



The SME battle against environmental performance: *The Hackefors model*

*A paper for the Small Enterprise Association of Australia and New Zealand 16th Annual Conference,
Ballarat, 28 Sept-1 Oct, 2003.*

Patrick Hallinan
University of Technology Sydney
4/89 Grasmere Rd
Cremorne 2090
Home: 9953 2586
Mobile: 0419 476 151

Abstract

Small to Medium-sized enterprises (SMEs) are thought to have a substantial collective impact on the environment and as a sector have been identified as problematic in terms of environmental issues. SMEs lag behind their larger counterparts in terms of environmental activeness and performance, and therefore require assistance to improve this area of their business operations. An effective way to stimulate SMEs in this area has not yet been found. This paper suggests that collaboration through networks is an effective way to increase the environmental activeness and performance within the SME sector. More specifically, this paper investigates the Hackefors model (a model developed to implement group ISO 14001 certification) in Sweden as a way to improve SMEs environmental activeness and performance.



SMEs and the Environment

Over the last decade, environmental ('green') issues have become an increasingly important to the business community (Holt et al., 2000; Schaper, 2002). Legal and public pressure on the attainment of good environmental practice has mounted and a significant proportion of this pressure has been directed towards business, which is often identified as the major source of pollution and environmental degradation.

The majority of environmental pressure thus far, has been pointed towards large companies, however the management of environmental issues is significant for both the large and small firm. SMEs have varying degrees of importance in the business sector, however they play a huge part in the overall business world and the communities in which they exist. They are thought to be extremely important to national economies, as they provide competition, innovation and are a critical source of job creation (Gerstenfeld and Roberts in Hillary, 2000; Hobbs in Hillary, 2000).

In Australia SMEs are playing an increasingly important role in the economy (Gerrans and Hutchinson in Hillary, 2000) SMEs represent 96% of all business enterprises and are responsible for over 40% of GDP output (Australian Bureau of Statistics, 2000). These figures illustrate importance of SMEs to the Australian economy and suggest that SMEs may have a significant impact on the environment in terms of input and output requirements (Gerrans and Hutchinson in Hillary, 2000), however to date, there is no national data set or figures available to measure the environmental impacts of the Australian SME (Schaper, 2002). Hillary (2000) suggests that SMEs environmental impact as a group may in fact outweigh that of their larger friends. Unfortunately, the problem is that most studies usually focus on large corporations and neglect the SME sector (Noci and Verganti, 1999).

Most large firms are aware of their effects on the environment and often have the resources to implement environmental management¹. SMEs however, are often unaware of their environmental impact and lack the resources to implement environmental initiatives such as Environmental Management Systems (EMSs), the majority of which have been designed for larger companies. (Biondi et al., 2000; de Bruijn and Lulofs, 2000; Friedman et al., 2000; Kassinis, 2000).

The question is, what is an effective way to help SMEs improve this area of their business operations? In Sweden there exists a possible solution to the problems and issues regarding SMEs environmental activeness and performance. This solution involves 'collaboration' through a network situation, in terms of SMEs seeking joint EMS certification (ISO 14001). More specifically, this paper refers to the Hackefors model, which was established in an industrial district outside of a city called Linköping (Sweden) to assist SMEs in implementing joint ISO 14001 certification. This model is not proposed as an overall solution to the problems SMEs face with regards to environmental performance and activeness, it is rather thought to be an effective tool to stimulate SMEs in this area.

This paper is based on a survey study carried out as part of the requirements of a Master's thesis and on an article that is currently in the review process. The study that embodies this paper explored the motives and/or pressures for SMEs to adopt an EMS through joint certification, the barriers that SMEs faced in implementing an EMS in a group certification network and the possible benefits / disadvantages for SMEs in adopting an EMS through a group certification network.

SMEs and Networks

¹ "Environmental management is management of those activities of a firm that have or can have an impact on the environment." (Starkey, 1998:12).



“SME networks are becoming an essential part of the ‘network economy’. From the ‘industrial districts’ of the Terza Italia to the entrepreneurial clusters of the Silicon Valley, SME’s are a significant driving force of economic growth, job creation, disinflation and productivity enhancement in most industrial countries”. (Zeleny, 2001:201)

Networks are one way that SMEs can increase competitiveness and tackle problem solving. (Henriksen, 1995; Zeleny, 2002; Seremetis, 1994). In some regions around the world, networks have already enhanced the capabilities of SMEs through increasing their competitive edge. Networks amongst SMEs can be found in many countries around the world, for example, the Hackefors Environmental Group in Sweden, Alcludia in Spain, Kinsale Chamber network in Ireland, Naturalmente in Finland and the Scottish Lace Guild-Ayrshire in the UK, to name a few.

