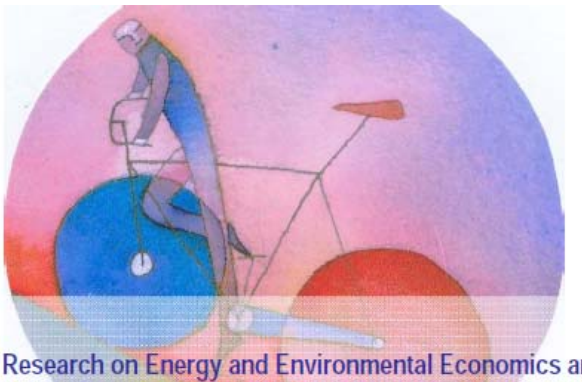

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How Does EMAS Affect Organisations' Efforts and Competitive Rewards? Analysis of the Drivers, Barriers and Benefits Connected with the EU Scheme

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How does EMAS affect organisations' efforts and competitive rewards? Analysis of the drivers, barriers and benefits connected with the EU scheme

Fabio Iraldo[*], Pietro Lanzini[**] and Michela Melis[**]

ABSTRACT

In sight of the incoming revision process relating to the two most important voluntary instruments of the European Commission – the EMAS Scheme and the EU Eco-label – the Ever Study has been carried out on behalf of DG Environment by a consortium of consultants led by Iefe - Bocconi University. The fundamental aim of the Ever Study was to provide recommendations for the revision of both the voluntary schemes. As regards in particular EMAS, the Study aimed at delivering a critical appraisal of the instrument, in terms of relevance, effectiveness and efficiency. Furthermore, it identified the drivers and barriers of the scheme, and investigate its effectiveness (i.e. appropriateness as policy instrument) and viability. The Study provided the Commission with recommendations by detailing options for improvement.

This paper aims at describing the results of the Ever Study, with specific reference to Emas barriers, drivers, benefits and impact on competitiveness, on the basis of the evidence collected in the different phases of the Study: the 'desk research' – consisting of a thorough review of existing literature and previous studies and surveys on the schemes – and the 'in-field' research, carried out by way of direct interviews and case studies, provided the background relating to their strengths and weaknesses.

Keywords: environmental management systems, competitiveness
JEL classification: M14, Q56

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1. Introduction and overview on the EU Eco-Management and Audit Scheme towards its new revision

Environmental Management Systems (EMSs) represent an important tool for companies (and organisations at large) to provide a third-party guarantee of environmental ‘‘excellence’’, thus spurring their competitiveness thanks to such advantage.

The EMAS Regulation (Reg. (EC) No. 761/2001 of the European Parliament and of the Council of 19 March 2001)[1] is a scheme implemented by the European Commission since 1993, and has recently undergone a process of critic review, as to gain insights on the flaws and barriers that today are still hindering its larger uptake on one hand, and the achievement of competitive results by the registered organisations, on the other.

The Proposal for the new EMAS Regulation (commonly known as ‘EMAS III’) was approved by the European Commission on July 16th, 2008, and the new EU Scheme has come into force at the beginning of 2010[2]. This final output is the result of a long and complex revision process, which encompassed a thorough evaluation study (the EVER Study[3]), aimed at providing recommendations to the European Commission for modifying both EMAS and the EU Eco-Label[4] and make them more effective.

The three scenarios the Commission has been facing provided for, respectively: (i) *keeping the status quo*, (ii) *progressively abandoning and closing the schemes* or (iii) *strengthening them by way of substantial integrations and improvements*.

The Commission finally chose the latter option, aware that, in order to be really effective, the new EMAS Scheme has to overcome many barriers and drawbacks that prevented it from diffusing at a

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[1] The EU Scheme has been available for participation by companies since 1995 (Council Regulation (EEC) No. 1836/93 of 29 June 1993), but was originally restricted to companies in manufacturing sectors.

[2] “*Proposal for a Regulation of the European Parliament and of the Council on the voluntary participation by organisations in a Community Eco-management and Audit Scheme COM(2008) 402/2*”. On November 25, 2009, the Council and the European Parliament adopted the revised EMAS Regulation, successively published in the Official Journal as *Reg. EC No. 1221/2009 of the European Parliament and of the Council of 25 November 2009.*

[3] Study carried out in 2005-2006 on behalf of the European Commission (DG Environment) by a consortium of consultants led by IEFE – Università Bocconi. Other partners in the consortium were *Adelphi Consult* (DE), *IOEW - Office Heidelberg* (DE*), SPRU - Sussex University* (UK) and *Valør & Tinge A/S* (DK). The EVER consortium relied on two kinds of evidence: (i) a *desk research*, based on a thorough literature review on existing evaluations, analysis and other studies focused on the two schemes and (ii) evidence collected by way of an in-field research, carried out through consultation and interviews with a diverse and broad group of stakeholders.

[4] The EU Ecolabel is a voluntary scheme, first established in 1992 to encourage businesses to market products and services that are kinder to the environment (Regulation (EC) No. 1980/2000 on EU Ecolabel Scheme).

large scale in the past. In other words, EMAS III should be able to achieve a synergetic balance of the following goals:

- resulting appealing for companies and organisations;
- providing a guarantee of excellence to stakeholders;
- leading to considerable environmental improvements;
- having a tangible impact on competitiveness, providing the registered organisations with economic advantages;
- being easily recognisable and preferred both by the public at large and by the reference markets.

The present paper focuses on some of the dimensions of the currently applied EMAS (i.e. the "facets" that characterised the scheme), namely its *drivers* and *barriers* on one hand, and its advantages and impact on competitiveness on the other hand, in sight of its upcoming revised version. While there is plenty of information regarding Environmental Management Systems (EMSs) in general, the evidence tailored to the specific case of this EU scheme is not so overwhelming. However, it is on the latter that the paper will be angled towards, with the relevant added value represented by the outcome of the EVER project in-field research.

During the EVER study, 199 interviews were carried out concerning the "state of the art" in the implementation and development of EMAS. These interviews have been based upon a standard version of a questionnaire, developed at the beginning of the project. The standard questionnaire has been then adapted, in a modular way, to five different typologies of interviewees, according to their specificities. Some of the questions were reformulated, to investigate specific aspects relating to each typology of interviewee, and others were kept identical, in order to guarantee a certain comparability between the different typologies.

The five typologies of interviewees were classified as follows:

- *EMAS participants* (70);
- *EMAS non-participants* (31);
- *EMAS stakeholders* (including environmental and consumer NGOs, trade associations, verifiers, competent bodies, etc.) (84);
- *EMAS participants - public institutions* (7);
- *EMAS drop outs* (7).

While for the "*stakeholders*" and the "*non participants*" it was not possible to establish a statistical significance of the sample (as the original population was too wide), the sample relating to the "EMAS participants" was able to provide robust calculations. Considering that the original population of

EMAS registered organisations amounted, at the beginning of the study, to 3072 units, the EMAS sample (77 organisations) more than satisfies the criterion of the "square root" established by the applicable EA standards (55) and implies a minimal error (ε =11%)[5]. Still, even if the sample size of the *non-participants* was limited, it reflected the views of a relevant number of practitioners across Europe. Actually, the most of the interviewed non-participants were large companies and companies that are also pro-active in environmental management: 55% have adopted ISO 14001, 22.5% operate a less formalised, non-standardised or 'company-based' EMS, and only 22.5% do not have any kind of EMS.

The interviewees were selected according to three criteria: i) *representative regional distribution*, ii) *representative distribution of organisation sizes* and iii) *representative distribution according to the type of organisation*[6].

2. EMAS Drivers and Barriers

As regards drivers and barriers, there is plenty of evidence in literature regarding both EMSs in general and EMAS specifically (Strachan 1999, Perkins and Neumayer 2004, Watzold and Bültmann 2000, Cesqa Sincert 2002, Hamschmidt 2000, Morrow and Rondinelly 2002, Aalders 2002, Anton *et al.* 2004, Malmborg 2003, Iris 2000, De Leo *et al*. 2003, etc). Given the broadness of the information background, the findings are not univocal; however, there are some trends that characterise most of the studies being analysed. First of all, we can note that there are many dimensions influencing the type and the relevance of the different drivers and barriers, such as the *size* of the organisation (SMEs vs large companies), the *sector* in which they operate (e.g: manufacture vs Public Administration) and the *national context*.

