ROYAL INSTITUTE
OF TECHNOLOGY

MIMS - MULTI INTEGRATED MANAGEMENT SYSTEMS FOR QUALITY, ENVIRONMENT AND SYSTEMATIC WORK ENVIRONMENT

- A General management system, based on large Swedish companies

Hugo Eliasson

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KTH, Royal Institute of Technology
Stockholm, Sweden

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ABSTRACT

This thesis describes mature Multi Integrated Management System (MIMS), mainly within Swedish companies, certified against three or more certificates. Other criteria have been to have a business system, usually SAP R/3 and that the companies investigated have had more than 200 employees. The two main reasons to implement have been customer demands and company Group requirements. The most common standards, besides ISO 9001, ISO 14001 and AFS 2001:1/OHSAS 18001 (9K, 14K and 18K) are EMAS, FSC (wood, paper standard), PEFC (wood) with two cases.

The following similarities describes the "Core in MIMS", i.e. similarities between different standards. The most important parts are to have a policy, a manual and review.

- Policy Statement – 4.2 (14K and 18K) 5.3 (9K)
- Objectives - 4.3.3 (14K and 18K) 5.4.1 (9K)
- Resources, Roles, Responsibility and Authority – 4.4.1 (14K and 18K) 5.5.1 and 6.1 (9K)
- Documentation - 4.4.4 (14K and 18K) 4.2.1 (9K)
- Control of Documents – 4.4.5 (14K and 18K) 4.2.3 (9K)
- Control of Records – 4.5.3 (18K) 4.5.4 (14K) 4.2.4 (9K)
- Competence; Training and Awareness – 4.4.2 (14K) 6.2.2 (9K)
- Internal Audit – 4.5.4 (18K) 4.5.5 (14K) 8.2.2 (9K)
- Management Review – 4.6 (14K and 18K) 5.6 (9K)

The most common approaches are that the Graphical User Interface is based on a "Manual" or the "Deming Wheel", but there are also other examples.

A general management system is described and there are examples of content in a manual.

In 2007 focus seems to be on audits and implementation of new standards (mainly systematic work environment) and SOX is mentioned for the first time. In academic literature successful examples of integration of management systems, with Lean production are described.

ISO 9001:2008 is now available, but there is not that dramatic changes from previous version, and all changes make the standard easier to integrate with other standards than ISO 9001:2000.

Key words: Management System, Integrated Management, Multi, Integration, Quality, Environment, Systematic Work Environment, ISO 9001, ISO 14001, AFS 2001:1 and OHSAS 18001.

ZUSAMMENFASSUNG

Diese Thesis behandelt ausgereifte, mehrfach integrierte Managementsysteme (Multi Integrated Management Systems, MIMS), hauptsächlich in schwedischen Unternehmen, die mindestens dreifach zertifiziert wurden. Andere Kriterien waren dass die Unternehmen ein Business-System haben, in der Regel SAP R / 3, und dass die betrachteten Unternehmen mehr als 200 Mitarbeiter haben. Die zwei wichtigsten Gründe für die Einführung von Managementsystemen waren Kundenwünsche und Anforderungen des eigenen Konzerns. Die am häufigsten verwendeten Standards, neben der ISO 9001, ISO 14001 und AFS 2001:1 / OHSAS 18001 (9K, 14K und 18K), sind EMAS, FSC (Holz-, Papier-Standard) und PEFC (Holz), mit je zwei Fällen.

Die folgenden Gemeinsamkeiten machen den "Kern der MIMS" aus, dh. Berührungspunkte zwischen den verschiedenen Standards. Die wichtigsten Aspekte sind Policy, Handbücher und Revisionen.

• Ausgesprochene Policy – 4.2 (14K und 18K) 5.3 (9K)
• Ziele - 4.3.3 (14K und 18K) 5.4.1 (9K)
• Ressourcen, Rollen, Verantwortung und Befugnisse - 4.4.1 (14K und 18K) 5.5.1 und 6.1 (9K)
• Dokumentation - 4.4.4 (14K und 18K) 4.2.1 (9K)
• Dokumentensteuerung - 4.4.5 (14K und 18K) 4.2.3 (9K)
• Datensteuerung - 4.5.3 (18K) 4.5.4 (14K) 4.2.4 (9K)
• Kompetenz, Schulung und Aufmerksamkeit - 4.4.2 (14K) 6.2.2 (9K)
• Internationale Audits - 4.5.4 (18K) 4.5.5 (14K) 8.2.2 (9K)
• Management Revision - 4,6 (14K und 18K) 5.6 (9K)

Die am häufigsten anzutreffenden Ansätze sind, dass das Graphical User Interface auf einem "Handbuch“ basiert, oder auf dem "Deming-Kreis", aber es gibt auch andere Beispiele. Ein generelles Managementsystem wird beschrieben und es gibt Beispiele vom Inhalt eines Handbuches.