Industrial districts have been the most common situation where SME networks have been found in the past. Historically, relationships in these networks have been spatially clustered and have linked SME firms. Often, the firms in these networks belonged to the same sector and contained all the upstream and downstream processes and services involved in the production of a family of products (Kassinis, 2001). Today, the situation is changing and many different industries are discovering that networks are an effective way to approach a variety of problems, and firms from a wide variety of backgrounds can now be found collaborating together to achieve common goals. SMEs are now using networks for product development, to gain ISO 9001 and 14001 certification, for tourism purposes and to tackle sustainability issues (Halme et al., 2000; Ammenberg et al., 1999; Henriksen, 1995).

Overall, the literature suggests that SMEs through networks can take advantage of economies of scale and scope; information and knowledge spill-overs; increased individual capabilities and better access to specialised inputs and infrastructure. These can lead to flow on effects, such as increased productivity and enhanced competitiveness. In the case of environmental management, the above benefits can be of large importance to SMEs, as they may allow SMEs to access resources at a more affordable cost through initiatives such as joint purchasing of education, which can reduce costs in the long run (Human and Provan, 1997).

The Hackefors Model

This paper is based on a study that focused on the Hackefors model, a joint ISO 14001 certification network, established and first used in 1996 in the Hackefors industrial district outside the city of Linköping in Sweden. The model was designed and structured to help SMEs to implement and achieve joint ISO 14001 certification, the idea being that group certification makes it easier and cheaper for the participating SMEs.

The model is primarily based on collaboration through a network situation and implies informal network relations, with no contractual obligations between network members. However, there may be a formal contract between network members and a consulting company that helps steer network operations and the certification process.

The original Hackefors network consisted of 26 SMEs, which formed an environmental group and implemented a joint EMS. The SMEs in the original network represented a wide range of businesses including the manufacturing, transportation, construction and graphic industries. The network was established in 1995 with EMS implementation starting in 1997 with environmental reviews. By the beginning of 1999 the group was certified according to ISO 14001, through the application of group certification. Each enterprise within the group has an EMS of its own that fulfils the requirements of ISO 14001. Each SME has their own ISO 14001 certificate and in this way the Hackefors model does not differ from other EMSs (Ammenberg and Hjelm, 2002).



The Hackefors model's use has increased rapidly throughout Sweden, since the achievement of certification within the original network in 1999, there is now some 24 networks and over 450 SMEs using the model to achieve ISO 140001 group certification (Ammenberg and Hjelm, 2002).

A joint EMS system

The Hackefors model is a joint system and is organised in a way that is similar to the systems for larger industrial concerns (depicted in figure 1). The model requires every company to have an environmental coordinator and these coordinators together form the EMS group. From the EMS group, a steering committee consisting of seven of the environmental coordinators is chosen, which in turn chooses a central coordinator who oversees the group's running. There is also a support group consisting of a number of individuals from the participating companies, these individuals help support the general coordinator, the steering committee and the environmental coordinators of each firm.

This model sees proposals prepared by the steering committee and decisions made by the EMS group. The steering committee, support group and central coordinator together can be compared to the central environmental staff in an industrial concern. The central coordinator can be from a company within the network or from a company outside. In the original Hackefors case the coordinator was from a consulting company within the Hackefors environmental group. Personnel from this consulting firm supported the coordinator, steering committee and also the environmental coordinators with environmental reviews, documentation, training etc. (Ammenberg and Hjelm, 2002; Ammenberg et al., 1999).