[5] The reader can consult the statistical appendix to the EVER Annex I for further details: http://ec.europa.eu/environment/emas/documents/kit_en.htm

[6] With respect to the regional distribution, the project team proposed a set-up which refleced the "numbers" of participants in the two schemes in the various countries. Some adjustments were made in order to take into account the weight of some countries (e.g. Germany for EMAS) and to guarantee a proper representativeness also to newly accessed countries, where the two schemes are not very diffused yet. As to size distribution, the sample included a relevant number of small companies (*1-50 employees*, 34% of the sample) and large companies (*more than 250 employees*, 38% of the sample); the rest of the sample was composed of medium-size companies (*51-250 employees*, 28% of the sample). Finally, as regards the *sector breakdown*, the sample was composed of 35% *manufacturing companies*, 23% *public administrations*, 16% *services*, 9% *other industrial sectors* and 17% of *others*. The significant presence of public administrations was mostly concentrated in the "stakeholder" type: competent bodies, governments, etc. "Others" include NGOs, trade associations and those organisations that operate in more than one of the other sectors (e.g. manufacturing and retailing).

2.1 Drivers

If we focus on EMAS companies it appears that, at first, most organisations achieved the registration for reasons that were not related to competitive advantages: the three most important reasons motivating current participants to register seem to be the willingness to better manage and guarantee legal compliance, the aim of improving environmental performance and the commitment to better manage risk and prevent environmental liability. According to the results of the EVER study, for example, the improvement of competitive capabilities ranked only sixth among the possible drivers for EMAS registration, showing that perhaps the relevance suggested by some literature could be overestimated (See Figure 1).

The most relevant motivations to adopt EMAS:	
better management and guarantee of legal compliance	4,0
Improvement of our environmental performance	3,9
better risk management and environmental liability prevention	3,7
Improvement of our organisational and managerial capabilities in the environmental area	3,6
improvement of the relations with our stakeholders and the local community	3,5
improvement of competitive capabilities or satisfaction of a specific request by customers	3,4
keeping up with our main competitors/members of our trade association	3,2
satisfaction of a request by our corporate headquarters	3,1
benefits from regulatory relief	2,9
increase of our rating in having access to public funding or procurement procedures	2,3

FIGURE 1. Drivers for Emas Registration (Source: Ever Study)

Going into further detail, we may note how "*better management of legal compliance*" and "*improvement of environmental performance*" display an average score of 4,0 and 3,9 on a maximum of 5, respectively:

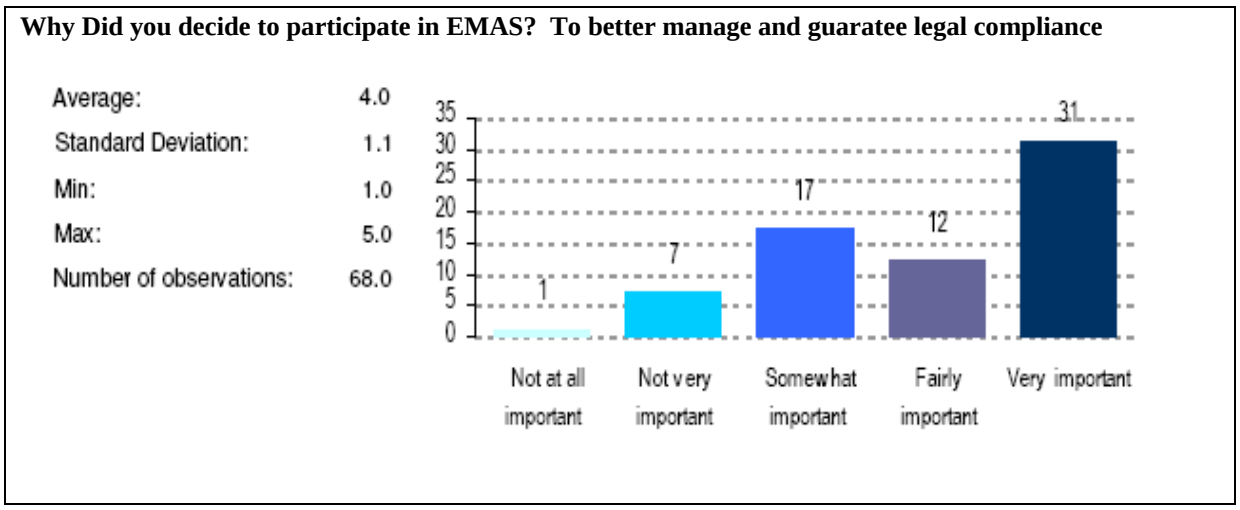

FIGURE 2. Drivers for Emas Registration: Legal Compliance (Source: Ever Study)

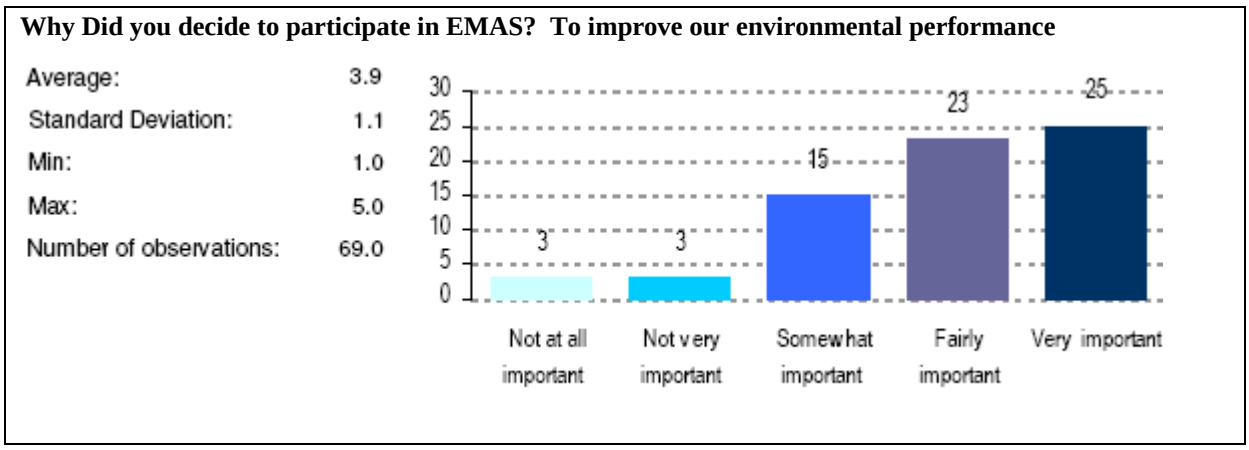

FIGURE 3. Drivers for Emas Registration: Environmental Performance (Source: Ever Study)

If we consider, for example, the environment-related driver, we can see that more than 37% of participants identified it as "*very important*", and an extra 33% rated it as rather or somewhat "*important*", while the figures depicting a scarce importance of the environment-related motivations to register are statistically not relevant.

Together with "*compliance*" and "*environmental improvement*", according to the EVER study, other key drivers seem to be more of an "internal" nature, dealing with better organisation and overall management roles and responsibilities definition. Competitive variables lag behind (the improvement of competitive capabilities is indicated only as the sixth driver in terms of importance, and the willingness to keep up with competitors as the seventh).

We should stress, however, that these strategic/economic drivers, even if they lag behind in comparison with other types of motivations, have nevertheless achieved fair "overall" scores: indeed, all drivers seem to have a "positive" motivational effect on companies (with scores higher than 3),

exception done for those drivers that are closely linked to the public sector and the relationship of EMAS with environmental regulation (regulatory relief, public funding, green public procurement, etc), since these kind of potential benefits are today virtually non-available for registered companies and, therefore, scarcely perceived by the interviewees.

