Developing TQEM in SMEs : Management Systems Approach

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2001

IIIEE Dissertations 2001:1

Developing TQEM in SMEs

Management Systems Approach

Licentiate Dissertation, March 2001

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The painting on the cover is "Microcosmic Dream", mixed media on handmade paper by Kristin Dorfhuber.

"the aspects of things that are most important for us are hidden because of their simplicity and familiarity". Wittgenstein, (Philosophical Investigations, 1968 para.129)

Published in 2001 by IIIEE, Lund University, P.O. Box 196, S-221 00 LUND, Sweden,
Tel: +46 – 46 222 02 00, Fax: +46 – 46 222 02 10, e-mail: iiiee@iiiee.lu.se.
Printed by KFS AB, Lund.

ISSN 1402-3016
ISBN 91-88902-20-X

Acknowledgements

Writing this thesis has provided an excellent challenge to test one's own "sustainability" to its limits. It has been extremely inspiring, frustrating and rewarding all at once. But what remains uppermost is a feeling of gratitude to all who in different ways have made this adventure possible:

- To University College of Gävle (HiG) for its financial support
- To my fantastic colleagues at HiG, especially at the Department of Technology, for their encouragement which made it possible to keep on going when the journey seemed endless and lonely. The following are but a few of all those to whom I would like to express my appreciation:
    - Åsa and all my students in environmental management and auditing for, at times heated, discussions about environmental management,
    - "Our gang" at the Department of Industrial Economics, who have provided great inspiration and support during the work,
    - Bengt-Olof och Staffan for patiently solving all my problems with the computer.
- To my supervisors Dr Thomas Lindhqvist and Dr Peter Kisch for their invaluable support and guidance, without which the goal of finalising this thesis had been unattainable; to Gerd Andersson and the other ladies at the International Institute of Industrial Environmental Economics for their kindness with all my contacts with the Institute and finally to Professor Karl Lidgren for making my studies at IIIEE possible.
- To Nicholas, Jonathon, Dagmara, Mårten and Carl at IIIEE as well as Kalle, Lasse, Ming, Svante and Camilla at HiG for providing constructive comments to the study
- To Ingela and Helen for their language support as well as Karin and Kristina for the library support
- To the management and staff in all the case companies as well as my "oldest" Swedish friend Per and other industry representatives, who made the work interesting and rewarding by providing the real life contact and their comments to the study
- To Sirkka-Liisa and Pentti for all the happiness and joy they provide to their sister

- The warmest of thanks go to my family Jussi, Laura and Olli, who by their love and support have enabled me to keep in touch with the most important in live, the people around us

Kaisu Sammalisto

Gävle, February 2001

Executive summary

The aim of the thesis is to increase the understanding of the environmental management systems (EMS) implementation and possibilities to further environmental development towards total quality environmental management (TQEM) in small and medium sized enterprises (SMEs). The scientific literature published in the area was almost non-existent except in the final stages of the study and there was very limited experience of EMS implementation in the province of Gävleborg in Sweden, where the case studies took place. The previous experiences with quality management system implementation (QMS) was used as a point of departure.

The study explores how ISO 9000 and ISO 14001 can be used to develop a wider quality or environmental thinking in a company and how the management systems standards differ from the total management concepts. The characteristics that separate SMEs from larger companies are discussed based on previous studies and those characteristics of SMEs that can facilitate the shift to total management approaches are defined as the SME potential. Different approaches to QMS and EMS implementation are studied and placed on a continuum from inactivity to TQM/TQEM development. This forms the theoretical base for the study.

Interviews with a total of 38 persons in four case companies form the study's empirical base. They represented functions from top management to production, maintenance, health and safety, quality and the trade union. They were asked about their experiences of the quality management system, the expectations of the environmental management system as well as how the management ideas and visions were implanted in the organisation. These responses were used to determine the approach the companies had adopted to QMS and the one they were likely to adopt to EMS implementation.

A conclusion of the study is that SMEs have strengths due to their size compared to larger companies that they can use in EMS implementation, but they need to become better aware of them.

- Resources that form the frame for SME operations and use of SME potential are important, but not the deciding factor in an SME's possibilities to implement EMS. Much can be done within the limited frame if environmental concern is introduced on the business agenda and a decision to implement EMS taken.

- The market does not exercise the pressure for EMS implementation that was initially expected based on the experiences with QMS. Regulations play an important role and the pressure from them has increased due to the new environmental code that places more strict requirements even on SMEs. But these need to become better aware of them.
- Ownership in incorporated companies can exercise the same pressure the market does, or heavier, since the corporate image can be damaged by the actions of individual companies in it. In "independent" companies the role of the ownership is merged with that of the management.
- The management needs to be aware of its visibility and role model status. The real will of the management is very apparent in SMEs and affects the company atmosphere and the engagement of the staff. This can be used in many positive ways to spread the company vision, to engage the staff and to increase the co-operation.

  A "too independent" mind set and self-sufficiency of the management can result in the company missing important information and knowledge due to missed opportunities to communication both internally and externally. The lack of appreciation of environmental issues among the management is a problem, but once the EMS process is started, the engagement of the staff can become an important driving force in the process.
- The organisation is in addition to the management the most important element in the SME potential. Due to the possibilities of easy and flexible communication, many changes can be made, with slight exaggeration, based on the communication during coffee breaks. But a precondition to this is that the staff has been provided with the tools to, for example, understand the financial statement of the company, get a wider view of the company situation and see their own role in it. They are then encouraged to take more initiatives and can experience the sensation that they are contributing to it.
- Flexibility and innovation are largely a result of the ability of the management to create favourable conditions and an open and creative atmosphere in the company.

Many different approaches to EMS implementation are possible, but the choice of the approach, without proper awareness of it in most companies will affect how the management system is experienced and so even the likelihood of further development towards TQEM and sustainable business

practices. The SME potential is also used to very different extent in them. The second main conclusion of the study points to the importance of SMEs becoming better aware of the different possibilities the various approaches provide and, consequently, the SME's ability to use them accordingly**,** since the likelihood of an approach just "happening" is probably the most dominant practice today.

- Companies with the reactive approach implement EMS solely due to customer requirements, but the system is not really used, and the company potential is also used to the minimum or even negatively and a further development in this direction is unlikely.
- The coactive companies also implement EMS solely due to customer requirements by documenting existing practices. The system remains isolated and is delegated to someone limiting the company's development towards wider environmental management and TQEM. There is limited use of the SME potential.
- Whereas the above two approaches see the EMS as a goal in itself, it is in the process-oriented approach seen as a tool in the company development and used accordingly. These companies will be able to make use of the company potential to the maximum and are likely to develop towards TQEM and even sustainable business practice as the appreciation of the issues grows.

A company is not often likely to choose a particular approach unless it is aware of the different possibilities and their consequences. The process-oriented approach is achieved by developing the use of the SME characteristics and the opportunities that it provides to the Small and Medium Sized companies. Some tangible advice could be given to SMEs:

- Get started, the requirements will more than likely increase in the future.
- Engagement for the environment among the staff is there and will show up.
- Create an open atmosphere for communication both within the company and with the interested parties.
- Provide training for the staff to understand the company situation and their own contribution to it.
- Encourage creativity and engagement.
- If you as a manger do not have the "right" personality, engage others in different tasks.

- There is help to be found for example via NUTEK and the Federation of Swedish Industries (Industriförbundet) in Sweden.

And finally:

When ISO 14001 came everything changed – because there was a new tool.
Nothing changed – because a tool needs to be used to be effective.
(Sheldon C. (ed.). (1997*). ISO 14000 and Beyond.* p.16)

Table of Contents

List of Figures

List of Tables

Some Terms and Concepts Used in the Study

Approach	Thinking demonstrated in action (Authors definition)
Coactive	The approach the QMS builds a set of rules to manage the work. The motive to implement a quality management system for these companies is exclusively to achieve quality assurance to comply with the given specifications.
Competence	Sum of knowledge, will and ability (Axelsson, 1996, p.27)
EMS	Environmental management system based on ISO 14000 if not otherwise stated
Environment	The natural environment
Environmental Code	The environmental frame law in Sweden
Holistic	Having regard to the whole of something rather than just parts of it
Implement QMS	The instructions of QMS are introduced and the staff also follows them in their work.
Introduce QMS	The instructions etc. for a QMS come into right places.
ISO 9000	ISO standard for quality management
ISO 14001	ISO standard for environmental management
Process-oriented	The approach where the QMS is used as a tool in company development and the goal is to change the thinking among the staff, provide them with a more holistic view and to get them more engaged in their work.
QMS	Quality management system based on ISO 9000 if not otherwise stated
Reactive	This approach where ISO 9000 does not get fully implemented and the instructions that satisfy ISO 9000 are not used in practice by the staff of the company.
SME	Small and Medium Sized Enterprise
SME potential	The characteristics of SMEs that could give them an advantage in relation to large companies in company development. See Chapter 2.
TQEM	Total Quality Environmental Management
TQM	Total Quality Management

CHAPTER
ONE

1. Introduction and Method

1.1 SMEs are Important….

Small and medium sized enterprises (SMEs) are gaining in importance in all economies today.[1] They also face a lot of expectations and are often mentioned in political speeches as the spearhead expected to drive long-term economic development into the future, for example by creating new employment opportunities. Although they are strongly focused upon by the authorities they receive less attention in general discussion. In 1970, the Confederation of British Industry argued that if the small firms closed down tomorrow "most of the large firms would grind quickly and painfully to a halt".[2] This statement dating back three decades is probably even more valid today, since more and more large companies turn to out-sourcing to increase the flexibility of their operations.

Previous studies indicate that SME are not little big firms since management practices in them do not tend to replicate those of larger firms. It cannot therefore be assumed that "what works in large firms will be appropriate in SMEs as well." [3]

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1 Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment*. Sheffield, UK. Greenleaf.

2 Stanworth M J K & Curran J. (1976). Growth and the small firm: An alternative view. *The Journal of Management Studies, 13, 2,* p.96.

3 E.g. Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment*; Welsh J A & White J F. Gumpert D E. (ed.). (1981). Small business is not a little big business. *Harvard Business Review. July-August.*

1.2 …. but They are Slow in Getting Started on the Environmental Road

Environmental activities in industry in general have traditionally been delegated to someone, who should take care of them in addition to his/her other duties, and most environmental problems have been solved in companies as well as in the society as isolated incidents not integrating the future prevention possibilities into the main operations.

The situation has, however, changed during the last decades and the environmental awareness of the general public has increased and environmental issues have been lifted onto the business agenda as the scientific knowledge of them has increased. The ICC's Business Charter for Sustainable Development in 1991, the UN Rio Conference in 1992 and the development of the different environmental management systems (EMS) standards; BS 7750, EMAS and the ISO 14000 series have contributed greatly to this development.

Also, the research concerning environmental issues has, with just a few exceptions,[4] mainly involved larger companies and left the small and medium sized enterprises behind. Therefore much less is known of the environmental impact and activities of SMEs, and often much more effort is put into highlighting their problems than solving them.[5] During the last two years, however, the knowledge in the field has started to increase due to the number of studies being published.[6]

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4 Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment;* Tilley F. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firms; with an investigation of mechanical engineering and business services in Leeds. PhD thesis.* Leeds. Leeds Metropolitan University; Hutchinson M A. (1994). *Environmental management in Devon and Cornwall's small and medium-sized enterprises sector. PhD thesis.* Plymouth, UK. University of Plymouth.

5 Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment;* Tilley F. (1998a). *A Qualitative Investigation of the Disparity Between Environmental Attitudes and Environmental Behaviour of Small Firms.* Unpublished. Durham University Business School. Foresight Research Centre.

6 E.g. Miles M P, Munilla L S & McClurg T. (1999) The impact of ISO 14000 environmental management standards on small and medium sized enterprises. *Journal of Quality Management, 4, 1*; Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment.*

In the meanwhile there have been a number of initiatives trying to find ways to assist SMEs to improve their environmental engagement and the theme has been discussed in some handbooks as well, but what is taking place in the companies has proven to be rather limited throughout the years.

> *… a typical SME is ill informed and unwilling to take action unless threatened by strong external forces such as prosecution or customer demands. Worse still, many foresee no threats or advantages to their companies from the environment.* [7]

This statement from 1995 is frequently quoted in the literature when discussing environmental management in SMEs, and has been the one best describing the impression given by the earlier studies.

The newer international studies confirm the picture and the general impression from 1995 remains. The SME sector is still:[8]

- *Largely ignorant of its environmental impacts and the legislation that governs it;*
- *Oblivious of the importance of sustainability;*
- *Cynical of the benefits of self-regulation and the management tools that could assist it in tackling its environmental performance;*
- *Difficult to reach, mobilise or engage in any improvements to do with the environment.*

But there are also a number of "shining" examples of SMEs that are innovative and have dynamic leaders on the environmental front, tackling their environmental aspects and gaining real benefits due to this.[9]

The international trend mentioned above concerning the space of development in SMEs is also apparent in two studies conducted by Lund University within the manufacturing industry in Sweden in 1991[10] and

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7 Hillary in Tilley F. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firms.* p.85 and in Ross A & Rowan-Robinson J. (1997). It's good to talk! Environmental information and the greening of industry. *Journal of Environmental Planning and Management, 40, 1,* p.122.

8 Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment.* p.18.

9 Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment.* p.18.

10 Arnfalk P & Thidell Å. (1992). *Miljöarbetet inom svensk tillverkningsindustri: Myt eller verklighet.* [Environmental Management in the Swedish Manufacturing Industry: Fact or fiction?]. Lund. Avdelning för Industriell Miljöekonomi, Lund University and NUTEK.

1998[11]. About half of the manufacturing companies totally lacked environmental activities in 1998 or were even working against the environment by filing complaints[12] against the decisions from the authorities. Most of these were SMEs. They tended to think that their activities had marginal environmental effects, which motivated their passive attitude and they faced no environmental requirements. But due to their sheer number, SMEs together are likely to have more than a marginal environmental impact. In international studies their estimated contribution to the total pollution is about 70%.[13] This figure might be high for Sweden, but since 95% of the manufacturing companies in Sweden are small with less than 50 employees, their impact should not be underestimated. In the manufacturing industry 12% of the employees were working in companies that did not have any environmental ambitions whatsoever in 1998.[14, 15]

Also the gap between the larger and the smaller companies had increased since 1991. The large companies had improved their activities further while the smaller had remained stationary.[16] This was especially interesting in the light of the many initiatives and the support that had been geared towards the environmental activities in SMEs since 1991 by NUTEK[17] in co-operation with local authorities, consultants, universities etc.[18]

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11 Heidenmark P. (1999). *Miljöarbetet inom svensk tillverkningsindustri: Fortfarande myt?* Lund. Lund University, IIIEE.

12 It is worth noting that the complaints may sometimes be motivated also for the benefit of the environment.

13 Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment.* p.11.

14 Heidenmark P. (1999). *Miljöarbetet inom svensk tillverkningsindustri.*

15 At the end of 1999 there were 851 companies that were certified according to ISO 14001 in Sweden. By July 10th in 2000 this had increased to 1116 and an additional 143 companies had both EMAS and ISO 14001. (ISO. (2000). ISO, 2000-07/1 500: The ISO Survey of ISO 9000 and ISO 14000 Certificates. Ninth Cycle – 1999. [Online]. Available: http://www.iso.ch.presse/survey9.pdf. [2000-10-19]) The information of how many of these were SMEs and which of them were part of a corporation was not available.

16 Heidenmark P. (1999). *Miljöarbetet inom svensk tillverkningsindustri.*

17 NUTEK = Swedish national board for industrial and technical development. Since 2001-01-01 one part of NUTEK forms together with ALMI Företagspartner a centre of competence for company development. The two remaining parts go into VINNOVA, the Council for Innovationsystems and ITPS, the Institute of Growth Political Studies.

18 Axelsson F, Norrthon P & Gärdström T. (1994). *Miljöanpassade produkter och avfallssnål produktion.* Sweden. Länsstyrelsen i Östergötland; Länsstyrelsen i Göteborgs och Bohus

1.3 Thinking Wider, a Way towards Sustainability?

A wider (even called holistic[19]) view as a basis for the environmental activity and EMSs in companies started to gain ground in the publications from around 1997. Its primary idea was that a successful interaction with all the systems on the planet is needed, since the whole cannot survive if its parts are destroyed.

As part of this holistic view, organisations were also seen to have the responsibility to provide their employees with quality work that is enjoyable and that satisfies the creative and spiritual needs of employees. Schumacher's idea (1979) that business is not there simply to produce goods but also people fitted the environmental context and the emerging concept of sustainability.[20,21]

Valuing wholeness would also help people to better understand and attend to the relationships with other elements of the environment and eventually promote sustainable development. This became the ultimate goal and added further considerations that companies were expected to attend to.

Although SMEs in general are not adopting EMS and even less discussing sustainability many of them have previously implemented quality

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län. (1996). *Företag och miljö i Bohuslän - en utvärdering.* Göteborg. Miljöavdelningen; NUTEK. (1999). *Miljöstyrning i små och medelstora företag: en utvärdering av NUTEKs nätverksprojekt.* Stockholm. NUTEK.

19 Crowther J. (ed.) (1995). *Oxford advanced learner's dictionary of current English.* New Ed. Oxford. Oxford University Press. "Holistic: having regard to the whole of something rather just to the parts of it."

20 Jones D & Welford R. (1997). Cultural change, pluralism and participation. In Welford R (ed.), *Corporate environmental management: Culture and organisations*. London. Earthscan. p.137.

21 Sustainable development can be defined in various ways. One of the most tangible are the Four System Conditions that state that the society can be sustainable only if the nature's functions and diversity are not systematically: 1. subject to increasing concentrations of substances extracted from the Earth's crust. 2. subject to increasing concentrations of substances protected by society. 3. impoverished by over-harvesting or other forms of ecosystem manipulation and 4. resources are used fairly and efficiently in order to meet basic human needs world-wide (The Natural Step. (2001). *The Four System Conditions.* [Online].The Natural Step UK. Available: http://www.naturalstep.org.uk/frameset4.htm. [2001-01-11].)

management systems[22] (QMS) according to ISO 9000 standard and are satisfied with it. Other companies go a bit further and say they are working towards Total Quality Management (TQM). This could be seen as a more holistic way of working with the quality issues.

An increased understanding of the connection between quality and environmental issues and the corresponding management systems might be a help for the SMEs on the road towards widening their view from one management system towards a more holistic management of companies and eventually even more sustainable business practices. A step towards it could be a more holistic environmental thinking as expressed in Total Quality Environmental Management (TQEM). A more detailed discussion of the concepts and their connection can be found in Chapter 3.

1.4 Smallness, an Opportunity?

One encounters no problems in describing the slowness of the small and medium sized enterprises in adopting environmental management practices. But this is not the only aspect in which they are different from larger companies. The question is then whether there are any such differences, which could prove to be an advantage when developing environmental management and specifically an environmental management system which leads beyond a certification towards TQEM and more sustainable business practices. In order to systematically take advantage of any such potential, it is obvious that the society and the SMEs need to become better aware of their special characteristics that can help them develop in this direction.

The approach a company adopts to the implementation of its management systems can be assumed to make a difference to its further development beyond the standard management system. This may also be the case for EMS according to ISO 14001, and hence for the development of TQEM.

The purpose of this thesis is therefore to increase the understanding of the environmental management system implementation and possibilities to further environmental development towards Total Quality Environmental Management in Small and Medium Sized Enterprises. Since the experiences of EMS implementation are still rather limited, the previous experiences

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[22] QMS refers to one of the standards in ISO 9000 series in the study if not otherwise stated

with Quality Management System implementation is used as a departure point.

This leads us to the two objectives of the study:

1. To study via literature and four case companies what is typical for SMEs and approaches to QMS implementation.
2. Based on the above define characteristics and an approach that can help SMEs in their EMS implementation process and to develop beyond the basic management system and eventually towards TQEM and sustainability.

The study also provided an opportunity to make a connection between research and some local SMEs in the province of Gävleborg and to develop a base for further contacts and research and development opportunities between the two.

1.5 Method

The aim of the thesis was to study approaches to quality management system implementation, and to find out an approach or approaches that could lead to the development of total quality management in a company. A step further would then be to see if this knowledge could be used to develop total quality environmental management as a way to sustainability.

An additional contribution would be the local connection to the province of Gävleborg, where rather limited contacts between companies, research and higher education exists at the moment.

1.5.1 A Prestudy in Two Companies

The case studies started when two companies became available in the province of Gävleborg for a prestudy late in 1996. They represented different kinds of ownership, a company within an international corporation and a small family-run company. The choice of companies was based on availability rather than other criteria, but nothing in the experiences of the researcher during the later stages of the study indicates that the results would be relevant only to these companies.

The prestudy was broad and its purpose was to sharpen the focus for the research questions for the main study and to learn more about the company processes and the interview techniques[23] in two different types of industries. These companies had not implemented any EMS so the questions were focused on the experiences they had of the quality management and the possibilities to connect a management system for health and safety (IK[24]) to it. Also the possible working process with the implementation of EMS in an SME in connection to the QMS and IK as well as the common values between quality and environment was studied. A further goal was to understand the connections between these systems in practice rather than to gain results that could be generally applied.

The machining and manufacturing industry was later chosen as the object of the main study, so some of the findings from the company representing it in the prestudy were:[25]

- The staff has a very clear implicit knowledge of the "real will" and the engagement of the management regardless of the verbal communication.
- The customer requirements and the staff engagement could be the strongest driving forces for an EMS as well as the past experiences of QMS.
- The environment and IK are delegated to special people, but there seems to be a general interest and willingness to engage in the issues among the staff as a whole.
- The lack of management engagement, knowledge and time as well as the unclear requirements from the customers are the greatest barriers in the EMS process.
- The approach[26] to the quality system is characterised as proactive, i.e. taking initiative in anticipation to customer requirements, by most members of the interviewed staff and as reactive by some.

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23 Yin R K. (1994). *Case study research: Design and methods*. Second Ed. Thousand Oaks, CA. Sage. Applied Social Research Method Series. Volume 5.

24 IK for Intern Kontroll. The name will in the Spring of 2001 be changed to Systematiskt Arbetsmiljöarbete = Systematic work for the working environment.

25 Sammalisto K. (1997). *A case study of the experiences of management of quality and working environment as basis for environmental management system in Gasell Profil*. Unpublished. Internal company material.

Another important activity was to create contacts with various local companies and other actors in the field that started to yield results first in 1997. Four companies from the machining and tooling industry became available in Gävleborg for the study.

1.5.2 The Main Study

The number of published scientific studies that dealt with environmental management in SMEs was extremely limited initially, but has increased during the last few years. The small number of studies available has been natural considering that the EMS is a relatively new phenomenon and that the process of EMS implementation takes some time.

Due to the connection between quality management and environmental management and the potential possibilities to learn from one process to the other it seemed appropriate to begin the study on quality management, and more specifically by studying TQM, ISO 9000 and their common features with ISO 14001 and TQEM (Chapter 1) and different approaches to its implementation in SMEs (Chapters 4). The number of publications on quality management was growing and they developed from basic ISO 9000 handbooks to research articles on ISO 9000 and TQM from different perspectives. These together with the SME research (Chapter 2) form the theory basis for this study.

The four case companies; ABB Nordkomponent, Automatindustrier i Hille AB, Cibes Hiss AB and Iggesund Tools AB were certified according to ISO 9001 or ISO 9002 and were all planning to implement ISO 14001 during the study. This plan materialised only at one of them. The EMS implementation in the others has been discussed based on the result of the previous discussion and expectations of an EMS. This forms the empirical base for the study (Chapters 5). The significance of the ownership i.e. an SME being part of a corporation will be discussed mainly in Chapters 2, 4 and 6.

The results as well as findings in literature are then used to discuss the possible implications of this on the implementation of ISO 14001 and further the possibilities for the development of TQEM. (Chapters 6 and 7).

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[26] For the description of the different approaches see Chapter 1.

The main sources in the information search for the study were the prestudy, and other relevant experience on the part of the researcher, previous studies by others active in the field, some fellow researchers in Sweden, different scientific article summaries and full-text databases for example Academic Search Fulltext Elite, EBSCO Online Fulltext via the Library at the University of Gävle on the Internet.

Preliminary interviews in companies were conducted in late 1997 and early 1998. Complementary interviews were conducted in October and November 1998. The literature studies continued until 2000 to enable the reference to the latest developments in the field of environmental management. It seemed important to limit the study to only one branch since the theory base was rather wide.

1.5.3 Qualitative or Quantitative?

The quantitative way[27] of the natural sciences, which is the traditional engineering way of thinking and studying something, would have been the most natural one, considering the background of the researcher. But it was not found to be the most suitable one for studying the implementation of a QMS or EMS in a company. It had been possible to take a number of companies and ask well-defined questions e.g. the number of hours of training or information each company provided its staff in connection to the implementation of ISO 9000. This would have led to the conclusion that the companies that offered more training also found their QMS to be more successful, as was the case in two of the case companies. This would be true, but based on the wrong conclusions. And it would not reveal much of the way people think or experience the implementation of the systems in the organisation that was likely to affect the results in a considerable way.

Case studies made it possible to gain a more holistic[28] insight into the implementation process at the case companies, taking into consideration a wider array of materials and aspects rather than focusing on details in the four companies that were available. This would also apply to the planned EMS implementation process since none of the companies that opened their doors for the study had implemented ISO 14001.

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27 Alasuutari P. (1994). *Laadullinen tutkimus*. Tampere, Finland. Vastapaino.

28 Yin R K. (1994). *Case study research*. p.3.

The motives for and the thinking behind the decision to implement QMS and EMS were assumed to reflect the approach chosen. This affects the implementation e.g. the way training was provided for the staff. Since this study is about approaches, experiences, thinking and expectations the qualitative way and case studies were chosen.[29]

The efforts to increase the reliability and the internal validity of the study will be discussed below and the generalisability[30] in the valuation of the study in Chapter 7.

1.5.4 Reliability and validity

The reliability of the study was gained through the audit trail i.e. by ensuring, to the greatest possible extent, that the findings reflect an authentic understanding of people's experiences[31] and the inquiry itself, rather than being the product of bias and prejudice on the part of the researcher.[32] The fact that someone could make another interpretation of the material does not necessarily disqualify the first interpretation, as long as it is possible based on the material.[33]

1.5.4.1 Cases

The selection of the cases in the study was based on the availability of SMEs in the region. They were private, local companies, which had less than 200 employees, had implemented a QMS according to ISO 9000 and were considering EMS implementation, which made them interested in participating in the study. One of them showed during the study to have a closer connection to the large corporation it belonged to and two others appeared to be part of small corporations, which gave a somewhat wider perspective to the study than was intended.

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29 Yin R K. (1994). *Case study research*. p.12.

30 Silverman D. (1993). *Interpreting qualitative data: Methods for analysing talk, text and interaction.* London. Sage.

31 Silverman D. (1993). *Interpreting qualitative data.*

32 Yin R K. (1994). *Case study research.*

33 Brunåker S. [2000-10-14]. Personal interview.

All cases were described and analysed, combining them to the theoretical structure of the study (SME ➔ QMS ➔ EMS). Their SME characteristics and the approach they had used to their QMS implementation as well as their more detailed plans and thoughts about the EMS were not known in the beginning of the study. These could later, as the theory was applied, be identified and classified. This study design with four single cases with no interconnection other than the theoretical framework can be assumed to contribute to the robustness of the study.

1.5.4.2 Interviews and documentation

To increase the reliability of the interviews[34], the interview schedule and lists of the prospective interviewees were already in the planning stage given to a scholar and an industry representative to comment upon, after which some changes were made. The interview schedule was formed based on the learning done during the interviews in the prestudy and adjusted in a minor way after the first interviews to better correspond to the interview situation.

Interviews were conducted with 13, 6, 8 and 11 members of staff respectively, on different levels of the organisations in the companies by using a semistructured questionnaire with open-ended questions. This resulted in some lengthy discussions, but most interviews lasted between 30 and 90 minutes. The companies were open and the staff seemed to feel free to discuss and answer the questions.

To ensure the reliability of text[35] the content of the interviews was recorded using a PC. In the first sets of interviews an assistant was recording the answers in a notebook, the notes were compared, and the uncompleted completed. This was later abandoned since typing proved to be fast enough to record the answers with sufficient accuracy.

The later interviews during meetings and by telephone were recorded manually and immediately transcribed onto computer. The stage of tape recording all interviews and then transcribing them was not deemed necessary after the prestudy, since the omissions of non-verbal messages that cannot be caught by tape-recording was not judged to be of great

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34 Silverman D. (1993). *Interpreting qualitative data.*

35 Silverman D. (1993). *Interpreting qualitative data.*

importance, due to the focus on facts and experiences as expressed by the interviewees. All interviews were also printed out on paper.

The individual interviews were coded and combined to "pictures" of the different levels of the organisation, and then further to a picture or a collection of pictures of the whole company. The later was done depending of the agreement or non-agreement of pictures as communicated by the different individuals. The picture of the case companies was created by looking at the situation with different actors' eyes where similarities and discrepancies could be observed. This resulted in some additional questions, which were taken up in the follow-up interviews with some key individuals, who provided additional insight.

The list of interview questions is in Appendix 1 and the answers are available for further study. Coding was not used after the initial stages due to the relative ease of finding the relevant information within the text mass. The first compiled and unsummarised company report with the "company picture" was sent the top management of each company, who corrected some details and minor misunderstandings and confirmed that the picture recorded in the reports even with contradictions corresponded to the history and situation in the company.

> *…, however, when respondents confirm the "truth value" of the findings regarding environmental management change process, we can also be reasonably certain that the results are not erroneous or strongly reflective of a researcher's bias.*[36]

The people who were interviewed were chosen by the top management of the company based on the request from the researcher so that they represented specific functions on different levels of the organisations. In addition to the top management functions such as production, maintenance, health and safety, quality and trade union were chosen. The goal was to find out their experiences of the quality management system, the expectations of the environmental management system as well as how the management ideas and visions were implanted in the organisation. In many cases the health and safety representative was, at the same time, the trade union representative, and may therefore have been slightly better informed than the rest of the staff.

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[36] Halme M. (1997). *Environmental management paradigm shifts in business enterprises: Organisational learning relating to recycling and forest management issues in two Finnish paper companies*. Tampere, Finland. TAJU. Acta Universitatis Tamperensis 542. p.78

Some possible sources of bias in the interviews could come from the following:

- Those responsible for the QMS implementation were bound to be proud of the work they had done and could stress more on the positive aspects of its functioning. This could be balanced by the others not so directly involved who were more critical.
- The trade union representatives could by tradition be expected to be more critical to company management than other employees involved. The cases where this was apparent were either confirmed or contradicted by the others in the company.
- Since it was known that the study concerned environmental issues, EMS and its possible implementation, people could be expected to make more positive statements of their interest and engagement in these issues to impress the interviewers. In ABB Nordkomponent, where the environmental issues were really worked with the staff's real knowledge of them was confirmed by the way they talked. In the others, poor knowledge was also demonstrated by the interviewees, as well as their willingness to do something about it. How much of this willingness was "lip service" is impossible to say.
- Some could see the opportunity to be heard and to convey the message they otherwise might have difficulty in spreading. When these were individual messages, they proved to be one of several disagreements in the company, and therefore not isolated cases.

Triangulation was also used to increase the validity of the study.[37] This included multiple case studies and interviews with several people at different levels in each company. They could provide multiple evidence of the same phenomenon. Those interviewed were asked not to discuss the contents of the interviews with their colleagues so that everyone would meet the questions with the same preconditions.

Other relevant data from the case companies were received by studying documents such as organisation charts, initial environmental reviews and reports, business information and financial reports, doing observations and having informal discussions during the visits. There was also an opportunity to attend a management environmental training, an environmental pre-audit and a certification audit in one of the companies and the presentation of an

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[37] Silverman D. (1993). *Interpreting qualitative data;* Yin R K. (1994). *Case study research.*

initial environmental review in another. Also, tutoring students in environmental management in three of the case companies as well as in over 30 other companies, most of them SMEs, provided insight into issues concerning their quality and environmental activities has greatly increased the author's understanding of the issues. This gave a good overall picture of the issues connected with the study as well as the literature studies and discussions with various researchers in the field both in Sweden and abroad.