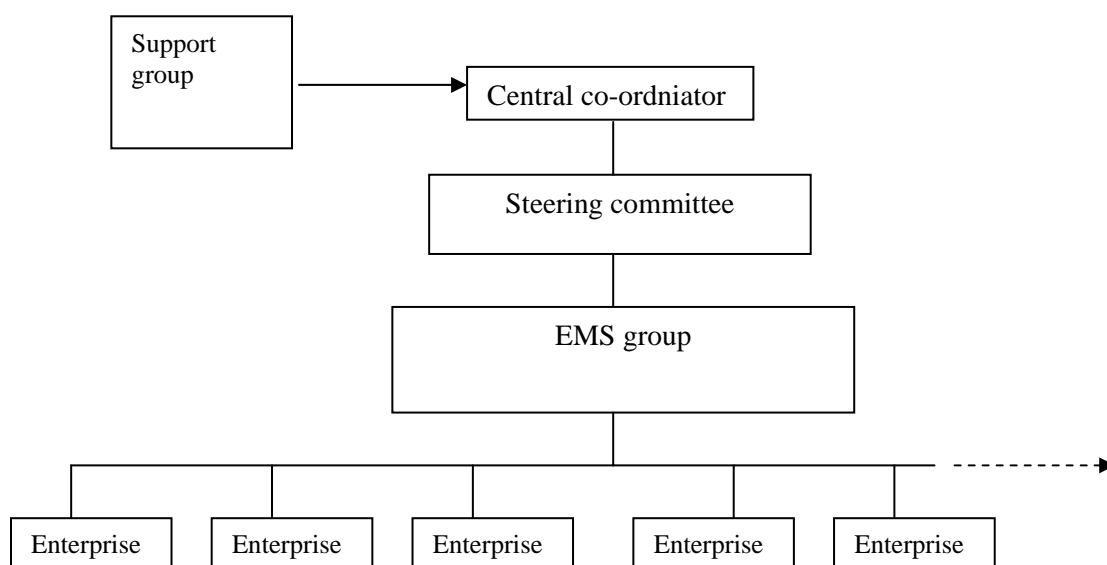




Figure 1: Organisation of the Hackefors Environmental Group in accordance with the Hackefors model (Source: Ammenberg et al., 1999:28).

Methodology

Data Collection and Sample

This study surveyed 4 out of the 24 networks that have implemented the Hackefors model in Sweden thus far. In each case, questionnaires were sent directly to the person responsible for the company's participation in the joint certification network. The networks were not chosen at random due to difficulties in attaining contact details for network companies and due to the limited time scale of the project. Rather, the networks contacted were those of which it was possible to attain contact details for.

The overall response rate of the survey study was 75%. In addition to the questionnaires, 3 telephone interviews were performed in order to facilitate the questionnaire design and to provide extra information to support some of the research findings.

Questionnaire design and analysis

The questionnaire consisted of a number of closed and open-ended questions. The majority of the closed-end questions used a 5 point Likert scale with descriptions at either pole. In analysing the results, it was observed whether the overall means lay above or below the midpoint of the scale. Thus, on a 5 point scale, a value over 3 (the mid point) can be concluded to be on the positive side of the scale, thus showing the overall opinion to be leaning towards the statement of the uppermost value. Due to time limits and the fact that the study was exploratory in nature, it was felt that a more detailed statistical analysis would not be necessary.

Results/Findings

To illustrate and discuss all of the findings from the study undertaken for this project is not possible within the limits of this paper, therefore only the significant contributions have been selected and presented.

A mixture of industries

The SME networks surveyed in this study represented a variety of different industries. Table 1 categorises the participating companies by industry and provides examples of each classification to illustrate the diverse nature of SMEs who use the Hackefors model.



Industry Classification	Examples
Manufacturing	Rubber, Plastic, Signs, Bio Energy, Cabinets, Drills, Machinery.
Service	Dentist, Vet, Advertising, Real Estate, Graphic Design, Security, Laminating, Chimney Sweeping, Tyre Service.
Transport	Haulage, Road Carrying, Freight Forwarding, Shipping.
Service (repairs)	Mechanical Workshop, Electrical repairs, General repairs.
Electric	Service of Electricity distribution, Electricity consulting and planning.
Recycling	Recycling and Re-utilisation
Construction	Renovations and reconstructions, Building.
Retail	Car Sales, Groceries/foodstuffs, Telecom products, Lighting products, Ice Machines.
Hospitality	Provision of materials to restaurants, bakeries, bars etc.
Medical	Nursing and Medical products

Table 1: Industry Classifications

The findings show that the Hackefors model is not limited to a specific industry or type of firm, displaying flexibility, which contrasts many other SME networks, which have been traditionally industry based.