Im Jahr 2008 scheint der Fokus auf Audits und Entwicklung neuer Standards zu liegen (vor allem systematisches Arbeitsmanagement) und SOX wird zum ersten Mal erwähnt. In der akademischen Literatur werden erfolgreiche Beispiele der Integration von Management-Systemen mit Lean Production Beschrieben.

Die ISO 9001:2008 ist jetzt zugänglich, aber ohne grosse Veränderungen im Vergleich zu älteren Versionen, und alle Veränderungen machen es leichter diesen Standard mit anderen Standards als den ISO 9001:2000 integrieren.

Schlüsselwörter: Management-Systeme, Integriertes Management, Multi, Integration, Qualität, Umwelt, systematische Umweltarbeit, ISO 9001, ISO 14001, AFS 2001:1 und OHSAS 18001.

ACKNOWLEDGEMENTS

The idea of writing something about Multi Integrated Management first occurred to me already in the spring of 1999 while I was doing a literature research at the Stockholm School of Economics and could not find any literature at all within the area. I then asked for professional help to search, but nothing was found. When I could not find anything there I thought maybe Integrated Management is something also missing in other schools and companies. A couple of years later I got the opportunity to document my findings in this thesis.

Since I know that Integrated Management is something demanded by many customers and therefore something needed by many companies my ambition is to share with others some of the lessons I have learned during the five years working as a consultant within the area through this thesis. My ambition has been to write something useful, not only from a theoretical point of view, but also for those working in practice with Integrated Management. Another ambition is therefore to write something that is rather easy to read.

First I'd like to thank Professor Torsten Cegrell, and his "right hand" Pontus, for giving me the opportunity to write this thesis, and Judy, an always positive link to the Department. One of the reasons it became a thesis is that Maj-Britt Rundkvist helped me to visualize my, sometimes very vague, ideas. I want to thank Linn, Lisa, Madeleine and Chris that helped me to phrase this correctly in English. Erik, Markus and Dorote helped me with the "German abstract". Matti Övermark helped me to find the initial literature within the area. Two of my "bosses" at Vattenfall, Robert Johansson and Martin Normark supported me on my way to the worlds largest ISO 9000-conference in Florida, Robert by improving the quality of the presentation and Martin for giving me the possibility to travel. I got fuel from Margareta Engström who has served as my mentor within Vattenfall for more than a year and helped me to find Quality Manager Rolf Ericsson as an internal sponsor for an important part of the work. Torbjörn Hanström, also a mentor, helped me with the final part of the work. I also want to thank all who have participated with knowledge into the study: Maria, Anne-Katrine, Tony, Kjell*2, Bo, Hans-Inge, Jonny, Dean, Leif, Sven-Erik, 2*Ulf (Ulf Andersson at VPC a little bit extra), Tomas, Sören, and Lars Sörqvist my mentor, a truly intellectual man with knowledge about what sells and is interesting for others. Last but not least Lise-Lotte, who even let me sit at the computer sometimes on our holidays without (that large) complaints.

Thanks to all of you!

For potential lasting errors and mistakes I take the full responsibility.

Stockholm, October 2009

Hugo Eliasson

Knowledge is no burden to carry.

Eva, my mother

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1. INTRODUCTION

1.1 OUTLINE OF THE THESIS

This thesis does not consist of attached papers. It is written as a monograph.

Parts of the material have been presented in Florida, at the ASQ-conference "ISO 9000 and related standards" in February 2007 (the largest ISO and related standards conference in the world).

The main parts of the thesis are "Horizontal Investigation-Summary question for question" and "A General Integrated Management System". In "Horizontal Investigation" an initiated reader may find most of the contributions. "A General Management System" is the author's analysis of that information.

"The core in MIMS (Multi Integrated Management Systems)" is describing the connections between different standards. Examples of content in a manual are found in Company B and C and in the chapter "Manual Focused Systems" (6.18.1) where a manual and the core in MIMS are combined. Other examples of systems are shown in 6.18.2 and 6.18.3.

1.2 RESEARCH OUTLINE

There was no problem to find, and identify, large companies with MIMS, not even 2003. At that time 41 companies were certified (including small and SME companies). In the summer of 2007 there were more than 150 companies using MIMS. Many of the 150 were small or SME, but many large companies have MIMS. At least 12 companies outside the examined group of large companies were mentioned as MIMS-users. Obviously MIMS is something used in Swedish companies.

Integrated management systems seem to be wider spread among smaller companies, i.e. companies with less than 100 employees. The most obvious reason is that it is because it is more natural to integrate different disciplines in smaller companies. The belief, however, is that it should be more efficient with a more integrated approach even in larger companies.