The quotations used in the text are meant to highlight some special aspects of the situation in the companies. They are used with the permission of the persons involved and can be traced back to the interview notes. They can also be expected to contribute to the reliability of the material presented here. There are a few cases where the individual comments could have a negative impact on the personal relationships between persons within the company, so even though they are taken into consideration within the study great care was taken not to endanger any relationship.

The companies, as well as the cases in them, are presented in alphabetical order.

1.6 Limitations

The study is limited to finding out possibilities of a small and medium size enterprise company developing beyond the basic standardised management system towards TQEM. Although sustainability will surface in the discussion, the main focus is on the environmental component of it and the development possibilities of environmental management rather than the whole concept including economical and ethical considerations as the concepts of equity and futurity, which are necessary to have in mind when developing global sustainability.[38]

The previously published literature on EMS in SMEs, which has been quite limited until recently, is mainly based on companies in the UK. There are bound to be some cultural differences for example in the prevailing management practices in different countries compared to Sweden, but they were, however, neither focused upon in the studies, nor observed by the

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[38] Welford R. (ed.). (1996). *Corporate environmental management : Systems and strategies*. London. Earthscan; Welford R. (ed.). (1998). *Corporate environmental management 1: Systems and strategies*. 2 ed. London. Earthscan.

author in the literature. These findings in it are therefore assumed to be relevant for the discussion also in this study.

The study is limited to four companies within the province of Gävleborg, Apart from the assumed influence of the Bruksanda[39] in some of them, it is not likely that the companies differ from similar Swedish companies in other parts of the country.

Although the case companies were chosen based on availability nothing was found in them that would indicate that they are in any way unique other than could be expected of any company composed of a number of individuals within a company structure. The findings could therefore have been derived in other similar SMEs as well and are not likely to effect the result of the study.

The situation where three of them later proved to belong to a corporation can be discussed, but due to the fact, that many small and medium sized manufacturing companies today are to a larger or smaller extent owned by corporations can in fact make the results more relevant than if only "totally" private companies had been included. This issue will be discussed mainly in Chapters 2, 4 and 6.

Although the number of the case companies is limited, the study provided an opportunity to make a connection between some local SMEs and research and to develop a base for further contacts and research and development opportunities between the two.

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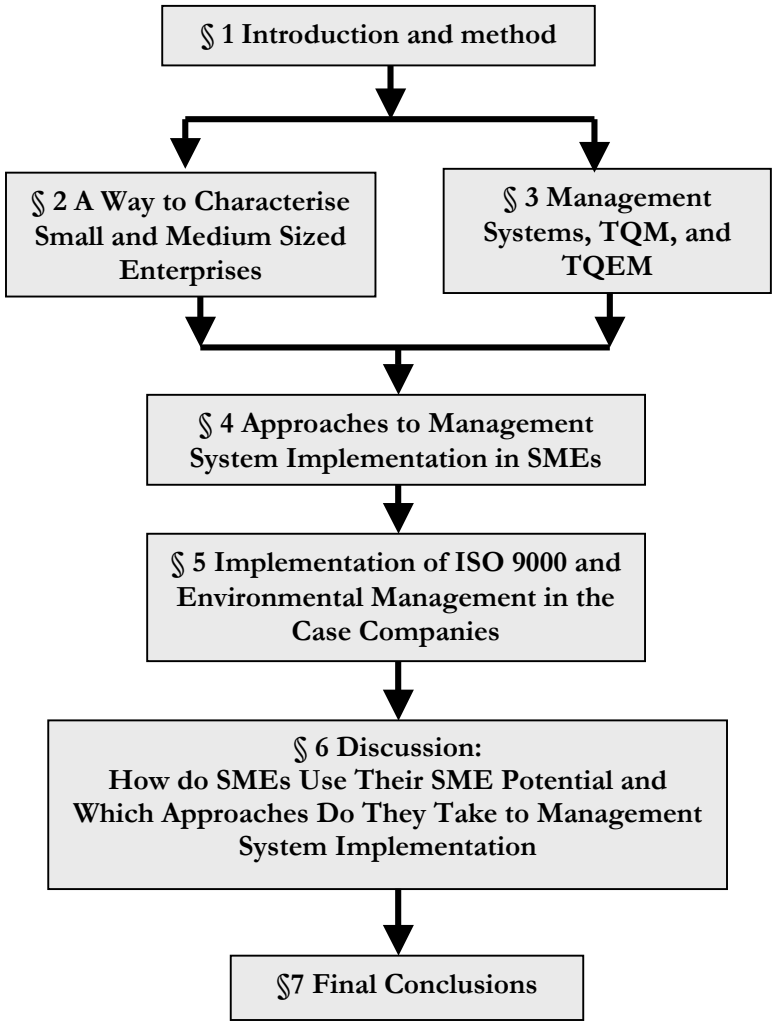
[39] Bruksanda: The "atmosphere" or the culture in a town where a large industry is very dominating providing rather strict social behavioural expectations. The people in the town are used to getting employment in the "plant" since generations without much training. What is characteristic for this type of management and organisation is that it is very hierarchic, and authoritarian with strict divisions e.g. between people doing manual labour and administrative work. [Author's definition]

1.7 A "Road map" of the study



CHAPTER
TWO

2. A Way to Characterise Small and Medium Sized Enterprises

The aim of this chapter is to study the characteristics of SMEs that can be of relevance to the implementation of QMS and EMS and development of TQEM. The objective is to make an overview of the recent development in SME research to find a possible connection to the research of quality management and environmental management as a theory base for this study. Some different ways of defining SMEs are then taken up, followed by a discussion of the concept SME and an attempt to define the characteristics that form the frame within which each SME operates.

2.1 SME Research as a Forerunner for EMS Research

The SME research is young compared to the classical scientific disciplines, but has had an almost explosive growth during the last decade. As young disciplines in "adolescence"[40] it used to be characterised by technical approach to knowledge and the aim was to achieve special results that could be applied in practical situations. The results in such a field are communicated in "peripheral" sciences books instead of articles in journals.[41]

The SME research has, based on a historical review, been regarded as a multidisciplinary field in which many different scientific disciplines were

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[40] Landström H & Johannisson B. (1998). Theoretical foundation in Swedish entrepreneurship and small business research. Working Paper 1998:1. Scandinavian Institute for research in entrepreneurship. *In 14th Nordic Conference on Business Studies,* Bodö Graduate School of Business. Bodö, Norway. 14-17 August 1997. p2

[41] Landström H., et al. (1998). Theoretical foundation in Swedish entrepreneurship and small business research.

"staking claims to conceptual definitions and research approaches".[42] But during the last decade it has grown into maturity largely due to the role as spearhead placed on it by the authorities. It is now displaying strongly the theoretical approach to knowledge, where different disciplines focus on different aspects of entrepreneurship, but the results are not so easy to apply in practice. There are 20 journals in the field of Entrepreneurship and SME in the world and a number of academic chairs especially in the USA.[43]

What is typical for the SME research mentioned above applies also to the research in the fields of quality management and environmental management. The literature available on environmental management in industry until quite recently consisted only of the consultative "how to" handbooks geared towards explaining common features between ISO 9000 and ISO 14001 and giving instruction on how to implement ISO 14001 in practice. An explanation of this may be that researchers in the field have been involved in companies solving problems with implementation of the system. Empirical material, which is a prerequisite for the researchers in this field wanting to have a real life connection, has been limited until recently.

Environmental issues are often multidisciplinary, which is also true of the field of environmental management. The lack of a common theory base shows in the existing studies that have been made from various disciplinary angles. They have mostly been directed towards large companies or corporations since they were the first to think about environmental management. On the basis of this, the research on environmental management could be considered to be a research field in its "infancy". At present it may, however, be going through the same explosive development as SME research has done earlier, and if this is the case the results of this will be first seen after a few years.

2.2 What is an SME?

The most simple definitions of an SME are based on the number of employees. According to NUTEK, small and medium enterprises can be defined in Sweden as those having less than 200 employees. In December 1999 there were 793 053 companies in private business. SMEs with less

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42 Landström H., et al. (1998). Theoretical foundation in Swedish entrepreneurship and small business research. p.4.

43 Landström H. (1999). *Entreprenörskapets rötter*. Lund. Studentlitteratur.

than 200 employees represented 99.86 per cent of the Swedish firms and employed 61.2 per cent of the total number of employees. Companies with 200-499 employees, which according to EC definition represent medium enterprises, employed about 10 per cent of the employees leaving about 28.8 per cent to the large companies.[44] This indicates that the small enterprises are an important source of employment today and their importance is likely to grow according to the trend in the rest of the developed world.[45] Out of the 21 924 manufacturers of metal and metal products[46,47] in Sweden, a total of 98.5% had less than 200 employees in 1998 and were therefore classified as SMEs.

In the European Union around 90 per cent of the firms are small or medium sized based on the limit of less than 500 employees.[48] In fact, most of the firms in all economies in the world are SMEs, regardless of how the SME are defined locally. But one trend seems to prevail everywhere: they become relatively more important and it is interesting that SMEs appear to survive economic recession better than large companies.[49]

The definitions of SMEs are often based just on the number of employees, which would suggest that the SMEs would be just smaller versions of larger companies, which would make no difference in the EMS implementation process. The criticism of this simplified definition pattern can be summarised in the five points below: [50]

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44 Statistiska centralbyrån. (2001). The number of companies according to size and those employed in them in Sweden in 1999. [2001-01-11]

45 Storey D J. (1994). *Understanding the small business sector*. London. International Thomson Business Press; Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment.*

46 SNI code DJ 27-28, DK 29, DL 30-33, DM 34-35. SNI is a five-figure code for the Swedish standard for defining an industrial branch. It is the basis for registering, providing permits, doing statistics etc. Heidenmark P. (1999). *Miljöarbetet inom svensk tillverkningsindustri*. p. 8.

47 Statistiska centralbyrån. (1999) SCB:s Företagsregister [SCB's Company Register]. [Online]. Available: http://www.scb.se/scbswe/eshtm/foretagregtab4.htm [1999-04-13]

48 Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment.* p.11.

49 NUTEK. (1996). *Småföretagen i Sverige 1996* [Small companies in Sweden 1996]. Stockholm. NUTEK B 1996:11; Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment.*

50 Storey D J. (1994). *Understanding the small business sector*. p.12.

- *There is no single definition, nor even any single criterion of smallness. Four different areas can be used in definition – employees, turnover, ownership and assets.*
- *There are different upper limits of turnover as well as upper limits of employees that can be identified for the different sectors of business.*
- *The statistical definitions based on monetary units are difficult to compare over time and between different countries, due to fluctuations of currency values and the fact that different index numbers have to be calculated to account for the change in value.*
- *The employee-based criteria in comparing large and small firms over time is incorrect due to variations in productivity over time and with the size of the company.*
- *The SME sector is not homogenous.*

Consequently "in practice, researchers have to tailor their own definitions of a small firm according to the particular groups of small firms which are the focus of their interest".[51]

In this study a small and medium sized enterprise is a company with less than 200 employees, which is further defined by its SME characteristics, which distinguish it from larger companies.

2.3 SME Characteristics

Since there is no single definition of SMEs the characteristics in which they differ from large firms and each other can be described and classified in numerous ways. The main characteristics that could be expected to be relevant to the TQM implementation in small and medium sized enterprises have been summed up in a list in Table 2-1 after the discussion below.

These characteristics have been grouped by the author under the headings of resources, management, organisation, flexibility and innovation to correspond to the TQM principles and to provide structure to the discussion of the cases. They can be expected to apply also to the implementation of QMS and EMS with the help of the standards. Additionally two characteristics have been added as bases for discussion. Market, in the meaning customers and other external interested parties was added due to the importance it has played for the QMS and was expected to play for the EMS implementation. Since three of the case companies appeared to have some connection to a corporation, ownership was included at the side of the management and will be discussed to a lesser extent.

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[51] Storey D J. (1994). *Understanding the small business sector*. p.16.

The different characteristics are used here to highlight the likely specialities of SMEs, but they overlap to some extent and will in the discussion below be completed with some other studies of the SME characteristics that were found to be relevant for the study as well as EMS implementation. A connection to the TQM principles will be made in Chapter 3 and they will provide structure to the discussion of the cases.

2.3.1 Resources

SMEs often have in relative terms modest human capital, limited financial resources and know-how[52] as well as small-scale technology. This may limit the possibilities of long term planning, since most of the effort has to be put into running the day-to-day business. Their possibilities of spreading the risk by engaging in several development projects simultaneously are limited. This is risky in case one of the few projects fails, but can at the same time lead into a greater awareness of costs both among the management and the staff, which again provides opportunities of finding out how to develop products more economically. [53]

2.3.2 Market

Most of SMEs operate in their narrow[54] niche and are able to provide marginally different products and services, which distinguish them from the more standardised products, or services provided by larger firms. They can have quite large shares of their specialised markets[55], but are most often price-takers, i.e. they have to compete on a market and cannot dictate the prices of their products. As price takers their negotiating position is weaker than the larger companies, since the latter are often active in several markets and can so compensate the smaller margins on one market with larger ones on another. SMEs function as subcontractors to one or few large companies manufacturing a limited number of products that have been developed by the customers. This makes them vulnerable to the actions of

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52 Ghobadian A & Gallear D N. (1996). Total quality management in SMEs. *Omega, International Journal of Management Science, 24, 1.*

53 Hult M & Odéen G. (1981). *Företagandet i små företag: En analys av småföretagens problem, villkor och utveckling i dag och i framtiden*. Stockholm. Affärsförlaget.

54 Ghobadian A., et al. (1996). Total quality management in SMEs.

55 Stanworth M J K & Curran J. (1976). Growth and the small firm.

their customers especially since these are large and are one of few or the sole out-let of the smaller company's products.[56] The production is single-sited[57] and accustomed to the requirements of the operations.[58]

SMEs have on an average less export than larger companies, but the indirect export as subcontractors via supplier sales to larger companies increases the export quote considerably.[59]

2.3.3 Management = Owner or Is It?

The majority of SMEs are provider companies where the owner sees the company as a way to get a reasonable standard of living and to maintain his/her freedom. The owner is often an entrepreneur,[60] who influences the operations and behaviour of the employees by his/her ethos and outlook.[61] The relationship between the owner and the business is very close, decision-making chain is short and decisions are often based on "gut-feeling". The motivation of the owner is the key to the company performance. The manager is highly visible and the management style if often directive or paternal.[62] Most of the characteristics of the owner/manger can be assumed to fit even to a manager who is not the sole owner of the company due to the dominant position he/she is bound to play in an SME.

Most owners have no special plans to expand or to reorient the company. Relatively few SMEs are therefore responsible for the growth and increased

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56 Storey D J. (1994). *Understanding the small business sector*.

57 Ghobadian A., et al. (1996). Total quality management in SMEs.

58 Ramström D. (1986). Bilder av småföretaget: i går, i dag, i morgon. In Stensson S. (ed). *Småföretagen: Tendenser inför 90-talet*. Stockholm. Liber.

59 NUTEK. (1996). *Småföretagen i Sverige 1996*.

60 Entrepreneurship is defined as ability of combining the existing in a new way: introducing a new product or a new production method, opening of a new market, conquering a new source of raw material and organising a branch in a new way. The entrepreneur is driven most not by his lust for money but by a wish to create a new kingdom, and even a dynasty. (Schumpeter J (1994). *Schumpeter: om skapande förstörelse och entreprenörskap: i urval och med inledning av Richard Swedberg*. Sweden. Ratio. p XXI)

61 Ghobadian A., et al. (1996). Total quality management in SMEs.

62 Ramström D. (1986). Bilder av småföretaget: i går, i dag, i morgon; Ghobadian A., et al. (1996). Total quality management in SMEs.

employment since this requires an owner, who has an ambition to grow,[63] which again varies greatly between different branches. But if an SME grows the growth takes place in a number of stages and is often managed by the second or third generation of owner manager. As the company grows and becomes larger the management is likely to turn from an entrepreneur in an SME into a bureaucratic director depending on how he sees his role in the company.[64] They are also more likely to change owners and even to fail than the large companies,[65] but the failure is not always connected to a general economic recession.

There is little internal conflict between the ownership and the control since they are located in the hands of few people or in an extreme case just one individual, the owner. This lack of several interest groups limits the fruitful exchange of ideas, which is often necessary to initiate change.[66] There are no requirements for external reporting, which is something that the management of large companies has to do to their boards and shareholders. This results easily in a lack of monitoring the performance as well as in missing the input of new ideas and knowledge and may also limit other contacts with the outside world.[67]

But the picture in which the SME is seen as a family owned business in the manufacturing sector is changing and the ownership chart of the SME is getting more varied from traditional private firms into SMEs incorporated in different ways. The form of ownership is only one factor in it and must be completed with other measures that describe the dependencies within the company and its environment.[68] It is not unusual either, that a small company used to be part of the large one, which now stands on its own, but the close contact remains, or that the growing, not too small, companies get absorbed by larger companies of corporations.

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63 Landström H. (1999). *Entreprenörskapets rötter.*

64 Stanworth M J K & Curran J. (1976). Growth and the small firm.

65 Stinchcombe A L. (1965). Social structure and organizations. In March J G (ed.). *Handbook of organizations.* Chicago. Rand McNally.

66 Ramström D. (1986). Bilder av småföretaget: i går, i dag, i morgon.

67 Ghobadian A., et al. (1996). Total quality management in SMEs.

68 Ramström D. (1986). Bilder av småföretaget: i går, i dag, i morgon.

What seems to be typical for an SME manager is that they are "independent-minded"[69], which is a term suggested to be used for owner-managed companies rather than calling them small. And it might with benefit also be used of SMEs more generally.

2.3.4 Organisation and Empowerment

The more informal and flat organisation with short decision chains provides the opportunity to have direct contact between different functions and decision-makers in SMEs and enables fast decisions.[70] The SMEs tend to be more result than control oriented as opposed to larger companies and evaluation, control and reporting procedures are often more informal. The management is close to everyone and it is easier to create a corporate (holistic) mindset and common culture in the company[71] since SMEs can also be seen as groups of individuals trying to achieve their vision through the company. The degree, to which different individuals agree to the company vision e.g. a management system, can vary, but a possibility to develop a shared vision is the key to how far the company can go in achieving its goals.[72] There are few interest groups, which may mean that there are few internal change catalysts.[73]

SMEs are often more people dominated (except the very high-tech companies), and the degree of specialisation is lower than in larger companies. The staff are therefore able (and often forced) to move between different tasks. It is also easier for people to see the results of their work and the less formal environment is likely to attract more creative talents who would find it difficult to adjust to the bureaucracy of larger companies.[74]

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69 Walley L. (2000). The environmental champion: making a start. Westfield: An SME success story. In Hillary R (ed.), *Small and medium-sized enterprises and the environment*.

70 Ghobadian A., et al. (1996). Total quality management in SMEs.

71 Ghobadian A., et al. (1996). Total quality management in SMEs.

72 Shrivastava P. (1995). The role of corporations in achieving ecological sustainability. *Academy of Management Review, 20, 4*.

73 Ghobadian A., et al. (1996). Total quality management in SMEs.

74 Ramström D. (1986). Bilder av småföretaget: i går, i dag, i morgon; Ghobadian A., et al. (1996). Total quality management in SMEs.

But one person who is not involved and engaged may equally well cause great harm since there is usually very little backup.[75]

There are often no specific training budgets and the staff training and development is likely to be ad hoc and small scale.[76] But this very lack of possibilities to miss any changes can lead to a greater engagement in different projects by the staff.

2.3.5 Flexibility and Innovation

The SMEs can be characterised by greater flexibility, evolution and change in regard to new products, markets and organisation than larger companies, which are bound to have a more stable structure. The degree of standardisation and formalisation is also low. They are generally less automated, but are on the other hand more flexible to adjust their production to the varying market demand and special requirements from the consumer,[77] whereas larger firms have to use their advantage of scale, i.e. manufacturing a long series of products to meet a secure demand.[78] There is, however, a number of SMEs with the most advanced technology, within which they have created their niche.

Also the organisation in SMEs is often organic.[79] There is little bureaucracy and most people on the staff has several tasks, which also contributes to the flexibility. This allows each person to see wider (have a more holistic view) and to act accordingly. The resistance to change is negligible[80] including the changes in the roles of the staff, which makes informal competence development possible. The same applies to new companies where people have to define their roles in relation to each other,[81] which is crucial for the flexibility of the company.

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75 van der Wiele T, Brown A. (1998). Venturing down the TQM path for SME's. *International Small Business Journal, 16, 2.*

76 Ghobadian A., et al. (1996). Total quality management in SMEs.

77 Ghobadian A., et al. (1996). Total quality management in SMEs.

78 Hult M & Odéen G. (1981). *Företagandet i små företag.*

79 Ghobadian A., et al. (1996). Total quality management in SMEs.

80 Ghobadian A., et al. (1996). Total quality management in SMEs.

81 Stinchcombe A L. (1965). Social structure and organizations.

An average SME is very unlikely to engage itself in R&D, but is likely to introduce and engage largely in innovations done by others due to less commitment to existing practices.[82] Even though innovations of larger scale are unusual in an SME, they are likely to see smaller every day innovations in the factory to solve problems on the initiative of staff and the owner in the informal organisation.

An exception to this are the very small companies that have started as buds by someone who was previously employed by the R&D department of a large company or at a university. The owners of these companies are often highly educated and the companies specialise in highly technical products.[83]

The discussion above is summed up in Table 2-1 below. It shows the main characteristics that could be expected to be relevant to the TQM implementation in small and medium sized enterprises in the column on the left whereas in the column on the right their main contents, compared to the larger companies, are summarised.

82 Storey D J. (1994). *Understanding the small business sector;* Ghobadian A., et al. (1996). Total quality management in SMEs.

83 NUTEK. (1994). *Småföretagaren: Sveriges framtid?* Stockholm. NUTEK. B 1994:4.

Table 2-1 A summary of the characteristics of SMEs in comparison to larger organisations. Modified by the author from Ghobadian et al.[84]

SME Characteristic	SME in Comparison to larger companies
Resources	*Modest human capital, financial resources and know-how* *Few development projects*
Market	*Limited external contacts* *A narrow niche* *Often price takers* *Dependent of a few large customers* *Less export*
Management and Ownership	*Very few layers of management* *Top management highly visible and close to the operations* *Incidence of "gut feeling" decisions more prevalent* *Dominated by pioneers and entrepreneurs* *Range of management styles: directive, paternal, Patronage* *Operations and behaviour of employees influenced by owners/managers' ethos and outlook* *Often no plans to expend or reorient the company* *Little conflict between ownership and control*
Organisation and Empowerment	*Flat with short decision-making chain* *Low degree of specialisation* *Division of activities limited and unclear* *Absence of departmental, functional mind set* *Corporate mind set, easier to share a vision* *Mostly organic with unified and fluid culture* *People dominated with very few interest groups* *Flexible organisation and flows* *Individuals normally can see the results of their endeavours* *No specified training budget* *Training and staff development is more ad hoc and small scale* *Informal evaluation, control and reporting procedures* *Single-sited with narrow span of activities* *Often more result than control oriented*
Flexibility and Innovation	*Activities and operations not governed by formal rules and procedures* *Low degree of standardisation and formalisation* *More rapid response to changes in the business environment* *Negligible resistance to change* *Very few internal change catalysts* *High incidence of innovativeness*

2.4 SME Characteristics and SME Potential

The characteristics that form a platform for the SME's operations to implement EMS could be summarised in this study as follows and

[84] Ghobadian A., et al. (1996). Total quality management in SMEs. p.87.

illustrated in Figure 2-1 below. They could be roughly divided into three categories:

Resources, form the **frame** within which the SME operates and uses its potential. The SME potential can be used to a smaller or larger extent until the frame is reached, i.e. the resources are used to the maximum and to enlarge the frame new resources have to be acquired. Resources are assumed to be scarce for all companies and small firms turn into large ones gradually and not at a certain point.

Market is the precondition for a company's existence and it is a factor **outside** the company affecting it internally. Market is the customer for QMS, but for EMS there are also other interested parties, which exercises external influence on the company.

Management/Ownership, organisation, flexibility and innovation form the "soft" **internal** potential, defined as the SME potential of the company, which it can use within its frame consciously or subconsciously.

- The effect of **Ownership** on the SME potential depends on how much the owners influence the details and decisions made by the management in the company. In this study the ownership will be discussed together with the management, as regardless of where the ownership lies, it mainly comes to the company via management.

  The most important aspect of **Management** is its visibility, which it needs to be aware of since is much more apparent in an SME than in larger companies, where several members and layers of management can complement one another.
- **Organisation** is also an important element in the SME potential. The short communication ways among the staff, the flexibility in moving between tasks provide opportunity to spread and anchor the common vision and use the creativity to develop the company. The smallness of the company makes it possible for the staff to see the contributions they make motivating further participation especially if they are also rewarded for them.
- **Flexibility** makes it easier for the company to see and use its SME potential, since the need to hold fast in the old ways is not so strong. This shows, for example, in the possibilities in trying out and adopting new ideas and practices, in making various changes and not being lost in the structures.

- **Innovation** is largely a result of an atmosphere that allows creativity and flexibility in adopting and applying creative ideas developed both within and outside the company.

The use of the SME potential and the characteristics in it will be utilised in the discussion of the different approaches and how the management by using an approach, also defines how much of the company's SME potential is used.

Although the SME potential can benefit a company in its EMS implementation the characteristics can also be seen as restrictions from the other side of the coin. They were defined as the characteristics where the SME could have an advantage over larger companies, and are therefore called potential.

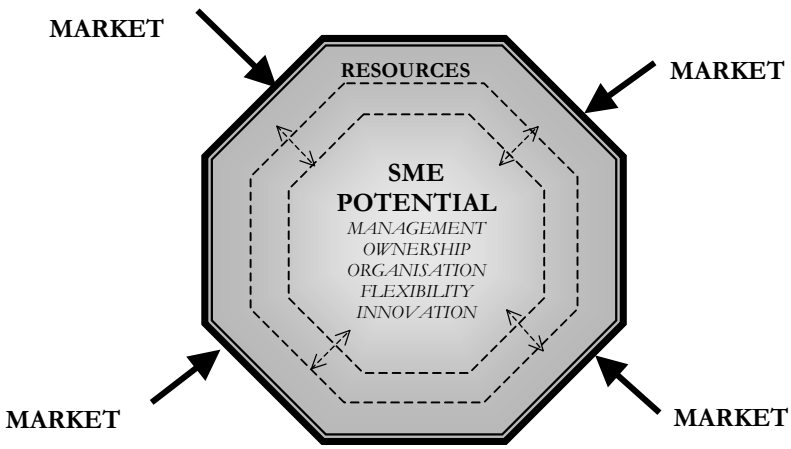

Figure 2-1 Model of the SME characteristics. The Resources (the area within the heavy line) within which the SME potential (the dotted lines) is used to a smaller or larger extent (<--->). Market exercises external influence on the company (⟵). Management and Organisation are the main components in the SME potential, which are affected by Ownership and Flexibility and which can promote Innovation.

CHAPTER
THREE

3. Management Systems, TQM and TQEM

The aim of this chapter is to provide management theoretical background to the study and discuss what can be attained by the management systems standards. The management systems and the total management principles are compared and defined in relation to one another.

3.1 Management of changes

There are many authors who have been studying the change process from different angles. One of the most quoted is Harold J Leavitt[85] and his basic system model for design variables: tasks and goal, tools and technology, structure and actors in an organisation. In his model[86]

- *tasks are the main functions, which an organisation is aimed to perform* and could, in addition to production, include implementation of an EMS
- *the structure is hierarchy, work flow and communication system,* where a standard like ISO 14001 could contribute to the communication system
- *technology is the machines and programmes including methods, theory and models* and could include the environmental management system
- *actors are different variables connected to participants as people, for example needs, goals, expectations and interests* of the management, the staff and the customers

All these parts are interconnected with each other, they are interacting and can be used to analyse organisations.

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85 Leavitt 1965 in Bakka J F, Fivelsdal E & Lindkvist L. (1993). *Organisationsteori: Struktur - kultur – processer*. Lund. Liber-Hemods. p.63

86 The cursive parts are direct from Leavitt in Bakka et al. 1993. p.63.

Besides these four main dimensions there are other aspects of management. They may have to do with the main dimensions such as goals or business strategy. Others are more temporary like quality management, environmental management and the corresponding audits, which can be more of a question of adjusting management into these circumstances rather than defining a totally new dimension.[87]

But there is no best way to describe an organisation, so Leavitt's model has been developed further by various researchers based on their values and to suit their own studies. This can be done since every structure is a compromise between different considerations and interests in the organisation, a problem that is common to all organisations. Galbraith and Kazanjian[88] have formed the model into a star consisting of task, structure, people, reward system and information and decision processes and Mohrman et al.[89] have developed it further and used it to illustrate an organisation's transition to a team based organisation. They state that "an organisation, regardless of the model by which it is illustrated, includes more than the structure of performing units":

> *the characteristics and competencies of the people;*
>
> *rewards;*
>
> *human resource processes and systems, such as career paths and employee hiring and development;*
>
> *performance management practices, including goal setting, performance appraisal, and feed-back;*
>
> *other processes, such as decision making, information processing, and communication;*
>
> *technologies employed to perform the task.*

Due to a change in one or some of the aspects, which can have its cause outside the organisation, the organisation always has to adjust all these aspects to support the way it is functioning. If one of the practices is changed, the other dimensions may need to be altered to maintain fit. Similarly, if the strategy is changed, then all dimensions may need to be

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87 Ewing P & Samuelson L A. (1998). *Styrning med balans och fokus*. Malmö, Sweden. Liber ekonomi.

88 Galbraith J R & Kazanjian R K. (1986). *Strategy implementation, structure, systems and process.* International Ed. St. Paul, MN. West Publishing Company.

89 Mohrman S A, Cohen S G & Mohrman Jr A M. (1995). *Designing team-based organisations: New forms of knowledge work.* San Francisco, CA. Jossey-Bass. p.25 ff.

altered so that the form of organisation remains consistent with the product-market strategy.[90] The implementation of an environmental management system could be such a change.

An organisation can be developed further into a more dynamic one where teams will be able to carry out the organisation's strategy and respond to changes thus enabling the whole organisation to change and to learn. This involves both technical and social change processes. "The technical issues entail the actual design of structure, processes and systems. The social issues entail helping people in the organisation to undergo a fundamental change in their understanding of how the organisation works and their new roles in it, as well as helping them gain the capabilities to operate effectively in that new environment and to enact their new roles." This means a deep change in deeply held values and assumptions about what constitutes effective performance.[91]

The internally or externally initiated obligation to take environmental considerations into all decisions and actions is one of these fundamental changes that has to be implanted in an organisation just as quality thinking has been during the latest decades. This transition is a process that takes many years. The practical organisational changes required by the environmental considerations are often not so deep, but the changes in the values of the organisation are quite fundamental in many areas. For the management this can mean a more futuristic thinking instead of the short-term profit in all situations. For everyone this would mean taking the responsibility for the EMS and the environmental activities in the organisation instead of the environmental responsibility being delegated to someone and remaining at the sidelines of the company activity.[92]

> *We do it (i.e. take care of the environmental activities) while we rest.*
>
> An interviewee in a case company

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90 Galbraith, et al. (1986). *Strategy implementation, structure, systems and process.*

91 Mohrman S A, et al. (1995). *Designing team-based organisations.*

92 Heidenmark P. (1999). *Miljöarbetet inom svensk tillverkningsindustri.*

3.2 The Three Letter Word Methods

Many modern management methods have first become known as "three letter word methods" (e.g. JIT = Just In Time, TQM = Total Quality Management). They have been dominating the debate of the change in companies and any company willing to be seen as modern and developing would have to follow them. They have been criticised for focusing just on one aspect of business, which is "bound to" increase profits due to activities in them. Many of the methods have spread widely indicating a need for renewing and developing organisations, although environmental concern has not been a core business issue and has therefore not been systematised as formally as other systems i.e. ISO 9000 for the quality management until lately.[93]

In spite of the risk of just focusing on one aspect of the business, the standards can be used by the management as tools for change. If they are integrated into the company operations as a whole and understood in the total context of the company rather than as instant miracle formulas, they give a frame for the structure, processes, systems, people practices and roles that differ from the previous practice in different ways. But the thinking, behaviour, skills and ways of making decisions have also to undergo change and be developed to correspond to this change. Previous experiences of QMS implementation process can come to use for the EMS implementation[94].