Pressures affecting SMEs to become ISO 14001 certified

The results of this study found customers to be the most important pressure influencing SMEs entrance into the joint ISO certification network. Today customers are becoming more aware of environmental issues and are placing higher demands on business (Starkey, 1998). Therefore, it was not surprising to see customers listed as the most influencing factor that led companies to enter the group certification networks. Related to this is the fact that more companies are demanding that their suppliers become ISO 14001 certified (Starkey, 1998) and quite often SMEs are suppliers to other companies.

Regulations regarding environmental aspects such as waste and recycling are becoming stricter and more prevalent throughout society and industry, and although this pressure showed an overall mean just below the midpoint on the scale (see figure 2), it ranked 2nd in importance as a pressure to become ISO certified.

ISO 14001 certification is still a developing area among SMEs, the pressure from certified competitors ranked 3rd and had a mean of just over 2 on the scale, thus indicating it did not act as a significant



pressure. However this area may become more important in the future, as more SMEs become ISO 14001 certified.

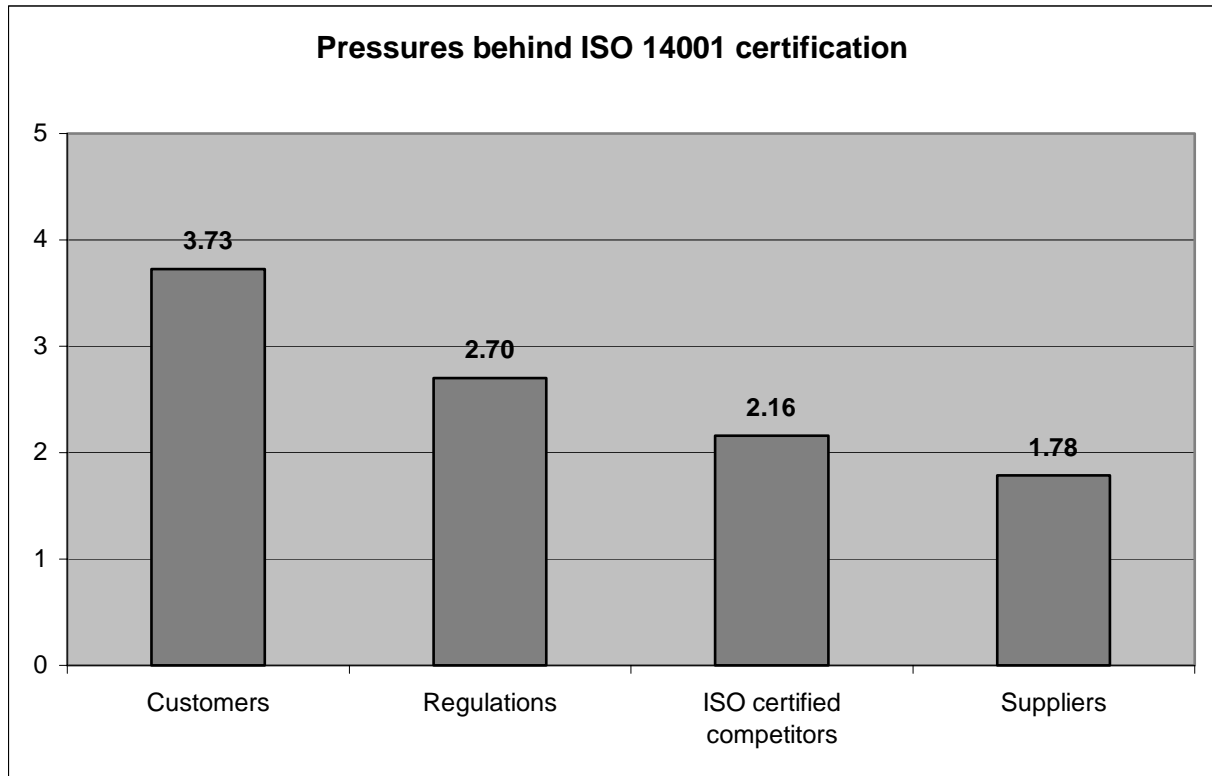


Figure 2 - Pressures behind ISO 14001 certification

Motives behind group certification

The ISO perspective

'Improving company image' was identified as the most important factor for joining the group certification network. This factor showed a mean of over 4 on the 5-point Likert scale (see figure 3). This result would seem to reflect the idea that implementing an EMS (ISO 14001) can be a way for companies to signal superior environmental performance to customers, thus possibly differentiating themselves from competitors.