Another study focusing on the specificities of the EMAS scheme (Clausen *et al.*, 2002) shows that economic and strategic drivers prevail in spurring companies towards registration. As it clearly appears from the following figure, economic and competitive motivations (such as energy/resources savings, better image, etc.) are very important, while other dimensions such as the reduction of environmental impacts, seem to play a marginal role:

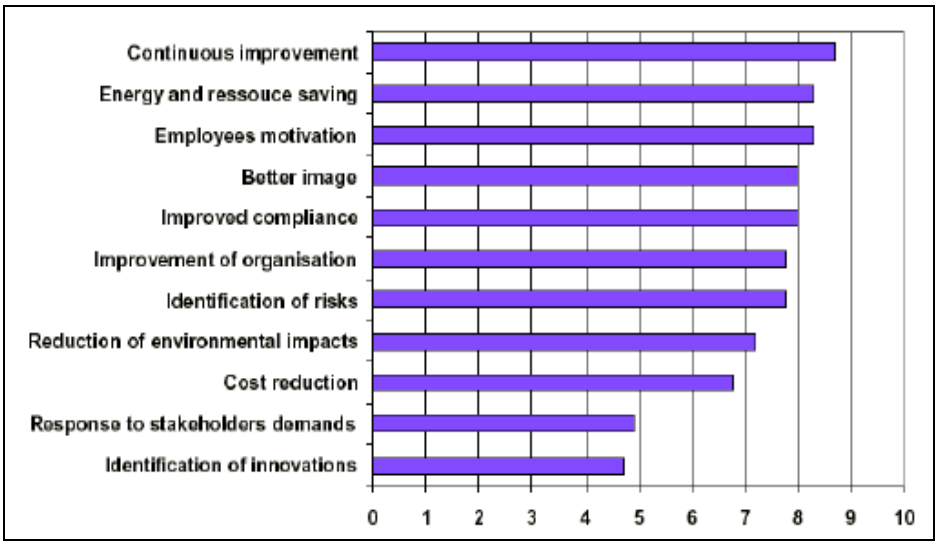

FIGURE 4. Motives for participating in EMAS (Source: Clausen *et al.*, 2002)

Other studies confirm this general trend, even if some discrepancies can be highlighted. Perkins and Neumayer (2004), for instance, agree that the cost-reductions, benefits and profitability of EMAS are major drivers, but they are unlikely to be the only ones, as firms often adopt high-impact organisational innovations (like the adoption of an EMS) based on self-motivation by managers, i.e.: for their own quest for external legitimacy, and specifically, their need to conform to widely held beliefs of rational and efficient management practice (both internal and external to the interested organisation). 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 EMAS adoption, such as liability threats and pressures from consumers, investors and the public opinion.

Even if the prevalence of economic and strategic factors is a general trend characterising most studies, there are cases where also environmental aspects seem to play a crucial role. As an example, we can mention a survey carried out on French EMAS registered organisations (Schucht, 2000): its results emphasise 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 (See Figure 5).

Companies' Motivations to Participate in EMAS[10]

	1	2	3	4	5	6	average grade	number of enterprises which replied
improvement of environmental performance of the enterprise	12	6	2	0	0	0	1,5	20
improvement of the company's image	10	6	4	0	0	0	1,7	20
improvement in the co-operation with public authorities	9	3	4	4	0	0	2,2	20
expectation of simplified administrative procedures (e.g. licensing requirements)	5	2	6	2	4	1	3,1	20
assurance of legal compliance	10	6	3	1	0	0	1,8	20
cost reduction	7	6	2*	1*	2	2	2,6	20
gain of competitive advantages	5	6	6	1	2**	0	2,5	20
gain of preferential treatment from clients (e.g. get more orders)	4	5	6	2	3	0	2,8	20
motivation of employees	5	8	5	0	0	0	2,0	18
gain of preferential treatment from insurance companies	4	4	3	2	4	3	3,4	20
gain of preferential treatment from banks	4	1	3	3	3	6	3,9	20
anticipation that the company will be compelled to participate in the future	5	2	8	1	3	1	2,9	20
Scale: 1 = "very important" to 6 = "no importance"								
* - one firm tagged 3 and 4 (average grade calculated with 4)								

FIGURE 5. Motives for participating in EMAS (Source: Schucht, 2000)

Also the UNI-ASU study (1997) found that the most important aim of companies adopting EMAS was to improve their environmental performance. An improved company's image and assured legal compliance come in second and third place. Other reasons were: improved relations with authorities, acquirable benefits from regulatory relief and the anticipation of public pressure. Less important reasons were a preferential treatment by clients and insurance companies.

A peculiar and very important "external" driver is represented by the communicational dimension of EMAS. Indeed, this is one of the main features differentiating the EU scheme from other forms of certification such as ISO14001. As reported by the relevant literature on environmental reporting and

EMAS statements (e.g.: Gorla and Iraldo 2001, Imperial College *et al*. 1999, Grafé 1996, Jones 2000, etc.), the willingness to communicate with the stakeholders can be a powerful driver for EMAS registration. Some of the analysed 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 and Iraldo 2001). It has to be noted, though, that in contrast with this motivation, few companies are proactively using the EMAS environmental statement as a communication tool towards the stakeholders and the market.

Other sources, such as the study carried out by FFU (1998) provide a more balanced view about the motivation of enterprises to participate in EMAS. The investigated companies in this study were participating in pilot experiences. Expected "external" benefits such as an improved image, better legal compliance or competitive advantages are as important as the expected "internal" benefits, such as an integrated concept for an effective environmental protection at the corporate level.
If we shift the attention on a broader, international context regarding for example other schemes like ISO14001 (Fryxell *et al.* 2004, Delmas and Magali 2000), we note that, as in the case of EMAS for the EU context, 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 140001-certification in China (Fryxell *et al.* 2004) 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.
In any case, a general key-finding emerging from the literature is that of the prevalence of "external" drivers over "internal" ones. For instance, we can mention the Cesqa Sincert research, carried out in 2002 in Italy: main motivations for the uptake of ISO 14001 are '*image improvement*' and '*legal compliance*' (53% and 55% of respondents, respectively, rate such drivers as "very important"), while a better organisation and rationalisation of activities was regarded as less important.

2.2 Barriers

According to the investigated literature, there are many factors that prevent organisations from implementing EMSs, or even tackle their maintenance over time. These barriers are heterogeneous in nature and scope, and can be broken down according to many different types of criteria, such as: internal and external, organisational and economic and so on.
The most important "external" barriers are represented by:

- *economic factors* (e.g: cost of implementation);
- *scarce consumer awareness and interest* (thus a limited market response);
- *lack of recognition and incentives by public institutions*.

The amount and relevance of the EMAS-related costs is difficult to assess and data on the issue are not univocal, even if some costs (e.g: external consultants) are reported by literature to be an excessive burden, especially for SMEs. On the other hand, different causes for the scarce awareness of EMAS by consumers have been identified, ranging from a lack of promotional activities at all levels (e.g: EU or governmental campaigns) to a wide "confusion", deriving from the spread of many certifications and labels overlapping with EMAS. Moreover, Public institutions' recognition and awards are overall perceived as lacking, even if there is evidence that, wherever applied (e.g: Germany, Italy), they provided a strong support for the uptake of the scheme.

Focusing more in depth on *external barriers*, they encompass a wide set of factors, ranging from the lack of support and guidance, to hindrances linked to the institutional framework and the verification/registration process.

A first relevant barrier that appears to be very important is represented by costs of implementation, and this holds true especially for those actors with limited financial resources such as SMEs (Hillary 1999, Biondi *et al*. 2000). Clausen *et al.* (2002) collected evidence from different studies on the costs of EMAS implementation in different countries, and the results are illustrated in the table below:

Size / Member States	Small < 100 emp.	Medium < 500 emp.	Large > 500 emp.	Average
Austria (BMUJF 1999) [2]	109.000 €	225.000 €	153.000 €	-
Denmark (Kvistgaard 2001) [2]	-	-	-	62.000 €
Germany (UBA 1999) [2]	37.000 €	84.000 €	85.000 €	59.000 €
Other Countries				
Switzerland (Dyllick, Hamschmidt 2000)	56.000 €	93.000 €	322.000 €	172.000 €
Hungary (INEM 2001) [2]	3.200 € up to 6.200 €	5.800 € up to 11.000 €	more than 11.000 €	-

FIGURE 6. Costs of implementation (Source: Clausen *et al*., 2002)

It appears that the costs vary significantly, due to the size of the organisation as well as in reference to the specific national context companies operate into. The widespread agreement over the importance of such a barrier is confirmed by many studies, like a survey on the uptake of both EMAS and ISO 14001 (Strategic SME Group, 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.