One purpose with this thesis is to describe a General MIMS (Multi Integrated Management System) for large companies, with more than 200 employees. This could be described as an "IS-system". Important with this part is to find and identify the Core in MIMS, i.e. the most vital parts. Thereafter identify optimal influences and describe a possible Dream system. This can be described as a "SHOULD-system" but is named "Optimal influences" (7.1). Compare the terminology with IS-process, SHOULD-process and process mapping (the words are defined in the end of the thesis). Besides that to find out general aspects

about how a well functioning MIMS is built up and run, i.e. compare findings and experiences with those made by others.

The companies that have been participating are; Armstrong World Industries, ABB, Banverket, BMW, SCA, Stora Enso, Strålfors and Vattenfall. More specific what persons and what parts of these large companies that have been participating are shown under the headline "Investigated Companies" at the end. More details about the research design are described more under the headline "Research Method".

1.3 BACKGROUND

This thesis describes mature Multi Integrated Management System (MIMS), mainly within Swedish companies, certified against three or more certificates. In most cases the certificates are covering Quality, Environment and Systematic work environment, as defined below. Other criteria when selecting companies to investigate have been that they also have a business system, usually SAP R/3 and more than 200 employees.

In this thesis a management system is defined as documentation of procedures and activities that create value in a company or prevent identified mayor risks, and a Multi Integrated Management System (MIMS) cover relevant aspects that concern, at least two areas like, quality, environment, systematic work environment, etc.

Definitions concerning the three core areas are "benchmarked" from Lindmark (1999).

In this thesis, work with quality (Q) is defined as an approach for continuous improvements, in order to achieve customer satisfaction. In this definition improvements can be seen as either small steps or breakthroughs. The standard concerning quality is ISO 9001 and ISO 9004.

Work with environment (E) is defined as an approach for improvements in order to minimise effects of a system on the environment. The standard concerning environment is ISO 14001.

Work with systematic work environment (W) is defined as an approach for improvements in order to achieve a better physical and psychosocial environment. The law concerning systematic work environment is AFS 2001:1. In an international perspective OHSAS 18001 is covering the subject.

Three reasons for the theory that integration of Quality, Environment and Systematic work environment in a management system is useful are:

1. The standard connection

Originally the approach was the similarities in the three standards. These similarities have been confirmed to be one important reason for integration. As much as 60-70 percent of the content, is the same in the three investigated standards.

2. The natural connection

In, for instance a nuclear power plant, a potential error is a quality problem, but also a health and an environmental problem. Therefore these areas are connected.

3. It is easier for employees, the customers of the system

It facilitates work for the employees, the actual customers of the system. If assuming that the employees are customers to a certified system, the belief is that it must be easier to have just one place to look for information, instead of three or maybe four.

A management system should contain the best way of conducting the work together with basic rules. The only way to receive results is if the employees accept and use the system. All companies have management systems but only a few choose to certify their management system.

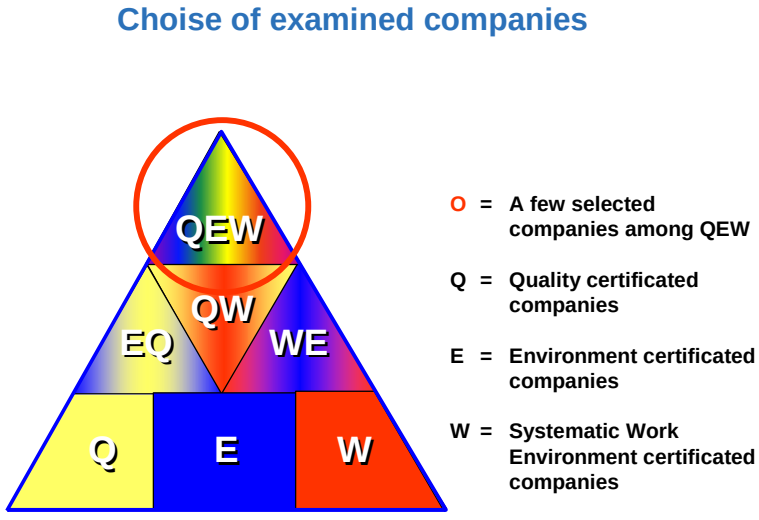


Figure 1. *Investigated companies have mainly been found among companies that are certified against Quality (Q), Environmental (E) and Systematic work environment (W) simultaneously.*

Among the certified companies even fever choose to become certified against two or more standards. The number of companies with three or more certificates is growing, from ap-

proximately forty 2004 to one hundred and fifty 2007. There must be advantages and reasons for this development. This study is mainly focusing on large companies with three or more certificates. Usually the selected companies also have some kind of business system*, like SAP R/3. Since no literature was found about this specific type of companies the study was found relevant.