In much of the literature, the strategic advantages of implementing an EMS are discussed as the main motives to try and encourage SMEs to become environmentally active. However, even if a company adopts ISO 14001 for strategic reasons alone, due to the processes they are required to undertake, their environmental performance *should* improve as a result. On the other hand, if their environmental performance is their genuine primary concern, regardless of costs for example, their environmental performance may improve more than a company who adopts ISO 14001 as a simple 'stamp of approval'. However, this area may prove difficult to study and would merit a research project by itself.

An interesting result from this study, was the 'importance of cost savings' as a motive for attaining ISO 14001 certification. The overall mean was below the midpoint on the scale thus indicating that it

was not a significant motive for joining the group certification network. The cost saving potential of ISO 14001 is often stressed upon, especially when it comes to SMEs who may be mainly concerned with this facet. It would seem that the potential benefits of improved company image and gaining new contracts from customers as a result of certification are more important than the potential cost savings.

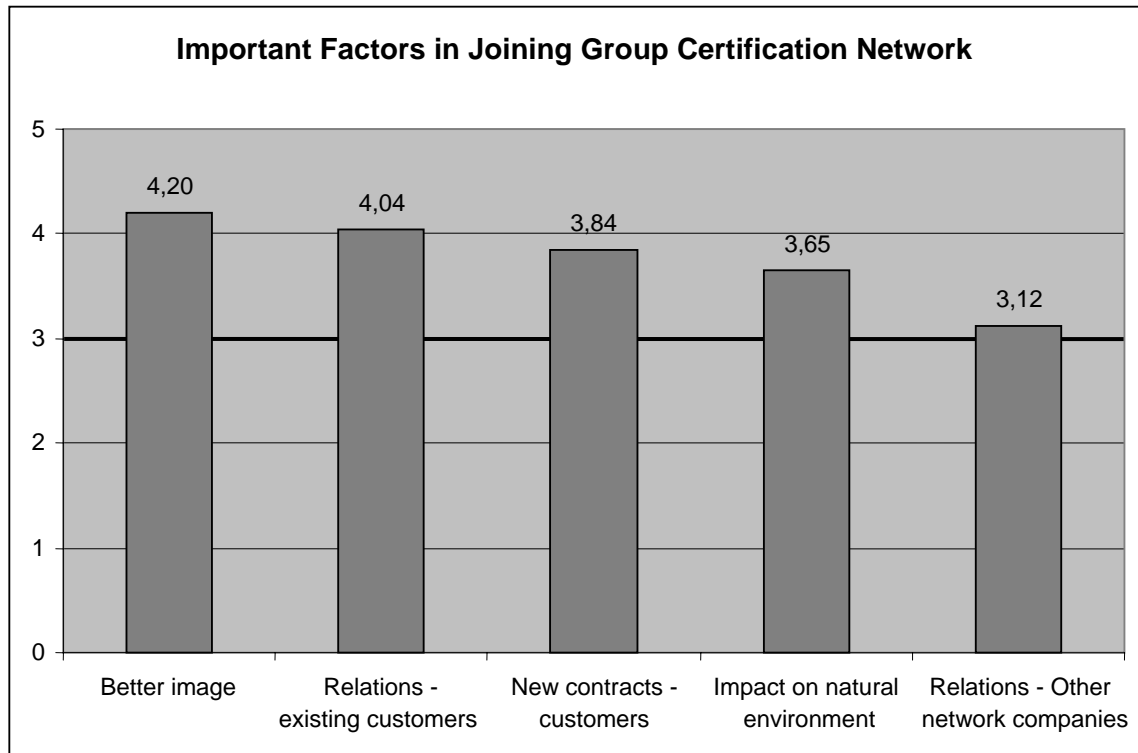


Figure 3: Motives in joining group certification network

The Network Perspective

One of the main reasons for companies to join a network such as the Hackefors model is to achieve something that may not be possible alone. When asked about whether they would have been able to achieve ISO 14001 certification before the opportunity of a network, 55% of the companies answered 'No'. The two most important reasons why, were lack of time and lack of knowledge respectively (see figure 4). This may lead us to assume that collaborating through the network helped overcome these problems. The next two most important factors were lack of human resources and company size (too small). These are common problems that SMEs face, and thus may also be seen as motives for network participation.