Moreover, the previously mentioned Cesqa Sincert study (2002) 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. Still, not only *achieving* the registration is expensive, but also *maintaining* EMAS or other EMSs. We can quote Delmas, who states that "*the annual cost of maintaining ISO 14001 is a more important constraint than are design and registration costs*" (Delmas, Magali, 2000).

Not only implementation and maintenance costs are to be regarded, however, as relevant external barriers hindering the diffusion of EMAS. Different studies stress how even the lack of customer interest and awareness (Kvistgaard *et al*. 2001, Brouhle 2000, Best Project 2004), with the subsequent need to promote EMAS and its logo (De Leo *et al*., 2003), and the lack of recognition and positive rewards by public institutions (Regione Toscana 2005, De Leo *et al*. 2003) play a relevant and detrimental role, from such perspective.
Brouhle (2000) stresses how there is basically a non-existing awareness of EMAS among the general public; furthermore, there is a scant level of EMAS knowledge among firms themselves. Mentioning a research study by UNI/ASU, over 25% of CEOs did not know about EMAS (Freimann and Schwedes, 1999), while another study by the Institute for Research in Social Choices identified that one third of managers had no knowledge of EMAS at all, with a further 33% claiming to have just a slight idea of the scheme.

The role played by public sector has indeed a crucial effect on the uptake of EMAS, as a relevant barrier can be also represented by a "hostile" overall institutional context (with central and regional governments refusing to promote the scheme), while, on the opposite, Member States (like for instance Germany) where the public sector is more keen on supporting the diffusion of EMAS (by way of promotional campaigns, incentives for registered organisations etc), the uptake of the scheme is much higher. A study carried out by De Leo (De Leo *et al*., 2003) on Italian and German sites showed how among the main reasons for the success of the German policy, one can identify several key-supports: an effective program of information and technical assistance to companies, sensitisation of the public opinion, financial aid and administrative simplification and deregulation.

Overall, this evidence is consistent with what emerges from the EVER Study. Most of the results are in line with what emerged within the pre-existing literature, but in some specific aspects it drew slightly different conclusions. It is particularly interesting to analyse the results of the EVER interviews exploring the point of view of the organisations that are not participating in the scheme.

The following figure shows how non-participants interviewees rated the importance of external barriers in discouraging EMAS registration:

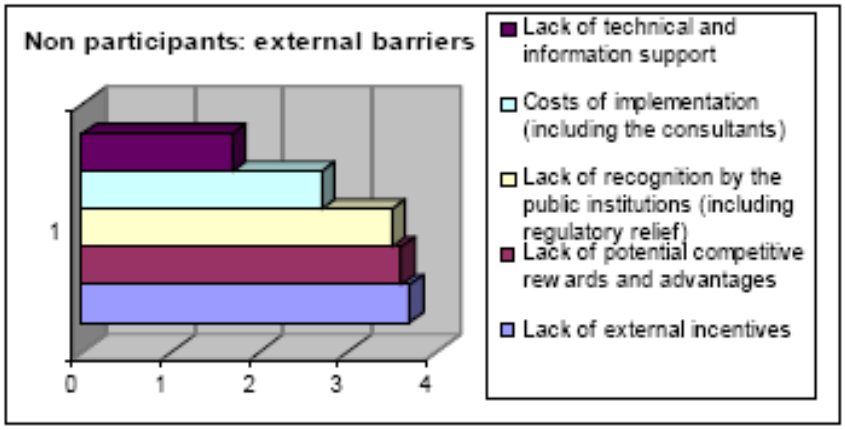

FIGURE 7. EMAS 'Non Participants' External Barriers (Source: Ever Study)

It clearly appears how the role of public institutions is crucial: the *lack of external incentives* (3,7) and *lack of recognition by the public institutions* (3,5) are actually perceived as the most relevant hindrances by most of the interviewees. Moreover, a scarce interest by consumers and the subsequent *lack of competitive rewards* (3,6) is indicated as a strong barrier, as well, being this consistent with the findings of the above mentioned studies. The EVER findings, however, provided some surprises, such as the scarce importance given to the cost of implementation (2,7). Despite high costs associated with activities such as external consulting, most organisations suggest these being not the reason why non-participants decide not to implement EMAS.

Moreover, the EVER interviews investigated the relevance, once the registration has been achieved, of the barriers tackling them in maintaining EMAS. In this respect, the opinion of EMAS participants is quite interesting. The in-field research outcomes show how the *lack of competitive rewards* and the *lack of recognition/rewards by public institutions* are the main hurdles faced by organisations, while costs, once again, are not considered as a relevant barrier by the EMAS participants (see Figure 8). Still, it has to be noted that none of the barriers are perceived as particularly important (most of the scores are close to or less than 3).

A last important comment should be devoted to the role of the bodies involved in the implementation of the scheme: neither the Competent Bodies nor the verifiers seem to be perceived as a potential or factual barrier in playing their role for the functioning of the scheme.

The most relevant external barriers:	
Lack of competitive rewards and advantages	3,2
Lack of recognition by the public institutions (including regulatory relief)	3,2
Lack of economic incentives (including funding)	3,1
Lack of recognition by the stakeholders	2,9
Lack of recognition at the international level (outside the EU)	2,9
Too expensive (including costs of verification and registration)	2,7
Difficulties in communicating EMAS to stakeholders and customer	2,7
Too difficult to maintain the EMS under the organisational and managerial point of view	2,6
Difficulties linked to the role of the CB	2,2
Difficulties linked to the role of the verifier	2,1

FIGURE 7. EMAS 'Participants' External Barriers (Source: Ever Study)

If we shift our attention on internal barriers, we note that the category is vast and heterogeneous, ranging from *lack of resources* (e.g.: time and human capital) to *difficulties in the understanding and perception of the EMAS scheme*, from *drawbacks in its implementation process* to the *culture* itself of organisations, and so on. There is evidence in literature that companies face relevant hardships in effectively understanding the scheme and its requirements, thus identifying relevant environmental aspects to deal with. In other words, there is an overwhelming difficulty in understanding EMAS and some specific parts such as the Initial Environmental Review, and to identify core-aspects (Hillary *et al*. 1999, Regione Toscana 2005).

IRIS (2000) shows that 49% of companies find it challenging to identify relevant environmental aspects, and more than 25% fail to identify some significant environmental aspects. Moreover, it has been assessed by some studies (e.g.: BMU/UBA 2000) that many companies evaluate the relevance of environmental aspects by the so-called "rule of thumb", and not by an objective and reproducible method. The drafting and the diffusion of the EMAS Statement represent another difficult requirement 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 organisation (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 as a matter of "harmony" within an organisation (e.g: interaction between business executives, sometimes also marketing and communication managers, and environmental managers) on business priorities. No surprise if, given such situation, it is very difficult to set performance objectives and to hence recognise relevant aspects within EMAS to be dealt with (MacLean, 2004).

Another relevant internal barrier is represented by the lack of resources, both financial and human. These assets are vital for a successful 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, 2001, Bonora *et al*., 2001).
The lack of resources can be even worsened by the high demands of documentation (both asked by the verifiers and strongly suggested by the consultants). In this case, 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 de-motivated believing the documentation requires too much of their time, and "*instead of documenting the problems, they pretend not to see them*" (Malmborg 2003).

A final internal barrier highlighted by the literature can be defined as "indirect" and identified in the fact that the implementation of a certified EMS (EMAS or ISO 14001) might have backlashes, for instance, by disclosing certain "environmental non compliances" that would have 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 EMSs. With this respect, a relevant 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 (Edwards *et al.*, 1999), while other studies show even higher figures for such barrier (e.g: 60% in Delmas' US-based survey).

The EVER study devoted great attention to internal barriers, showing however how they seem to play a lesser role compared to external ones. Indeed, on a 1 to 5 scale, in the in-field research none of the internal barriers achieved a score higher than 3, both for participants and non participants. Only stakeholders signalled some internal barriers as moderately important.
Figure below summarizes the results of the interviews, as far as "internal" barriers are concerned:

	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**

FIGURE 8. Internal Barriers (Source: Ever Study)

Actually, it is surprising to see how for 'non participants' the lack of human resources and competences is not considered as a relevant hindrance, at all. Only one respondent out of 22 regarded it as "very important", while for 17 interviewees (almost 80%) the barrier is not important at all or not very important (See Figure 9).

