffusing the experience on benefits and advantages that result from the adoption of an environmental management standard is the only way to promote SMEs participation.

The experience of many SMEs shows that by implementing an EMS they are able to raise the organizational and management efficiency of the whole company (Biondi et al. 2000). For instance, they improve the capacity of managing and controlling their environmental performance, by continuously monitoring their activities (by means of procedures and operational control), systematically registering and evaluating environmental effects and periodically verifying the effectiveness of the whole system (auditing). A second relevant benefit emerges from a better definition of responsibilities and tasks, achieved through the definition of formal documents (charts, job descriptions): this enables employees to identify persons responsible to which refer to for environmental aspects and problems. This can lead SMEs to a more efficient, rapid and effective management of environmental risks. Documentation represents a significant benefit also because SMEs, by writing procedures, rationalising and standardising their activities, improve their work efficiency and quality.

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