Both ISO 9000 and ISO 14001 are often expected to be implemented in a one-shot process, but they should in fact be a process of continuous development via regular audits. A successful implementation always involves learning, and assessments done on the above activities give the tool to evaluate the learning, the success of the implementation process. This leads to an action-learning mode by Mohrman that corresponds well to the continuous improvement cycle of ISO 14001 and the P-D-C-A (plan-do-check-act) cycle well known in connection to quality management.

How the management sees the change process of its organisation and the role of the management standards in it can be seen on its approach the

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93 Ewing P., et al. (1998). *Styrning med balans och fokus*; Hillary R. (1997). *EMAS: An analysis of the regulation, implementation and support. PhD thesis.* London. Imperial College.

94 Cohen W M & Levinthal D A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly, 35, 1.*

management has to their implementation. But before a further discussion of it we will study the differences of the concepts of quality and environment and possibilities of the management systems standards in developing an organisation and total management concepts, since this is significant for understanding of the different approaches to management system implementation.

3.3 Quality and Environment

There are some similarities and differences between the environmental and quality issues, which are discussed below.

The strategic need for better quality is seldom subject to controversy and the philosophical issues in connection to quality deal, e.g. if the implementation of quality management is to be done via Total Quality Management practices or via certain techniques. The environmental issues, such as "the spotted owl controversy in the USA, where environmentalists are pitted against loggers" on the other hand result in larger philosophical, ethical, economic and ecological conflicts based on different values and are therefore not always easy to solve.[95]

One other significant difference for a company is that quality failures are normally easy to identify and result in direct feed-back from the customers whereas environmental failures are often indirect, not easy to identify and may have long-term cumulative effects with little feed back.[96] This results in a lot of questions which are not always easy, and are sometimes impossible to answer.

The difference between the concepts has implications for the management systems as well. ISO 9000 was the first non-technical and non-engineering standard developed in the 1980s to allow a company to get its QMS certified. As environmental concern in society increased in the 1990s, development of ISO 14000 was rather a logical continuation to it in the area of organisational management system standards. But there is a difference between the consequences of the two standard series. ISO 9000 introduces a "zero-defects" policy and imposes this on the suppliers hoping to reduce

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[95] Chandrashekar A, Dougless T & Avery G C. (1999). The environment is free: The quality analogy. *Journal of Quality Management, 4, 1.*

[96] Chandrashekar A., et al. (1999). The environment is free. p.124.

time and cost to produce a product addressing business efficiency. "ISO 14000 leaves the industry-client realm and enters into a field of significant public interest: the environmental performance of companies."[97]

The very concept of quality can be defined in various ways and each of them has its strengths and weaknesses in relation to measurement and generalisability, managerial usefulness and customer relevance, so different definitions should be used depending of the circumstances.[98] "Quality of a product or a service is its ability to satisfy the needs and expectations of the customers"[99] was chosen for this study.

3.4 A Management System or a Total Concept?

Management systems standards like ISO 9000 and ISO 14001 are the most commonly known and used way of implementing management systems in organisations. They are geared to provide structure for the organisation, responsibilities, procedures, processes and routines and provide a well structured approach to managing quality and environment, to guarantee products and service that meet stated requirements for quality[100] or maintaining environmental policy[101].

But the standards are not the only way towards improved quality and environmental activities. Concepts like TQM are also used and if total quality management was perceived to include environmental considerations as well as quality thinking, the negative impact of a product or a service should be minimised as part of a company's quality effort.[102] This is an

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97 Gleckman H & Krut R. (1997). Neither international nor standard: The limits of ISO 14001 as an instrument of global corporate environmental management. In Sheldon C. (ed.), *ISO 14001 and beyond.* Sheffield, UK. Greenleaf. p.46.

98 Reeves C A. & Bednar D A. (1994). Defining quality: Alternatives and implications. *Academy of Management Review, 19, 3.*

99 Bergman B & Klefsjö B. (1994). *Quality from customer needs to customer satisfaction.* Lund. Studentlitteratur. p.13.

100 Modified from Ollila A. (1995). *Quality improvements through ISO 9000 standards.* Helsinki. ABB Service. p.51; ISO 9000-1:1994 4:8; Lindgren H & Sandell B. (1993). *ISO 9000 – den offensiva vägen.* Lund. Studentlitteratur. p.9.

101 ISO 14050:1.14.

102 The fact that quality requirements at times go against environmental concerns is left outside this study (e.g. JIT).

assumption that is incorporated in the Swedish Quality Award and is also increasing among the public.

> *If the environment is not good, then we have not reached all the way to quality.*
>
> A production planner

This is, however, not the general understanding of the concept and that is why environmental management systems focusing especially on the environment are needed and the concept of TQEM, Total Quality Environmental Management, has been introduced. It means applying the total quality management principles, concepts and practices to the environmental area. It could be defined as a holistic systems way of environmental management thinking in an organisation.

The connection of ISO 14001 to TQEM is said to be the same as ISO 9000 to TQM, i.e. the standards can be used as tools to get started on the quality and environmental road. Just as TQM demands quality improvements from a holistic point of view TQEM perspective seeks to optimise the ecological performance of the organisation.[103]

If we assume that the ultimate environmental goal for a company should be to develop towards sustainability in all its operations, we have to be aware of the fact that it is impossible for a company to reach that goal in a non-sustainable society and only a few companies are starting to think about the importance of the environment beyond EMS. Also TQM and TQEM are in some ways idealistic, visions or goals to be working towards, and it is impossible to exactly define when one has reached them. Companies that have implemented management systems based on the standards can be said to have advanced a shorter or longer distance towards them. But a company that has developed total quality environmental management has not reached sustainability since the focus still is on environmental issues rather than the whole concept of sustainability.

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[103] Hemenway C G & Hale G J. (1996). The TQEM – ISO 14001 connection. *Quality Progress, 29, 6*; Shrivastava P. (1995). The role of corporations in achieving ecological sustainability.

3.5 Management by Standards

3.5.1 Management of Quality

Quality management systems started to gain ground in Sweden during the later part of 1990s after the International Standardisation Organisation (ISO), published a series of quality management systems standard called ISO 9000[104] in 1984. These provide a standardised tool to work with quality in different kinds of organisations in a structured way.

> *An ISO 9000 quality management system is the organisation, responsibilities, procedures, processes and routines that are documented, implemented and maintained in order to guarantee that products and services meet the stated requirements.*[105]

This means that a company must accurately document all the details required to achieve the requirements of its QMS. This includes, for example, the quality policy, measurable quality goals and instructions about internal quality audits. When a company has introduced this, which is the very quality management system, and got it implemented[106] the company can be said to follow ISO 9000.

ISO 9000 with its practical approach has proved to be a useful tool in lifting quality issues on the agenda and in getting the quality work stated. Companies can have different ambitions and may use ISO 9000 as a goal in itself or as a starting place on the road to achieving strategic TQM orientation.[107] The standard can be used in different ways, which may be one of the main reasons for the great popularity it has gained. And even though it is considered voluntary it is often mandatory in practice due to customer requirements.

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[104] ISO 9000, ISO 9001, ISO 9002, ISO 9003 and ISO 9004. A common name ISO 9000 is used in the study for the quality management systems standard and refers to the 1996 revision unless otherwise stated.

[105] Modified from Ollila A. (1995). *Quality improvements through ISO 9000 standards*. p.51; ISO 9000-1:1994 4:8; Lindgren, et al. (1993). *ISO 9000 – den offensiva vägen*. p. 9.

[106] Hedborg T. (1996). *Införande och tillämpningar av ISO 9000*. KTH. Stockholm: Here the definitions accepted in the industry for introduce and implement are used. To **introduce** means that the instructions etc. come into the right places. To **implement** means that the staff also follows the instructions in their work.

[107] Carlsson M & Carlsson D. (1996). Experiences of implementing ISO 9000 in Swedish industry. *International Journal of Quality and Reliability Management, 13, 7*.

Although ISO 9000 has been largely criticised, no holder of an ISO 9000 certificate is claiming that the certificate has harmed its business and companies that stick to the process rather than rushing to earn the certificate report many benefits. The following benefits are among the most commonly cited:[108]

- *Creation of a more comprehensive, formalised and documented quality system*
- *Improved internal and external communication – removing the guesswork*
- *Better control of operations and cost reduction, ability to identify inconsistencies and ability to follow up procedures*
- *Credibility, i.e. the ability to offer quality services to customers with the assurance that the company can deliver*

The system provides also a very rigorous auditing tool to check the company's compliance with it and to measure the company's quality performance, which is a precondition for continual improvement.

But there is a real risk of focusing on improving the quality management system itself and not the quality of the company's products and services in rushing to achieve and maintain the certificate, since a certificate is all that the market requires. Various authors dealing with ISO 9000 system in the context of the TQM are quite critical toward the shortcomings of the standard and see it at times as mostly benefiting consultants.[109] They compare the systems and state that companies focusing on standards lie at the low end of the total quality continuum.[110] The criticism of ISO 9000 often includes the following:

- The quality management system is implemented mainly due to customer requirements.[111]
- No guarantee that the product satisfies customers' needs or has better quality than non-registered companies.[112]

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[108] Zhao M. [1999-11-24]. Personal interview; Barnes F C. (1998). ISO 9000 myth and reality: A reasonable approach to ISO 9000. *SAM Advanced management journal, 63, 2,* p.24 ff.

[109] Barnes F C. (1998). ISO 9000 myth and reality.

[110] Chuchry A, Hyder Ca, Yasin M & Mixon D. (1997). A systematic approach to improving quality: A framework and a field study. *International Journal of Quality and Reliability Management, 14, 8-9*. p.877.

[111] Yung W K C. (1997). The values of TQM in the revised ISO 9000 quality system. *International Journal of Operations and Production Management, 16, 1-2,* p.226 ff.

- The system is defensive and product-oriented, and encourages conservative control to achieve change. A minimum effort is required to ensure good product quality. It rarely mentions quality in the context of administrative work.[113]
- Risk of comprehensive paper work taking over improvement work.[114]
- No guarantee of good or improved product quality or productivity and responsiveness to customers.[115]
- Human resources focus only on training, but no guarantee of workforce development.[116]
- No emphasis on teamwork or the necessity to share information.[117]
- Conformity to own quality management system and comprehensive documentation encourage delegation with a risk of less management involvement.[118]
- It is expensive to implement and to maintain for the SMEs.[119]

Since quality efforts in ISO 9000 primarily focus on conformity, documentation and auditability, there may be a separation between quality management and overall business management, reversing a trend toward

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[112] Bergman B, et al. (1994). *Quality from customer needs to customer satisfaction*. p. 399; Ollila A. (1995). *Quality improvements through ISO 9000 standards*. p.51 and p. 56.

[113] Bergman et al. (1994). *Quality from customer needs to customer satisfaction*. p. 399; Ollila A. (1995). *Quality improvements through ISO 9000 standards*. p.51 and p.56; Reimann C W & Hertz H S. (1993). The Malcolm Baldrige National Quality Award and ISO 9000 registration: Understanding their many important differences. *ASTM Standardisation News, November*.

[114] Ollila A. (1995). *Quality improvements through ISO 9000 standards*. p.56.

[115] Hedborg T. (1996). *Införande och tillämpningar av ISO 9000*. p.8.

[116] Reimann C W et al. (1993). The Malcolm Baldrige National Quality Award and ISO 9000 registration.

[117] Bergman et al. (1994). *Quality from customer needs to customer satisfaction*. p. 399; Ollila A. (1995). *Quality improvements through ISO 9000 standards*. p.51 and 56.

[118] Chuchry A., et al. (1997). A systematic approach to improving quality; Taylor W A & Meegan S T. (1997). Senior executives and the ISO 9000-TQM transition: A framework and some empirical data. *International Journal of Quality and Reliability Management, 14, 6-7,* p.672.

[119] Taylor W A. (1995). Organisational differences in ISO 9000 implementation practices. *International Journal of Quality and Reliability Management, 12, 7,* p.11.

their better integration[120]. The prestudy also indicates that the responsibility for the ISO 9000 implementation, as well as the running and maintenance of it, are delegated and so easily left with little attention from the management and rest of the staff.

Further criticism of the standard is presented by Reimann et al.:[121]

> *Its central purpose is to enhance and facilitate trade by providing a common basis for an independent and transportable supplier qualification system. It is directed towards reducing auditing costs and helping to assure buyers that specified practices are being followed, both important to enhancing and facilitating trade.*

The authors conclude that ongoing audits are "in essence a tool for assessing continuing compliance and foster improvement only to the extent necessary for maintaining compliance".

3.5.2 Managing Environment by a Standard

As companies become more aware of their environmental impact, they also want to guard themselves against unpleasant surprises in their products and processes from the details delivered by their suppliers. This concern that used to comprise only of the functional aspects like measuring the harmful emissions like dust or toxicity, can now also include environmental impacts like acidification.

One of the main arguments for the voluntary environmental management system implementation in companies is the assumed reduction of command and control regulation from the authorities when a company can show that it is taking charge of its own environmental situation and has it under control i.e. taking the initiative themselves. It could also reduce trade barriers world-wide in companies and make it easier to compare environmental performance in different companies and between one company's operations in different countries.[122]

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120 Reimann C W et al. (1993). The Malcolm Baldrige National Quality Award and ISO 9000 registration.

121 Reimann C W, et al. (1993). The Malcolm Baldrige National Quality Award and ISO 9000 registration.

122 Begley R. (1996). Is ISO 1400 worth it? *Journal of Business Strategy, 17, 5.*

But there has also been a fear that EMS could prove to be a trade barrier especially in the European market. This has been the driving force for certification in the Far East in the electronics industry, where about 60% of the certified companies in 1997 were in that sector.[123] In December 1998 it could be seen that the uptake of ISO 14001 is growing at more than 300% per year globally.[124]

As with quality management, in 1992 the British Standards Institute in the UK was first to introduce BS 7750, environmental management systems standard, which follows closely the corresponding quality management systems standard. At the same time EMAS, The Eco-Management and Audit Scheme was created within the European Union, and presented in 1993. But it was first in 1996 with the presentation of ISO 14000 environmental management system standard series[125] that the critical mass for a large-scale EMS implementation was reached in industry and later in other organisations. ISO 14001 will be used in this study to mean EMS based on ISO 14001 and the thinking it represents and which is further defined in standards ISO 14004 and ISO 14050.

The ISO 14001 standard defines EMS as: "Part of the overall management system that includes organisational structures, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining the environmental policy."[126] The role of EMS is defined as a system that "provides a structured process for the achievement of continual improvement, the rate and extent of which will be determined by the organisation in light of economic and other circumstances."[127]

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123 Environmental Data Service. (1997). *Extract: Global uptake of ISO 14001 shows uneven picture*. [Online]. October. Available: http://www.ends.co.uk/report/iso.htm. [1999-08-16].

124 Environmental Data Service. (1998). *Headings: Global growth for ISO 14001*. [Online]. December. Available: http://www.ends.co.uk/report/Dec98Heads.htm.[1999-08-16].

125 Swedish Standards in the SS-ISO 14000-series. ISO 14001 and ISO 14004 refer to the 1996 version and ISO 14050 to the 1998 version of the standard if not otherwise stated.

126 ISO 14050:1.14.

127 ISO 14001:A.1 p.17.

It is also clear that even though the improvement of environmental performance can be expected due to a systematic approach,[128] EMS is a tool, which makes it possible for an organisation to achieve and systematically control how it reaches its own goals for environmental performance. This does not immediately result in a reduction of adverse environmental impacts.[129] The ISO 14001 standard also recognises the special situation in the SME and allows variations in detail and complexity, extent of documentation and the amount of allocated resources to suit the size of the organisation and the nature of its activities.[130]

But ISO 14001 makes environmental concern part of a company's overall management, so that it is included in all aspects of the company's life. The EMS can be developed separately for each company, until the guidelines of how it can be co-ordinated with other management systems are more established .[131]

Some of the advantages of having an EMS include the possibility to perform more structured environmental audits, where the environmental management system and the environmental situation in the company can be audited by an external auditor. This can increase the creditability of the company among the general public and customers.[132] The interested parties should be able to be assured that there is a management commitment, emphasis on prevention rather than corrective action, evidence of reasonable care and regulatory compliance and that the system design incorporates continual improvement.[133]

It is also a good way of making use of the increased awareness among the employees of the need to protect and conserve the environment.[134]

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128 Sheldon C (ed.). (1997*). ISO 14000 and Beyond: Environmental management systems in the real world*. Sheffield, UK. Greenleaf.

129 ISO 14001:A.1 p.17.

130 ISO 14001:0.1 p.6 and A.1 p.17.

131 Sheldon C (ed.). (1997*). ISO 14000 and Beyond.*

132 Brorson T & Larsson G. (1997). *Miljöledning*. Stockholm. EMS.

133 Svensk standard SS-ISO 14004:0.2 p.6

134 Green P E J. (1993). Environmental TQM. *Quality Progress, 5*.

3.6 Management Beyond a Standard

When thinking about quality management most people are first likely to think of the quality management system standards in the ISO 9000 series. Certification according to one of these has been seen as a goal for every company wanting to assure a position in an ever-hardening competition on the international market.

But some managers see beyond the standard and the certificate, which they see simply as a tool in their company's development process. They may say they have adopted a more holistic view of quality, something of the concept of Total Quality Management (TQM) and may be striving towards a Quality Award. But the differences between these and various other quality doctrines, philosophies and systems are unclear for most people apart from those specialising in these issues.[135]

A large number of articles about total quality management have been written both in business and trade press and even some academic press during the nineties. But there is still no total agreement on how to define the concept. Even the most often named TQM authorities differ in their writings about the framework of total quality management, but they have a common ground to their approach:[136]

> *The importance of controlling the process and not the product.*
>
> *The human process is vital, if not more so, than the control of the technical process.*
>
> *The top management is responsible for quality; to provide commitment, management, and support to technical and human process. The management must have a clear understanding of the process.*
>
> *That management determines the climate and framework of operations within the organisation. The management must foster the participation of the staff in quality improvement, and develop a "quality" culture by changing perception of, and attitudes towards, quality.*
>
> *Education and training must be emphasised in changing employees' beliefs and attitudes and enhancing their competencies in carrying out their duties.*
>
> *The emphasis is on prevention of product defects, not inspection after the event, and on the reduction of the costs of quality to improve competitiveness.*

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135 Ollila A. (1995). *Quality improvements through ISO 9000 standards.*

136 Ghobadian A & Speller S. (1994). Gurus of quality: A framework for comparison. *Total Quality Management, 5, 3,* p.62-63.

> *The quality improvement is emphasised producing benefits over time, whether developed continuously or project by project. Quality is a process, and not an instant cure.*
>
> *All aspects of activity should be looked at for quality improvement, as they contribute towards quality. Functional integration is important to TQM.*
>
> *Quality is a company-wide activity.*

These can be summarised in the three main principles of total quality management that are the very essence of the whole concept and which characterise it in a company. They are the customer focus, continuous improvement and teamwork,[137] and form the base for this study together with the principle of management. This is the key to the previous three principles and could be included in teamwork, but is looked at separately here since it is one of the key components in the SME potential. The principles are then implemented through a set of practices, which in their turn are supported by a wide array of techniques.[138]

The TQM principles will be discussed in more detail below with application to TQEM, i.e. an environmental focus and considerations, and the differences of the standards and the total management concepts are summarised at the end of this chapter.

3.6.1 Total Quality Environmental Management

The total quality environmental management was defined in this study as a more holistic systems way of environmental thinking, and developing towards it means taking a holistic environmental responsibility in all business operations rather than striving for certificates.

TQEM falls, however, short of the sustainable or ecological approach defined by Tilley, which could even be called an "ecocentric" approach to environmental management and subordinate all other company functions to it.[139] Although it would require a fundamental rethink about all aspects of the business it would still not include all aspects of sustainability since it is mainly focused on environmental concern.

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[137] Dean J W jr & Bowen D E. (1994). Management theory and total quality: Improving research and practice through theory development. *Academy of Management Review, 19, 3.*

[138] Dean J W jr., et al. (1994). Management theory and total quality.

[139] Tilley F. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firms.*

Customer focus is the most important of the TQM principles since the goal for the organisation is to deliver products and services that fulfil the customers' needs. This could include the customers' need of products that do not harm the environment, but is not usually perceived in that way, thus excluding the environmental considerations. Customers or the market are all parties having different interest in the company and would for sustainability, also have to be redefined to also include future generations and the global effects of a company's products, which can be seen as a further development from TQEM.

Customer focus means in practice active contacts with customers on a broad front building and maintaining relationships where also solutions that may not be obvious at first glance, for example ones that are less harmful for the environment, can be negotiated. These will also require common long term solutions that in the short run may, for example, be more expensive than the conventional solutions. The relationships also provide an opportunity to have less bureaucracy in all contacts, which is an advantage especially for the SMEs.

Continuous improvement means a commitment in the organisation, a system of processes, which are constantly examined in the company in search of better methods.[140] This can in practice mean that certain variables are measured and processes audited regularly to observe the development and to take action accordingly. But also providing the staff opportunities for development is of uttermost importance.

The base for continuous improvement is flexibility to make the changes where own or others innovations play an important role. There will be some situations where quality and environmental improvements contradict each other, e.g. JIT requirement for more precise deliveries, which increase transports and consequently the negative environmental impact due to it.

In TQEM continuous improvement also means not designing environmental problems into new products and processes, which entails using tools like LCA to gather information.

Customer focus and continuous improvement are usually best achieved by **teamwork**, collaboration between different groups both within the

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[140] Dean J W jr., et al. (1994). Management theory and total quality.

organisation (over the boundaries of sub-units to benefit the whole organisation instead of sub-optimisation) and with customers and other interested parties outside it (partnership for everyone's benefit).

All employees at all levels are involved with the management leading the way. One part is the empowerment of the staff, as the employees can make important contributions to the organisation when they have the power and necessary training.[141] Empowerment can in practice, for example, mean encouragement to make even small proposals, the best of which are rewarded in a tangible way to encourage further participation and engagement. In TQEM all efforts and emphasis are needed on the engagement of everyone to find the more sustainable solutions that are required in the long run.

Management is the key for the vision for TQEM to work. It has to understand its role-model status and its function within it to be able to use the company potential to the full. It is personally involved and provides the resources, the encouragement etc that are required, which in practice means that all aspects of the business have to be totally re-evaluated. This is a long-term commitment with the hope of engaging suppliers and customers later[142], but does not necessarily require large costs, but rather an awareness to be able to achieve a lot with small resources.

Measuring the development may not be easy. It is possible to apply the tools from the management systems standards, the quality awards or a number of tailor-made check-lists, but in the end there is likely to be few, if any, tangible items to measure.

These four principles are connected so that continuous improvement is necessary to maintain customer satisfaction and company development and it is best driven by customer needs. The process to achieve this goes through organisational boundaries and makes teamwork necessary while the management leads and engages everyone in the process.

When an organisation wants to implement TQEM it has to find a way of addressing the different principles and elements in its operations. For most organisations this involves defining a tool, an environmental management

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141 Dean J W jr & Bowen D E. (1994). Management theory and total quality.

142 Chuchry A., et al. (1997). A systematic approach to improving quality.

system to work with in practice and of which ISO 14001 could be an example.

3.7 Are the Standards not Enough?

3.7.1 TQM Principles in ISO 14001

ISO 9000 is criticised for its failure of being able to accommodate TQM principles and of not necessarily providing stimulus for other than minimum compliance with the standard. But how does ISO 14001 actually incorporate the TQEM principles?

By stating the intentions of its creators that "the standard contains only those requirements that may be **objectively audited** for certification/ registration purposes and/or selfdeclaration purposes and has **no absolute requirement** of environmental performance **beyond commitment to compliance** with applicable legislation and regulations and to continual improvement"[143], ISO 14001 will only state the very basic requirements, thus leaving out much of its TQEM content, which may be difficult to objectively measure. (emphasis added by the author)

There are several requirements the standards place on the **management** of the company.

> *Top management has a key role in building awareness and motivating employees by explaining the organisation's environmental values and communicating its commitment to the environmental policy. It is the commitment of the individual people in the context of shared environmental values that transforms an EMS from paperwork into an effective process.* [144]

The importance of management commitment, motivating and value creating role and engagement in the company along the lines of the TQEM principles is very clearly communicated in the guidelines for an EMS but not quite as clearly in the main standard. But since the standard is voluntary the verb used is shall/should instead of the compulsory must leaving an opening for the company to decide so the approach the company has chosen plays an important role.

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[143] ISO 14001 p.5.

[144] ISO 14004:4.3.2.4 p.28.

ISO 14001 does not talk about customers but of **interested parties**, which are "an individual or group concerned with or affected by the environmental performance of an organisation, and can be internal or external".[145] Their concerns should be included and even suppliers should be encouraged to establish an EMS.[146] The standard takes into consideration that "the control and influence over the environmental aspects of products vary significantly, depending of the market situation of the organisation and it may only have a limited control over them."[147]

TQEM objective customer focus does not appear here very clearly, but the communication and consideration shown to interested parties are in line with it. This is quite natural, since it is often other interested parties and not the traditional customers that have the greatest interest in the company's environmental activities and performance.

The standard even makes a claim for sustainability: "The overall aim of the standard is to support environmental protection and prevention of pollution in balance with socio-economic needs".[148]

At the first glance the focus on EMS standard is conformity and achieving **continuous improvement** is defined so that it "requires organisational commitment to a systematic approach and to continual improvement of the EMS"[149]. This is later clarified to concern environmental performance, although the audits in themselves are no guarantee of meeting or ensuring continuing to meet performance and legal requirements, and the rate and the extent of the improvement is determined by the organisation itself.[150]

The bottom line for certification according to ISO 14001 is a commitment to comply with the legislation and other requirements from the authorities.[151] The standard clearly states that the organisations should

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145 ISO 14001:3.11 and ISO 14004:0.1.

146 ISO 14001:A.6 p.25 and ISO 14004:0.1.

147 ISO 14001:A.3.1 p.19.

148 ISO 14001 p.4.

149 ISO 14001:1 p.7 and ISO 14004:0.1 p.4.

150 ISO 14004:3.1 p.8 and 4 Principle 5 p.10 and ISO 14001 p.4, ISO 14001:4.2 b) p.10 and ISO 14001:A.1 p.17.

151 ISO 14001 p.6 and 14004:0.1 p.5.

review and continually improve its EMS, with the objective of improving its overall environmental performance, where the standard is only a tool. But there is some uncertainty in practice whether the continuous improvement implies to the EMS itself or the environmental performance of the company among those wanting to implement ISO 14001.[152] This may reflect the somewhat unclear focus in ISO 9000 on this point, although ISO 14001 is somewhat clearer on the main objective, improving performance and not the system.

The TQEM concept of continual improvement is clearly stated although the standard also talks frequently about conformity. If the EMS is functioning the different environmental aspects are being noted, renewed goals to work with them are continuously being set up and so continuous improvement is more or less automatically achieved.[153]

ISO 14001 combines continual improvement with **teamwork**, enabling everyone to participate[154], which is in line with TQEM. It is clearly recognised that it is the commitment of individual people, beginning with the highest level[155], to the common vision that is the key in forming the EMS into a functioning system, not just paperwork. Everyone has clear assignment, receives appropriate training and gets recognition for achieving environmental objectives and targets and receive *encouragement to make suggestions* to improve environmental performance provides motivation.[156]

Management is seen as an important role model and the importance of effective communication is emphasised. One of the key principles for managers implementing EMS is to *develop the management and employee commitment to the protection of the environment*[157] (not the EMS, authors comment) with clear assignment of accountability and responsibility. But there is no clear emphasis of working together cross-functionally to achieve

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152 Environmental Data Services. (1999). *Setting the agenda for the revision of ISO 14001*. [Online]. February. Available: http://www.ends.co.uk/report/Feb99_2_tx.htm. [1999-08-16].

153 ISO 14001:A.6 p.24 and ISO 14004:0.1 p.5.

154 ISO 14001:4.2 e) and 4.3.3.

155 ISO 14001:A.4.1 p.21and 4.3. p.22.

156 ISO 14001:4.4.1 p.11 and ISO 14004:0.1 p.5.

157 ISO 14004:4.3.2.4 p.28.

improvement along the lines of TQEM, but rather everyone seems to be expected to work on his own possibly encouraging others if needed.

The concepts and ideas connected with TQEM appear in several places in the environmental management systems standard ISO 14001 and the guidelines on principles, systems and supporting techniques ISO 14004, but how does it differ from ISO 9000 at present and how are the revisions, that are on the way, going to change the picture. And can a standard be a guarantee for a further development?

3.7.2 Differences in the Management Systems Standards

It could be concluded that ISO 14001 incorporates somewhat more of the TQM/TQEM principles than ISO 9000 in the following way.

1. Firstly, the management gets in an EMS standard a more visionary role model status, in which he/she is expected to engage and encourage the staff to participate actively in the EMS process along then lines of TQM/TQEM as opposed to the mainly administrative management role in ISO 9000.

2. Secondly, the customer, who is only the receiver of a company's products in QMS[159] incorporates in ISO 14001 more clearly all different groups of interested parties, as in TQM/TQEM. These are encouraged and expected to contribute to a company's EMS and their interests and concerns have to be taken into consideration as well in planning of the activities as in informing of any relevant aspects of the results. There is no requirement of openness of this in line with the EMAS system except for the environmental policy. Therefore the judgement of what is relevant is left to the company, which can without a wider understanding of the issues behind it be difficult since they have previously not been included in the company considerations. Stakeholders in ISO 9000 are mostly included on economic basis even though other aspects, such as work satisfaction and responsible stewardship can also be included. Conformity to customer's quality

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158 Gleckman H, et al. (1997). Neither international nor standard. p.46.

159 ISO 9000-1:A.10.

requirements and providing confidence in being able to supply it are in main focus here.[160]

3. Thirdly, both standards focus on continuous improvement, but they also leave the door open for minimal efforts above the basic criteria or near conformity. But according to the fifth principle in ISO 14001, reviewing and improving, an EMS, is only a means of improving overall environmental performance, which requires organisational commitment to a systematic approach.[161] The check should be done on regular intervals.

   The goal of continual improvement in ISO 9000 is to provide confidence to the supplier's QMS and to demonstrate the company's capacity to design and supply conforming products and for assessment of the capacity of a supplier by external parties.[162] This is achieved by corrective and preventive actions to eliminate causes of actual and potential nonconformities, which corresponds to the work with environmental aspects in ISO 14001. The extent and the timetable of the QMS are also up to the company to decide, but it should be appropriate to the magnitude of problems in the company and correspond to the risks encountered, whereas ISO 14001 talks about economic and other circumstances that should be considered,[163] thus leaving the door wide open for minimum development.

4. Finally there is an opposite view of teamwork and staff development. Although ISO 14001 says nothing of teamwork as such its goal is that everyone is committed to the common vision of protecting the environment. Resources are allocated for training to increase awareness and competence, everyone is considered accountable and responsible and gets recognition for achieved environmental objectives. This as well as dialogue between all interested parties, encouragement to make suggestions and emphasis on effective communication processes are clearly aimed at promoting participation by all. This is in line with the TQEM principles.

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160 ISO 9000-1:4.2 p.5.

161 ISO 14004:4 p.10.

162 ISO 9000-1:1994 p.3.

163 ISO 14001:4.5.2.

ISO 9000 does not talk about teamwork either; training is reserved for the QMS to inform on its contents. Co-operation is referred to only as a possible source of problems when people have to manage several processes and their interrelationships especially when they span across several functions.[164] Personal development is limited to training for the QMS and an appropriate balance between documentation and the extent of skills and training given should be sought to keep the documentation to a reasonable level.[165]

3.7.3 Revisions of the Standards

The new version of the ISO 9000, which was going to be published by the end of year 2000, is revised in several points to meet the criticism above. There is a stronger focus on customer satisfaction and requirements to measure it. The customer concept is extended to include any interested party, which is an individual or group concerned with or affected by the environmental performance of an organisation along the lines of ISO 14001. The new ISO 9000 series has the requirement of continuous improvement and is penetrated by process thinking.