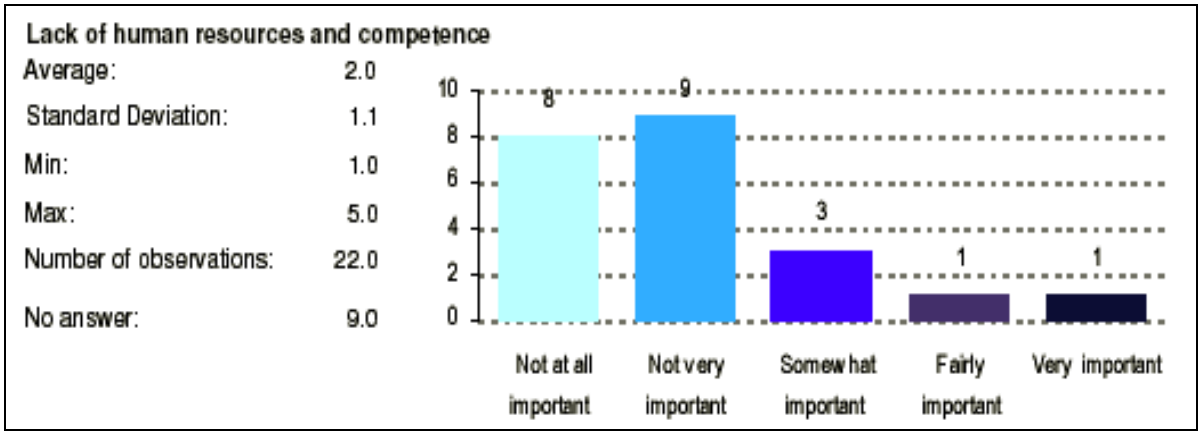

FIGURE 9. Internal Barriers for 'Non participants': Lack of Human Resources and Competences (Source: Ever Study)

3. Benefits and competitive advantages

One of the key aspects regarding the success of EMAS refers to its capability to produce economic paybacks and to support the competitiveness of registered organisations on the market, enabling them to obtain positive feedbacks from the final consumer or the intermediate client, in terms of variables that conventionally measure "competitiveness", such as: *market shares*, *increase of sale and turnover*, *innovation*, *image* and *customer satisfaction*, etc. While some of these dimensions are closely linked to the market (e.g: market shares and sales), others refer to "immaterial" and non-quantifiable assets (e.g: image, customer satisfaction, innovation), being nevertheless crucial for the overall competitive performance of organisations.

The general impression deriving from literature is that EMAS registration is actually able to exert a positive influence on competitiveness, even if the effective relevance in supporting it is not certain or easily quantifiable, especially as far as some variables (such as market positioning and revenue or turnover increase) are concerned.

A straightforward and crucial question regards whether EMAS is considered as an effective competitive tool or not. A recent answer has been provided by the EVER study: from the in-field

research it emerges that there is no agreement upon the answer, as 54% of respondents believe the scheme is actually effective, while 46% have a more pessimistic view.

If we break down the outcome of the interviews between "participants" and "non participants", we can gain insights of how companies actually adopting the scheme judge it as a tool capable of supporting their competitiveness.

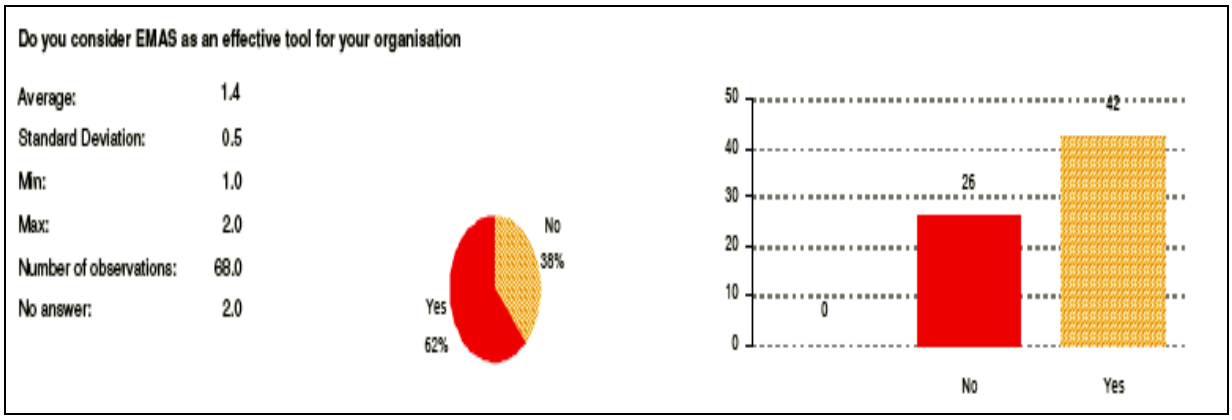

FIGURE 10. Emas Participants and Competitiveness (Source: Ever Study)

The percentage of interviewees having a positive perception of EMAS competition capabilities is higher than the average of the whole sample in the case of the "participants" subgroup (62%), even if we have to highlight that a relevant number of EMAS registered organisations (38%) are not perceiving benefits in terms of competitive effectiveness (see Figure 10).

On the other hand, if we consider "non participants", it is interesting to note how only 26% believe that EMAS would actually provide an effective support to their competitive performance.

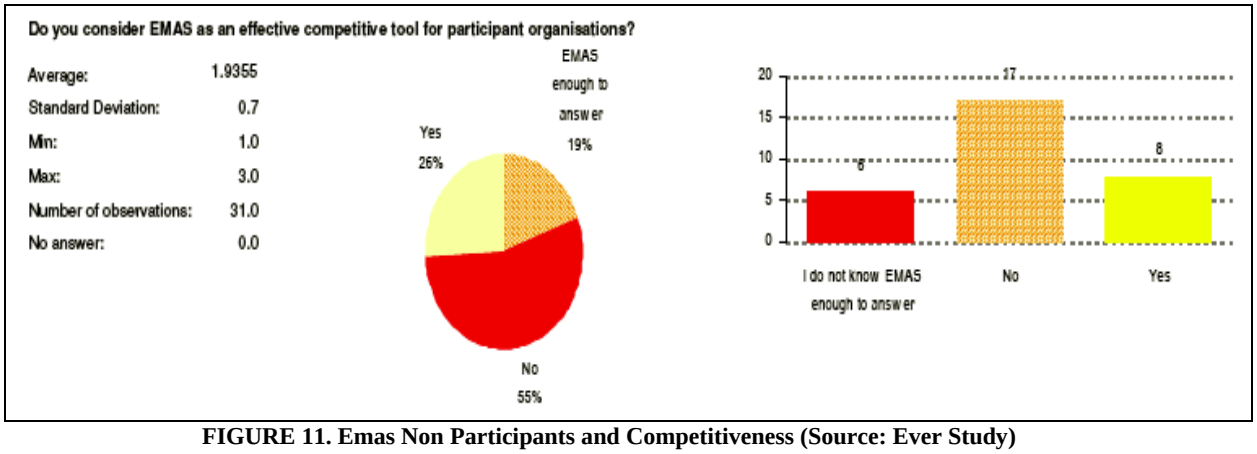

FIGURE 11. Emas Non Participants and Competitiveness (Source: Ever Study)

Most of the literature agrees on the benefits provided by the EMAS registration in terms of cost optimisation, and this is consistent with the evidence emerging from the EVER "in-field" research, as

well. Most studies show that EMAS implementation supports firms competitiveness, thanks especially to the lower cost-savings they can obtain by effectively implementing the management system. Actually, this is the most perceived benefit, if we consider the whole set of the analysed studies reported in the table below.

Type of benefits	NL VROM 1997	EU Hillary 1998	GER UBA 1999	AUS BMU 1999	GER BMU 2000	SWE IRIS 2000	SWISS Baumast 2001	DK Kvistg. 2001
Reduced resource consumption	yes		yes	Yes	yes			yes
Lower cost (several reasons)	yes	yes	small	Yes	yes	yes	yes	yes
Better working conditions								yes
Better employee motivation and participation		yes	yes		yes	yes	yes	yes
Positive market response		yes	small		yes	yes	small	no
Better financial conditions in banking and insurance				Yes	yes		small	no
Better Image	yes	yes	yes		yes		yes	
Reduced risk of non-compliance	yes	small	yes	Yes				

Tab. 5.3: Economic benefits of EMAS implementation found in different studies[7]

FIGURE 12. Emas Benefits spurring competitiveness

The "in-field" research carried out in the EVER study confirms the importance of economic efficiency - related benefits, as one of the main way in which EMAS supports the participants' competitiveness.