*A business system can be described as soft-real-time business applications, with multi-currency and multi-language capabilities built in.

1.4 WHY MANAGEMENT SYSTEMS ARE NEEDED

All companies have management systems, but not all of them are certified. Some reasons to have certified management systems are customer demands, company group requirements, concern about the environment, getting satisfied customers, avoiding injuries, to save money, etc.

An obvious reason to implement a management system is to give management support to lead the organisation. A management system is an excellent way to make goals, business plan and marketing plan known within the company. In many companies these documents are stored in safes and so secret that those who are supposed to follow the documents hardly know about their existence. To spread information about the business plan and goals are a good way to make all employees run in the same direction. One way of achieving this is to implement a management system. In practice a management system is needed even for small companies, to secure that laws and other legislation are followed.

Some Motives for Management Systems

- Reduce Environmental Impact
- Save Resorurces
  - Customers
  - Producers
- Competitive Advantage
- Customer Demand
- Marketing
- Higher Quality
- Increased Awareness about working with environmental risks

Figure 2. *Some reasons for a Management system from a producing company is shown above. This company has forgotten Improvement, which also should be on the list.*

Motives to implement integrated management systems vary from organisation to organisation. An example of motives for a company, outside this study, is shown in the figure "Some motives for Management System". This company has forgotten Improvement, which should also be part of the enumeration.

Another reason may be to reduce Poor-Quality Costs. According to Sörqvist (2004) white-collar poor quality costs accounts for as much as 20 to 35 percent of the total effort. Harrington (1987) has the opinion that it is very difficult to develop a system to report white-collar poor-quality costs. The reason is that today's accounting systems have never focused on the detailed operation in the white-collar area. Nevertheless, many of these costs, both direct and indirect, may be prevented by a Management System.

According to Eriksson (2003) companies that successfully implement TQM (Total Quality Management) find that the financial performance is affected positively. The experience is also that working with in-company quality awards has positive effects on the customers as well as the employees.

Instead of focusing on why a company should be certified, another approach is to answer the question, why not? Bergman and Klefsjö (2007) are referring to several studies outside Sweden showing that companies that are winning an award have a more positive economic

growth than other companies. Companies that have been winning an award have increased their value with 80 percent compared to a general company in the S & P 500-list. The study is found under http://www.nist.gov/public_affairs/factsheet/stockstudy.htm.

1.4.1 REASONS NOT TO IMPLEMENT A CERTIFIED MANAGEMENT SYSTEM

Are there no disadvantages with certified management systems at all? Some reasons not to implement and some reasons that it might go wrong are:

- It takes time, usually 15 to 18 months
- It is expensive. Some of the costs are internal project time, a consultant, system development, educations in how to use the system, cost for the certificate, costs for audits and it has to be persons to maintain the system
- In some cases the systems become large and complicated
- No one is using the system despite the effort to construct it and becoming certified
- External consultants and auditors are interfering, giving no time for more important production
- "An ISO-certified company can make life wests out of concrete, and still be certified, as long as the company makes the life wests exactly the same all the time."

The above-mentioned objection to certification is rather old, and an objection to early standards. Against it could be objected that a company making life wests of concrete may not have that much contact with its customer needs, and should not receive a certificate for that reason (exception, the mafia☺).

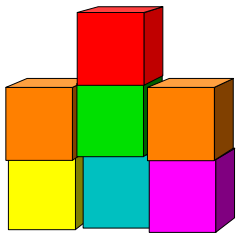
Sometimes certification is used only for marketing purpose. In rare cases only the marketing department of a company or organisation is certified. It is noting but a sub optimisation and will only result in "backlash and hangover" when customers become aware that only the shining front of the company is certified. The marketing approach however is one of the easiest triggers to use in the boardroom, but a dangerous and expensive solution. If the purpose is only to have something beautiful to hang on the wall of the boardroom, it is much cheaper to buy a Zorn painting. Fortunately this is not a common reason to become certified.

1.5 EXAMPLE OF CONTENT OF A INTEGRATED MANAGEMENT SYSTEM

The figure (3) shows the cornerstones of an environment and quality system and can work as an example of a simple multi integrated management system. The system has an environmental checklist to make sure that environment factors are taken care of in each project. There are also objectives and targets for other important factors, and an Environmental programme fore some extremely important factors. Roles and Responsibility are described for all in the company. Purchase is only made from Approved Suppliers to se-

cure safe input. Relevant Laws are briefly described. All is described in a "cycle-instruction" that brief describes the above mentioned.