This new revision of ISO 9000 will imitate the good examples provided by ISO 14001 in use. The procedures are co-ordinated with the environmental management systems standard and the text structure according to the P-D-C-A cycle. This is said to be the natural and intuitive way for people to do things and it is the basis for all modern management systems. The revision will make it easier to audit the quality and environmental management systems in organisations simultaneously.[166]

Some of the criticism of ISO 9000 applies also to ISO 14001 even though some of the critical points in comparison to TQEM have been adjusted in it and a scheduled revision every five years that is taking place at the moment will further strengthen them. The standard includes a clear requirement to continuous improvement, and the controversy whether this refers to the operation of the environmental management system or the environmental performance of the company is likely to be clarified in the next revision of

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164 ISO 9001:4.7 p.7.

165 ISO 9001:4.1 p4, 5:4 p.8 and 9001:4.18.

166 Freed M. Telephone interview. [1999-08-09].

the standard.[167] Only commitment to meet the requirements from legislation and authorities is enough to be accepted for certification according to ISO 14001. But how far above the basic requirements and how fast the company should improve is up to it and in the end to the auditors performing the certification audits.

The requirement to make reporting mandatory is also a proposal[168] to increase pressure towards continuous improvement. The audits and reviews taken by many companies may not be enough to assure that a company's environmental performance meets, and will continue to meet, legal and policy requirements. They need therefore to be conducted within a management system, which is integrated with the overall management activity of the company.[169] This is, however, likely to be quite exceptional so far.

The designers of ISO 14001 EMS have partly managed to avoid the criticism about compliance contra continuous improvement that ISO 9000 has been faced with. The idea of continuous improvement is implanted in ISO 14001 in that the work with environmental aspects is meant to guarantee the progress. The baseline of requirements from authorities can be exceeded to different degree and with different speed. But it remains to be seen, when the companies that now are certified will start being audited how much weight is to be placed on the tempo of continuous improvement. Due to the newness of system most of the audits performed so far have been certification audits, and the praxis for them are not yet quite established.

If applied, the revision takes ISO 9000 from compliance closer to TQM with performance improvement,[170] but it is not certain that a standard can be perceived so that it is possible to implement total quality management completely. Some authors conclude that standards cannot really accommodate all the ideas of TQM, since the non-assessable elements like teamwork, quality cost and management commitment are out of the reach

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167 Environmental Data Services. (1999). *Setting the agenda for the revision of ISO 14001*. p.1.

168 Environmental Data Services. (1999). *Setting the agenda for the revision of ISO 14001*. p.1.

169 ISO 14001:1996 p.4.

170 British Standards Institute. (1994*). ISO 9000: A seamless introduction to the year 2000 revisions*. [Online]. Available: http://www.bsi.org.uk/iso-tc176-sc2/Summary.html. [1999-08-09].

for them.[171] Negligence of the people factor in ISO 9000 also means often that there is less management involvement and that the engagement and empowerment of all staff is not emphasised.

The possibilities of ISO 14001 to contribute to the holistic development process in companies appear to be somewhat better than those of ISO 9000. The common characteristics can contribute to learning and synergies in the management systems of companies in areas like documentation and product development. This can help in developing a more holistic systems view of a company's quality and environmental activities towards TQM and TQEM. The standard leaves however many "loopholes" and is in itself no guarantee for a positive development. This will depend on where the focus lies in the implementation process and in the possible further development. The approach taken for the management systems by the company is likely to be of vital importance in this and in the understanding of the role the tool plays in the process.

The new revisions are expected to take the standards closer to the total management concepts than their predecessors were, making it easier to develop a company into a more holistic direction with its help, but the question still remains how much can the standards achieve.

Before going on to discuss how the different approaches affect this, we will make a summary of the differences of between ISO 9000, ISO 14001, TQM and TQEM. (Table 3-1). The strength of the incentive they provide for the development of the different TQM principles is presented in the table modified from the core values of the Swedish Quality Award[172] (SIQ). The core values that correspond to the aspects discussed in this study were chosen. The evaluation of the strength is made by the author based on the discussion above.

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[171] Czuchry A,. et al. (1997). A systematic approach to improving quality; Yung W K C. (1997). The values of TQM in the revised ISO 9000 quality system.

[172] SIQ, (1998). *Performance excellence with the Swedish quality award 1998: Criteria in translation.* Göteborg. Swedish Institute of for Quality. p.7 and p.38.

Table 3-1 The strength of the incentive in ISO 9000, ISO 14001, TQM and TQEM for development of TQM principles as expressed by some of the core values of the Swedish Quality Award. The letters S (strong), A (average) and W (weak) refer to strength of the incentive in the four management systems to push for the development as perceived by the author.

TQM Principle	Core value	ISO 9000	ISO 14001	TQM	TQEM
Customer focus	*Customer orientation*	***S***	***S***	***S***	***S***
	Public responsibility	***W***	***S***	***W***	***S***
	Partnership	***W***	***A***	***S***	***S***
Continuous improvement	*Process orientation*	***A***	***A***	***S***	***S***
	Prevention	***W***	***W***	***S***	***S***
	Continuous improvement	***QMS or quality?***	***EMS or Env. Performance?***	***S***	***S***
Teamwork	*Participation by everyone*	***W***	***S***	***S***	***S***
	Competence development	***W***	***S***	***S***	***S***
Management	*Committed leadership*	***W***	***S***	***S***	***S***
	Long range perspective	***W***	***A***	***S***	***S***

The relative orientation of the standards and the total management concepts can be placed on a continuum based on the above as presented in Figure 3-1.

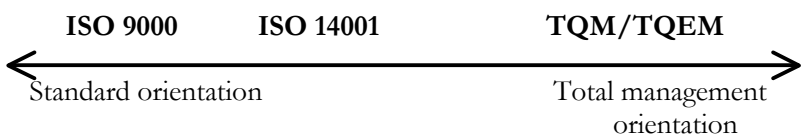

Figure 3-1 The relative placement of ISO 9000 and ISO 14001 on a scale from standard orientation to total management orientation.

[173] SIQ, (1998). *Performance excellence with the Swedish quality award 1998* .p.7 and p.38.

The main difference between ISO 14001 and TQEM could be defined as follows:

Environmental management systems standard **focuses** mainly on activities geared to **controlling individual aspects,** making it easy to forget the larger connection lying behind the motivation for activity. Although ISO 14001 has somewhat better preconditions of focusing on total management compared to ISO 9000, it still is easy to forget the main objective.

TQEM is based on **awareness and understanding of environmental** issues in a wider perspective and keeps the main motive for the activity in focus aiming at integrating environmental concern in all company activities. The standard provides the tool to start implementing the thinking, but the wider context is emphasised.

3.8 Total But Not Perfect

In spite of the fact that TQM at times is, and TQEM would be likely to be, perceived to be the "ideal" solution to all problems in a company it can be criticised. In the attempt to cover everything there is a risk of losing important details. Implementing total quality management is at least initially based on the management input i.e. from up and down perspective rather than the other way around. This may change to include also the "down and up" perspective once the staff via empowerment learns to take initiative and responsibility.

Focus of the thinking is still a lot on quantifying the company operations. This is understandable since it makes evaluation easier. But there is a risk of losing the qualitative aspects, which cannot be so easily measured and some of the opportunities to creative thinking offered by TQM. On the other hand it can be argued that to get interested in the concept is likely to require a somewhat creative mindset of not being afraid of less fast structures.

The concept, as many of the three letter word methods and other management concepts, is also in some ways deterministic, suggesting that the once you follow the TQM principles everything will go well for you. It works in theory, but is more difficult in practice.

Although TQM and TQEM are theoretical and in a way "idealistic", they can serve as a goal for a company on its way to a more holistic quality respective environmental thinking and SMEs rather than the large

organisations are in a position to make the necessary changes due to their special characteristics. It means that the whole organisation must be focused on this, since it is the long-term condition of survival for the company[174] and in the long run for the whole society in TQEM.

Previous studies indicate that, in practice it is not simple to turn an organisation from existing practice to cultural reorientation with shared vision and common quality values.[175] These studies are largely based on large companies and this may be easier for SMEs due to their special characteristics. How they are able to use their SME potential with ISO 9000 implementation is discussed in Chapter 4.4.

[174] Dean J W jr., et al. (1994). Management theory and total quality.

[175] Carlsson M., et al. (1996). Experiences of implementing ISO 9000 in Swedish industry.

CHAPTER
FOUR

4. Approaches to Management System Implementation in SMEs

4.1 Approaches to QMS and TQM Implementation

The implementation of quality management systems is a field that has been widely studied during the last decades even with some focus on the SMEs. Companies experience that they get very different results of their QMS implementation efforts, which probably has given rise to some of the criticism of ISO 9000. It could be stated, with a slight exaggeration, that there are no two people whose picture of the quality management systems standard is identical. This is a paradox, since the idea of standard means that something is alike, but due to the subjective perception of individuals in different companies the experiences seem to vary.[176]

The approach the staff in the company has to the system is instrumental for the benefits they experience of ISO 9000. This again is determined by the approach of the management. It is therefore essential that the management is aware of its approach toward QMS and demonstrates it in a credible way. It is important to note that the different approaches do in reality overlap, so the ones discussed below should be seen as types defined to provide structure for the discussion.

Two different studies on approaches to QMS implementation will be discussed below concerning their possibilities to help a company to develop TQM, followed by a discussion of possible differences to EMS implementation approaches and TQEM development in a company.

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[176] Hedborg T. (1997). *Vad kan man få ut av ISO 9000?* Stockholm. An unpublished paper for Svenska Arbetsgivarföreningen.

In a study of 80 Swedish companies three different approaches[177] management and staff can have to the QMS were found: the reactive, the coactive[178] and the process-oriented. But in addition to these dominating approaches characterising companies there can be different approaches among the staff within any company at any time and that they can change over time.[179]

The discussion of the different approaches is mainly based on the division as used by Hedborg, but even other definitions are used in discussing their possible development from inactivity towards TQM/TQEM e.g. in Figure 4-1.

4.1.1 The Reactive Approach

This approach is used in a company that is **forced** to introduce ISO 9000, but the system is **not fully implemented** and the instructions that satisfy ISO 9000 are **not used in practice** by the staff of the company.

The company may nevertheless receive an ISO 9000 certificate and so maintain customers, but is likely to experience the standardised quality management system as an unnecessary burden.

The reactive approach was demonstrated by a quarter of the companies in the Swedish study. They have a good and even product quality without ISO 9000 and were mostly manufacturers of parts or components as subcontractors to relative large customers.

They have not articulated any emphasis on the company and staff development or any other TQM principles in connection to the QMS. They

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177 Hedborg T. (1996). *Införande och tillämpningar av ISO 9000*. Hedborg uses the Swedish word "förhållningssätt". It has been translated with the word approach in this study, and used for the different ways of seeing ISO 9000 and its implementation. (Approach: a way or method of doing something. Longman (1993). *Language Activator. The world's first production dictionary*. Essex, UK. Longman. p.53 and p.1539)

178 In they study by Hedborg called proactive. His definition, however, differs quite significantly from the predominant use of the term, in which a company with this approach is suggested to act ahead in anticipation to customer requirements. Therefore the term coactive where a company follows customer requirements is introduced and will be used here to avoid confusion.

179 Hedborg T. (1996). *Införande och tillämpningar av ISO 9000*.

appear to have a rather mechanical approach to just complying with quality that is acceptable to the customers, but the technical system dimension of the QMS system is unidentified.

4.1.2 The Coactive Approach

The coactive approach means that the QMS builds a **set of rules** to manage the work. The motive to implement a quality management system for these companies is **exclusively to respond to customer requirements** and **to achieve quality assurance** i.e. to achieve an even product quality and to manufacture products that comply with the given specifications. The goal is not to improve the procedures but to establish **permanent,** well defined **routines**. Certification is often easy and the motive for it is to demonstrate to current and prospective customers that the company is seen to follow ISO 9000.

This approach was identified in about half of the studied Swedish companies. The best routines have been documented as instructions, which are signed by the MD to demonstrate to the staff how important they are. The employees are trained to use the QMS and learn the connection between following the instructions and satisfying the customer. The purchase instructions can for example demand that all suppliers must have ISO 9000 certificate. These suppliers then often adopt this approach as well since many of them may previously have had other QMSs.[180]

This coactive approach appears to correspond to the "stakeholder motivated"[181] method described in the ISO 9000 standard and is said to be the predominant one. The supplier's management must lead the work, but the effort is driven by external stakeholders to comply with the given specification in the company's own QMS thus limiting them to the basic implementation of ISO 9000 to be able to demonstrate it.

The continual improvement is not focused upon other than impulses coming from the customers. There is a risk that documentation gets the main focus instead of improvement of products and services, which can contribute to the experience of the QMS being bureaucratic and heavy.

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[180] Hedborg T. (1996). *Införande och tillämpningar av ISO 9000.*

[181] ISO 9000-1:6 p.9.

The management's involvement is limited to signing the documents whereas the rest of the work is delegated in the organisation and done rather mechanically following the standard. There is no outspoken ambition to develop processes, teamwork or the staff beyond following instructions according to TQM. The focus of the eventual development is mainly geared to the very QMS, to pass the audits and so to maintain the certificate.

4.1.3 The Process-oriented Approach

The process-oriented companies see QMS **as a tool in the company development** and their goal is to **change the thinking** among the staff. They want to give their staff a more **holistic view** of the company and to get them more **engaged** in their work along the lines of TQM.

The employees that are going to be affected by the QMS are the ones participating in creating and finding ways to improve it. What is important is how the staff will form their work rather than the optimum routines, which can be achieved by external help. The implementation of ISO 9000 is often done in working groups, which promotes problem solving ability and creates common knowledge about the working process.

The result can be a more even product quality and decreasing cost of failure in quality, but this is not the main goal.[182] The more holistic perspective and the influence the staff has on their work makes it easier to make changes in the organisation such as reducing organisational levels or to implement goal oriented groups. About 25% of the companies studied demonstrated this attitude. They see the quality certification as less important and do it only when customers require it.[183]

The main focus of the managers with process-oriented approach is the internal development of the organisation with staff participation along the lines with TQM. This corresponds to the *"management motivated"*[184] approach defined in the ISO 9000 standard and it is the supplier's own management that initiates the effort in response to expected market demands and trends. The employees are expected to have insight and to participate in the

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[182] Occupational health studies have shown that the possibility of being able to affect one's own working situation gives stimulus to working more efficiently (Hawthorn effect).

[183] Hedborg T. (1996). *Införande och tillämpningar av ISO 9000.*

[184] ISO 9000-1:6 p.9.

company operations rather than just performing their tasks. Teamwork and continuous development of the human potential of the staff are emphasised. The continuous improvement and management involvement can be perceived as strong factors underlying this approach, since management is the key in forming the company strategy for changes and development. This model is said to be usually more comprehensive and fruitful than the stakeholder motivated one.[185]

4.1.4 Some Other Approaches

The Swedish study focused on ISO 9000 implementation, which is the most frequently used tool even for companies that aim at developing total quality management. The difference between the standard and total quality management is that where ISO 9000 is a tool with "hard" measurable elements to implement quality management, TQM is a set of principles that require a more holistic system view and a common vision in a company to succeed.

This difference is visible in an Australian study of approaches to implementing ISO 9000 and TQM in 15 organisations.[186] The approaches found in the study were the minimalists, converts and committed.[187]

The minimalist (Forced ISO, No TQM) correspond to the companies with the reactive approach in the Swedish study. They were forced to become certified, but did it with minimum involvement of the staff, who saw the system as a costly exercise and did not use it. These companies were unlikely to move towards TQM after the certification.

The converts (Forced ISO, and TQM) go a bit beyond the coactive approach. While these companies are forced to be certified to a QMS standard, they get converted during the process, see the benefits and move on towards TQM. They correspond to companies that start as coactive and move via a process-oriented approach to become committed.

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185 ISO 9000-1:6 p.9.

186 Brown A & van der Wiele T. (1996). A typology of approaches to ISO certification and TQM. *Australian Journal of Management, 21, 1.*

187 Brown A, et al. (1996). A typology of approaches to ISO certification and TQM. p.64.

The committed (Wider View of Quality or Voluntary ISO and TQM) approach in the Australian study, where the companies see the standard as a means to improve the business operations corresponds to the process-oriented approach in Sweden. The motive for implementation in this approach is largely internal with the standardised system as a tool in a process. This approach focuses on the "soft" process aspects of the quality efforts and has the potential to develop further towards TQM, although much of the TQM concept is unarticulated in it and may remain unconscious.

The companies with the approaches above could be said to approach their quality goal from different perspectives. If we assume that their goal is improved quality in all aspects of the company, the system itself is not important, but rather the way it is implemented. To develop TQM a quality culture that penetrates the whole company needs to be attained. The companies using the different approaches have covered different distances in this direction and use their SME potential to a different degree.

4.2 Approaches to EMS Implementation

The most common approach taken to environmental management system among the small and medium sized enterprises appears to have been the totally inactive one, not taking any action. This approach has not solely been a result of ignorance, but may also have been a conscious strategy chosen for various reasons based on different levels of awareness of environmental issues.[188] Also, the experiences the companies have of a previous QMS implementation are likely to play a role in this. These companies are not using their SME potential for EMS in any way and are therefore left outside this present study.

The approaches below should be seen as examples of how a company implements its EMS and not how it approaches single environmental issues. There will be different approaches to environmental management system

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[188] Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment*; Inactive in Heidenmark P. (1999). *Miljöarbetet inom svensk tillverkningsindustri*; Resistant strategy in Tilley F. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firms;* Ostrich, Laggards and Thinkers in Welford R. (1994). Barriers to the improvement of environmental performance: The case of the SME sector in environmental management & business strategy. In Welford R. (ed). *Environmental Management and Business Strategy*. London. Pitman.

within one company since "a single company might be compliant, reactive, anticipatory and proactive on different environmental issues depending on the centrality of these to its own business, its public profile, legislative interest and the ease with which technological responses can be made."[189]

We will now take a short look at the approaches defined earlier and in some other studies and discuss how they could be used to develop towards TQEM. It is important to note that the previous studies of EMS have mainly focused on EMAS, but the approaches identified in them can be assumed to apply also to ISO 14001.

4.2.1 The Reactive Approach to EMS

This approach appears to be quite common also for EMS among SMEs. Most of them perceive their environmental impact to be marginal so it does not need any attention. They will **not get certified other than due to customer requirements,** which exist to **a very limited extent so far.** The EMS is not really used and the likelihood of these companies to develop towards TQEM is quite limited.

The above is supported by the findings in the UK and Sweden. The changes in these companies are made with minimum compliance to standards and could therefore also be called Minimalist. They include most of the SMEs that have responded to environmental pressure and their interest is not really in improving the environmental performance but often in short term solutions.[190] Even the companies with the highest environmental awareness belong to this category in Sweden.[191]

4.2.2 The Coactive Approach to EMS

As for the QMS it can be expected that many of the SMEs implementing ISO 14001 due to customer requirements are likely to fall into this category.

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[189] Petts J. (2000). Small and medium-sized enterprises and environmental compliance: attitudes among management and non-management. In Hillary R. (ed.), *Small and medium-sized enterprises and the environment.*

[190] Tilley F. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firms;* Petts J. (2000). Small and medium-sized enterprises and environmental compliance.

[191] Heidenmark P. (1999). *Miljöarbetet inom svensk tillverkningsindustri.*

They **certify their existing** documented environmental work and are satisfied with the **minimum commitment to compliance** as far as legal and other requirements are concerned. The EMS is implemented by **"checking out points in the standard"** and remains as a file on the shelf, up-dated as needed. The audits of the system even here are easy since the system is based strictly on the standard.

This approach is also most common in large companies where environmental improvement mainly takes place. Environmental training consists mostly of information on global, regional and local environmental problems rather than providing the staff with tools on how to act in their daily work. The companies do not see the EMS implementation as a learning process, which means that the system is not used to the optimum, but rather to be able to show a certificate.[192]

But SMEs that implement EMS with this approach have also been found to get a real boost in their environmental activities due to it,[193] and therefore might even be expected to develop even their thinking further turning from coactive to process-oriented to develop even further toward TQEM.

The approaches identified by Tilley[194] and Welford[195] are closer to the convert approach than the coactive one. Tilley includes elements of the process-oriented view when talking about environmental efforts in the company. They are more long-term and ongoing, but she agrees that they are not always fully integrated into the management of the business. The holistic view is likely to be missing although new solutions are implemented. Businesses operating in environmentally high profile sectors tend to be here. The SMEs are very much an exception, and when they do appear they tend to be associated industries or have owner-managers who are personally committed to the environmental cause.

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192 Ostrich, Laggards and Thinkers in Welford R. (1994). Barriers to the improvement of environmental performance; Resistant strategy in Tilley F. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firm*; Heidenmark P. (1999). *Miljöarbetet inom svensk tillverkningsindustri.*

193 Heidenmark P. (1999). *Miljöarbetet inom svensk tillverkningsindustri.*

194 Tilley F. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firms.*

195 Welford R. (1994). Barriers to the improvement of environmental performance.

Also the Doers that constituted 10% of the companies studied by Welford appear to belong mainly to converts. They are beginning to change their strategy to modify their products and processes due to the increasing pressure put on them and the expectation that by doing this they will become successful. They see their role in the society but the motivation appears still to be largely the marketing advantage, the image.[196] This rather broad definition describes an approach that is already developing towards TQEM defined in this study whereas both the reactive and coactive approaches are strictly and mechanically focused on the EMS itself rather than the thinking it in many ways represents.

4.2.3 The Process-oriented Approach to EMS

If an environmental vision is getting implanted in process-oriented companies the possibilities of developing commitment towards TQEM are predominant. For them a standardised system is **just a tool to achieve other goals for the development** of the company. These companies are likely to **take advantage of the general environmental interest and engagement among their staff and in the society**. They see that in the area of environmental interest the different roles of an individual can be combined.

The staff in these companies is already likely to be engaged since they can influence their own work and get information for the whole company, which gives them a feeling of belonging to "a company family".

> *I know what it is like to be a flea in a box with a lid without being able to get out. But I also know how it is to get out of the box and to be able to influence one's work and understand the situation in the company and to be part of it.*
>
> A service manager

The different approaches above will be used to discuss the QMS and EMS implementation and they are placed in a continuum from inactivity to TQM/TQEM in Figure 4-1 below. The approaches do overlap but the reactive, the coactive and the process-oriented approaches are mainly used as a base for the discussion while references the other ones are made where applicable.

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[196] Welford R. (1994). Barriers to the improvement of environmental performance.

4.3 The Approaches in a Continuum

The approaches discussed above can be placed on a continuum from inactivity to TQM/TQEM based on the main focus on them as seen in Figure 4-1 below.

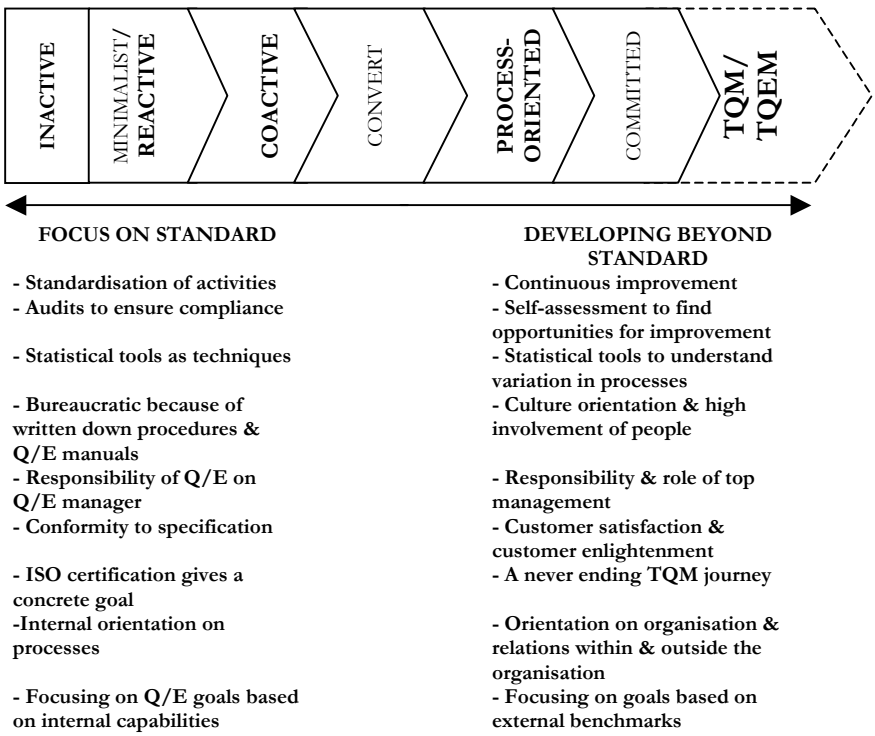

Figure 4-1 Development of the company approach from inactivity to TQM/TQEM. The lists modified by the author from Brown et al. (1996).

We will now continue by discussing QMS implementation in SMEs and possibilities of developing TQM with different management approaches.

4.4 Use of SME Potential and in Management Approaches with QMS Implementation

Since the small and medium sized enterprises[197] are often assumed to be just scaled down versions of large firms people might think that the application of some of the large business concepts directly in SMEs would be reasonable. But are the larger resources the only explanation to the fact that large organisations are three times more likely to implement quality management systems than small and medium sized ones?[198]

The special characteristics of SMEs present both opportunities and problems for organisations wanting to implement quality management systems and the outcome varies depending on the approach chosen by the management. The discussion below is based on the previous chapters and some studies found in literature for QMS implementation.

4.4.1 Resources in the QMS process in SMEs

Resources that are assumed to be scarce, are often given as a reason for not engaging in development projects. Shortage of financial resources is not necessarily the main issue, but that of time and knowledge.[199] This tends also to limit the ability to think in a longer perspective due to everyday business and the possibilities of hiring consultants may be limited. But the smallness may also allow the company to have a better overview of their costs and to take a more disciplined approach to the use of resources.

But the special characteristics of SME can compensate for this and the resources can be seen as a frame of the potential within each SME operates. The approaches the companies can have can help them to use their potential to different extents but do also pose limitations for, or even excuses for, not doing anything.

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[197] Note: Most of the referred studies define an SME as a company having less than 500 employees, whereas the definition in Sweden includes companies with less than 200 employees.

[198] Ghobadian A., et al. (1996). Total quality management in SMEs.

[199] Ghobadian A., et al. (1996). Total quality management in SMEs.

4.4.2 Market

The market often forces small and medium sized enterprises to have a quality certificate to maintain its supplier status, but does not promote any quality engagement above the basic ISO 9000 implementation. A long lasting subcontractor status may provide possibilities and even incentive for a deeper quality effort, but in the initial contact only a certificate is necessary. Due to their smallness the SMEs may in their turn not have the weight to extend the pressure on their own suppliers to engage in quality activities.

As price takers they cannot easily incorporate the costs for their quality activities in the prices of their products, and as subcontractors, their negotiating position is often weak. This may tempt the coactive and reactive managers just to do the minimum to comply to the customer requirements, but is no barrier for the process-oriented manager who sees the quality activity as something important for the company development. He/she is likely to involve most of the staff in the contact with the customers so increasing their awareness and emphasising the customer focus of his company, which is a precondition for the external focus in a TQM environment.[200]

Since many large companies will only have certified suppliers they may assist their suppliers to meet the new quality standards for example by providing training and other consultant help.[201] Their goal is even then in the first place that their suppliers reach certification as part of their own quality effort and not to develop them further, which may form a temptation for the subcontractor to retain his coactive or reactive approach.

Even though export directly from SMEs is limited, a quality certificate plays an important role even there and many companies get certified to avoid any trade barriers on the foreign market. This is often the main motive for companies to get certified, but may limit the efforts to the minimum requirements especially, since further quality efforts cannot be as easily demonstrated.

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200 Ghobadian A., et al. (1996). Total quality management in SMEs.

201 Interviews at ABB Nordkomponent; Sammalisto K. (1997). *A case study of the experiences of management of quality and working environment as basis for environmental management system in Gasell Profil.*

4.4.3 Management and Ownership

The management, often equal with owner, is the key to developing the company and to what kind of approach the company takes to its QMS implementation. If he/she is motivated to develop quality management, it should be easy for him/her to create any changes throughout the company. Due to the smallness of the organisation the management has a possibility of "seeing" the staff and showing them the value he/she places on them.

The fact that the owner/manager is often an entrepreneur who is open for new ideas and willing to be involved, would favour the process-oriented approach, since its dynamic character is likely to appeal to him and lead to changes. But if the company is within a branch where the owners are less likely to adopt changes, the likelihood of coactive or reactive approach is greater. Also the smaller number of contacts outside the company and eventual lack of new ideas and lack of monitoring the performance will promote the latter approaches.

The effect of **Ownership** on the SME potential depends on the degree of detail of influence the owner wants to have in the company. In case the management is also the owner, there is no contradiction, but when this is not the case the owner's willingness to influence the details is likely to vary to a large degree.

Corporate owners will in most cases to play the same role as the market, although the force to get a certification may be stronger since it may be part of the total corporate image. If the culture is strongly influence by process orientation or development towards TQM, the approach of the SME is likely to become the same. In the initial stages of the corporate quality process when the main focus is often just on getting all units certified a coactive or even a reactive approach may be allowed, but later on the corporate culture is bound to take over. Also the possible cost for the quality effort are easier to motivate when a corporate directive must be followed.

For a process-oriented management a basic corporate requirement for QMS implementation is easy to meet, and he/she may find it difficult to motivate further engagement if it is against the corporate culture. This is however likely to be an exception and the engagement is likely to fit within the freedom of the individual corporate company.

4.4.4 Organisation

The opportunities of a developing a cross-functional way of operating as well as the informality and the flatness of the organisation are the greatest assets available for an SME due to its smallness. It makes it easier to make fast decisions to promote the process, to get the information across effectively and for everyone to see their own contributions and responsibility in the company operations. Staff training can be organised cross-functionally and since only a few people are involved, mobilisation goes faster. A common quality culture can be created in the whole organisation. Making changes becomes easier as well as promoting teamwork in the company so fewer catalysts are needed.[202] This also makes it easier for everyone to be aware of the expectations of the customers and to work toward meeting them.

But the very dependence of the company processes on every individual due to the very smallness of the organisation may also be a liability.[203] There is not the back up for all functions that is available in larger companies. This risk is more apparent in the coactive and reactive companies, where the number of individuals e.g. with customer contacts is limited and the others with positive customer vision are not there to back up like in the process-oriented companies.

The lack of possibilities for training and personal development in SME can be a problem for the process-oriented manager. This lack can, however, be partly compensated by the common vision that is easier to create in the company. The vision can basically be shared and implanted "at the coffee table" and spread easily in the organisation due to its smallness. Also, the stimulus provided by the quality process in otherwise limited opportunities of the SME and the possibility of using ones creativity are promoting factors in this company. The personal development in many areas can be achieved in the cross-functional way of operations and via customer contacts with relatively small external help.[204]

The main motive for QMS implementation for the process-oriented manager is the company development. This is to a very large extent

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202 Ghobadian A., et al. (1996). Total quality management in SMEs.

203 Ghobadian A., et al. (1996). Total quality management in SMEs.

204 Ghobadian A., et al. (1996). Total quality management in SMEs.

achieved by developing the staff that in turn develops the company, so the manger can take full advantage of this. He probably likes to see his whole staff engaged in teamwork in dynamic development processes.

4.4.5 Flexibility and Innovation

The flexibility of the SME is also a positive factor that can be used within a company with the process-oriented approach. Even though ISO 9000 is seen just as a tool by the management, the implementation and any changes required by it are made easier. This applies even to the adjustment to meet any wishes from the customer. The management with this approach can make wider use of the capacity and the creativity of the staff for all the innovations required in the practical operations as well as in creating a company wide culture. And due to this wider view the staff also has less resistance to change, as they are part of the change.[205]

The companies with the coactive and the reactive approach could also make use of the same qualities, but are less likely to see the whole potential of their organisation and to make use of it for other than satisfying the basic requirements of ISO 9000. These companies have the advantage of focusing on the measurements and documentation as required by the standard carefully and are likely to focus on the bureaucratic control possibilities provided by the ISO 9000 system.

The results of the chapter, how Management/Ownership, organisation, flexibility and innovation form the "soft" internal potential and how they are used within the different approaches will be presented below in Table 4-1.

[205] Ghobadian A., et al. (1996). Total quality management in SMEs.

Table 4-1 How the different approaches to QMS implementation make use the different factors in the SME potential. The ownership is presented for a case when an SME is independent. The case of corporate ownership has been discussed above.