The most relevant competitive benefits perceived	
Cost savings through decrease in resource use, reuse or recycling	**3,3**
Cost savings through waste reduction	**3,2**
Better planning of investments in machinery, equipment and plants	**2,7**

FIGURE 13. Emas Benefits spurring competitiveness (Source: Ever Study)

We can see from the Figure 14 that opportunities for cost-optimisation such as reuse, recycling and an overall decrease in resources used are regarded as "fairly" or "very important" by most of the respondents (37 out of 66), and the same goes for cost savings achieved through waste reduction, while there is less perception of effective benefits as far as the planning and optimisation of investments is concerned.

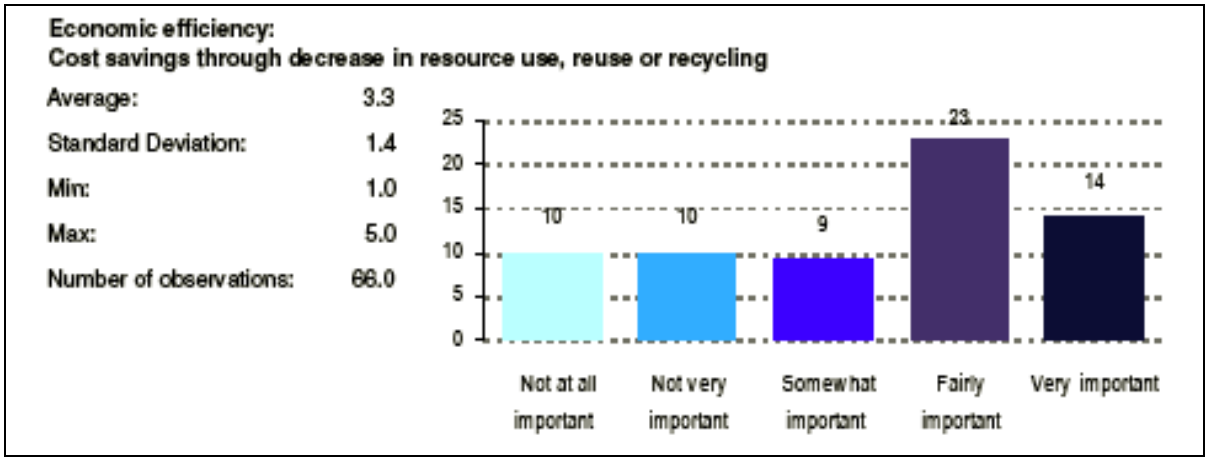

FIGURE 14. Economic Efficiency: Cost Savings (Source: Ever Study)

Also the studies that more generically deal with EMSs show how cost savings represent one of the main dimensions on which the certification supports competitiveness (Petrick *et al*. 1999, Axelsson *et al.* 2003). Indeed, it appears that all kinds of EMSs do actually spur competitiveness of firms as they operate as cost-cutting measures, especially as far as some issues like *greater energy efficiency* and *reduced resource consumption* are concerned. We can mention, as an example, a study carried out in 2001 (Hamschmidt *et al*., 2001), showing how 50% of Swiss ISO 14001-certified companies perceive cost reduction as a relevant benefit deriving from the implementation of an EMS.

While there is general agreement on the "qualitative" support provided by EMAS to improved image (and thus competitiveness), some studies make a further step, trying to analyse more in depth and to "quantify" the importance of such benefit which, by nature, is intangible and difficult to evaluate.
As far as EMAS-based studies are concerned, the German based survey carried out by Wittman (1996) indicated an effective improvement in company image in 62% of the cases being analysed, while a 1999 Imperial College and Iefe study found that the improvement of company image (with 29% of preferences) ranks among the most significant benefits, following only cost reduction (31%). Moreover, Hillary (1998) carried out a pan-EU EMAS survey, showing that SMEs perceive an improvement of image as the main registration-driven benefit (54%), whereas its importance, however consistent, seems to decrease as the size of the organisation increases.
The relevance of a better reputation is confirmed by the results of the EVER "in-field" research, singling out "improved image" itself as the main competitive advantage experienced due to the participation in EMAS (Figure 15).

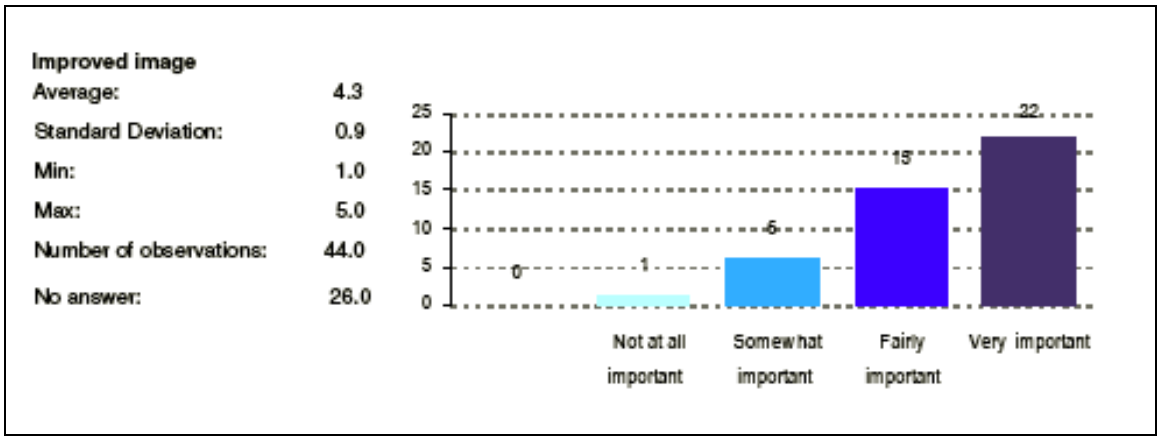

FIGURE 15. Improved Image (Source: Ever Study)

A strong image can assume also the form of "leadership recognition" especially by competitors, but also by other relevant stakeholders and economic actors (such as trade associations and unions). Indeed, the EVER "in-field" research proves that organisations clearly perceive EMAS registration supports such "strong image" (3,3), as reported in the Figure 16.

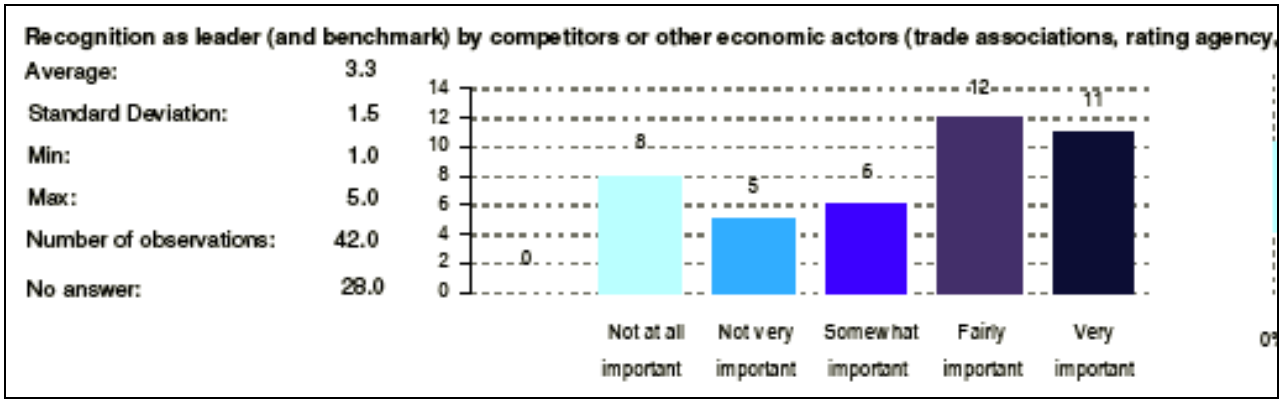

FIGURE 16. Recognition as a Leader (Source: Ever Study)

The outcomes relating to EMAS are not significantly different from the literature findings related to studies focusing on other EMSs. These studies, once again, stress the relevance of certification-driven improvement in corporate image as a key-benefit supporting firms competitiveness (e.g.: Del Brio 2000, Danish EPA 2003, Christiansen, Dalby, 1998). Von Hauff (2000) shows that an improved image is among chief benefits deriving from an ISO 14001 certification.