Some Cornerstones



- Environmental checklist
- Objectives and Targets, Environmental Programme
- Roles and Responsibility
- Approved Suppliers
- Relevant Laws and other Requirements
- Documentation Control
- A "Cycle-Instruction"

Figure 3. *The content in a basic Management system certified against an environment and a quality standard. Combined with education it covers the most vital parts of a system.*

1.5.1 CRITERION OF AN INTEGRATED SYSTEM

Some things that are characteristic for integrated management systems are:

- An integrated policy. Concerning policy a way is to get inspiration from the management principles that are linking ISO 9001:2000 and EFQM. An example of an integrated policy is Company E:s quality, environment and systematic work environment policy
- Common procedures, i.e. not divided in different types, for instance Quality- and Environmental-procedures divided in separate handbooks
- The organisation, functions and work descriptions are covering all three disciplines
- The manager of each discipline should have somewhat the same level of responsibility within the company
- Those who are working with environment, quality and systematic work environment should work together, or at least be connected to each other in some way within the organisation
- If the organisation has a balanced score card, all three disciplines should have goals

- When purchasing, and accepting or rejecting suppliers all three disciplines are important and asked for, i.e. joint resolutions
- Education is run simultaneously for all parts of the system, or at least simultaneous basic introduction of the system are held
- Evaluation of the system at the same occasion for environment, quality and systematic work environment, i.e. integrated audits.

A summary of the points is a somewhat balanced and similar PDSA-cycle for all three disciplines.

1.6 ACCEPTANCE

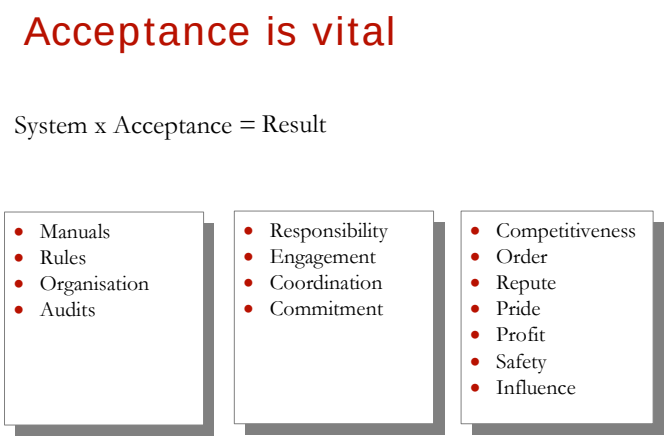


Figure 4. *The function, the result of the system is a multiple of the two factors function of the system and acceptance. If one of those factors are zero the result of the system also becomes zero.*

In the optimal management system the best way of performing the work according to practical knowledge, is documented. The processes of the company have been documented in a process map and the processes have been documented in "process procedures". Add to these procedures, policy, goals, a document management system, and descriptions of procedures, education and you will have a basic management system, i.e. some kind of basic rules for the company. The aim is to make sure the delivered products at least fulfil a basic level and to deliver approximately the same product every time, in a way that is good for the environment and the employees.

To make the system work efficiently it is necessary that it is accepted by as many as possible, hopefully everyone. The function, result of the system is a multiplication of the two

factors "function of the system" and "acceptance". If one of those factors is zero the result of the system is zero. For instance if someone constructed the best, integrated management system in the world, but all the employees at the company or in the organisation refuse to use the system, the result will also be zero. It is easy to focus on the system, but we must never forget that to obtain a good result acceptance is also extremely vital.

One important conclusion in the thesis is that no matter what system it is, or how it is constructed, the system has to be accepted in order to deliver constructive results. Behind this statement is simple mathematics. The system is a multiplication of "system" and "acceptance". It is therefore, according to the author, better with a simpler system with a better acceptance, than the "top of the line-version" with small or none acceptance. Changing people's habits takes time.

In an ideal world, the best way of performing a task is described in the system and all employees have accepted it and are working according to the system. Often this is only nothing but a vision; nevertheless there is nothing wrong in having this vision as an ambition.

Some identified ways to increase acceptance is shown in figure 5 below. All are important but that the material is updated and that it is easy to find may be the two most important factors, but design of the system is also vital and is including "easy to find". The focus in this thesis however is more on the system (hard quality) than on acceptance (soft quality).