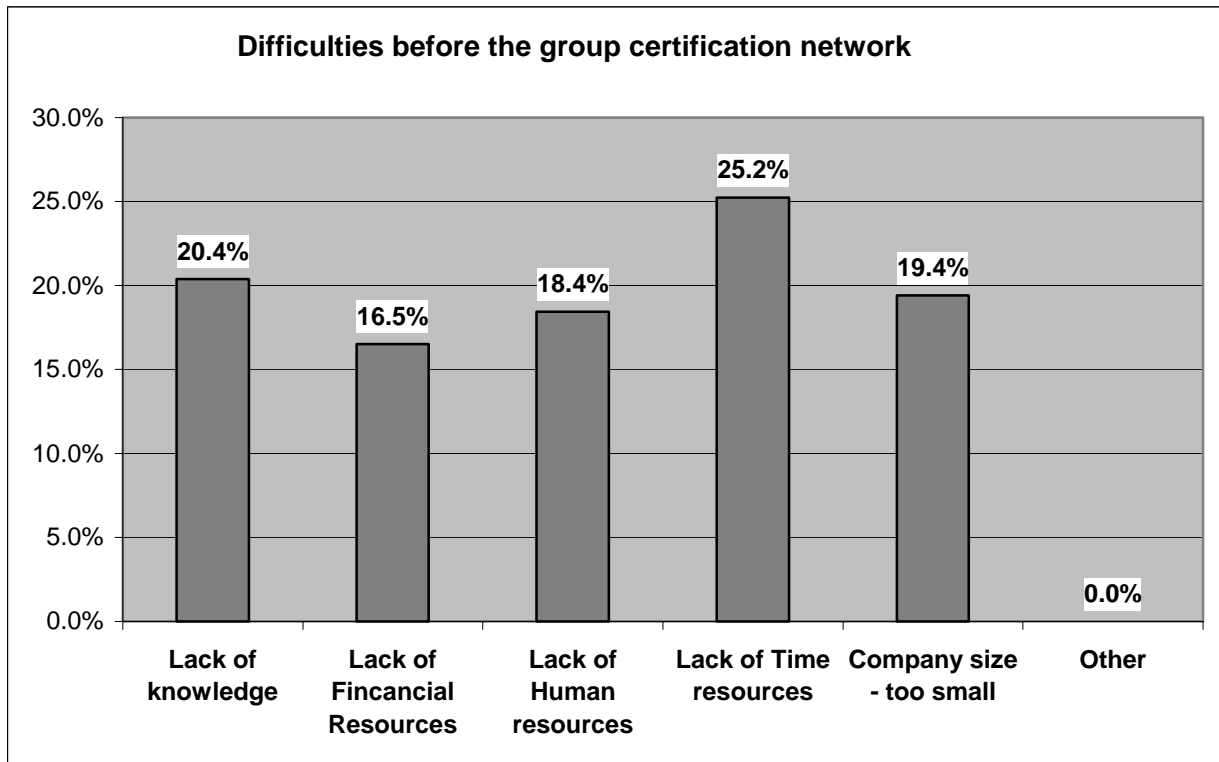


Figure 4: Difficulties before the group certification network

Even though 45% of the respondents answered that it would have been possible to adopt ISO 14001 without the network, when asked to what extent the network facilitated ISO 14001 certification, on a Likert scale of 5 from 'not at all' to 'significantly helped', the average was 4.4. On such a scale, this can be considered a particularly high result. This would seem to suggest that the joint certification network greatly helped the companies to overcome some of the difficulties associated with adopting ISO 14001 independently.

For the SME to implement an EMS alone can be expensive and this may be a reason why SMEs have been less likely to do so in the past, compared to large companies. From the interviews and the research conducted in this study, it was noted that, had the companies become certified by themselves, the costs of doing so would have been double what they were under group certification. This was stressed as a very significant factor and important motive by the companies for joining the networks.

Further collaboration sparked by network relations

Even though the networks studied in the survey were established for the sole purpose of achieving ISO 14001 certification, over one third (39%) of the companies collaborated further in areas different to that of certification since joining the networks. This is similar to the original Hackefors group, where SMEs continued to collaborate in many areas after certification was achieved, i.e. training and recycling.



The areas where companies collaborated further (see table 2) included; sharing resources to advertise and educate, sharing personnel and business contacts and purchasing of certain products together.