The overall trend emerging from literature shows an increase in customer satisfaction deriving from the EMAS registration. And this is in line with the general finding that "immaterial" benefits are those that are most perceived by organisations. However, there is no general agreement upon the overall degree of success in increasing customer satisfaction. For instance, while the Imperial College and Iefe

study (1999) stresses how such benefit is perceived as important by 10% of respondents only, being overpowered by other issues such as cost reductions, the EVER, in-field research seems to give it more credit, as respondents gave a rather positive evaluation (3,2 on a maximum of 5):

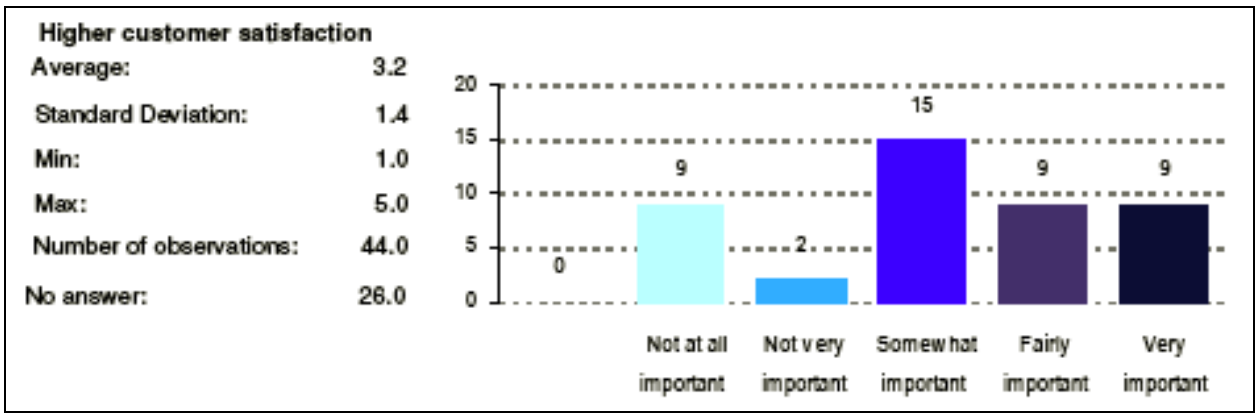

FIGURE 17. Customer satisfaction (Source: Ever Study)

A further dimension that has been extensively analysed is that of *innovation*, as to assess if and to what extent the adoption of EMAS actually supports the competitiveness of companies by spurring innovation processes. Most of the evidence gathered in the relevant literature suggests that there is a positive influence of EMAS on environmental process and product innovations, as well as on environmental organisational innovations. The most important survey on this issue (Rennings *et al.*, 2003), carried out on German registered sites, shows that EMAS actively supports the development of innovations, whose scope depends on the maturity of the scheme itself. Moreover, it appears that sites who have achieved significant "learning-by-doing" processes by EMAS are particularly successful in economic terms, exploiting synergies between the "environmental" and the "innovative" dimensions. In a subsequent survey of production managers in 588 German facilities, this time evaluating different Integrated Product Policy initiatives, Rennings *et al.,* (2004) found a weak but significant positive influence of both ISO 14001 and EMAS on environmental product innovations. This result suggested that "*a certified EMS induces companies to review their existing procedures for potential improvement with respect to environmental product innovations*". The influence of EMS certification was, however, found to be weaker than other IPP initiatives such as waste disposal or take-back systems.

As one may expect, especially organisational changes are being induced by EMAS, such as environmental project- or innovation- teams, R&D creative capabilities and employee suggestion schemes. These can support learning processes and contribute to capacity-building (Bradford *et al*. 2000). Additional environmental innovations, especially process and product innovations of a technical nature, are often a result of preceding organisational innovations (Rennings *et al*., 2003).

The EVER "in-field" research confirms the relevance of EMAS-driven innovations in supporting the competitiveness of participating organisations: both organisational and technical innovation capabilities are spurred by the EMAS registration, with the former placing second (3,5) among the most perceived competitive benefits, and the latter achieving a positive assessment (3,1), as well (Figure 18).

The most relevant competitive benefits perceived	
Improved image	4,3
Improved organizational and managerial innovation capability	3,5
Cost optimization	3,5
Recognition as leader by competitors and other economic actors	3,3
Higher customer satisfaction	3,2
New customers (or contracts) or market shares acquired	3,2
Improved technical innovation capability	3,1
Improved product quality or performance	3
Facilitated access to credit or to public call for tenders	2,1

FIGURE 18. Competitive benefits (Source: Ever Study)

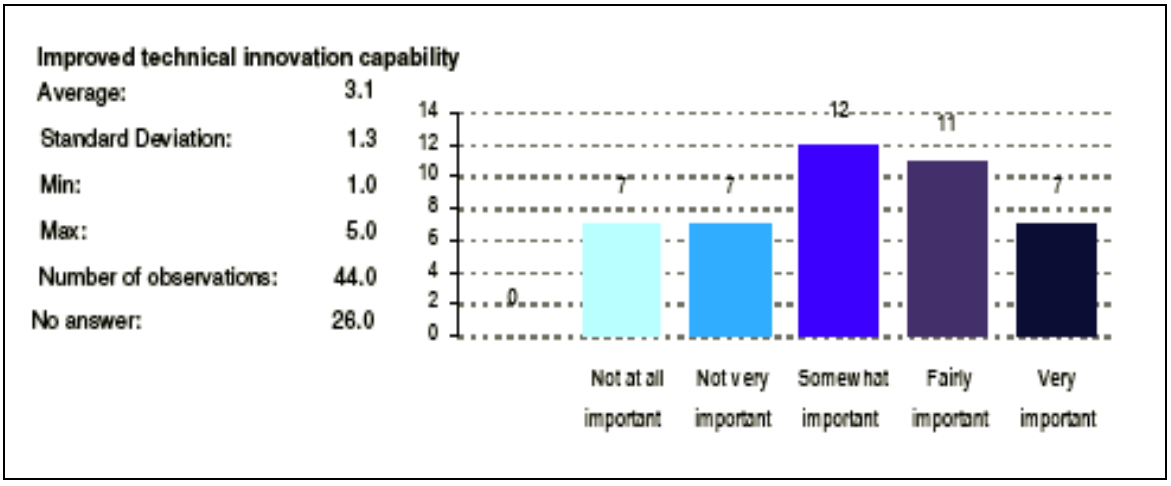

FIGURE 19. Technical innovation capability (Source: Ever Study)

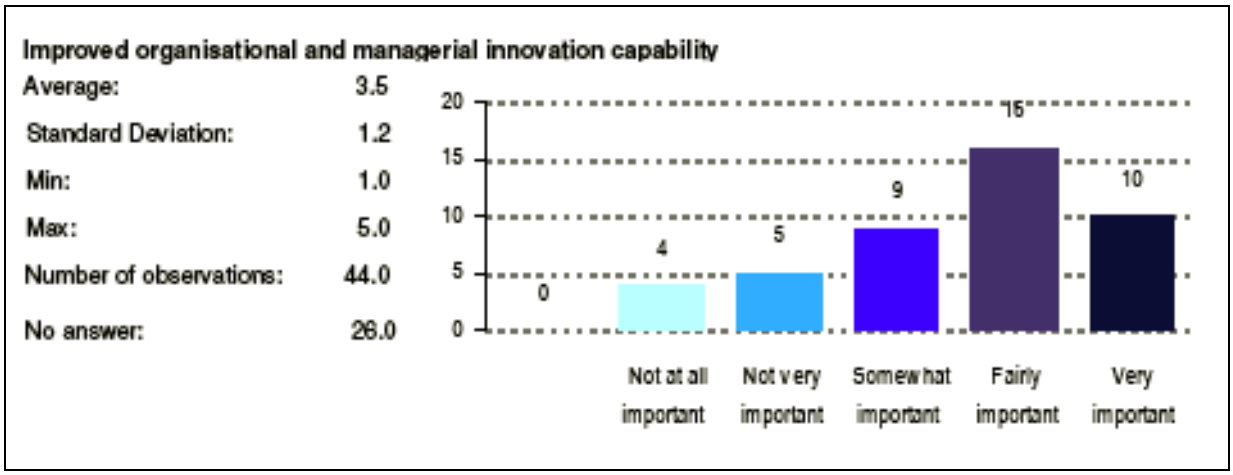

FIGURE 20. Organisational and managerial innovation capability (Source: Ever Study)

The results of the EVER study spurred further research on the relationship between EMAS, innovation and competitiveness at large. Iraldo *et al*. (2009) applied an econometric model that proved how EMAS organizations that are perceived as better performing from an environmental viewpoint are also able to improve their innovation capabilities as a key competitive factor.