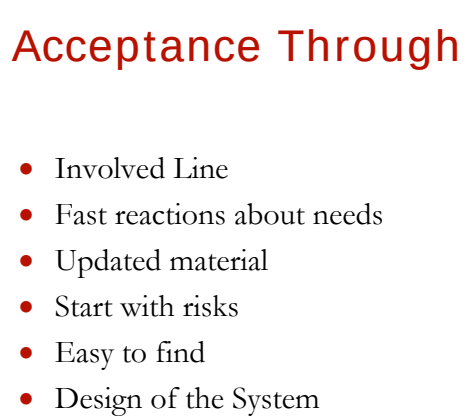


Figure 5. *Some identified ways to get acceptance. Acceptance is vital but mainly mentioned as a background in this thesis.*

2. RESEARCH METHOD

Large parts of the material were collected during five years as a consultant within the area**,** and mainly collected out of own interest. Therefore it is sometimes difficult to find the source. In some cases the source cannot be exposed due to obligations to my former employer, SwedPower, now Vattenfall Power Consultant. Besides that literature research has been done in the Royal Institute of Technology Library in order to find out what's written on the subject. Besides that knowledge and information also have been collected at courses, in literature and from the Internet.

On top of this a multiple-case study among selected companies having Multi Integrated Management Systems. Important factors taken into consideration when choosing interesting companies or organisations have been: The size of the company and to select companies integrating different standards in order to get an indication whether EMAS, SS 627799 or ISO 15288 are easy to integrate. Also to find some companies using business system, like SAP R/3, in order to investigate if that also is integrated. Besides that companies also have been found through different kind of seminars within the area and through certification bodies.

The possibility to certify systematic work environment systems with other management systems started during 2000. In January 2001 there were only 12 companies with three certificates in Sweden. In September 2003 there were 42 companies according to the eight different companies in Sweden that perform audits. In June 2007 the number of certified companies was 152. This number of certified however is found in another way than the 2001 and 2003 numbers. The 2001 and 2003 numbers were found by phoning to eight certification agencies. The 2007 figures were found through a web page.

The number seems rather low. However this is only the top of the top of the "iceberg". Lots of companies are only certified against one of the standards. Some companies are certified against two, but only a few companies against three or more standards.

The choice of companies was mainly (one exception) done among the 42 companies that were certified against all three of the standards ISO 9001, ISO 14001 and AFS 2001:1 in September 2003.

During the process the language of this thesis has been changed from Swedish to English. The first draft was written in Swedish (covering one company) and everything from 2004 and forward (the remaining eight companies) has been written in English.

Another way to describe the process is that it started with one company, and then findings and some extra questions within interesting areas were studied on eight other companies.

After each interview documentation has been sent back to the contact person in each specific company to make sure the answers were correctly understood and documented in a proper way. This precaution was taken in order to secure quality of the base-data. This data was then used to do vertical and horizontal investigation. Vertical investigations have been sent to each company for comments adjustments and to be updated.

What questions the companies were actually asked are found in "Horizontal investigation".

"Vertical investigation" is findings within each of the companies.

"Horizontal investigation" is findings concerning each question.

These two approaches have been studied together and a General Integrated Management System has been created, i.e. interesting result from both approaches. In the end of 2007/beginning of 2008 Vertical and Horizontal Investigation have been updated after contacts with participating companies.

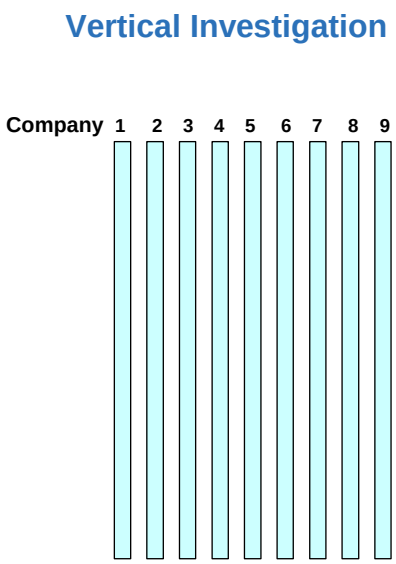


Figure 6. *The first step of the multiple-case study was to make a study of each company. This step was named Vertical Investigation.*

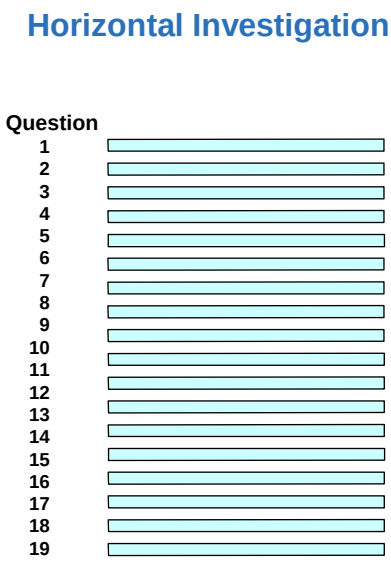


Figure 7. *Next step was to compare the answers of each question, i.e. a Horizontal Investigation.*