Areas of extended collaboration
<ul style="list-style-type: none">- Training e.g. environmental courses- Manufacturing e.g. of certain equipment- Educating schools- Sharing personnel- Sharing business contacts- Purchasing of certain products and services from each other- Simply making more use of each other- Supplying other companies from the network- ISO 9001 certification

Table 2: Areas of extended collaboration

In addition to the areas listed above, over two thirds of the respondents suggested areas where further collaboration would prove beneficial. Many of the suggestions matched the areas in which further collaborations have already taken place, so presentations of these results are omitted.

From the interviews it was gathered that the extended collaboration after certification is seen to be the result of the joint certification networks. It could be, that many of the companies had not thought about collaboration as a way to do business before joining the network, or had thought about it, however had not had the opportunity to do so. For example, to set up a network to collaborate in areas such as knowledge sharing or marketing may be too time consuming, expensive and complicated for SMEs to do from scratch. The Hackefors model is designed to perform one particular task, the companies collaborate in a network to achieve a common goal, but the relations that are formed in such a network seem to provide an opportunity for companies to collaborate in other areas or triggers the thought to do so. The results of this study indicated that almost 40% of the companies *had* collaborated on issues since the group certification, while 67% *believed* their businesses could benefit from further participation within the networks.

Barriers and difficulties of joint certification

The study explored the difficulties that SMEs face when undertaking group certification through the Hackefors model. Approximately 30% of participating companies stated that they did suffer some difficulties within the joint certification groups, however it must be noted here that within the findings it was hard to distinguish between the drawbacks that were caused by the joint ISO 14001 certification and those that were caused by the network relations.

Companies reported that the process of group certification required large amounts of time, resources, increased work, and overall, was a big project for a small company (see table 3). However, it should be understood, that difficulties would have been far greater without the benefits of collaborating in the Hackefors model.



Difficulties of joint certification

- Hard to motivate company personnel
- Increased bureaucracy
- Increase in work
- Required more resources than thought
- Hard to motivate all companies in the network
- Difficult to unite all companies on policy
- A big project for a small company
- Increased Administration

Table 3: Difficulties of joint certification

Through the interviews conducted it was found that extending network relations after certification could be problematic. The problem is that network relations after certification require guidance. Once certification is finished, the Hackefors model structure is foregone and the network loses its central co-ordination. For network relations to continue there must be someone responsible for network activities, otherwise the network will die. In regards to this, it seems difficult for networks that use the Hackefors model to continue to collaborate without this guidance. Network relations in original Hackefors group were continued after certification, however some network relations were identified before the joint certification and this may have made it easier for the continuation.

Discussion and Conclusions

The aim of this paper was to investigate collaboration amongst SMEs through networks as a way to increase environmental activity and performance. The study focused more specifically on the Hackefors model, which has already been implemented in several regions throughout Sweden. The model is becoming increasingly popular in Sweden and is successful in achieving its goal – group ISO 14001 certification for SMEs. Participating companies that use the model are not only increasing their environmental activity, but also implementing an internationally renowned EMS.

As already highlighted, the model caters for a wide variety of different industries and company types. This is one of the most important findings, as this model is not industry specific, allowing SMEs from all walks of life to achieve certification together. Although in theory this model is not one that can only be applied to specific regions, the fact that companies who use this model must work closely together to achieve certification, means that Hackefors networks are usually found in regional localities, such as the original Hackefors district.

The Hackefors model is an effective way to encourage SMEs *'who may not have previously considered an EMS'*, to implement ISO 14001. The Hackefors model helps SMEs to become ISO 14001 certified at a significantly lower cost and has helps overcome some of the problems traditionally associated with the SME sector, ie. size and resource shortages.



From this study it cannot be concluded that all companies that use the Hackefors model do so with the aim of improving their environmental activeness or performance. The fact is that many companies entered the networks with other aims and motives. However, this is not important in the overall picture, as the steps that are taken in the process towards ISO 14001 certification (i.e. mainly that of implementing an EMS) through Hackefors model, increases companies environmental activeness whether it is the sole aim of certification or not. Over two thirds of the participating companies had not considered implementing an EMS before the opportunity of the Hackefors model. This would suggest that the model was quite an encouraging factor in regards to motivating SMEs in this area. This alone is positive, and joined with the fact that the model is successful in achieving group certification highlights how it is of great benefit to the SME sector.