SME char* / Approach	Management	Organisation	Flexibility and Innovation
Reactive	Sees no advantage in QMS. Not engaged in implementation Communicates lack of engagement Visibility used in a negative way.	Implementation delegated Minimum involvement from staff. Staff tasks limited Shorter communication ways not used	Little work over functional limits Incentive to change limited Little room for creativity and innovation.
Coactive	QMS to create structure to existing quality work Engaged only to sign documents. Visibility used to the minimum.	QMS implementation delegated Staff expected to follow rules Information limited to how to use QMS Smallness opportunities not really used.	Rules govern the work Opportunities for flexibility not taken
Process-oriented	Advantages of QMS seen and sized Staff encouraged to get engaged and develop Visibility used to share vision and to create positive atmosphere	All expected to contribute Competence and information provided Aware of role in fulfilling the vision Company culture provides stimulus	Opportunities of smallness taken Flexibility promoted Creativity stimulated Own and others innovative ideas used

* SME characteristic

4.5 Developing TQM

All approaches to management system implementation are possible but they all make different use of the opportunities provided by their SME characteristics and potential and so also affect how the company is likely to experience its management system.

All the companies have the possibility to use their company potential to the maximum. But to what extent and how fast the development goes depends on the approach adopted by the company. If the company is not aware of its SME potential, it is likely to make only limited use of it and focus on the

QMS itself. This is the case with the reactive and coactive approaches, where the initiative and the force come from the customers.

But it is also possible to get real benefit from the QMS as the companies with the process-oriented approach do. They may be unaware of the indications that the TQM characteristics correspond better with their companies, making it easier for them to implement TQM than for the larger ones. But they are still somehow able to mobilise the potential of their company and use it to develop it further. They appear to be able to overcome the largest obstacle in SMEs, that is "the management realisation and the ability of owner/managers to modify their behaviour and management style".[206]

Provided that the quality management system implementation experience is positive the company will develop further and see new possibilities such as an EMS implementation. A further positive experience will encourage them to develop further towards TQEM and finally maybe even towards sustainability.

A negative experience will limit the interest of the company in developing further in that direction and will also limit the interest in implementing EMS. This will also reduce the possibilities of becoming more aware of the SME-potential and using it. There is even a risk that the feed-back is so negative that it discourages the company from any further development efforts for a while, thus reducing the use of the SME potential.

In the next chapters we will discuss the implementation of ISO 9000 and identify the approaches used in the case companies. The implementation of plans for environmental management in the case companies is also discussed in Chapter 5 followed by a more general discussion of the EMS implementation in the case companies in Chapter 6.

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[206] Ghobadian A., et al. (1996). Total quality management in SMEs.

CHAPTER

FIVE

5. Implementation of ISO 9000 and Environmental Management in the Case Companies

The aim of this chapter is to present the empirical base for the study. Firstly the case companies are presented and their SME characteristics summarised in a table. Secondly their ISO 9000 implementations are presented as pictures based on the interviews with the staff and the approach they have used as well as their use of their SME potential in the process are identified. Finally their experiences and expectations of ISO 14001 will be described followed by a short summary of the findings.

5.1 Companies in the study

It should be kept in mind that the case companies are described as they appeared in the interviews in 1998 and other material available at that time. They all have undergone some changes since then. The functions included in the interviews are shaded in the organisation charts and persons occupying several functions in an organisation are marked with letters A, B etc.

It could be questioned if ABB Nordkomponent can be placed among SMEs. Its strong corporational ties gradually became apparent as the study advanced and a decision was made that it would be included and the connection not hidden. Many SMEs in the machining and manufacturing industry are incorporated and this was in fact, the case with two other case companies as well, although the corporate influence in them appeared to be weaker.

5.1.1 ABB Nordkomponent in Bollnäs

ABB Nordkomponent (later called ANK) belongs to the ABB group, which aims at being "local world wide"[207], i.e. consisting of a number of rather independent local companies all around the world. They have to survive on their own and pay for the services e.g. internal audits that the corporation provides just as any independent SME.

ANK has two divisions; one in Sollefteå with 150 employees and one in Bollnäs with 80 employees. Both divisions have complete machine shops including surface treatment plants. In addition to this the company has an administrative unit in Västerås, where the president, his secretary and the central functions of sales and construction, logistics and purchasing as well as personnel are located. All of the central functions serve both divisions.

The company's main areas of operation are manufacturing control cabinets for industrial use, switching devices for operating electrical breakers and industrial components. ANK's business idea is expressed as: "In order to fulfil the business strategy co-operating with the customer regarding product development and good logistics is of uttermost importance."[208]

The operation in Bollnäs was founded in 1949 within the former ASEA Corporation, which was formed into a separate company called ABB Mekanik in 1990. In 1994 this division B for Bollnäs was joined with division S in Sollefteå into ABB Nordkomponent AB.

Besides the changes in names and ownership, the company has lived through tough times with many redundancies and changes in organisations, but has survived. One of the interviewees tells that in the 1970s the only thing that came into company was yarn for the ladies to knit with.

The company has over 300 suppliers, out of which 22 are key suppliers for metal sheet, shafts and electrical apparatus. About 75% of the customers, for which they compete just as any private companies, are within the ABB Corporation. The remaining are other smaller companies.

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[207] Bengtsson L. (1999). A new start at an old Mecca. In Bélanger J et al. (ed). *Being local worldwide: ABB and the challenge of global management*. Ithaca, NY. Cornell University Press.

[208] ABB internal company material.

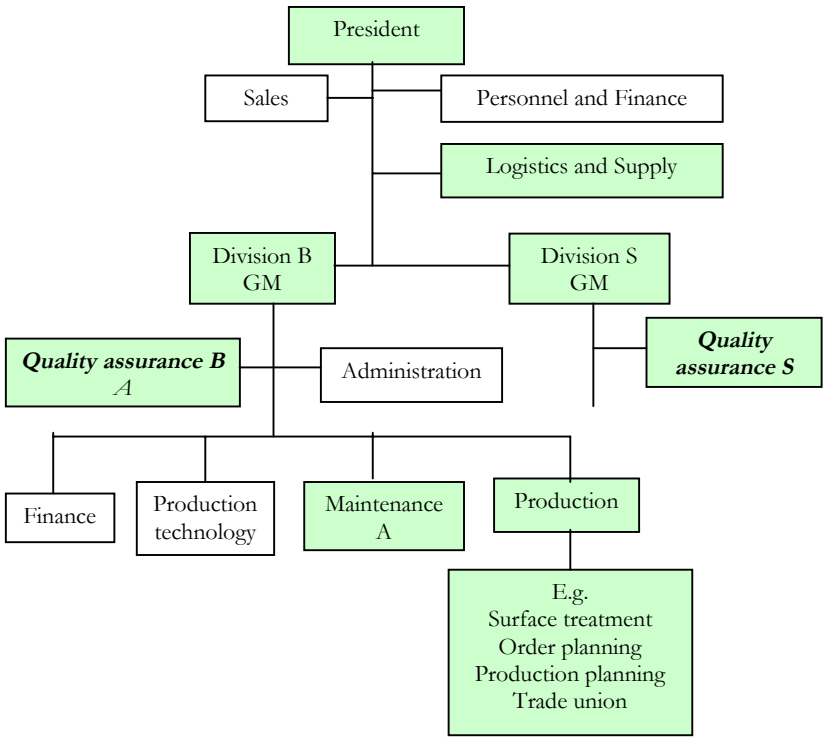

Figure 5-1 The organisation chart of ABB Nordkomponent and Division B. The Quality function and the functions included in the interviews are highlighted.

ABB has, as a corporation, been known for its activities of organisational development. The companies within the corporation have among other things worked actively to advance employee empowerment within multiskilled teams, development of staff and to improve productivity within the T50 project[209], which was geared to reducing the production time by 50%.

ABB with its management is among the most prominent multinational companies promoting responsibility for the environment and the EMS. The corporation had a goal of getting all its 76 production units in Sweden certified by the end of 1998. This created a lot of pressure on them. The EMS for ANK is common for both divisions B and S so the interviews at the first stage were limited to Bollnäs, even though some of the staff that

[209] Bélanger J et al. (ed). *Being local worldwide.*

provided information are shared by both units. The company had a pre-audit for ISO 14001 in October 1998 and the second set of interviews was conducted in connection to it. The certification audit was going to take place in November 1998.

5.1.2 Automatindustrier i Hille AB

Automatindustrier i Hille AB (AI) is a machining and tooling company, which produces details and components on contract manufacturing for other industrial companies. The five largest customers are responsible for 80% of the invoicing. The company has no products of its own. It was founded in 1947 and is, after several changes in ownership, now owned privately by the managing director (51%) and by 6 other members of the staff (49%). All those who have shares must be active in the company in some way. AI had, in 1997, a staff of 45 and sales of 37 million SEK. Exports to Norway, Finland, Holland, Belgium, Austria, France, UK and USA are about 10% of the revenue.

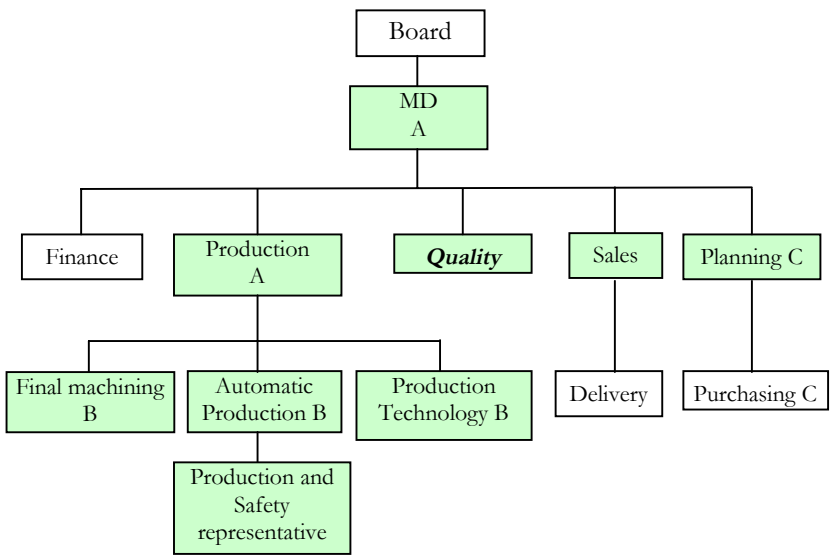

Figure 5-2 The organisation of Automatindustrier i Hille. The Quality function and the functions included in the interviews are highlighted.

AI's business idea is based on[210]

- Always laying ahead in the technical development
- Having only machinery of good quality
- Always using the best technical methods for metal cutting
- The company's manufacturing technicians always being up to date with the latest ideas within metal cutting
- Striving to continuously produce more complete details and components

5.1.3 Cibes Hiss AB

Cibes Hiss AB (CH) in Järbo is a machining and tooling company. Its main product is a screw-operated platform lift within a shaft, but the company also produces door openers and does some contract manufacturing for a sister company, Cibes AB. Each lift is specially designed and produced to order. In 1996 the company had a staff of 21 and a turnover of 22 million SEK. It is part of the AB Cibenon Group, which in addition to Cibes Hiss AB consists of Cibes AB with 15 employees and ELT-Elanslutingsteknik AB with 12 employees. Cibes Hiss AB was founded in 1950s as a division of Cibes AB. It became an independent company in 1986 and was acquired by the present owner in 1989.

The company's customers are different building construction companies. Exports in 1996 were 30% and had by the end of 1997, increased to 70%, the main markets being Norway, the UK and Central Europe. New markets have even opened up in Eastern Europe and the Middle East. The following principles guide the work at the company:

- *The company vision:* To successfully sell and produce electrical and mechanical products within a niche market.
- *The company philosophy:* Simplicity and efficiency with a willingness to change with responsibility and freedom.
- *Basic requirements for the company:* Growth, profitability and development.

The company has also been striving to get a broader market with more products and has been able to use the initial market pressure to get ISO 9000 certified to broaden its market for quality lifts to other somewhat

[210] AI internal company material

unexpected areas. An interesting example of this are the lifts sold to the Middle East to serve as luxury items in private homes instead of help for the disabled in public places.

The company has worked on two development projects during 1998, to change the sales function and to get a complete test gear for the lifts ready. At the moment the change is taking place mostly in the development of the lifts in the new deliveries and responding to the strong growth in demand of the company's products. The increase of production to about 150% of the company capacity is filled by out-sourcing.

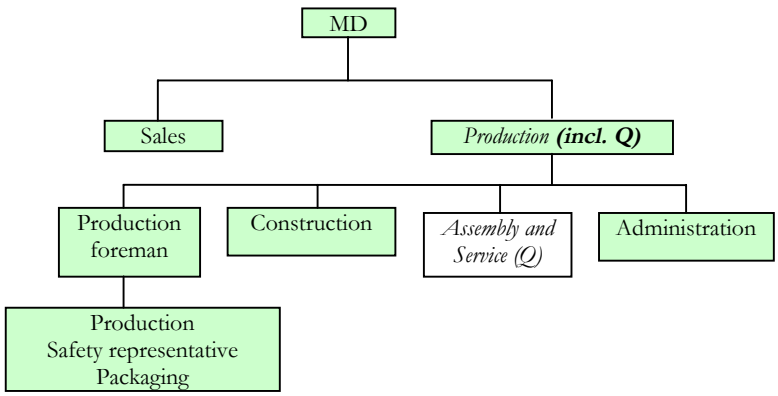

Figure 5-3 The organisation of Cibes Hiss AB. The Quality function and the functions included in the interviews are highlighted.

5.1.4 Iggesund Tools Ltd

Iggesund Tools AB (IT) is a tooling company, which produces equipment for chipping, barking and chip analysis for the sawmill and pulp industry. The company is owned by Björn Rahmström, who bought it in 1983 from Iggesund Bruk, a pulp and paper company located near by. The company has 115 employees most of whom work daytime. The revenue for 1996 was 190 million SEK, half of which came from the North American market.

The company's most important markets are Sweden, the USA, Canada, Finland, Norway, France, Austria and Germany, and the company's products in chipping and debarking clearly dominate the market in Sweden. For some products the market share is 85-90%, which is not possible to

increase based on the maximum amount of chips that are produced in Sweden. About 75-80% of the production goes to export.

The market opportunities for the company's products correlate closely with the ups and downs of the pulp and sawing industry. For example, the year 1996 was characterised in the company's annual report, *"weak forestry market development, which made it more difficult to take new customers and reduced the sales volume by the existing customers. The result has also been reduced by the unfavourable foreign exchange rates. During the last quarter there has been a slight improvement".*[211] This trend has continued during the following years.

IT's business ideas for the different product lines are:

- *Chipping:* To provide chipping knife systems of the highest quality to the chip producers delivering to the pulp industry
- *Chip analysers:* To provide pulp industry continuous size and size distribution analysers for chip quality, which enables a more effective pulp production
- *Debarking:* To provide sawmills the most effective debarking tool on the market

The company wants primarily to offer different forms of service contracts to its customers. This means that IT maintains the ownership of the systems and takes responsibility for the function including storage and maintenance against a monthly charge that is either fixed or in proportion to the volume of, for example, chips produced. The quality is more important for the company now when the patent for one of company's products has expired.

[211] Iggesund Tools AB, annual report 1996

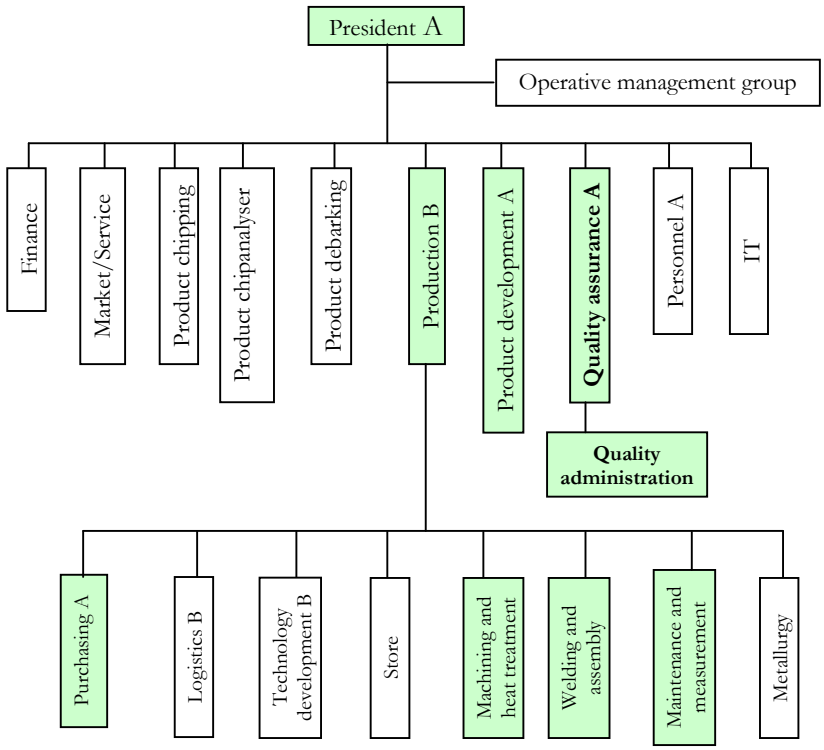

Figure 5-4 Organisation of Iggesund Tools AB. The quality function and the functions included in the interviews are highlighted.

5.1.5 The SME in this study

The SME in this study is defined broadly within the maximum limit of 200 employees and when referring to them in the text below the word small is used for all of them to avoid having to repeat small and medium sized or SME. Strictly speaking AI and CH should be classified as small and ABB and IT as medium sized companies. The table below summarises the other characteristics.

Table 5-1 The SME characteristics in the case companies as perceived by the author. +/- growth indicates that the company has experienced ups and downs rather than stable growth during the last 10 years.

	AI	CH	IT	ANK
Size in Sweden	45 employees	21 employees	115 employees	80 employees
Products	No own products	Main product own	Own products	Some own products
Resources	Small resources	Small resources	Small resources	Small resources plus some corporate backup
Market	Price-taker Small share of its market Subcontractor Little export	Price-taker Rather large share of its market Subcontractor Some export	Price–taker to some degree Large share of its market Not subcontractor Quite large export	Price–taker to some degree Small share of its market Subcontractor Little export
Management Ownership	MD is majority owner Private	30% MD Part of a small corporation	President Part of a small corporation	President Part of a large corporation
Organisation and Empowerment	Rather flat, no empowerment	Rather flat, no empowerment	Rather flat, extensive involvement in projects	Rather flat, developing multiskilled teams
Flexibility and Innovation	Products to customer requirements, little own initiative	Individual products, normal product development	Goal to increase flexibility, new service concept	New products, goal to increase flexibility
Change	Owner change and -/+ growth during last 10 years	Owner change and -/+ growth during last 10 years	No owner change and -/+ growth during last 10 years	Owner change and -/+ growth during last 10 years

5.2 Implementation of ISO 9000 and Environmental Management

5.2.1 ABB Nordkomponent

ANK wanted to be first. There were no requirements from the corporation or the customers for a ISO 9000 certificate and the company proved later to be an example for some of the larger units within the corporation to follow. It was one of the first 15 units out of 150 within the ABB Corporation to get a quality certification according to ISO 9001 in 1993. The idea of ISO 9000 implementation was implanted simultaneously among different members of the management via external contacts. They recognised it as a future requirement and decided to act.

> *People buy our products even though they are not always the "cheapest pieces of steel plate on the market but have high quality". It is a marketing statement that holds.*
>
> The General Manager

Later on the company has also actually played a positive role in its suppliers' development by forcing them to attend courses in quality, which has helped them to grow.

The certification process was driven through in 10 months with very strong support from the new president with one of the local managers driving the process. There was a strong competitive motive to be in the forefront of the development within the ABB Corporation but getting rid of the cost of failure in quality was also important. The general focus was on development, training and creating a holistic picture of the company so that everyone could take responsibility and develop. Everyone was expected to participate.

The introduction of the regular customer meetings coincided with the development of multiskilled teams and provided the persons with the customer contacts in the groups an opportunity to get first hand feed back and to take the responsibility of informing their groups.

Although the individual companies in the corporation are independent, they both help and compete with one another. Information is exchanged in regular meetings between the company presidents and other special functionaries. The directives are part of the conditions of being part in a corporation.

It is possible to be disobedient, but then you have to be able to motivate, and are likely to be sent back home to reconsider.

The president

The management expresses an ambition to be ahead in the competition between different units within the corporation. It is important to be very alert in noting the changes that are about to come and provide the resources it takes immediately. They see themselves as examples, go through the same training they expect their staff to do and are often on the floor talking to the staff. They state a belief that people learn and engage themselves more in a positive climate.

The staff on different levels appears to be "speaking as one man" in the interviews and express that there is a positive "family" atmosphere in the company. Everyone is allowed to grow into their new roles in the groups and the young people with good competence who have been recruited during the last years have given a positive input to the company.

There is a better competence, a totally different awareness of the total company situation and people care. The incentive to hide your mistakes is reduced; people tell when they have made a mistake. There is an open and lighter atmosphere and freer roles in the groups. People talk with each other in a different way. The failure in quality has gone down from 2 to 0.5% and when you make less mistakes you become happier.

A production planner

Also the management has experienced the positive development in the atmosphere; people take more responsibility, although it does not show in their salary so far.

The very extensive personal development programme, which is taken up by every interviewee as something positive, is part of the management vision as a key to flexibility. The individual development plan for everyone is expected to ensure the right competence for new areas in the company in the future.

The motive is actually very egoistic both for the individual and the company. The company is selling "brain power" and training contributes to motivation, increases awareness and responsibility, which again increase involvement. It is not possible to motivate people but to create preconditions for motivation for the future, which contributes to the survival of the company. For example without the direct initial effort for the QMS the company would have to struggle for a long time to get it going. But maybe we had a bit unreasonable requirements on the

competence development, that people could acquire new competence they did not have previously. It is always difficult to convince people that this is important.

The president

The many changes during the last few years have strengthened this idea. The new more automatic production machinery enables production to clearances required by the customer. A machine for degreasing with trichlorethylene has been replaced by alkali washing due to earlier environmental requirements by the authorities. This resulted initially in some quality problems, which are now solved. Multifunctional production equipment contributes to the rationalisation of the production process and eliminates some difficult working positions, also benefiting occupational health.

5.2.1.1 "Environmental thinking has been there for a long time"

The work towards the development of environmental management has been going on for many years pushed by a corporate environmental auditor, with the main goal of avoiding and substituting dangerous chemicals. She has performed environmental audits in the company every three years, talked to the people in the plant in a straight and positive way and asked questions. By doing that she has created awareness and interest, which is important for the motivation.

Everyone is aware that getting an ISO 14001 certification has been part of the company strategic vision for the last three years and it is easy for the staff to find motives for the implementation of EMS in the interviews:

There is a strong business argument since large customers are going to require it soon although, so far they have only informed of their intentions. In the long run it is a question of survival, since companies that are not certified are going to get sorted out.

The company is going to find smarter solutions and earn money for example by saving energy.

EMS has an enormous value depending on how the society acts. It may cost initially and the company has to take it from productivity but in the long run it is going to be worthwhile, especially if authorities can help with their requirements. It is good if everyone is forced to work with it, but it is going to be tough on the small companies.

Everything people work with affects their attitudes, but they change slowly. Their awareness increases and in the long run this is going to affect the choice of the company people will work in.

> *Attitude of the staff is more positive to environment than it was to quality in the beginning. This is going to create more ideas in different areas and not just concerning the environment.*
>
> *It is possible that many things come free due to the things that have been learned during the ISO 9000-implementation process. Most people are aware and positive and will commit themselves.*

The work for environment and health and safety is now connected in the practice and there is a plan to combine the inspection rounds (internal audits) and meetings in the routine activities in Bollnäs starting in November 1998. QMS and EMS will also be connected in the future as a computerised version.

Even with the EMS the company wants to be in the A-team. The motive is partly sales, partly survival. They expects to win business opportunities with the EMS as they did with the quality certificate, but the requirement from the corporation is stronger. ISO 14001 certificate will be "a feather in their cap". The larger companies will require this in the future. A problem is all the work that has to be done, especially by the first ones who are leading the way.

Since a lot of work has already been done due to the earlier environmental activities the expected changes are small daily ones in materials, processes, chemicals and constructions to introduce alternatives that have less negative environmental impact. It may be difficult to get the product flow initially, but as a whole it will be positive and the customers are expected to be happy to adjust material and construction for the environment.

Everyone is going through a four-hour training for environment and those responsible in the multiskilled teams (MO)[212] will get an extended course. This is an example of the distinct and concentrated training strategy since "otherwise it had taken much longer to get it going".[213] An enormous increase in competence is expected when everybody finds the environmental aspects around his work and makes proposals for improvement. Knowledge increases the involvement and it is the many small decisions that make the difference.

> *All the ABB companies in Sweden are required to achieve an EMS certification during 1998. If it seemed impossible for a company e.g. due to the cost, the management is expected to inform*

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[212] MO = Miljöombud. The environmental representative of a multiskilled teams.

[213] The president of ABB Nordkomponent

> *the corporation why that is the case, but he can also expect to be told to go home and think it over. It is actually not a question of large investments, but of handling figures. If you do not act now you soon get left behind.*
>
> The president of ABB Nordkomponent

The initiative to implement EMS came from the whole organisation in Bollnäs. It was already there, and as soon as the corporate directive came, everyone was ready to start discussions. It will be easier to get people engaged in environment than in quality since it concerns everyone in the long run and as awareness increases motivated people create a change in the society.

5.2.1.2 "A common vision to go ahead"

The company appeared to be in a stage of strong and dynamic development at the time of the study. This included development of the multiskilled teams and strong focus on staff development, training and engagement. Although both management systems were implemented in project form, there was a strong focus in getting them to become thoroughly implanted and functioning so that they could later live with less attention than if it was done without everyone's participation.

There seems to be a clear commitment to the environment as if the whole organisation was moving in the same direction as it seemed with pleasure. The vision expressed by several people that "motivated people can change the society" demonstrates that they see themselves as part of and able to contribute to something bigger than the company. This seems to point to an environmental commitment beyond ISO 14001 and development towards TQEM. Also the QMS appears to be developing from a process-oriented approach towards commitment and TQM. The way the SME potential has been used seems also to support this approach.

Being part of a corporation was a positive factor for QMS and EMS implementations by providing competitive incentive to be among the A-team. A strong vision implanted by the corporate environmental auditor and the president got a push from the corporate directives for ISO 14001 and played a significant role. But it seems that the development might have been possible even in an independent SME based on the expectations of a positive response from the market and the strong management vision.

There was no market pressure for EMS, but due to the previous active environmental work the incentive from the corporation came as a long-waited start signal. The company demonstrated their readiness to take the opportunity and to start acting as a part of its own strategy rather than something being forced upon it. The MOs in the multiskilled teams could take on the responsibility of engaging their team-mates and the training provided for everyone helped in the process.

As a whole it appears that ABB Nordkomponent has managed to use its SME potential to a large extent. It has taken advantage of the smallness and flexibility of the organisation in implanting a common vision and encouraging open communication. There is a strong management commitment and a well-planted vision that is utilised in the broad customer contacts, in multiskilled teams and the long-term view for the development of the company. The company seems to have been able to make use of the short communication ways and has created a natural, open atmosphere. By providing and engaging resources for a strong input involving the whole staff the company can really focus on the goal of e.g. implementation of a management system.

Everyone can be an active part of the company processes and plenty of opportunities are provided for their development. The staff is kept well informed and encouraged to co-operate internally as well as with the customers, with whom the multiskilled teams have direct contact. This is a clear priority in the company. It is not just for quality or environment, but also to create flexibility in the company for its benefit and survival.

The resources dedicated to the training and for getting the process going were also a strategic priority for EMS. This was based on the experiences from the QMS process and the staff development programme. This could be seen as a demonstration of a positive development spiral, where the approach with openness to use the SME potential internally as well as openness for external input leads to a further development of the company.

It became very clear during the pre-audit that this strategy had been successful so that the EMS is functioning with lots of proposals for improvement from the MO. They were appointed early, called to meetings and were the ones who had to keep the system running. The system was well established among the staff.

The approach with a lot of input of TQM principles got a credit when the company got certified according to ISO 14001 in December 1998. In the certification audit, the auditors commented that they had not seen the system so well implemented in any other company so far. The work of the MO in implementing and maintaining the system earned special comment as well as the management engagement. There was no doubt of the "management's real will".

5.2.2 Automatindustrier i Hille AB

The requirement to develop a QMS came originally from IBM and the car industry 10-15 years ago. Every customers wanted Automatindustrier i Hille AB (AI) to follow their specific quality management systems to be allowed to deliver. Since the products are made solely to customer requirements there is a feeling of being bound by their requirements, although openings for negotiating of the various solutions do exist.

It became impossible to follow different quality management systems with time so the company decided to go for ISO 9002 certification, a system that could be accepted by every customer. The QMS was certified in June 1996.

The company used to be part of a corporation, but is now owned by six members of the staff. The managing director owns 51% and it is very much his person and attitudes that direct the way the company is run. He is interested in developing his company, but his role in the QMS implementation was limited to making the decision for the certification. A group of key persons with the quality manager had the responsibility of the implementation and the staff received 4-5 hours of information on it.

There is an ambition to increase the work content of all employees but so far their tasks are mainly limited to working with the machines. Some men are making calculations, preparing jobs and doing administrative tasks, but have no customer contact and the management has not talked about such a possibility.

> *I hope the customers are going to place tougher and tougher requirements on us so that we can become better.*
>
> A lathe operator

The competence development is done solely via new routines and when new technology is purchased. The supplier then provides the training. The

cost for the learning of a new job is taken from the production budget and any possibility of increasing competence by a broader training has not been discussed.

> *There is no tangible will to develop. At the moment there is some training in IT, but there is a long time in between when nothing happens.*
>
> The sales manager

The salary system is promoting a broader competence and flexibility among the staff, but the interest to learn something is always checked against the absolute need in the company. When a new machine is purchased some suitable people are asked to learn that. This may mean working in three shifts but most of them are interested provided it suits their private lives.

> *There was no direct improvement due to training or so but when new routines are introduced people have to learn new things, work with them, make less mistakes so there is certain competence development.*
>
> The production manager

5.2.2.1 "Only what the law and regulations stipulate"

The above statement by the production manager describes the environmental situation quite well. The company "got burned" by its first conscious change for the environment, which was made when the authorities signalled that trichloroethylene as a degreasing agent would be forbidden by a certain date and that you could get an exemption for a fee of 125 SEK/kg. This would cost the company 450 000 SEK/year plus 10000 SEK for the exemption. Different alternatives were studied and when the deal was made the signals from the authorities changed. The exemption would cost 1000 SEK and trichloroethylene would not be forbidden due to EU regulations. The investment in a new washing technique proved to be unnecessary and expensive. It also resulted in quality problems in details that are hidden in the final product and have no other than aesthetic significance, but the perfect appearance is still required by the customer.

The required environmental reports have been delivered to the authorities since some environmentally dangerous materials with oil and heavy metals are used. There is confusion about health and safety and environment in people's minds and only those responsible and directly involved; the MD and one of the production mangers, know the difference.

The company had an ambition to get an ISO 14001 certification during 1998. The initiative came from the company management who have seen the benefits of a QMS and was looking forward to the same with the EMS. So far the customers had just asked about the EMS status of the company without requirements, but the interest was growing. The MD recognised the pattern from the QMS: 5-6 enquiries, followed by an increased interest from the customers to get certified.

According to the MD, there is no common vision in the company due to incompetence and lack of information. He expects initial difficulties in implementing the environmental management system but there will be no problems once they have started. The lack of common vision also shows in the interviews. Some interviewees see force as the only incentive to EMS, which has no value of its own. Others see that the company wants to go further ahead with EMS and be able to demonstrate good will and fill a norm that someone else has set.

The products are made to customer specifications and the customers extent also direct the processes to a large. When they, for example, require tri-washing it has to be out-sourced and although changes AI wants to make for the environment could be discussed, the customers would make the final decisions.

> *We are really a tailors' shop and work with the material the customer decides, but I believe we would be listened to if we wanted to change something for the sake of the environment.*
>
> The managing director

Most interviewees seem to find it difficult to think of any environmental competence development other more than a few people. The development is expected to happen by learning new routines, as was the case with QMS and via investments. Due to similarities with QMS, the staff will understand EMS easier and the implementation is expected to be quite trivial.