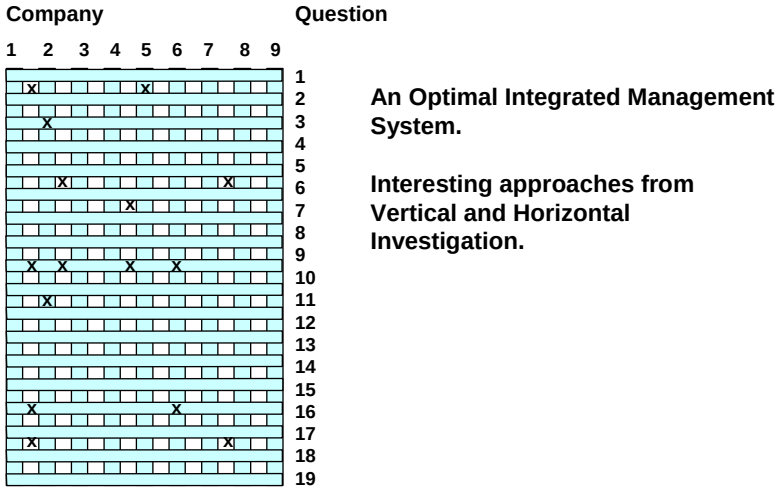


Figure 8. *The plan was to combine interesting approaches from different companies in order to construct a "top of the line system", i.e. an Optimal Integrated Management System. Finally this part was named "Optimal Influences" (7.1).*

2.1 PARTICIPANT OBSERVATION, MULTIPLE-CASE STUDY AND ARCHIVAL ANALYSIS

According to Yin (2003) the Strategy for this specific Research is a Case Study and then on top of this a Multiple-Case Study. This however is a bit diffuse since the Case Study originally was not meant to be a Case Study. At least the original purpose was not for it to be a Case Study. Instead it was to construct an Integrated Management System and findings during this work were documented as a "final report". Participant observation may be a better term and description. This participant observation awoke an interest for this subject and resulted in a Multiple-Case Study against the original company and eight more companies.

Parallel with this Multiple-Case Study Archival analysis was done in the Royal Institute Library.

These three types of Research, all with focus on Contemporary Events and according to Yin (2003) they require no control of behavioural events. Forms of Research Questions for the Case Study are how and why. For Archival analysis the questions usually are who, what, where, how many and how much. For Case Study and the Multiple-Case Study how and

why have been the questions used. For Archival analysis the questions used have mainly been who and what in order to find everything written within the subject.

2.1.1 VALIDITY

Validity is according to Yin (2003) constructed through:

1. Select the specific types of changes that are to be studied (and relate them to the original objectives of the study) and
2. Demonstrate that the selected measures of these changes do indeed reflect the specific types of change that have been selected.

Point number 1 was taken care of during the Case study. One of the outcomes of that was the questions that were used in the Multiple-Case Study, with one exception. The exception was the question "What would your dream system look like?" That specific question came up during the first interview.

Concerning point number 2 the selected areas were found to be problematic during the case study, and the selected areas were a result of the study. Validity therefore is granted through experiences, colleagues, customers and sponsors during this work. The horizontal investigation showed all the answers of a specific question. No real measures were established in terms of figures, but nevertheless specific types of changes within each area could easily be found, and best practice could be found. Another way to construct validity was the way the sample for the Multiple-Case study was chosen. All companies were certified against three or more standards, with one exception. (An employee from SWEDAC pointed out this specific company as a good example of a company with a well functioning integrated management system.) Furthermore they were large companies with some kind of business system, usually SAP R/3.

Concerning external validity this is granted through the authors experience as former consultant within the area. Also people, with expertise in English or in Quality, have read the thesis. The findings have also been tested in the largest ISO 9000-conference in the world in Florida 2007, where a presentation of the findings was held.

2.1.2 RELIABILITY

Concerning reliability, or if a later investigator followed the same procedures would arrive at the same findings and conclusions? Most certainly the result would be approximately the same with the same questions to the same persons concerning the Multiple-Case Study. The difference would be due to the fact that the interviewed persons are real people and not machines and therefore the answers would not be exactly the same from one occasion to another. Furthermore, same individuals were not available when the material was updated. Concerning the first Case study the answer most certainly would be no. The reason is that the Case study was based on several years of work as a consultant with several different assignments, and due to confidentiality against customers is it not possible to get enough information about, or come to the same findings and conclusions.

2.1.3 SOURCES, AND CHAIN OF EVIDENCE

The sources of evidence are interviews, documents, direct observations and archival records. Archival records in this case are findings from the library. Interviews have been the main source with documents, in some cases direct observations and findings in the literature to verify findings in the interviews. If we are focusing on the size of each source interviews have been the largest followed by archival records.