The Hackefors model has not been implemented outside of Sweden to date and this paper does not aim to push the model in an Australian context. Rather the aim of this paper is to highlight the benefits that collaboration through networks can bring to the SME sector, more specifically how collaboration - through the Hackefors model - can be used to tackle the challenges that face SMEs in improving their levels of environmental performance and activeness.



References

- Ammenberg, J. and Hjelm, O. (2002). *Greening an Industrial District: Experiences from Networking Small Enterprises*. Presented to the 10th International Conference of the Greening of Industry Network, Göteborg, Sweden.
- Ammenberg, J. and Hjelm, O. (2002). The Connection between Environmental Management Systems and Continual Environmental Performance Improvements *Corporate Environmental Strategy*, Vol. 9 No. 2, pp. 183 –192.
- Ammenberg, J. and Hjelm, O. Tracing business and environmental effects of environmental management systems – A study of networking small and medium-sized enterprises using a joint environmental management system. Submitted to *Business Strategy and Environment*.
- Ammenberg, J., Börjesson, B. and Hjelm, O. (1999). Joint EMS and Group Certification: A Cost-Effective Route for SMEs to Achieve ISO 14001, *Greener Management International*, No. 28, pp.23-31.
- Biondi, V. Frey, M. and Iraldo, F. (2000). Environmental Management Systems and SMEs, *Greener Management International*, No. 29 , pp. 55-69.
- de Bruijn, T.J.N.M. and Hofman P.S. (2000). Pollution Prevention in Small and Medium-Sized Enterprises, *Greener Management International*, No. 30, pp. 71- 82.
- de Bruijn, T., and Lulofs, K. in Hillary, R., (2000). *Small and Medium-Sized Enterprises and the Environment – Business Imperatives*, Greenleaf Publishing Limited, Sheffield.
- Friedman, A.L., Miles, S. and Adams, C., (2000). Small and medium-sized enterprises and the environment : Evaluation of a specific initiative aimed at all small and medium-sized enterprise, *Journal of Small Business and Enterprise Development*, Vol. 7 No.4, pp. 325-342.
- Gerrans, P. and Hutchinson, B. in Hillary, R. (2000). *Small and Medium-Sized Enterprises and the Environment – Business Imperatives*, Greenleaf Publishing Limited, Sheffield.
- Gerstenfeld, R. and Roberts, W. in Hillary, R. (2000). *Small and Medium-Sized Enterprises and the Environment – Business Imperatives*, Greenleaf Publishing Limited, Sheffield.
- Halme, M. and Fadeeva, Z. (2000). Small and Medium-sized Enterprises in Sustainable Development Networks, *Greener Management International*, No. 30, pp.97-113.



- Henriksen, L.B. (1995). Formal cooperation among firms in networks: The case of Danish Joint venture and strategic alliances, *European Planning Studies*, Vol. 3 No. 2.
- Hillary, R. (2000). *Small and Medium-Sized Enterprises and the Environment – Business Imperatives*, Greenleaf Publishing Limited, Sheffield.
- Hobbs, J. in Hillary, R. (2000). *Small and Medium-Sized Enterprises and the Environment – Business Imperatives*, Greenleaf Publishing Limited, Sheffield.
- Human, S.E. & Provan, K.G. (1997) An emergent theory of structure and outcomes in small firm strategic manufacturing networks, *Academy of Management Journal*, Vol. 40 No. 2, pp. 368–403.
- Holt, D., Stewart, A. and Howard, V. (2000). Supporting Environmental Improvements in Small and Medium-Sized Enterprises in the UK, *Greener Management International*, Vol. 30, p. 29.
- Kassinis, G.I. (2001). Location, Networks and Firm Environmental Management Practices *Journal of Environmental Planning and Management*, Vol. 44 No.6, pp. 815–832.
- Seremetis, P.S. (1994). SMEs in Technological Networks: Italy, Denmark and the UK, *European Planning Studies*, Vol. 2, No. 3, p. 375.
- Schaper, M. (2002). Small Firms and Environmental Management, *International Small Business Journal*, Vol. 20 No. 3, pp. 235-248.
- Starkey, R. (1998). *Environmental management tools for SMEs : a handbook*, Luxembourg : Office for Official Publications of the European Communities.
- Zeleny, M. (2001). Autopoiesis (self-production) in SME networks, *Human Systems Management*, Vol. 20 No. 3, pp. 201-207.