> *People are more aware of environment than quality. Nobody opposes to something that has to do with the environment. It is common sense, which is an advantage.*
>
> The production manager

But it may be difficult to find the time to learn the system and environmental problems and to implement all the routines. But once the EMS is implemented it is easier to see its advantages and when you start thinking you can earn money and send signals to the staff.

> *We used to buy 40 000 plastic cups for a staff of 45 people, which makes 1000 cups per person a year. We started to count just for fun, but now each one has two cups of their own and its costs equals only half a year's consumption of plastic cups.*
>
> The managing director

The MD expects the EMS to pay itself back in one way or another and the staff attitude is going to become more positive since "we care and think in advance". This study is going to set pressure on them since they have committed themselves to show that they do something. Also, the possibility to avoid some occupational damage in the long run, due to the environmental exposure, should affect the attitude. "If we improve the environment, we should also feel better psychologically."

Others believe EMS is going to be positive since the customers require it. Many of them are environmentalists privately and believe it is positive for the company as well. It will not be expensive to get structure in the environmental activities, but it may cost a lot, depending on the fees the authorities place on them. It always costs more to do something for the environment.

In the new interview in November 1998 it became clear that some of the expectations on the EMS had been too optimistic. The MD used to think that it would be simple to implement an EMS until he attended a course and so the due date for certification was moved to late in 1999.

The company has now engaged a consultant who has studied the company as part of his own training (i.e. free of charge), and will help the company to get certified. He is there to get the work started and is planning training for the whole staff to open their eyes so they will understand the global connections better. The consultant is needed due to the slim organisation that has no resources for this work. He is checking for necessary routines and documentation.

The consultant and a production manager have initiated discussions with the staff at the coffee table, since according to him, it is more difficult to implement EMS from down and up via engagement than the other way around, via rules and regulations.

5.2.2.2 "It would be easier with environment"

There seems to be a discrepancy between how the management and the staff experience the situation in the company and no indications to develop the company beyond basic ISO 9000 requirements surface in the interviews. The QMS was built as a set of routines, which made the follow up of the activities easier and everyone is now expected to be aware of the system and to follow it. The fact that the company was forced by its customers to have different systems for quality management points to a reactive approach. That the various systems were then changed to ISO 9000 to make the work easier within the company seems to indicate a movement towards the coactive approach.

Force rather than own initiative seems to be the driver in doing something other than the daily production. The structures seem to be quite fixed with very little ideas of change. There seems to be a lack of a common language in the company and the work is done in a routine not encouraging innovation.

Minimum training and staff development are provided strictly based on the needs and only a few people work in production groups. There is encouragement to learn additional skills though, which is rewarded by extra pay. But any active thought of staff development to gain a wider view of the company has not been put forward or discussed.

Continuous improvement comes as a result of finding failures in quality in what appears to be a passive way.

It appears that the management has not used the opportunity of providing a vision for the company and creating staff engagement and empowerment is low key in the company. They appear to be rather happy with the state of the art and not so interested in developing the company beyond the very necessary. The discrepancy between the answers from the MD and the rest of the staff regarding the implementation of the QMS and the experience of it reflects possibilities of improvement. The reason for it can be a lack of communication, some failure in the implementation of the quality strategy, or the fact that as it later appeared the MD had plans to retire, which may have reduced his engagement with the company.

The company was found to have used a coactive approach to its QMS implementation, which appears to equal not using the company's potential, but rather seeing the QMS as a goal in itself.

There is a general idea in the company that compared to QMS people understand and are more interested in environmental issues, which should make the EMS easier to implement, although the experiences of the first environmental improvements were quite negative. The idea introduced during this study and the consultant input of the need of more training than just a short introduction seem to have been implanted in the company. This is important in order to create a vision and understanding of the background of the system and the practical aspects of everyone's work.

The idea that it would generally be easier for the staff with the environment than with quality remains, but the expectation of the process being easy due to the previous work with the QMS was abandoned.

The possibilities the owner/management have in creating vision, engagement and example remain to be utilised. The lack of a common understanding, due to the apparent lack of communication and efforts to create a common vision or picture for all the staff seems to be a factor that could endanger any efforts to develop the company.

Since the organisation was very fixed without many opportunities for the staff to take initiatives, influence their working situation and be flexible, the SME potential of the organisation and flexibility tends to be used to a very limited degree.

Negotiating with the customers also appears to be under-utilised, which might change once the customers get their own EMSs.

> *In the beginning we saw no special value in ISO 9000, but when we worked with it we saw that this is useful, but we cannot set any price on it. If we had not implemented it maybe we had had no orders. And once we have gone through ISO 9000, introducing ISO 14001 is a triviality.*
>
> The purchasing manager

The coactive approach, which the company was identified to have to its QMS, seems to be the goal even for EMS. The management expresses a different vision for EMS, but it appears that this implementation is likely to go the same way. It will likely be delegated to some of the staff, as most of them only get very basic information.

There is a risk that the EMS will remain a burden, a system to be maintained rather than a development factor. The contact with the outside

world is mainly input from the customers. It is used for the conformity of the system, rather than for active, open exchange of ideas for wider development.

5.2.3 Cibes Hiss AB

There was initially an offer from an industrial trust[214] to receive assistance to work towards a quality certificate, which the company lost due a late start. A consultant was hired to create the system, which he made rather independently, but he informed the staff about it in the end. No training in the whole concept of quality management was provided. The company was certified according to ISO 9001 in June 1996, but the system showed later to be too complicated for use in the company, which resulted in remarks during audits of not updating the documentation etc. Quality issues are on the agenda of staff meetings only when there is something special.

There had been work with quality issues in the company before, but in a non-systematised way resulting in variations in quality. The main constructor for a construction site often wants be able to leave the site with a quality guarantee, and therefore requires a certificate from the subcontractors and being the only Q certified A-lift manufacturer has resulted in new customers and a competitive advantage for the company.

The certification has even opened up new export opportunities together with the fact that the company also has CE marking. This would not have succeeded without the quality drive and was therefore seen to be of key importance. This has also resulted in a marked improvement in the atmosphere in the company and improved profitability.

The company is part of a small corporation with similar small companies, but acted quite independently in its quality drive. The problems in implementing QMS have been time and the priority given to the question.

> *It (QMS) is no written manual. It is a lifestyle, as if you would speak as one person for the company to have QMS. It must grow, be anchored in the management group and among the staff. You have to ask for the customer opinion, check suppliers and competitors.*
>
> The managing director

[214] Trygghetsfonden was a fund created in co-operation with employer (SAF) and employee organisations (PTK and LO) and was designed to support companies via for instance training so that they could develop and maintain the staff etc.

The MD will focus on better information and the staff potential as a force lifting the company, and a new organisation of 3-4 groups divided among different tasks is planned as a way towards more empowerment. These groups will have the responsibility of the planning of the work in detail and to deliver the material and products from their groups. They will also have a representative in the production meetings.

Information is often delivered in short meetings and there are no "ear marked" resources for personal development. But when new technology is purchased the supplier provides the training for it.

> *Competence development means taking better care of the papers. The quality improves and we are plugging in the holes all the time. That is how we work.*
>
> A production foreman

There is a directive from the corporation that every company must drive development projects on every level. This is a question of prioritising resources and time, which are the limiting factors. Since the MD is now more on site it is easier to get resources for different efforts.

5.2.3.1 "It is a 'virtue' for a company to have the environmental activities in order."

There has been no environmental work in Cibes Hiss AB other than basic cleaning and getting rid of the wastes, of which nobody appeared to be responsible. During the study this was changed since the public cleansing division notified that they could now receive sorted waste. Containers were purchased and the staff responded well. The questions within the study may have also spurred the interest and willingness to show some progress in the area. The OBS-list[215] for harmful substances is, however, checked to avoid them. Most of the surface treatment is out-sourced, painting is done only one or two hours a day and there are plans of replacing the steel plates in the surface panels with aluminium.

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[215] Kemikalieinspektionen. (2000). OBS–listan: Exempellistan över ämnen som kräver särskilt uppmärksamhet. 3rd revised ed. [Online]. Kemikalieinspektionen, Naturvårdsverket & Arbetarskyddsstyrelsen. Available: http://www.kemi.se/default.cfm?page=publikationer/obs_swe/default.htm. [2001-01-14].

The MD has a vision of what an EMS is going to mean for the company. CH will be working with a strategy to fulfil ISO 14001 regulations as well as the public and the customers' requirements for the environment. Quality and environment go hand in hand and it is an ambition of the company to have its environmental activities in order. The company is going to strive to find better materials and produce with better resource efficiency. Environment is going to be one of the 6-7 factors considered in all decisions and environmental issues are natural to have on the agenda at meetings as soon as the EMS is in operation.

The competence development must include concrete knowledge of the environmental issues, what is dangerous in materials and products. Information will be required from the suppliers and everyone must learn about recycling and cleaner production, which will create other spin off effects. This will be done in internal staff training based on the environmental review of the company. All departments and different work moments must be checked so that they work better.

The pressure for the EMS from the market has not been as clear as for QMS, but the company itself is taking the initiative. They want the company to be in the A-team. If the large companies will live up to their reputation they must buy from environmentally sound suppliers provided their prices are not too high, which will increase the market requirements. So far, the customers have only asked about environmental declarations, which will be included in a future quotation document.

The plant manger sees the EMS as a file, which the staff should work after. Some changes may come in the products, oils, paint etc., but few changes in the processes.

The staff outside management does not know of EMS and few have any idea of the present environmental situation of the company. They can see only minor changes of details in products and processes for the environment, and that the requirements on the suppliers may have to be increased. And they see a need to learn.

There are different ideas among the staff for the need for competence development in connection with a possible EMS from basic information about the manual "not so that everyone shall get training" to proper training for everyone plus possibly some more for specific people.

We hope to get more competence development to become more aware. There are so many things we do without thinking.

The production planner

The MD sees the EMS as a strategic question for the company management to carry out. Others see that strengthening the market position and producer responsibility are important factors as well as improvement of the working conditions. But there is also a fear that it only will imply more work. "But there must be something positive, otherwise it would not be done."

There can be a contradiction between EMS and the legal requirements, which a lift is surrounded by, which can have consequences for the company. The safety requirements can cause difficulties in changing materials, for example wood instead of steel is impossible outdoors and some electrical cables have PVC in plastics. The lack of proper substitutes can also cause problems.

The management has expectations for financial benefits since the EMS can be used as a sales argument in the package of EMC, ISO 9000, ISO 14001, CE and fire safety. That means the company can fill all the requirements from the construction industry. EMS is a clear argument to get a better price since it is difficult to argue against taking care of the environment. The initial certification cost is going to be compensated by being able to deliver to those who require it and it gives environmental profit.

The attitude to environment is very good already now, but it can improve when people see that they are on the right track.

In a later interview in November 1998, the situation had changed so that the work with EMS was no longer on the list of priorities, but would a project, which must go through the whole organisation. The plant manager attended a series of lectures of implementing EMS, which was interesting, but showed that the company did not have the resources to do it themselves.

5.2.3.2 "MD has a vision"

There appears to be a discrepancy between the MD's vision for the company and the way the staff experiences the situation. This may be due to the fact that the MD is rather new in his post and shares his time between being MD in Järbo 30% and as a controller for the corporation 70%. The

division between administration and production seems rather strict and the information does not always reach the staff as intended.

The will and intentions of the management are clear but there seems to be a problem in materialising them. One of the problems may be the "bruksanda", although it is not so dominant on the surface.

The company has been very restrictive in investing in the staff and there appears to be some fear for changes. An example is the danger of meddling with the quiet knowledge of the staff since it can cause "a feeling of being lost". The structures appear to be quite fixed and a question arises if it is the lack of priority, time and training, which could widen the views that has limited the common engagement in the company. The contacts outside the company are also limited to a few individuals, but many members of the staff are capable of doing different jobs.

It is difficult to see that the opportunities provided by the smallness of the company would have been used at all. They can be seen in the MD's vision, but it has not reached the rest of the staff so far. It is difficult to say if, due to the limited time he has in the company he can implant and maintain the vision so that it can grow and effectuate changes.

The company has used an approach that could be classified as coactive since the system is used, but the use appears to be somewhat limited bringing in a rather strong reactive component. The motive for implementation was mainly to be able to show the certificate. The management got the idea, a consultant was hired and there was very little engagement of either the management or the staff in the process. The result is a file on the shelf and problems in the work with the QMS.

The MD's vision appears to be the same for the EMS so that the company can have the whole "sales package"; EMC, ISO 9000, ISO 14001, CE and fire safety. His vision is not really shared by the staff.

The company is making limited use of its SME potential, but would be able to use it in the EMS implementation process provided the vision can be implanted among the staff and the key persons see the importance of getting everyone involved. Rather than development opportunity the EMS is likely to become the same kind of burden as the QMS has proved to be with the present state of affairs.

5.2.4 Iggesund Tools Ltd

Iggesund Tools Ltd is developing from a traditional SME into a corporation with companies in North America. It sells its own old products and service deals for machinery and is dominant in its market in Sweden. Its position in North America is also good with products it has had a patent for.

The company exports an unusually high proportion of its products for an SME and it was mainly via signals from the USA market that the importance of the QMS was realised. But the market pressure was not strong enough to initiate an ISO 9000 implementation but a new president with a vision was needed. Under him, the company has gone through a considerable change during the last years and once the climate for quality had changed it was easier than expected to implement the QMS.

The first trials for the QMS took place in the 1980s but they soon died out. A new process started in the late 1990s due to a query from a foreign customer. There was little support from the president (who is also the owner) initially, but he became convinced during the process, and gave his full support. Also, the production staff saw the lack of management involvement and perceived the QMS to involve only more work and more papers for obvious things in files to keep track of. Even if they did not experience it to be difficult in itself it "felt like forced feeding". The problem with too many other projects that were running besides the normal production was solved by new rules of priority and resources.

Since the new president was both the quality and the production manager and was in charge of about 90% of the staff, it was easier for him to drive the QMS through. The company was certified according to ISO 9001 in 1995 and the goal now is to integrate both EMS and health and safety management in it.

The company does not have a large quality department since everyone is expected to control his own products. There were 14 people out of the staff of 120 who made the description of operations. A new management system is now being installed to enable the staff to participate more and to get more information.

There was short internal quality training for everyone and a more specific training for certain functions. What was missing was the background information to quality and how the new system relates to the old QMS the company had. The ambition was to write down the instructions the way

work was done, but some changes had to be made due to requirements in the quality standards.

The company has made great efforts in improving the working conditions for its staff. They have, for example, introduced a new type of timetable for the people working in shifts from 24 hours to 3 times 6 hours so that no one is working during the early morning hours. There is extensive job rotation to increase the work content, but this contributes also to the insight in the company as a whole and reduces the physical and psychological stress and improves the competence. This has resulted in improved well-being at work as well as increased productivity by 35% as well as savings in energy cost due to less machine time, heating and lighting.

In the last 6 months the company has had a team-based improvement proposal system. The reward for a realised proposal is 50% of the calculated saving for the company and it is shared among the people working in the team. The members of the team that has most realised proposals per year get 12 000 SEK each. In addition, the team that makes the best proposal of the year gets a prize. During the first half of 1997 they made 100 proposals as opposed to a total of about 70 individual proposals per year.

> *We used to only make improvements, but now we write down everything. The rule is that if the improvement takes a shorter time to write down on a paper than to make it, then you shall write it down. People are thinking more in terms of continuous improvements which actually results in working less to produce more.*
>
> The stores and purchasing officer

Everyone also tries to think more about quality due to the company bonus system based on less rejects which the company has had for 3 years ago. This brings in about 3-6000 SEK per person twice a year.

In the organisation the top management is very close to the production, participates in training and is very visible. There is also a lot of activity within and between groups, which also contributes to communication and faster action.

> *Nobody saw the whole picture of the processes; everyone was only thinking of his own work. E.g. someone could say that this item must be ready tomorrow and when we asked how long he has known that he could reply: 3 weeks.*
>
> The president

The necessary resources were provided and the staff's proposals were listened to. This spread information, increased independence, interest and challenges in the job.

The president also takes the opportunity of communicating with the staff in small groups, which have been strengthened during the last years, to get everyone to look into the same direction.

> *A certain activation of learning is required. There is always production staff in the different projects and the company is not managed from the top down as it used to be. The barriers have faded and although people have different tasks everyone is working towards the same goal.*
>
> A production foreman

There is a strong focus on competence development and it is done to increase flexibility of the staff. One of the most important values in the company is the willingness to develop, which the staff also appears to share. Everyone is allowed to participate, "to jump on the train", which develops. The company has a training policy, which states that all training must primarily be done internally, training each other, secondly by taking external help and lastly by sending someone out of the company for a course.

> *Training creates vision and understanding employees, makes communication easier since we speak the same language. Everyone understands why the managers say yes or no to investments, if solidity is good or bad etc. Everyone's participation is a vision, since it makes people creative and builds up the company culture. That means that the company can take care of the things it wants to retain, change basic values and learn of old mistakes. The management must have patience and cannot win them all, but invest in those who will. Those who do not want to come along cut their own wounds.*
>
> The president

The high value in being positive and involved is expressed over and over again since it is seen as a precondition of good communication. According to the president the fact that you get 50% of the staff to come along is a reason to be satisfied and if it takes two years instead of one there is reason to be happy for the progress. But it appears as if the general atmosphere in the company would suggest a strong engagement for the "Tool's family".

> *The ape is sitting on your shoulder. Responsibility has been delegated to the staff, they take it and have more fun.*
>
> The service and environmental officer

5.2.4.1 "EMS is a tool to push the development started with the QMS"[216]

The necessary environmental activities in Iggesund Tools are at present taken care of by the service and environmental officer on top of his other duties. There are routines, but the work is not systematic. Many of the routines are inherited from the previous owner, from where even assistance to check new chemicals and to dispose of harmful material is received.

The initiative to start considering an EMS implementation came from the president who got a question from a customer, and a hazy reply from the service foreman. The president saw the need. The first question came around 1996 and there have been four enquiries from customers but no requirements. Two of the foremen attended an EMS course. The president thought this was an important question and the goal was to get an ISO 14001 implemented by the end of 1998.

The EMS-implementation was not expected to bring any immediate changes in the products, but processes have to be changed as otherwise there is no reason to implement ISO 14001. Just increasing knowledge will create new ideas for the cost of waste disposal for example. Later the work with resource minimisation will be important.

> *Competence must be improved. There was a lot of knowledge of quality but of environment we knew much less. If you do not know anything you cannot ask relevant questions. The more you know, the more aspects you can consider in your reasoning. Some people must become much more competent within their areas of responsibility. It is possible this is going to spill over so there are more driving forces to attach to.*
>
> The president

It should be easier to implement EMS compared to QMS since the staff can better manage their time and the internal processes are better. It may be possible to use the activities the staff is already engaged in and to show the profile of the company.

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[216] The company's expectations of an EMS below are based on interviews with the president, the service foreman and the quality foreman only, once it became clear that the rest of the staff did not know anything about EMS or the environmental situation in the company.

The EMS must be built up first and it is expected to be more long-term than the QMS. It is a question of survival of the mankind, opposed to quality, so it is important to work with it but not necessary to get certified.

An EMS does not automatically equal earning money, but ISO 14001 can be used as a tool to push the development started with the QMS implementation. In the long run it will mean savings of energy and waste, since the costs are expected to rocket up. Also, some customers will downgrade the company if it does not meet their environmental requirements. EMS is there to create a set of rules and a system that will show what to improve.

Apart from the lack of competence, knowledge, time and other resources can come to be a problem, getting the key people involved is not a problem, since the president is interested and driving the development.

New interviews were answered by the president, the service foreman and the trade union chairman in November 1998. An environmental review was done in 1997 by a consultant firm but since then nothing has been done on EMS. The company had only two enquiries about EMS, but many about the transition to the new millennium.

5.2.4.2 "Ready to go, but not now"

The company had a satisfactory product quality before the QMS implementation, but several problems in the internal processes, which also showed up in the products. The top management sees and has used ISO 9001 just as a tool in initiating development in the company. He has a clear vision, which includes everyone's involvement and empowerment in the development process.

> *USK, ISO 9000 and ISO 14001 are actually tools to initiate changes in the company. They can be used so that you do not need to run your own race. You must find motors for ISO 14001, which drive the development so that it does not grind into a halt.*
>
> The president

Much of the training and the projects are geared to providing a holistic insight of the company making further development and changes easier. This is a characteristic of the process-oriented approach including a portion of TQM.

We ourselves are a process.
The service and environmental officer

Although the company's resource frame at the moment seems rather large the most important issue seems to be the management's willingness to invest a lot of the profits in the staff as well as in the plant. This includes two million SEK on a new boring mill and a lot of competence development for the staff. Since the staff is well aware of the company's total situation they are flexible and express their commitment to the company as well.

It appears as if the top management has succeeded in taking advantage of the smallness of the company in creating an atmosphere that encourages flexibility, willingness to change and initiative to make proposals. The reward system plays a significant part in this.

The visions of the top management appear to be implanted among the staff. Due to training and competence development all speak the same language and have a "go" for the common good. Everyone has been encouraged and provided with tools to participate.

The process-oriented view of the QMS implementation is implanted in the organisation and has resulted in a positive development in the company shared by the staff. The company appears to be developing towards TQM. But it is difficult to say if the company would have gone ahead without any requirements from the customer or a strong visionary promoter, the new president.

The company has responded to the limited interest from the market by giving the EMS lower priority by the end of 1998. But if the company will decide to implement, there are many factors pointing to a positive process. The development, engagement and common vision of working towards the same goal appear to be well implanted both among the management and the staff. To widen the vision to include even environmental considerations should not meet resistance, since there is openness in the contacts with the world outside and readiness to use the input to find strategic opportunities for the company development. Also, the willingness to provide resources for a proper training in environmental issues as well as in the EMS is likely to favour the process.

The company was identified to have a process-oriented approach with a developing TQM to its QMS, where ISO 9000 was explicitly seen as a tool for company development by the president. The widening of the perspective and the openness in contacts indicate that there is awareness and willingness to make use of the company potential. TQEM can develop starting with EMS since ISO 14001 is not seen as a goal but as a tool in case implementing it would be seen as a strategic direction. This approach is growing and developing into something that the management can use the lift the company in the future.

CHAPTER

SIX

6. Discussion: How Do SMEs Use Their SME Potential and Which Approaches Do They Take to Management System Implementation?

The aim of this chapter is to discuss the characteristics in the SME potential, the management approach and their role in developing an EMS towards TQEM. The discussion is based on the results in the case companies connected to a more general discussion that is partly supported by findings in other literature studied. Finally a discussion of the ISO 14001 standard, development of TQEM and Sustainability will follow. Implications of the study on SMEs and other actors on the field will be presented with the final conclusions in Chapter 7.

6.1 The Role of the Characteristics of an SME

6.1.1 Market

The four case companies are rather dependent on their customers with the exception of IT with its strong market position and CH whose products are also largely regulated by safety regulations. The dependence is strongest for AI and they experience they are in the hands of the customer.

Their customers, the larger companies are still developing their own EMS, their environmental thinking and are going through an environmental paradigm shift[217], so they are only now starting to look at their suppliers. Their number is, however, limited and so are their requirements on SMEs, e.g. an indication of environmental policy to demonstrate that the subcontractor is working on an EMS (There are incidents, though, when a

[217] Halme M. (1997). *Environmental management paradigm shifts in business enterprises.*

large company has provided help for its subcontractors with EMS implementation.[218]). Consequently all case companies had initially had some enquiries about their environmental activities from customers, but no requirements so far. This was true for the export market as well, where the companies expected that a certification would become a competitive factor within the EU, although they now are mainly focused on the Swedish market.

The market that was the strongest driving force for quality management systems was initially expected to also form the major push for EMS. But the push appeared to come mainly from the regulatory agents rather than corporations and other customers. SMEs expected to see a change in their customer behaviour and saw ISO 14001 as one of the potential major competitive factors, but did not think their own EMS was important.[219]

Even now the requirements from the authorities are the main force behind the environmental activities in SMEs in short term, and compliance with them, e.g. Miljöbalk[220], in Sweden are also expected to provide the companies with the baseline of the requirements according to ISO 14001. All case companies are subjected to this, based on their surface treatment activities. But generally many SME know very little about the regulations authorities place on them.[221]

The customer interest focuses primarily on having "environmentally" certified suppliers as part of its own environmental management system. They are not necessarily interested in the environmental impact of the supplied products or services and other interested parties are often the ones most affected by them. But as companies get their EMSs well implemented and increase environmental knowledge and awareness, the direct environmental considerations on products and services are also likely to increase and priority will in the future be given to the suppliers that can

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218 Tunnesson W W. (2000). The mentoring of small and medium-sized enterprises: insights from experiences in the United States. In Hillary R (ed.), *Small and medium-sized enterprises and the environment*.

219 Welford R. (1994). Barriers to the improvement of environmental performance.

220 Miljöbalk. [Environmental Code]. SFS 1998:808. [Online]. Available: http://www.notisum.se.htm. [2001-02-01]

221 Tilley F. (2000). Small firms environmental ethics: How deep do they go? In Hillary R (ed.), *Small and medium-sized enterprises and the environment*.

deliver products that fulfil the environmental requirements. It is still not, however, certain that these priorities will ever go as far as choosing environmentally safer products regardless of price. This was the expectation in all the companies, and the market requirements are unlikely in the near future to develop beyond the ISO 14001 certificate towards TQEM.

6.1.2 Management and Ownership and the EMS in SMEs

There appear to be a few issues that rise above others when considering the management as a factor in the SME potential.

The **first one is the role model status**, which the top management needs to be aware of, and which is reinforced by management visibility in an SME. This is one of the main factors affecting the EMS process and this is where the management approaches differ most significantly in the case companies.

The presidents of ANK and IT are highly visible and engaged in their companies. They are aware of their role model status, used it in a positive way, which was appreciated and commented upon by several members of the staff in the interviews. They participated, for example, in certain training sitting next to an operator. They communicated their vision for the company clearly, for example, when discussing with the employees individually and in groups and appeared to be leading the way towards it.

The importance of the dominance and engagement of the management could be seen in these case companies. They identify with the company and if they value environmental concern as the management in ANK does, their companies do so as well. The real will of the management is very important for the success of both quality and environmental management systems and it is really noticeable in this situation.

The MD in CH is new and present only part of the time due to his engagements in the other companies of the small corporation and the MD of AI appears not to be much present for other reasons. Their daily engagement in the company appeared to be much lower than those of the other two companies, limiting their opportunities to spread the vision they appeared to have.

Another important factor for the managers to be aware of is **how they perceive their staff** and can engage them in the planned changes.

The management of both IT and ABB highlight an interesting point that they have an ethical dimension to their actions, a "view of man", which seems to be apparent for the staff and acts as a strong motivating factor for the company development.

> *If there is a positive climate in the company people will learn more. It takes a positive basic view of people otherwise one can not go ahead. For an individual it depends on the self-image he has, what he thinks he can or cannot do. It is a pleasure to talk with people in the plant and the messages are straight. How someone is involved in the job depends also on his home situation. We have one life and the whole picture of a person is important to see what is behind the problems.*
>
> The president ABB Nordkomponent

Ethical dimensions appear to be important even more generally for a company to extend its considerations beyond plain economics[222] and can be more easily demonstrated in an SME with fewer managers than in a larger company.

The managers' view shows, for example, in providing opportunities for staff development and personal growth, which he/she considers important and in creating **an open atmosphere in the company**, for example that of belonging to the Tools family. The staff can experience this openness and use their creativity, which through the direct contact as well as the less formal communication ways make it easy for the EMS to penetrate the SME.

An open atmosphere also **counteracts** the problem of limited **contacts with the business environment of the company**, which is a very real issue in EMS connections, although the management in all the case companies had become aware of the increasing importance of environmental issues in society rather early. It may more generally take a long time for the SMEs even to become aware of the new trends in society, including customer requirements on the EMS until they become acute since

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222 Tilley F. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firms;* Tilley F. (2000). Small firms environmental ethics. In Hillary R (ed.), *Small and medium-sized enterprises and the environment*; Miles M P, et al. (1999) The impact of ISO 14000 environmental management standards on small and medium sized enterprises; Chandrashekar A., et al. (1999). The environment is free.

they tend to seek information only when compelled by authorities, by the market or for perceived commercial advantage by the company.[223]

Even though the managers in SMEs may be aware of the global environmental issues, they tend to think that this is nothing that affects their companies since they thought they had no negative environmental impact.[224] Consequently they considered strategic environmental management irrelevant to their business operations and showed no signs of it in practice. EMSs were seen as "… primarily cosmetic exercises, applicable only to larger manufacturing companies".[225]

Once the SMEs become aware of the new requirements, they must then be met quickly, resulting in short-sighted activities instead of coming into the long-term strategic plan. An example of this could be a MD who drafted an environmental policy for his company as a response to customer enquiries without further considerations.

The limited external contacts and input also deprive the company of important environmental knowledge. They seldom have anyone with sufficient knowledge and understanding of environmental issues. Senior managers lack training in environmental management in the way they have in financial management and therefore do not have the instinctive understanding of the significance of the environmental issues.[226] This easily results in confusion and uncertainty among them regarding what constitutes an environmental improvement and what not. This may result in no action since the managers often think that they have to put the company first and environment last when they come to work, although they really are more environmentally focused than they dare show.[227] They may also want to but may be unable to communicate their positive intentions and be unsure of

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223 Ross A & Rowan-Robinson J. (1997). It's good to talk!

224 O´Laore D & Welford R. (1996). The EMS in the SME. In Welford R (ed.), *Environmental managment: Systems and strategies*; Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment.*

225 Hutchinson M A. (1994). *Environmental management in Devon and Cornwall's small and medium-sized enterprises sector.* p.264.

226 Miller W H. (1998). Cracks in the green wall. *Industry Week, 247, 2.*

227 Green P E J. (1993). Environmental TQM.

how and what to do to include environmental issues in the business strategy.[228]

The management in all the case companies were aware of and had a positive attitude to and even a vision for a stronger environmental engagement of their companies. But once they realised the amount of effort required combined with the limited number of signals from the market, the level of ambition was lowered in three of them and the planned date of ISO 14001 certification was postponed. The corporate directives of the fourth one certainly played an important role here and the process there might have been delayed with some strong argument, but not halted.

The lack of knowledge can be helped by engaging a consultant to implement the system and it can at best result in a functional system, provided that the consultant has involved the company staff and trained them in the process. In the worst case the result will be a "dead" systems file on the shelf as a sign of the EMS in the company. There was an example of this for the QMS among the case companies. For the Coactive and Reactive companies it would be quite natural to rely on consultants to implement their EMS, but it would be unthinkable for the process-oriented and committed managers other than for limited, well anchored assignments in the company.

The lack of requirements for external reporting that affects SMEs, which does not support openness, can mean that no one has an overview of the possible environmental problems in the company, if the activity is not directly classified as environmentally harmful. Additionally, many SMEs tend to think that they do not have anything to report. The authorities controlling the activities will then pay less attention to the company, as is the case of CH and AI, which may also lower the ambition concerning EMS. Since ISO 14001 in itself requires no openness, as opposed to EMAS, the company may hesitate to open itself up to the public eye.

"In SMEs an enlightened top management could readily implement far reaching change. On the other hand a backward looking top management

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228 Tilley F. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firms*.

could effectively block the progress indefinitely."[229] But is it mainly a question of enlightenment or of management personality?

It is an interesting question, which role the management personality plays in the factors above. For example the willingness to expose oneself as a role model and to exercise openness are largely a result of how a manager sees himself. How he sees his staff is largely a question of his values. The relationship of top management personality to TQM implementation[230] has been studied to some extent, but a further discussion of it falls outside this study.

An **ownership** change from private to corporate, which is becoming more common, changes the EMS situation for a company. The push from the corporation may be harder than the pressure from the market, since the corporation has more at stake than an SME in maintaining its image. The management of an SME has then no option but to follow.

A previous study indicates that the SMEs belonging to a corporation tend to have more environmental activities than others provided they have their own environmental policy instead of using the one of the corporation. Even for them the customers and the corporation appear to be equally strong drivers,[231] but making an individual environmental policy indicates a stronger engagement than merely adopting a corporate one.