Being environmental performance positively linked to the age of the EMS and the extent of investment planning and resources, this can produce a better innovative-orientation in the organization, coupled with a ‘‘cumulating’’ know-how and an increased technical ability to sustain innovation patterns. We can hence observe how companies investing in environmental innovation develop better skills in developing new technologies and organizational solutions as well, and to manage them effectively.

Finally, there is a broad literature investigating the support provided by EMAS (or other EMSs) to firms’ competitiveness, in terms of “direct” indicators such as market shares, increased sales and revenues and improved market position.

The findings are consistent with the idea that only part of the above-mentioned benefits support a concrete improvement of the competitiveness of EMAS organisations. It seems like the main benefits are either immaterial (such as a better image) or linked to the internal sphere of the company (e.g: lower costs or better management and rationalisation of activities), and not directly linked to the “market response”. Again, the 1999 work by Imperial College and Iefe emphasises how, notwithstanding the good results achieved in terms of cost reduction and improved image, the concrete competitive advantages “on the market” (stressed by 11% only of respondents) are existent but still limited (see Figure 21).

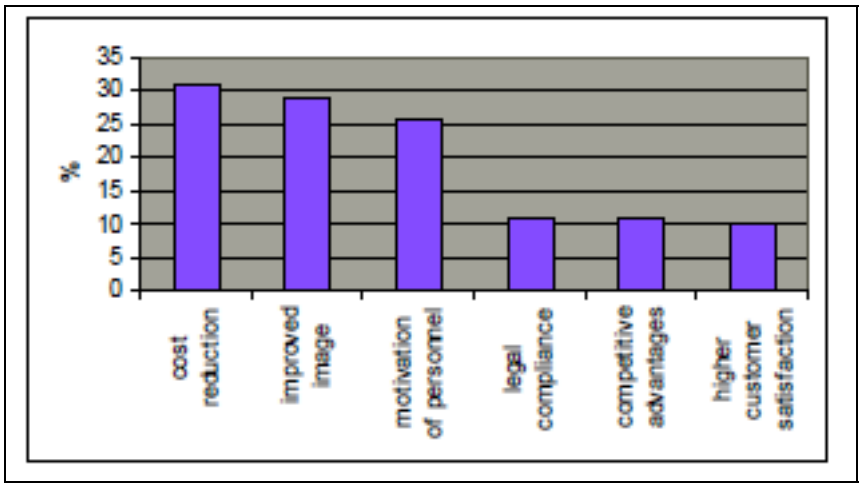

FIGURE 21. Competitive advantages (Source: Imperial College, Iefe, 1999)

In conclusion, there is no overall agreement on the support provided to the competitiveness of registered organisations for the struggle in the competition arena. Most of the evidence gathered is anecdotal, and refers to a specific context.

Anyhow, some studies provide a brighter picture, as some authors state (Clausen *et al*., 2002) that "*the reported information for EMAS competitive results from all studies indicates in general a positive impact*". Hillary (1998) found in an EU-wide representative sample 41% of 140 sites which felt that the market had rewarded their EMAS participation.

However, there is evidence that the support of EMAS towards competitiveness is bitterly tackled by the lack of market pull (Kvistgaard *et al*., 2001), so that the response given by the market is not overwhelming as organisations might hope. For example, we can mention Wittmann's survey on German EMAS-registered companies (1996), showing an effective increase in revenues in only 17% of the cases (and a reduction in 8%).

As we have seen, one of the most interesting studies in this perspective is the survey conducted in the German region of North-Rhine-Westfalia in 2003, investigating the reasons for dropping out of EMAS (Lange *et al*., 2004). One of the main conclusions of the study is that markets have insufficiently responded to EMAS.

It is hence not possible to provide a universally accepted assessment of the impact on the market of EMAS registration. As a general conclusion, we should therefore acknowledge that EMAS appears to support the competitiveness of participant organisations, with best results achieved in the internal sphere of the organisation (e.g: costs optimisation, innovation capabilities) that might turn into a better positioning with respect to competitors (e.g.: in the pricing policy). Nevertheless, the marker response, however present, is still very weak, so that the lack of market pull results in little improvements of the more "traditional", direct and quantifiable competitive variables, such as market shares and revenues.

That is why competitive advantages directly linked to any sort of "market reward" today are still perceived only by a small minority of the EMAS registered organisations.

4. Conclusions

By relying on the results emerged from the EVER study and from a comparative analysis with the available literature, we can finally propose some conclusions that can be drawn from our analysis.

First of all, economic and strategic drivers play a key-role in the adoption of EMAS, ISO 14001 and other certified EMS, even if their relative importance may vary according to the institutional and geographical context, etc.

The main barriers to achieving the first EMAS registration seem to be the following: the cost of implementation (including the consultant), the lack of human resources and competence and the difficulties in involving and motivating the internal personnel. Direct cost of registration seems to be rather unimportant. These barriers are mostly the same in case of other forms of environmental certification, such as ISO 14001.

The barriers in maintaining EMAS, however, are mainly linked to a lack of external feedback or incentives for the company running the scheme. Similarly, the perceived lack of feedback and incentives is currently discouraging potential new applicants.

Furthermore, at present competitive advantages (especially those directly related to the market response, such as customer satisfaction, increase of the turnover or the market share, etc.) and stakeholder-relations (particularly with reference to the relation with institutional actors and with the local communities) are the main motivations that drive potential new applicants to participate.

As to the perceived benefits, EMAS strongly improves an organisation's capacity to meet to legal and regulatory requirements. In addition, organisational benefits are strongly associated with EMAS implementation: participants experienced an increase in the motivation and involvement of personnel in management, and a better definition of responsibilities.

EMAS is also able to produce cost savings for companies, but this benefit is not as important as the other benefits mentioned above.

As concerns more specifically the competition-related issues, we reckoned that the most important advantage for EMAS organisations is an 'improved image'. EMAS positively affects other aspects of competitiveness, but not those directly related to the 'customer response', such as improved innovation capabilities, cost optimisation and recognition as a leader by competitors and trade associations, etc. Still, according to existing studies, all kinds of EMSs do actually spur these aspects of competitiveness, with particular regard to those related to the organizations' intangible assets.

The success of EMAS as a competitive tool is not particularly related to general conditions such as the sector, size or Member State in which the registered organisation operates, but it seems to be closely related to specific conditions (linked to the local context) and to the effort that the organisation makes in communicating and valorising EMAS registration on the market and with stakeholders.

Market payback is perceived as much less significant: competitive advantages directly linked to any sort of 'market reward' are only perceived by a minority of the EMAS registered organisations.

In the end, the question of whether EMAS is an effective tool for competition or not remains a controversial matter: participants in the scheme are more positive, while very few organisations outside the scheme believe it can produce competitive advantage on the market, especially if compared with other forms of certification, such as ISO 14001.

In order to improve the capability of the scheme to produce positive competitive feedback, we can say that the most desirable action by the European Commission and by the Member States is with no doubt related to the implementation of institutional measures, such as fiscal incentives (e.g. tax abatement) and regulatory flexibility and relief.

Our work also emphasises the great importance of 'indirect' incentives, aimed at increasing the "demand" for EMAS, such as the setting up of information and promotion campaigns for EMAS by public institutions and the inclusion of EMAS in Green Public Procurement practices.

On the opposite, direct funding and technical support seem to be less desirable according to our work than the literature and previous studies would suggest.

Finally, in order to improve the effects on competitiveness at the global scale, upgrading EMAS to an internationally recognised scheme is considered by many companies and stakeholders as a very powerful measure.

We should wait for the actual implementation of the "EMAS III" Regulation to check if and to what extent these measures will be effectively pursued and with what results.

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