An SME belonging to a corporation may also receive resources in the form of training and other support from the corporation as was the case for ANK. Even if they have to pay for this, the management of the SME then has a better chance to motivate this investment on account of something that a totally independent SME probably would prioritise. The strong focus on the training, which is typical for large companies[232], could be an indication of the corporal influence. The staff development in ANK seems to be paying off since the staff is willing to take more responsibility.

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229 Tilley F. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firms*.

230 Krumwiede D W, Sheu C & Lavelle J. (1998). Understanding the relationship of top management personality to TQM implementation. *Production and Inventory Management Journal, 39, 2*.

231 Heidenmark P. (1999). *Miljöarbetet inom svensk tillverkningsindustri*.

232 Ghobadian A., et al. (1996). Total quality management in SMEs.

Possibilities create curiosity and appreciation and can influence and encourage the staff to participate more.

6.1.3 Organisation and the EMS in SMEs

The implementation of an environmental management system in ANK appeared to be one of the "heart issues" for the president, although the operative work was delegated along the line. The previous environmental activity and the positive development atmosphere made almost all the staff "environmental enthusiasts". In IT the environmental responsibility was delegated to the maintenance and safety officer and the company appeared to be "feeling the ground" before implementing an EMS. In AI the production manager was appointed, whereas CH's limited environmental responsibilities appeared not to have been clearly assigned.

The more cross-functional and informal way of operating in ANK made the EMS process easier. This would also be the case in IT. The arrangement of the work in groups is furthest developed in IT, while ANK was developing them actively. This kind of management approach enables faster changes and the penetration of EMS throughout the whole organisation, is a clear advantage of an SME compared to larger companies.

All case companies have wage schemes that increase salary for ability to perform new tasks, but it is limited to the working moments in the production. In IT the staff is encouraged to make lots of proposals and is rewarded for them, and gets to be part of the company's improvement and success along the lines of TQM. ANK is discussing a reward scheme, but AI and CH appear to keep management and production separate from each other. This is reflected in the expressed lack of communication and understanding of the whole situation of the company.

The staff in all companies seemed to be well aware of the increased focus on the environment in society and welcomed the development since they saw the connection to improved working environment as well. It is also easy for them to accept the tangible environmental goals that made it easier to work with ISO 14001 than ISO 9000, even if it is just a question of sorting out the waste in different fractions, as was the case in CH. Many members of the staff in all companies expressed personal interest in environmental issues and wished that their companies would start acting accordingly. Apart from their role in the company they could see themselves as consumers, environmentalists, parents, grandparents etc. and stated that their

companies' actions should coincide with these roles although there are instances when the environmental aspects of these roles may contradict each other.

The environmental training could be conducted cross-functionally since everyone can contribute with ideas and proposals, which helps to create a stronger feeling of participation and teamwork. This is part of the training policy at IT. The practical side of EMS can give these benefits even with a very basic training, provided the management communicates its engagement and support clearly. This is a requirement in the ISO 14001, but in order to succeed, it requires the personal touch from the management, which cannot be achieved by a standard. The specialised functions then require more advanced training.

Problems are likely to appear when the EMS responsibility is strongly delegated to a single person or a small group with little involvement by the top management, as was the situation in three of the case companies. As they are already overburdened by previous duties, feel the lack of support and lack resources and authority, there is a risk of the focus remaining on marking the points on the standard.[233]

But it appears to be relatively easy to get both management and staff engaged once they start thinking and working for the environment. In this case ISO 14001 becomes the first step on the road to TQEM and can thus contribute to staff development.

6.1.4 Flexibility and Innovation and the EMS in SMEs

The changes concerning EMS are easier to establish in an SME if the management is engaged since the decision to start can be made fast and everyone involved is easy to reach and engage in the activity.

The development started in ABB and IT during their QMS implementation. They had a goal of making the company more flexible to enable the adjustments to future changes. The staff was encouraged to come with proposals and actively participate in the company development. The creativity of the staff has come to use especially in IT with its advanced

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[233] Hillary R. (1997). Environmental management standards: What do the SMEs think? In Sheldon C. (ed.), *ISO 14001 and beyond.*

proposal system in small innovations required for the purpose. It appears as if these companies have come a long way and it could therefore be expected that it could facilitate for them to continue within an EMS process. The other two companies appeared less flexible and less likely to promote the innovative spirit among their staff.

Since EMS can be implemented via a standardised system, the need for innovation in the very process of EMS is rather small. But for the different applications and for the work with the environmental aspects innovations made by others can also come handy. "Stolen with pride" is a useful expression in connection to EMS although in certain cases it may be subject to a problem of competitive interests.

The environmentally motivated adaptations and innovations as a form of continual improvements in products and production can be easier to make in an SME due to the smaller scale of technology. The overview provided by the smallness provides plenty of opportunities and the lack of bureaucracy makes it easier for everyone to contribute and for the company to develop towards TQEM. But a customer may not accept the changes that can cause some cosmetic changes in the product even if they do not entail any functional disadvantages and are less harmful to the environment as was the case in AI.

6.1.5 Resources and the EMS in SMEs

Although lack of resources is often given as the reason for SMEs not to engage in development activities, none of the case companies had experienced problems with the cost for a QMS. All companies had, however, a "gut feeling" and could tell examples of savings in time and a lower "cost of failure in quality", but the actual figures were difficult to get. They expected the EMS to cause some costs as well, but it is interesting to note that none of them gave financial resources as a barrier to the EMS implementation. They were aware that some costs would incur, but they would not exceed an amount that could be taken from the production budget as was done for the ISO 9000 implementation. EMS was also expected to pay for itself in one way or another.

It was seen rather as a question of setting priorities, which was demonstrated by ANK and IT. ANK gave ISO 14001 implementation high priority, which resulted in a successful ISO 14001 certification, an EMS that could function well, which again would allow the company to focus on

other issues. Whereas IT started getting enquiries about the millennium change rather than the EMS, which resulted in a lower priority for the EMS.

Some previous studies partly contradict and partly point in the same direction regarding resources. Hillary[234] found that there is little correlation between turnover and financial resources devoted to EMAS implementation and that the limited resources in an SME are human rather than financial. It could be commented though that this limit on human resources can always be converted to financial terms, to increase the knowledge by acquiring training, to buy time, to employ staff etc.

This could also be expected to apply to ISO 14001 implementation as was assumed for this study; the financial resources would form the framework within the company operations, but the other SME characteristics actually form the SME potential. Hutchinson found that the SMEs experienced lack of time, financial and personal resources for EMS and the whole concept seemed inappropriate for their business and proposed a more holistic system that would focus on sustainable development.[235]

6.2 Approach and Use of the SME Potential and TQEM

It would be easy to assume that the approach once adopted by a company to ISO 9000 implementation would continue even for the EMS. But this is likely to depend on how the QMS was experienced, which again influenced their approach to the EMS and their willingness to consider implementing it. The experience would also affect the likelihood of a company to develop further towards TQM and TQEM.

All case companies had implemented ISO 9000 quality management systems, but they experienced them rather differently. They were working on or planning to implement EMS via ISO 14001, but appeared to be developing in different ways. Implementing QMS was and EMS could be seen either as a goal in itself or as a tool, which would influence the development of TQEM. We will now discuss how different management

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234 Hillary R. (1997). Environmental management standards.

235 Hutchinson M A. (1994). *Environmental management in Devon and Cornwall's small and medium-sized enterprises sector.*

approaches could make it possible for a company to use its SME potential and eventually develop its TQEM based on the study.

The willingness to invest in time, training and development of the staff required to establish a functioning EMS in the company is dependent on the approach adopted by the company. The time may be tied totally in the actual production, but small changes in processes that do not require excessive training or investments are still possible, where a more holistic thinking and the engagement of the staff could come to use. This was given as a somewhat limiting factor in three of the case companies, but they expected that it would be possible to overcome.

6.2.1 Coactive Approach, Limited Use of SME Potential

This approach could be identified in AI and CH for QMS and appeared to be the likely one to an EMS as well. They demonstrated limited own initiative and an EMS would be done mainly as a response to a demand from the customers to comply with their requirements and to be able to demonstrate a certificate. They will focus on the control and documentation provided by the ISO 14001 system, and so fail to use the potential provided by their smallness and resort to claiming lack of resources as an excuse. CH and AI appeared to be rather fixed in their thinking and appear not to see their SME potential, which is also likely to limit their flexibility in the future. In CH there is both a vision and a fear of changes, whereas AI seems to have settled in a "we are in the hands of the customers" strategy. The change of MD may bring some changes in AI.

The coactive companies appear to have a more fixed, state of the art organisation, where the implementation is delegated to a few persons who do the work with minimum participation from the others. Staff development is not seen as an important investment for the future of the company and was seen as minimum information, "necessary evil" also in the QMS implementation process. The staff sees this as well and will not easily get engaged in the process, but see it as additional work in case there are no other incentives e.g. quality bonus, to promote the engagement.

The implementation and maintenance of the EMS would also be delegated and done by a few members of the staff rather than with everyone's participation throughout the organisation. The training is mainly information about the standard and the files in the EMS implementation.

Since the EMS is primarily seen as a standard system without the insight into the thinking behind, there is a risk of it remaining as "a burden", a system to be maintained rather than a tool for developing the company. The contacts with the customers are limited to a few people and the rather strict organisation in these companies also limits the fruitful exchange of ideas within the company, leaving the SME potential with only a limited use.

This approach has the potential to develop further towards TQEM and into the sustainable direction but this requires a real rethink to increase the environmental awareness on all levels of the organisation starting from the management that can then provide a vision. If they start working with an EMS, the understanding of the issues can develop during the process into a more sustainable direction. There is even a possibility to develop a more holistic view of the company. It could also be seen how the thinking started to change in the case companies as the result of the discussions in connection to this study.

6.2.2 Process-oriented Approach, the SME Potential is Used

It was typical, for the process-oriented approach to see the management system standards as tools to develop the company. The thinking of the staff has already changed due to the previous activities with the QMS implementation. The staff is engaged in their work and open for further changes, since they already have an insight into the company operations and are participating in many ways and it will be easier for them to see the environmental activities as everyone's business. They are allowed to participate in the work and training is providing them with the skills needed. Two of the case companies fitted this category.

The vision of the presidents in ANK and IT, with their process-oriented approach for the development of the company, appears to be well implanted. It is apparent to everyone in ANK that the work for the environment is included in their tasks, whereas in IT the work is still delegated and the president is still waiting for the right moment. But he is apparently aware of his role and his ability to advance things when it is required.

The process-oriented management takes the advantage of his position as the leading figure of the company in getting things done. Both in ANK and IT the development started with the entrance of a new president. The top

management is very visible, talking, engaging and informing the staff and they have been able to communicate the vision down the organisation. One aspect that is lifted up by the staff in these companies is the fact that the management "sits in the training class" with the staff, knows them all and is "one of them". They act as role models.

Although the process-oriented approach focuses mainly on its internal activities, the company uses its SME potential on a broad front. It can also be used to increase the external contacts and to develop holistic environmental thinking towards TQEM. One of the two case companies with this approach, ANK, appeared to be developing further in this direction. They are also aware of the expectations and development outside the company and take necessary measures to adjust to the changes in the short and long run. The well-established customer contacts are implanted throughout the company and the staff is seen as the key participants in the whole process.

It seems to be the question of the management identifying with the staff, as ANK President expressed it, being egoistic so that the good of the staff will be the good of the company. The way the top management sees the staff plays the most important roll, the willingness to share, show appreciation, invest in the staff etc.

IT has an organisational structure that has played the role of enabling the top management to keep in touch with the staff. ANK's management goes to great lengths in communicating with the staff and both companies are characterised by informality and openness in communication.

The companies with the process-oriented approach will make full use of the SME potential of the organisation and their staff in spreading the holistic view of the company. The potential can be used in all aspects of the QMS implementation process and the atmosphere of personal development encourages the staff to participate and to use their creativity. The companies dedicate resources for the staff development, seeing it as strategic priority for the company's long-term survival and success. The staff sees itself as an important part in the company operations and gets both encouragement and rewards like quality bonus for their efforts. The flexibility also provides opportunities to make fast decisions and to adjust to the customer requirements.

ANK and IT express clearly that the goal of the whole company development, the investments on the staff training and development is to ensure that the company, with its staff, is prepared to meet any changes in the future. It may be difficult to employ technical staff then, so it is better to invest in the workforce that is presently available and develop them instead. They see that the key to this is the engagement of the staff in the company as a whole, which also means that they have to receive communication about the total situation in the company, not just the work they are doing. The top management appears to have a clear picture of their own role in the process and are willing to take the consequences. It appears that the TQM is developing in their companies, where IT appears to have come longer in the "company sharing" and ANK in the "customer focus for all".

How much of this has to do with the size as long as the company is an SME? IT and ANK are both larger and could be classified as medium sized companies. IT has good economy. Both the small companies CH and AI appeared to have relatively good economy. But is it also a question of critical mass, openness, to be able to receive information from outside, communication within the company and having the customer contact in more than one pair of hands that means more information and input?

It may be easier to implant this approach and to develop it throughout the organisation in an SME. An interesting question in this connection is the "bruksanda" among the staff and management, and the fact that the managers of ANK and IT appear to have been able to get rid of it whereas the other companies appear to have much of the thinking still present.

The SMEs with TQM have been found to have a small number of management layers, to lack strong functional interest, rigid structures and formalisation.[236] This indicates that adopting the process-oriented approach equals moving away from the typical Swedish bruksanda.

6.2.3 Reactive Approach, Unknown Use of SME potential

None of the companies expressed a clearly reactive approach, although some elements were apparent in three of them. It would mean developing an EMS of their own and getting formally certified according to ISO 14001 if required by the customers, but not using it.

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[236] Ghobadian A., et al. (1996). Total quality management in SMEs.

This does not mean that they could not prove to be using their SME potential for other causes than EMS implementation or to in a very advanced position if they would be certified and compared with other companies. But it means that a certified company does not necessarily have a better environmental status or activity than a non-certified one.

If we assume that the question is not only of "environmental assurance", but activate work with environmental aspects, any one of the two other approaches including the development of TQEM could be possible and would also define the use of the SME potential. Many companies are also interested in structuring their environmental activities along the lines of ISO 14001, but not to get certified, mainly due to the cost of certification and the audits required for this.

6.3 The Approaches Used and the Use of SME Potential in the Management System Implementation

In this chapter we have studied ISO 9000 implementation in the case companies and identified which approach they have used and how they have used their SME potential. It appears that the reactive and coactive approaches correspond to a low and the process-oriented approach to a high use of the SME potential. We have also studied the plans and expectations of the companies concerning ISO 14001 and identified a likely approach to it. The results are illustrated in Figure 6-1.

6.4 ISO 14001, TQEM and Sustainability

Just as total quality management, total quality environmental management could be included in a list of miracle formulas for business development and therefore expected to guarantee a company's development towards sustainability. It is difficult to implement TQEM as such, so management system standards like ISO 14001, can be used as tools for that. But even the best tool cannot compensate for poor use. The parallel could be drawn where the standard is the tool, the approach is the way to use it, and the company, lead by the management, are the users.

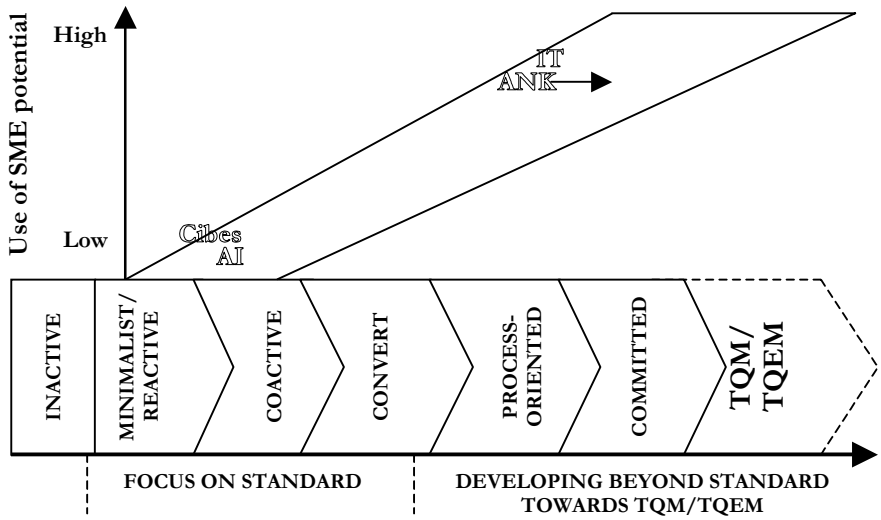

Figure 6-1 The use of the SME potential and the approach to QMS/EMS implementation in the case companies as perceived by the author.

Since the focus is on the tool and a certificate in the coactive and reactive companies, a development towards TQEM and sustainable business practices is less likely in them than in the process-oriented companies.

It is not certain that a company needs to go all the way through the stages EMS ➔ TQEM ➔ Sustainable business practices. Although EMS is a tool it is just one tool. This is, however, likely to be the most common way, since the interest and the awareness of environmental issues often starts to develop only after a company, for one reason or an other, takes the decision to implement EMS. Then it is forced to find out what it is all about and why it is needed. But it is also quite possible that some key people in a company have such an interest and engagement for the environment that they can already, from the beginning, introduce it in all company activities. These are often new companies that do not have the burden of having to change existing business practices and can make it clear to all the staff they employ. It is then obvious that they have a shorter distance to cover towards sustainability than those starting from a minimum awareness and engagement.

The question of necessity of certifying one's EMS is also interesting. Due to the high cost of getting certified and maintaining certification and the low perceived environmental impact many SMEs are choosing not to do it[237] unless explicitly required by customers. These companies would in the classification above be characterised as Inactive, which with a deeper look does not tell the whole truth. It would be difficult for them to compete with certified companies if the dividing issue is having a certificate or not, but they might still have better environmental status and activities than certified companies. Even IT, with a good potential for EMS implementation questioned strongly the need of certification. Many alternative "guarantee" systems have been developed in an attempt to provide companies with tools to demonstrate their environmental credibility even without ISO 14001 certificate.

We have concluded that the approach used to a management system implementation reflects the use of the company's SME potential. The aim would be to induce a positive development spiral where the holistic approach supports the use of the company potential, which supports a positive development, which the company could see and which would support further use of the approach.

If a company already has developed its TQM, the understanding of the TQEM is the likely continuation of it. The process-oriented approach with its more holistic thinking would seem to support this.

This thinking coincides with the list of factors that assist implementation of EMS in SME found in a previous study[238] for EMAS, including existing structured management systems, ability to draw on external assistance, genuine long term top-management commitment to implant EMS, use of team approach, rapid involvement of all staff at all levels on the EMS programme. The use of external assistance, however, should be limited to well defined and anchored input to enable the company to develop.

Since many of the TQM principles are already to some extent implanted in ISO 14001, it should be easier for a company to move further to the

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[237] Palmer J. (2000). Helping small and medium-sized enterprises improve environmental management: lessons from proactive small and micro firms. In Hillary R. (ed.), *Small and medium-sized enterprises and the environment.*

[238] Hillary R. (1997). Environmental management standards.

TQEM with it than having TQM based on the previous ISO 9000 implemented in a company. This depends, however, on if the systems are understood in a wider context and the standard itself promotes this understanding only to a limited extent. Widening of holistic quality thinking and a more holistic environmental thinking can go hand in hand.

How about a combined management system comprising of systems based on the standards for the management of quality, environment and even health and safety? It is reasonable to think that together these systems would be bound to promote a wider thinking in a company. It should be easier to implement them in SMEs than in the larger companies and to create one comprehensive management system of them. But although there are advantages in this due to the common elements in the systems, there is also a danger of the implementation requiring too much time and a risk of drowning in bureaucracy while trying to keep it all together and making sure that all details in all systems are met. On the other hand, there is a danger of loosing details in trying to make the overall system work. But working together in a group of individuals it is possible to manage both the total system and the details.

But does implementing ISO 14001 and development of TQEM automatically mean development towards sustainability?

This issue of how much ISO 14001 contributes to development of sustainable development is widely discussed in some of the newer literature on environmental management.[239] When the standard was first introduced it was expected to be THE key to sustainable industrial development. But due to the process in creating a worldwide standard that could be accepted by everyone, something of the original intentions and the hopes of many environmentalist inevitably got lost and the standard is now mostly seen as a bottom line for the development.

But when implemented as a tool in the company development, ISO 14001 can play, and has played, an important role in creating and increasing awareness of environmental issues in companies and in society. The training provided in connection to it often provides knowledge of global environmental issues and hopefully also insight into the role the company

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[239] Krut R & Gleckman H. (1998). *ISO 14001: A missed opportunity for sustainable global industrial development.* London. Earthscan; Several authors in Sheldon C (ed.). (1997*). ISO 14000 and Beyond* and in Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment.*

and each individual play in this context. The more holistic view of the company and the global perspective can also contribute to the awareness on other issues and values, differences between countries, social issues and promote the development of systems like SA 8000[240] social accountability and SMAS[241], Sustainability Management and Audit Systems.

Then again, it is always a question of how the development can be kept going, keeping the vision alive and not to lose the momentum after the first stages, but that is a question for further study.

[240] Ellipson. (2000). *Social accountability (sa8000)*. http://www.ellipson.com/sa8000/[2000-12-22].

[241] Spencer-Cooke A. (1997). From EMAS to SMAS: Charting the course from environmental management to sustainability. In Sheldon C. (ed.), *ISO 14001 and beyond*.

CHAPTER
SEVEN

7. Final Conclusions

The purpose of this study was to increase the understanding of environmental management system implementation and the possibilities for further development towards Total Quality Environmental Management in Small and Medium Sized Enterprises. Typical characteristics for SMEs compared to larger companies were defined and those that were strengths for the smaller companies were called the SME potential. An approach to EMS implementation that can help the SMEs use this potential in the implementation process was identified and how it could help them to develop beyond the basic management system and eventually towards TQEM and sustainable business practices was discussed. The aim of this chapter is to provide some final conclusions based mainly on the discussion in Chapter 6 as well as with contributions from the study.

7.1 The SME Potential and Approaches to EMS Implementation

It is apparent that the SMEs have strengths due to their smallness that they make use of in different ways in EMS implementation depending of the approach they adopt. These were described with the help of the SME potential.

SME Potential was in this study defined as the characteristics in which SMEs differ from larger companies, and which can give them strengths in EMS implementation.

Resources, that form the **frame** for SME operations and use of its SME potential were found to be important, but not the deciding factor in the possibilities of SMEs to implement EMS. Although the lack of financial resources is often given as the problem or an "excuse" for the SMEs in not to engage in development activities, the study indicates that much could be

done within the limited company frame by using the SME potential. This seems to be mainly a question of priorities.

Market, which consist more of interested parties than customers, does not exercise the amount of pressure for EMS implementation that was expected based on the previous experiences with ISO 9000. The requirements from authorities still appear to form the main incentive, but only in industry that is aware of the environmental regulations it is subjected to.

The **Ownership** does not necessarily play the key role even in companies belonging to corporations and its effect can actually be combined with the market or the management depending on if the company is private or incorporated. In private companies the role of the owner is often equal with that of the management. The pressure exercised by a corporation can be much heavier than that of the market since corporations have higher stakes on maintaining a coherent image than an individual company would.

The aspects of **Management** that are important could be summarised in its ability to use its visibility and role model status. The real will of the management shows in the approach the company takes, which again has direct consequences to the engagement of the staff and the internal and external openness of the company.

The independent mindset of the SME management can cause problems if it results in too much self-sufficiency. This may lower the motivation to keep up to date with the changes in the society and so missing important information regarding the possibilities to develop the company. Self-sufficiency in the management may also result in not using the opportunities of communication and co-operation and creating a positive atmosphere for the company.

The lack of appreciation for environmental issues is a problem, but on the other hand once a company starts implementing EMS the awareness increases, and can develop into concern, which can become an internal driving force for the process. The fact that many SME managers are entrepreneurs, who like challenges and have visions for their companies, can also support positive development in this direction.

Organisation appears to be, in addition to management, the most important element in the SME potential and within it much of the approach and vision of the management are realised and opportunities provided to

the staff. Many changes can, with a slight exaggeration, be initiated and maintained in an SME via the communication during coffee breaks. The different roles each individual has in the society, together with the possibilities to have a more holistic view of the company and to contribute to its development, make it easier for an SME to implement EMS and to get it functioning. The flexibility and the ability to make small everyday innovations in different areas of operations also benefit the process.

Flexibility and **Innovation** are largely a result of the ability of the management to create favourable preconditions and an open and creative atmosphere for them in a company.

The importance of the different characteristics of the SME potential can now be summarised in a modification of Figure 2-1 in Figure 7-1 below.

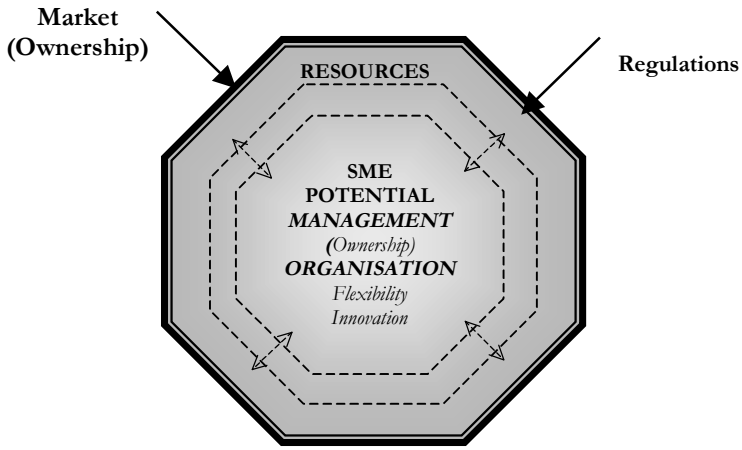

Figure 7-1 The importance of the SME characteristics. The Resources (the area within the heavy line) within which the SME potential (the dotted lines) is used to a smaller or larger extent (<-->). Market and Regulations (—►) exercises external influence on the company. Management and Organisation are the main components in the SME potential, which are affect Flexibility and can promote Innovation. The effect of ownership for a private SME equals that of management and for an incorporated SME that of the market.

But how these different benefits are utilised and which form the future development is likely to take depends finally on the approach taken by the management and, in the end, the whole company. All approaches are possible and have the potential to develop further, but the likelihood of that

depends on the previous experience of the company of other management systems and of their expectations of the new one.

Companies with the reactive approach implement an EMS solely due to customer requirements, but the system is not really used, and the company potential is also used to the minimum.

The coactive companies implement an EMS also due to customer requirements by marking off points in ISO 14001, and document the existing practices for example. The implementation, as well as the running of the system, is delegated and is likely to remain as a isolated system in the company limiting the opportunities of the company to develop towards TQEM and sustainability. The use of the SME potential is also limited here.

The process-oriented companies do not see the EMS as a goal in itself as opposed to the companies with the reactive and coactive approaches but rather as a tool to develop the company. They will also be able to increase the use of their SME potential to the maximum and eventually, as the appreciation grows and the society develops, also develop the company towards TQEM and sustainability.

7.2 Implications to practitioners

Although the pressure from **the market and regulatory agents is still rather weak**, it will increase as the evidence of the environmental impact of the modern life-style becomes more evident and requires more urgent measures. It is better to act first than to be forced to make acute changes. Although the positive evidence of an EMS is still rather limited,[242] there is even less evidence of negative consequences of it for a company. The company is advised to conduct an environmental review to find out its environmental situation at present and preferably to be able to act directly, not waiting until it is forced to.

The **management** needs to be aware of its visibility and importance as a role model. The staff is aware of the manager's real will regardless of what is said. It is therefore important that the management is honest in this point both towards itself and the staff.

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242 Bäcklund C. (1996). *Erfarenheter från miljöstyrningsprojekt*. Stockholm. NUTEK; Hillary R. (ed.). (2000). *Small and medium-sized enterprises and the environment.*

Another important factor for the management is to increase its understanding of how its management style is perceived by the staff. This could be best done in open dialogue by asking directly, but this requires some courage and if this is not possible there are surveys conducted by external parties, such as the health and safety consultants, that can be used to provide feed-back. Awareness of this is a precondition for the possibility to change.

Equip the staff, via communication and training, to see the company as a whole and their contribution to it as important, as it encourages engagement, creativity and innovation. This can then be used and increased into natural contacts and communication within the company, as well as with the contacts with the customers, and provides the company with the necessary knowledge and opportunities for learning from others.

The management does not need to know everything, but can make use of the sources of information within new areas such as contacts with local universities, where the students can make a contribution, both to the knowledge and engagement of the staff, by asking questions within their project assignments. Many among the staff, especially in technical departments of many universities, are today open for co-operation with industry, and can make the adjustments it takes.

The top management personality does not need to be a barrier, but lack of openness for the resources within others is one. But the resources need to be deployed and the employees experience that their contribution is appreciated.

The **smallness of the organisation** provides possibilities to develop openness both vertically and horizontally in a company. This promotes communication, learning, getting a more holistic view of the company and appreciation of the company situation. This again will promote engagement towards the company vision.

The closeness of their own actions in the company situation, as well as better understanding of environmental issues makes it easier for the staff to work with an EMS than was the case with the QMS. Seeing their own contribution and the openness will also encourage the staff to use their creativity, provided they get positive feed back. In practice this can be done in regular meetings and by finding ways to promote this by working within

different project group constellations etc. and by allowing some time for free dialogue.

The flexibility and individual innovations making use of the creativity and smallness in a company is largely a result of successful management and an organisation creating conditions for their use. They can therefore either be encouraged or discouraged in an SME.

It cannot be denied that an EMS implementation is always bound to take **some resources,** the minimum being the time required to inform the staff of the work to be done. But the meaning of resources can also be exaggerated. Many things can be achieved by utilising the natural interest and engagement of the staff in environmental issues, when they experience that they can contribute in some way. Training in some form is naturally required to increase the knowledge of the EMS itself, the contribution that is needed in each task and the connection these have to the whole company situation and the environmental situation in the world. But much of this can be done with rather limited resource input using the internal potential of the company and the internal resources.

Since **the process-oriented approach** appears to make most use of the SME potential, companies should make efforts to develop towards it. But since the approach and the use of the potential go hand in hand**, improving the elements in the SME potential and their use will direct the development towards the process-oriented approach** and eventually towards TQEM. They could be summarised from the above discussion as follows:

- Get started, the requirements will more than likely increase in the future.
- Engagement for the environment among the staff is there and will show up.
- Create an open atmosphere for communication both within the company and with the interested parties.
- Provide training for the staff to understand the company situation and their own contribution to it.
- Encourage creativity and engagement.
- If you as a manger do not have the "right" personality, engage others in different tasks.

- There is help to be found for example via NUTEK[243] and Industiförbundet[244] (Federation of Swedish Industries) in Sweden.

The SMEs are important in many ways and their importance is growing in all countries today. They are also estimated to be responsible for about 70% of the total industrial environmental impact, although each individual company's contribution to it may be limited. As the society becomes more aware of the global environmental situation all sectors will be required to do their part in reducing the negative impact. This will require also the SMEs to become more active.

Implementing EMS, although not necessarily getting it certified, will enable the SMEs to become more aware of their part of the total, and make it easier to start acting before acute action is required. Since the SMEs have advantages compared to larger companies, they can make the necessary changes and provide a positive contribution to the environment and to their own company's development at the same time.

7.3 Assessing Credibility of the Study

The questions asked in this study had partly focused historically on the ISO 9000 implementation and the experiences around it and partly contemporary, where ideas, thinking and expectations around a possible ISO 14001 implementation were enquired about. Although there was no conscious attempt to control or to manipulate the behaviour of the interviewees, it was impossible to avoid the fact that they obviously started thinking and made changes based on the discussions in connection to the interviews.

The discrepancy between the different experiences and views in two of the case companies resulted in more scattered descriptions. In the companies that had a common vision and where similar experiences were expressed, the picture was also more coherent.

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243 NUTEK. (2001). Miljöstyring i småföretag. Idébanken. [Online]. Available: http://www.nutek.se/. [2001-02-01]

244 Industriförbundet. (2001). SME unit. The federation of Swedish industries. [Online]. Available: http://www.industriforbundet.se/eng/newseng.nsf. [2001-02-01]

An interesting question is also how the values of the researcher affect the validity of a study.[245] Being engaged and interested in the subject can have influenced the interviewees in some way. It could be seen that those interviewed got engaged and started thinking about the issues during and after the interviews, which they commented during the later visits to the company. This could be a result of the Hawthorne effect. The efforts to limit this in the study are discussed in detail in section 1.5.4.

More quantitative data, such as financial facts and figures, money savings due to QMS, training costs, time costs, Q bonus etc., which would have given a deeper insight into the economic realities were not considered. This may distort the picture somewhat, but was done due to the definition of the SME potential, where resources, including economic realities formed the frame within which the company operated. It may, and does, vary for different companies, but is nevertheless the frame, within which the company uses its SME potential to a smaller or larger extent, depending on the factors discussed in the study.

7.4 Generalisability

The question of generalisability can be difficult in a study like this, since it does not change in multiple-case studies in qualitative research. "The generalisation is made from one case to the next on the basis of a match to the underlying theory not to the larger universe." [246] How likely is it that ideas and theories generated in one setting will also apply in other settings?[247] The observations do not necessarily need to be generally applicable and there was no attempt to try to achieve a general representation. The goal was to develop a theory that could be used consistently for analysing all the cases in this study.

The fact that four case companies in this study were chosen among a few SMEs available for the study in the region, does not need to mean that the results could not be more generally applicable. Getting to know over 30 companies, most of which have been SME, while tutoring students in

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[245] Silverman D. (1993). *Interpreting qualitative data.*

[246] Miles M B & Huberman A M. (1994). *Qualitative data analysis.* Thousand Oaks. CA. Sage. p. 29.

[247] Easterby-Smith M, Thorpe R & Lowe A. (1991). *Management research: An introduction.* London. Sage.

environmental management and auditing, has given the researcher confidence that the companies in the study are not unique in such a way that it would endanger the relevance of the results also in other SME in the manufacturing industry.

The situation described in 1998 in the case companies is partly invalid by now due to the development they have gone through, but most likely there is, even today, a fair number of companies that can recognise themselves in the discussion and hopefully benefit from it.

The discussion in this study is focused on QMS and EMS, but it can be assumed to apply to other management systems and development efforts as well, since they tend to require changes in the thinking and behaviour of the people in an organisation.

7.5 The Contributions of the Study

The main contributions of the study, apart from the development of the researcher, can be found in the following areas:

Carrying out empirical work that has not been done before by firstly interviewing SMEs on the particular issues that were studied here and secondly by the fact that the study was done in companies in the geographical area of Gävleborg in Sweden.

The new synthesis consists of combining the theoretical framework of the SME, QMS and EMS in a study.

The above also means **being cross-disciplinary and using different methodologies** such as interviews and literature studies. Holistic thinking, which is present in both quality and environmental management, is bound to be cross-disciplinary by definition, since acquiring a more holistic picture of a manufacturing company means crossing over borders in different ways. The understanding of the environmental issues in a larger perspective requires knowledge and understanding that could only be acquired by also crossing borders between disciplines.

SMEs have been studied from different perspectives as well as management systems. One study on the approaches to QMS was found and approaches to EMS have been discussed in some previous research, both have been

referred to in the previous chapters. No studies of this particular combination have come to the author's knowledge.

New interpretation of existing material. As stated before, there are several studies on different aspects of SME, but most of them focus on their specific problems. This study focuses on the opportunities and defines it as the SME potential. Companies can become aware of it and use it in different ways, depending of the approach they adopt to QMS and EMS implementation and for development in more general terms. It is likely that the results can also be useful in other areas within company operations.

Trying out something in a geographical area such as a province, that has previously not been carried out in that area before. The case companies were all located in the province of Gävleborg where little research generally and in SMEs in particular has been done before. The study does not claim to take into consideration the special characteristics of the area other than the discussion of "bruksanda", which is a common phenomenon here. But the contribution of the study lies in introducing the contact with the academic world in these companies, which may make it easier for future research efforts.

7.6 Questions for further study

The study has focused on companies that have an ISO 9000 quality management system as a basis for their ISO 14001 environmental management system. Three further questions emerge from the discussion.

The study in the case companies was done based on the experiences of their ISO 9000 implementation and the thinking and expectations around a possible ISO 14001 implementation. Since more companies now have management systems based on the standards it would be interesting to study how the real experiences in a larger group of companies, possibly within another branch, correspond to the results of this study.

How does the development of TQEM and Sustainability differ in companies that start with an EMS and continue with a QMS?

The main, although weak, driving forces for environmental management systems and sustainable development, that is market and regulations, are likely to change. This leads to the other question for further study; under

what conditions do, for example, the requirements for cleaner production and environmental innovation change?

References

Alasuutari Pertti. (1994). *Laadullinen tutkimus* [Qualitative research]. Tampere, Finland. Vastapaino.

Arnfalk Peter & Thidell Åke. (1992). *Miljöarbetet inom svensk tillverkningsindustri: Myt eller verklighet.* [Environmental Management in the Swedish Manufacturing Industry: Fact or fiction?]. Lund. Avdelning för Industriell Miljöekonomi, Lund University and NUTEK.

Axelsson Björn. (1996). *Kompetens for konkurrenskraft: Källor, drivkrafter och metoder för kompetensutveckling i företag.* [Competence for competition: Sources, drivers and methods for competence development in companies]. Stockholm. SNS Förlag.

Axelsson Florence, Norrthon Petter & Gärdström Tomas. (1994). *Miljöanpassade produkter och avfallssnål produktion.* [Eco-designed products and production with waste minimisation]. Sweden. Länsstyrelsen i Östergötland, Rapport 1994:6.

Bakka Jörgen F, Fivelsdal Egil & Lindkvist Lars. (1993). *Organisationsteori: Struktur - kultur – processer* [Organisational theory: Structure – culture – processes]. Lund. Liber-Hemods.

Barnes Frank C. (1998). ISO 9000 myth and reality: A reasonable approach to ISO 9000. *SAM Advanced management journal, 63, 2, 23-31.*

Begley Ronald. (1996). Is ISO 1400 worth it? *Journal of Business Strategy, 17, 5, 50-56.*

Bengtsson Lars. (1999). A new start at an old Mecca. In Bélanger Jacques et al. (ed). *Being local worldwide: ABB and the challenge of global management* (156-178). Ithaca, NY. Cornell University Press.

Bergman Bo & Klefsjö Bengt. (1994). *Quality from customer needs to customer satisfaction.* Lund. Studentlitteratur.

British Standards Institute. (1994*). ISO 9000: A seamless introduction to the year 2000 revisions.* [Online]. Available: http://www.bsi.org.uk/iso-tc176-sc2/Summary.html. [1999-08-09].

Brorson Torbjörn & Larsson Göran. (1997). *Miljöledning.* [Environmental management]. Stockholm. EMS.

Brown Alan & van der Wiele Ton. (1996). A typology of approaches to ISO certification and TQM. *Australian Journal of Management, 21, 1, 57-73.*

Bäcklund Carl. (1996). *Erfarenheter från miljöstyrningsprojekt* [Experiences from an environmental management project]. Stockholm. NUTEK.

Carlsson Matts & Carlsson Dan. (1996). Experiences of implementing ISO 9000 in Swedish industry. *International Journal of Quality and Reliability Management, 13, 7, 36-48.*

Chandrashekar Ashok, Dougless Thomas & Avery Gayle C. (1999). The environment is free: The quality analogy. *Journal of Quality Management, 4, 1, 123-143.*

Chuchry Andrew, Hyder Carroll, Yasin Mahmoud & Mixon David. (1997). A systematic approach to improving quality: A framework and a field study. *International Journal of Quality and Reliability Management, 14, 8-9, 876-887.*

Cohen Wesley M & Levinthal Daniel A. (1990). Absorptive capacity: A new perspective on learning and innovation. *Administrative Science Quarterly, 35, 1, 128-153.*

Crowther J. (ed.) (1995). *Oxford advanced learner's dictionary of current English.* New Ed. Oxford. Oxford University Press.

Dean James W jr & Bowen David E. (1994). Management theory and total quality: Improving research and practice through theory development. *Academy of Management Review, 19, 3, 392-418.*

Easterby-Smith Mark, Thorpe Richard & Lowe Andy. (1991). *Management research: An introduction.* London. Sage.

Ellipson. (2000). *Social accountability (sa8000).* [Online]. Available: http://www.ellipson.com/sa8000/ [2000-12-22].

Environmental Data Service. (1997). *Extract: Global uptake of ISO 14001 shows uneven picture.* [Online]. October. Available: http://www.ends.co.uk/report/iso.htm. [1999-08-16].

Environmental Data Service. (1998). *Headings: Global growth for ISO 14001.* [Online]. December. Available: http://www.ends.co.uk/report/Dec98Heads.htm.[1999-08-16].

Environmental Data Services. (1999). *Setting the agenda for the revision of ISO 14001.* [Online]. February. Available: http://www.ends.co.uk/report/Feb99_2_tx.htm. [1999-08-16].

Ewing Per & Samuelson Lars A. (1998). *Styrning med balans och fokus* [Management with balance and focus]. Malmö, Sweden. Liber ekonomi.

Galbraith Jay R & Kazanjian Robert K. (1986). *Strategy implementation, structure, systems and process.* International Ed. St. Paul, MN. West Publishing Company.

Ghobadian Abby & Gallear D N. (1996). Total quality management in SMEs. *Omega, International Journal of Management Science, 24, 1, 83-106.*

Ghobadian Abby & Speller Simon. (1994). Gurus of quality: A framework for comparison. *Total Quality Management, 5, 3, 53-70.*

Gleckman Harris & Krut Riva. (1997). Neither international nor standard: The limits of ISO 14001 as an instrument of global corporate environmental management. In Sheldon Christopher (ed.), *ISO 14001 and beyond* (45-60). Sheffield, UK. Greenleaf.

Green Philip E J. (1993). Environmental TQM. *Quality Progress, 5, 77-80.*

Halme Minna. (1997). *Environmental management paradigm shifts in business enterprises: Organisational learning relating to recycling and forest management issues in two Finnish paper companies*. Tampere, Finland. TAJU. Acta Universitatis Tamperensis 542.

Hedborg Thorolf. (1996). *Införande och tillämpningar av ISO 9000.* [Implementation and application of ISO 9000]. Stockholm. ISRN KTH/IEO/R/1-SE.

Hedborg Thorolf. (1997). *Vad kan man få ut av ISO 9000?* [What can we get out of ISO 9000]. Stockholm. An unpublished paper for Svenska Arbetsgivarföreningen.

Heidenmark Pia. (1999). *Miljöarbetet inom svensk tillverkningsindustri: Fortfarande myt?* [Work for the environment in Swedish production industry: still a myth]. Lund. Lund University, IIIEE.

Hemenway Caroline G & Hale Gregory J. (1996). The TQEM – ISO 14001 connection. *Quality Progress, 29, 6, 29-32.*

Hillary Ruth. (1997). *EMAS: An analysis of the regulation, implementation and support. PhD thesis.* London. Imperial College.

Hillary Ruth. (ed.). (2000). *Small and medium-sized enterprises and the environment.* Sheffield, UK. Greenleaf.

Hillary Ruth. (1997). Environmental management standards: What do the SMEs think? In Sheldon Christopher (ed.), *ISO 14001 and beyond* (333-358). Sheffield, UK. Greenleaf.

Hult Magnus & Odéen Göran. (1981). *Företagandet i små företag: En analys av småföretagens problem, villkor och utveckling i dag och i framtiden* [Enterprising in small companies: An analysis of small companies' problems, conditions and development today and in the future]. Stockholm. Affärsförlaget.

Hutchinson Michael A. (1994). *Environmental management in Devon and Cornwall's small and medium-sized enterprises sector. PhD thesis.* Plymouth, UK. University of Plymouth.

Industriförbundet. (2001). SME unit. The federation of Swedish industries. [Online]. Available: http://www.industriforbundet.se/eng/newseng.nsf. [2001-02-01].

ISO. (2000). ISO, 2000-07/1 500: The ISO Survey of ISO 9000 and ISO 14000 Certificates. Ninth Cycle – 1999. [Online]. Available: http://www.iso.ch.presse/survey9.pdf. [2000-10-19].

ISO 9000-1. (1996). *Quality management and quality assurance standards: Part 1: Guidelines for selection and use.* Stockholm. Swedish Standards Institute.

ISO 9001. (1996). *Quality systems: Model for quality assurance in design, development, production, installation and servicing.* Stockholm. Swedish Standards Institute.

ISO 14001. (1996). *Environmental management systems: Specification with guidance for use.* Stockholm. Swedish Standards Institute.

ISO 14004. (1996). *Environmental management systems: General guidelines on principles, systems and supporting techniques.* Stockholm. Swedish Standards Institute.

ISO 14050. (1998). *Environmental Management: Vocabulary.* Stockholm. Swedish Standards Institute.

Jones David & Welford Richard. (1997). Cultural change, pluralism and participation. In Welford Richard (ed.), *Corporate environmental management: Culture and organisations* (127-151). London. Earthscan.

Kemikalieinspektionen. (2000). OBS–listan: Exempellistan över ämnen som kräver särskilt uppmärksamhet. [OBS-list: Examples of substances that require special attention] 3rd revised ed. [Online]. Kemikalieinspektionen, Naturvårdsverket & Arbetarskyddsstyrelsen. Available: http://www.kemi.se/default.cfm?page=publikationer/obs_swe/default.htm. [2001-01-14].

Krumwiede Dennis W, Sheu Chwen & Lavelle Jerome. (1998). Understanding the relationship of top management personality to TQM implementation. *Production and Inventory Management Journal, 39, 2, 6-10.*

Krut Riva & Gleckman Harris. (1998). *ISO 14001: A missed opportunity for sustainable global industrial development.* London. Earthscan.

Landström Hans. (1999). *Entreprenörskapets rötter.* [Roots of entrepreneurship]. Lund. Studentlitteratur.

Landström Hans & Johannisson Bengt. (1998). Theoretical foundation in Swedish entrepreneurship and small business research. Working Paper 1998:1. Scandinavian Institute for research in entrepreneurship. *In 14th Nordic Conference on Business Studies,* Bodö Graduate School of Business. Bodö, Norway. 14-17 August 1997.

Lindgren Hans & Sandell Bert. (1993). *ISO 9000 – den offensiva vägen* [ISO 9000 – the offensive way]. Lund. Studentlitteratur.

Longman (1993). *Language Activator. The world's first production dictionary*. Essex, UK. Longman.

Länsstyrelsen i Göteborgs och Bohus län. (1996). *Företag och miljö i Bohuslän - en utvärdering.* [Enterprises and the environment in Bohus province - an evaluation]. Göteborg. Miljöavdelningen. Rapport 1996:12.

Miles Matthew B & Huberman A Michael. (1994). *Qualitative data analysis.* Thousand Oaks. CA. Sage.

Miles Morgan P, Munilla Linda S & McClurg Timothy. (1999) The impact of ISO 14000 environmental management standards on small and medium sized enterprises. *Journal of Quality Management, 4, 1, 111-122.*

Miljöbalk. [Environmental Code]. SFS 1998:808. [Online]. Available: http//:www.notisum.se.htm. [2001-02-01].

Miller Willim H. (1998). Cracks in the green wall. *Industry Week, 247, 2, 58-65.*

Mohrman Susan A, Cohen Susan G & Mohrman Jr Allan M. (1995). *Designing team-based organisations: New forms of knowledge work.* San Francisco, CA. Jossey-Bass.

NUTEK. (1994). *Småföretagaren: Sveriges framtid?* [SME entrepreneurs – Sweden's future?]. Stockholm. NUTEK. B 1994:4.

NUTEK. (1996). *Småföretagen i Sverige 1996* [Small companies in Sweden 1996]. Stockholm. NUTEK B 1996:11.

NUTEK. (1999). *Miljöstyrning i små och medelstora företag: en utvärdering av NUTEKs nätverksprojekt.* [Environmental management in small and medium sized enterprises: An evaluation of NUTEK's network projects]. Stockholm. NUTEK.

NUTEK. (2001). Miljöstyring i småföretag. Idébanken. [Environmental managment in small companies: A bank of ideas]. [Online]. Available: http://www.nutek.se/. [2001-02-01].

O´Laore Donal & Welford Richard. (1996). The EMS in the SME. In Welford Richard (ed.), *Environmental managment: Systems and strategies* (199-209). London. Earthscan.

Ollila Antero. (1995). *Quality improvements through ISO 9000 standards.* Helsinki. ABB Service.

Palmer Jason. (2000). Helping small and medium-sized enterprises improve environmental management: lessons from proactive small and micro firms. In Hillary Ruth (ed.), *Small and medium-sized enterprises and the environment* (325-342). Sheffield, UK. Greenleaf.

Petts Judith. (2000). Small and medium-sized enterprises and environmental compliance: attitudes among management and non-management. In Hillary Ruth (ed.), *Small and medium-sized enterprises and the environment* (49-60). Sheffield, UK. Greenleaf.

Ramström Dick. (1986). Bilder av småföretaget: i går, i dag, i morgon. [Images of the small company: yesterday, today, tomorrow]. In Stensson Stina (ed). *Småföretagen: Tendenser inför 90-talet.* [Small companies: Tendencies for the nineties] (7-19). Stockholm. Liber.

Reeves Carol A. & Bednar David A. (1994). Defining quality: Alternatives and implications. *Academy of Management Review, 19, 3, 419-446.*

Reimann Curt W & Hertz Harry S. (1993). The Malcolm Baldrige National Quality Award and ISO 9000 registration: Understanding their many important differences. *ASTM Standardisation News, November, 42-58.*

Ross Andrea & Rowan-Robinson Jeremy. (1997). It's good to talk! Environmental information and the greening of industry. *Journal of Environmental Planning and Management, 40, 1, 111-125.*

Sammalisto Kaisu. (1997). *A case study of the experiences of management of quality and working environment as basis for environmental management system in Gasell Profil.* Unpublished. Internal company material.

Schumpeter Joseph (1994). *Schumpeter: om skapande förstörelse och entreprenörskap: i urval och med inledning av Richard Swedberg* [Of creative destruction and entrepreneurship]. Sweden. Ratio.

Sheldon Christopher (ed.). (1997*). ISO 14000 and Beyond: Environmental management systems in the real world.* Sheffield, UK. Greenleaf.

Shrivastava Paul. (1995). The role of corporations in achieving ecological sustainability. *Academy of Management Review, 20, 4, 936-961.*

Silverman David. (1993). *Interpreting qualitative data: Methods for analysing talk, text and interaction.* London. Sage.

SIQ, (1998). *Performance excellence with the Swedish quality award 1998: Criteria in translation.* Göteborg. Swedish Institute of for Quality.

Spencer-Cooke Andrea. (1997). From EMAS to SMAS: Charting the course from environmental management to sustainability. In Sheldon Christopher (ed.), *ISO 14001 and beyond* (243-262). Sheffield, UK. Greenleaf.

Stanworth M J K & Curran J. (1976). Growth and the small firm: An alternative view. *The Journal of Management Studies, 13, 2, 95-110.*

Statistiska centralbyrån. (1999) SCB:s Företagsregister [SCB's Company Register] . [Online]. Available: http://www.scb.se/scbswe/eshtm/foretagregtab4.htm [1999-04-13].

Statistiska centralbyrån. (2001). The number of companies according to size and those employed in them in Sweden in 1999. [2001-01-11].

Stinchcombe Arthur L. (1965). Social structure and organizations. In March James G (ed.). *Handbook of organizations* (142-193). Chicago. Rand McNally.

Storey David J. (1994). *Understanding the small business sector.* London. International Thomson Business Press.

Taylor W Andrew. (1995). Organisational differences in ISO 9000 implementation practices. *International Journal of Quality and Reliability Management, 12, 7, 10-28.*

Taylor W Andrew & Meegan Sarah T. (1997). Senior executives and the ISO 9000-TQM transition: A framework and some empirical data. *International Journal of Quality and Reliability Management, 14, 6-7, 669-687.*

The Natural Step. (2001). *The Four System Conditions.* [Online]. The Natural Step UK. Available: http://www.naturalstep.org.uk/frameset4.htm. [2001-01-11].

Tilley Fiona. (1998a). *A Qualitative Investigation of the Disparity Between Environmental Attitudes and Environmental Behaviour of Small Firms*. Unpublished. Durham University Business School. Foresight Research Centre.

Tilley Fiona. (1998b). *The gap between the environmental attitudes and the environmental behaviour of small firms; with an investigation of mechanical engineering and business services in Leeds. PhD thesis*. Leeds. Leeds Metropolitan University.

Tilley Fiona. (2000). Small firms environmental ethics: How deep do they go? In Hillary Ruth (ed.), *Small and medium-sized enterprises and the environment* (35-48). Sheffield, UK. Greenleaf.

Tunnesson Walter W. (2000). The mentoring of small and medium-sized enterprises: insights from experiences in the United States. In Hillary Ruth (ed.), *Small and medium-sized enterprises and the environment* (219-232). Sheffield, UK. Greenleaf.

Walley Liz. (2000). The environmental champion: making a start. Westfield: An SME success story. In Hillary Ruth (ed.), *Small and medium-sized enterprises and the environment* (343-355). Sheffield, UK. Greenleaf.

van der Wiele Ton, Brown Alan. (1998). Venturing down the TQM path for SME's. *International Small Business Journal, 16, 2, 50-69*.

Welford Richard. (1994). Barriers to the improvement of environmental performance: The case of the SME sector in environmental management & business strategy. In Welford Richard. (ed). *Environmental Management and Business Strategy* (152-165). London. Pitman.

Welford Richard. (ed.). (1996). *Corporate environmental management : Systems and strategies*. London. Earthscan.

Welford Richard. (ed.). (1997). *Corporate environmental management 2: Culture and organisations*. London. Earthscan.

Welford Richard. (ed.). (1998). *Corporate environmental management 1: Systems and strategies*. 2 ed. London. Earthscan.

Welsh John A & White Jerry F. Gumpert David E. (ed.). (1981). Small business is not a little big business. *Harvard Business Review. July-August. 18-32*.

Yin Robert K. (1994). *Case study research: Design and methods*. Second Ed. Thousand Oaks, CA. Sage. Applied Social Research Method Series. Volume 5.

Yung Winco K C. (1997). The values of TQM in the revised ISO 9000 quality system. *International Journal of Operations and Production Management, 16, 1-2, 221-231*.

Other relevant literature not referred to

Ahire Sanjay L & Golhar Damodar Y. (1996). Quality management in large vs. small firms: An empirical investigation. *Journal of Small Business Management, 34, 2, 1-14.*

Anderson John C, Rungtusanatham Manus & Schroeder Roger G. (1994). A theory of quality management underlying the Deming management method. *Academy of Management Review, 19, 3, 472-510.*

Corrigan James P. (1995). The Art of TQM. *Quality Progress, 28, 7, 61-64.*

Deming W Edwards. (1993). *The new economics for industry, government, education.* Cambridge, MA. MIT. Center for Advanced Engineering Study.

Easterby-Smith Mark. (1997). Disciplines of organizational learning: Contributions and critiques. *Human Relations, 50, 91, 1085-1113.*

Gitlow H S & Gitlow S J. (1987). *The Deming guide to quality and competitive position.* Upper Saddle River, NJ. Prentice-Hall.

Lang James R, Calantone Roger J & Gudmundson Donald. (1997). Small firm information seeking as a response to environmental threats and opportunities. *Journal of Small Business Management, Jan97, 35, 1,11-24.*

Lee Gloria L & Oakes Ian. (1995). The 'pros' and 'cons' of total quality management for smaller firms in manufacturing: some experiences down the supply chain. *Total Quality Management, 6, 4, 413-426.*

Lillrank Paul. (1990). *Laatumaa* [The land of quality]. Helsinki. Gaudeamus.

Mabon Hunter. (1990). *Organisationsläran: Struktur och beteende* [Organisational science: Structure and behaviour]. Stockholm. Decathlon.

Mallac Larry A, Bridgelson Liwana S & Lyth David M. (1997). A cultural study of ISO 9000 certification. *International Journal of Quality and Reliability Management, 14, 4-5, 328-349.*

Merriam Sharan B. (1994). *Fallstudier som forskningsmetod* [Case studies as a research method] Lund. Studentlitteratur.

Moates William H & Kulondola Dennis J. (1990). An examination of differences between supervisors in large and small companies. *Journal of Small Business Management, 28, 3, 27-37.*

Mohan-Neill Sumaria I. (1995). The influence of firm's age and size on its environmental scanning activities. *Journal of Small Business Management, 33, 4, 10-22.*

Nordström Stig. (1997). *Miljöeffekter av införandet av EMAS: Svenska erfarenheter som resultat av intervjuundersökning.* [Environmental effects of EMAS implementation - Swedish experiences as a result of an interview study]. Stockholm. Naturvårdsverket. Rapport 4843.

Sartti Seija, (1998). Lyhyt johdatus insinööritieteeseen. [A Short Introduction to Engineering Science] *Helsingin Sanomat. Kuukausiliite. (42-48) Elokuu.*

Sitkin Sim B, Sutcliffe Kathleen M & Schroeder Roger G. (1994). Distinguishing control from learning in total quality management: a contingency perspective. *Academy of Management Review, 19, 3, p537-565.*

Spencer Barbara A. (1994). Models of organization and total quality management: A comparison and critical evaluation. *Academy of Management Review, 19, 3, 446-472.*

Swales John M & Freak Christine B. (1996).*Academic writing for graduate students.* Ann Arbour, MI. University of Michigan.

Victory Kathleen M. (1998). *EMAS and ISO 14001 implementation case studies.* Arlington, MA. Cutter.

Tener Beth. Victory Kathleen M. (ed.). (1999). *ISO 14001: Lessons from the Early Adopters.* Arlington, MA. Cutter.

Welford Richard & Gouldson Andrew. (1993*). Environmental management and business strategy.* London. Pitman.

Zwetsloot G. (1994). *Joint management of working conditions, environment and quality: In search of synergy and organisational learning.* Amsterdam. Dutch Institute for the Working Environment NIA.

Material from the case companies

ABB Nordkomponent AB. Internal company material such as presentation material, organisation charts etc. and students' reports

Automatindustrier i Hille AB Internal company material and students' reports

Cibes Hiss AB. Internal company material and students' reports

Iggesund Tools AB. Internal company material.

Iggesund Tools AB. (1996) Annual Report.

Interviews

Brunåker Svante. [2000-10-14]. Personal interview.

Freed Martin. Telephone interview. [1999-08-09]. Project leader Management systems. STF Ingenjörsutbildningar.

Zhao Ming. [1999-11-24]. Personal interview.

ABB Nordkomponent

President ABB Nordkomponent	971127 and 981005
MD Bollnäs	971121
Manager Quality and Service Bollnäs	971121 and 981005
Manager Env. and Quality ABB Nordkomponent	981005
Manager Logistics ABB Nordkomponent	971127
Marketing Bollnäs	971121
Manager production Bollnäs	971121
Surface treatment Bollnäs	971127
Order planning Bollnäs	971121
Production planning Bollnäs	971121
Production planning Bollnäs	971127
Trade union chairman	981005
MD Sollefteå	981005

Automatindustrier i Hille AB

MD	980113 and 981112
Purchasing manager	980113
Quality manager	980113
Manager production	980113 and 981112
Production and Safety representative	980119
Sales manager	980119

Cibes Hiss AB

MD	980127 and 981020
Manager production	980108 and 981020
Sales manager	980126
Foreman production	980108
Production planning	980108
Administration	980108
Production and safety representative	980108
Packaging	980108

Iggesund Tools AB

President	971212 and 981007
Service and environmental officer	971212 and 981007
Purchasing	971114
Export orders and delivery	971114
Quality officer	971114
Production manager	971114
Store and incoming goods	971114
Main safety representative	971114
Production foreman	971114
Production foreman	971114
Trade union chairman	981007

Appendix 1

The interview schedule

The questions were used as a guide to the interviewer and were not given to the interviewees. Additional questions were at times used to clarify the point.

The interviewee: *Name, function, tasks, how long employed in the company and in which functions?*

BACKGROUND *(Note: all four companies had implemented only ISO 9000)*
How far have you come with the implementation of quality-, health and safety (IK) and environmental management systems in your company? How was it done?
How are these systems organised? Are they connected in some ways?
What kind of changes have you made due to them in e.g. processes, products, and competence development?
Where did the initiative to develop these systems come?
DRIVING FORCES
What kind of driving forces and barriers have you met in your process of QMS, IK and EMS implementation?
Have these driving forces and barriers changed over time?
Are they specific for the SME or this branch?
How does the ownership of the company effect the implementation process and the driving forces and barriers?
CREATING VALUE
Have the systems contributed to economic gains, increased market shares etc. for the company?
Has the competence in the company increased?
Have you been able to create a positive development culture?
Has the attitude of the staff towards their work changed during the process?

EXPECTATIONS ON EMS
Do you expect any changes in the products?
Do you expect any changes in the processes?
Do you expect any competence development?
Where did the initiative to develop the system come from?
What possibilities and barriers do you see in an EMS implementation?
Do you see any value in an EMS e.g. economic or increased competence?
Do you expect any change in the staff's attitude toward their work due to the EMS?

Appendix 2

The relationship between the inherent characteristic of TQM and size of the organisations.[248]

TQM requirements/Characteristics favour	Small	Independent	Large
Top management believes that quality is everyone's responsibility and that quality leadership starts at the top		x	
Plans and manager's quality chain		x	
Explicit and disciplined about goals, rules and standards at all levels			*x*
Decision-making devoted to the lowest possible level. Empowerment		x	
Effective and open communication channels	x		
Continuous improvement culture		x	
Cultural change	x		
Resistance to change	x		
Values people	x		
Focuses on preventing problems		x	
Runs by people with other people	x		
Open culture – invites and encourages participation		x	
Availability of company related information	x		
Mistakes are not punished, rather they are considered as a part of the learning process			
Employees know that positive efforts to improve will be recognised		x	
Drive out fear in dealings with the organisation		x	
Team working encouraged and fostered		x	
Employees know that they are responsible for the quality of their work	x		
High spending on training			*x*
Attainment of corporate objectives flow from customer satisfaction	x		
Treats complaints as an opportunity to learn		x	
Cost containment through disciplined approach to own operations and the supply chain		x	
Company-wide awareness	x		
Functional integration	x		
Continuous search for improvement of the business with quality, productivity and cost reduction		x	

[248] Ghobadian A., et al. (1996). Total quality management in SMEs. 83-106. p. 92.

IIIEE Dissertations

Carl Eneroth
e-Learning for Environment. Improving e-Learning as a Tool for Cleaner Production Education
IIIEE Dissertations 2000:8

Håkan Rodhe
Preventive Environmental Strategies in Eastern European Industry
IIIEE Dissertations 2000:7

Nicholas Jacobsson
Emerging Product Strategies: Selling Services of Remanufactured Products
IIIEE Dissertations 2000:6

Karin Jönsson
Communicating the Environmental Characteristics of Products
IIIEE Dissertations 2000:5

Pia Heidenmark
Going Organic?
IIIEE Dissertations 2000:4

Peter Kisch
Preventative Environmental Strategies in the Service Sector
IIIEE Dissertations 2000:3

Thomas Lindhqvist
Extended Producer Responsibility in Cleaner Production
IIIEE Dissertations 2000:2

Desta Mebratu
Strategy Framework for Sustainable Industrial Development in sub-Saharan Africa
IIIEE Dissertations 2000:1

Peter Arnfalk
Information technology in pollution prevention: Teleconferencing and telework used as tools in the reduction of work related travel
IIIEE Dissertations 1999:1

Thomas Parker
Total Cost Indicators: Operational Performance Indicators for managing environmental efficiency
IIIEE Dissertations 1998:2

Kent Lundgren
Förnyelsebara energibärares nuvarande och framtida konkurrenskraft - föreställningar om konkurrenskraft
IIIEE Dissertations 1998:1

Lars Hansson
The Internalization of External Effects in Swedish Transport Policy: A Comparison Between Road and Rail Traffic
IIIEE Dissertations 1997:2

Mårten Karlsson
Green Concurrent Engineering: Assuring Environmental Performance in Product Development
IIIEE Dissertations 1997:1

Erik Rydén
Car Scrap: Throw it Away or Make it Pay?
IIIEE Dissertations 1995:2
Also available in Swedish: Bilskrot: möjlighet eller miljöhot?
IIIEE Dissertations 1995:1