Three sources in Yin (2003) have mainly been used since all answers are based on interviews and documents and compared with findings in literature. The chain of evidence has been tried to remain intact since all findings according to each company were sent back to, and accepted by each contact person. This is something between the second and third tactic described by Yin. This has actually been done two times, 2004 and 2007/2008. In order to verify that there have not been too large changes the material was sent to each contact person again during the end of 2007 and is updated based on that information. In one company it was impossible to get contact. This company has not been updated in the thesis.

The chain of evidence (Yin, 2003) is maintained in the way that the answers of the questions from each company have been documented in the company's Case Study Protocol, and then all of them stored in the Case Study Database. These Protocols are then included in the final thesis and many of the conclusions are directly from the Protocols, i.e. Horizontal and Vertical investigation. Pattern Matching (Yin, 2003) is used as a method in Horizontal Investigation (a General System).

2.2 LIMITATIONS

One limitation is that no visit has been done to companies outside Sweden. Contacts have been taken with scientists, and literature has been studied about findings outside Sweden but no visits have been done. The reason for this limitation, to not visit all companies, is economical. No literature before 1996 has been taken into consideration, with the exception of Zweetsloot. There are at least two reasons for this. There is not much written, even before 2000 within the area. Another reason is that, for instance AFS 1996:6 (later 2001:1), was published in 1996 and then it took some time before it was spread and then even more time before it was used and integrated with other standards.

All the companies studied have been certified against standards within the SS EN ISO-system. There may be excellent companies not certified against ISO but I have not found a way to identify these companies, therefore they are left out.

A third limitation is that all respondents are working within the area environment or quality. From this point of view, for instance asking individuals working with economics or top management, answers about integration may have been different.

ISO 9001:2008 is now available, but there is not that dramatic changes from previous version ISO 9001:2000. The new version of the standard will however make integration easier according to Peter Hartzell, Swedish Standards Institute.

Concerning results some findings concerning processes and general findings about change have been left out since the connection to MIMS was too vague.

3. Related Works

All companies have Management Systems. Areas that may be covered are, according to Persson (2006), strategic issues (management), economics, laws, owners, media, society, marketing, construction, purchase, production, warehouse, delivery, production plant, buildings, maintenance, etc.

Persson (2006) is explaining system as a group of interacting elements and is comparing with the steering system of a car consisting of all the elements from steering wheel to the wheels. A management system is according to Persson (2006), free translation, "a system to establish policy and goals and everything needed to fulfil the policy and reach the goals".

Concerning Integrated Management Systems, or Coordinated Systems which is the term for example Birgersdotter et al (2002) are using, the main source seems to be Zweetsloot (1994). Blücher et al (2001), Johansson et al (2001) and Schylander et al (2002) are also all referring to him. He seems to be the first who actually is pointing out the similarities and links between the three areas. Most of it is relevant today, and since Zweetsloot was the first to cover the subject it is part of the introduction.

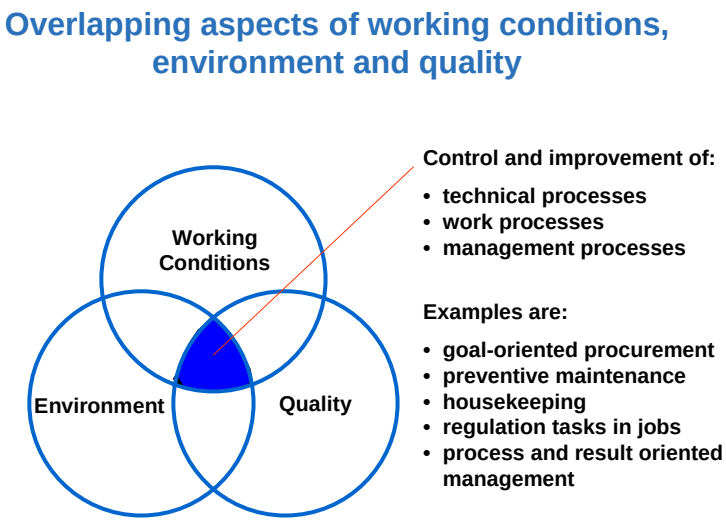


Figure 9. *Zweetsloot (1994) is giving some hands on examples of aspects that contains Systematic work environment Quality and Environment.*

In figure 9, Zweetsloot describes areas that are linked together. Housekeeping is not exactly what this thesis is about, but this was as mentioned the first published within the area and therefore part of this thesis.

In 1997 the trend is to integrate Safety with Environment. Both Dennis (1997) in Toronto, Canada and Kemikontoret (1997) in Sweden are describing this. Dennis is integrating with Quality and Kemikontoret with Health, but nevertheless it is two examples of Integrated Management. The conclusion that the three areas (Environment, Systematic Work Environment and Quality) are suitable to integrate is made from different directions. Johansson et al (2001) were approaching the area from an Environmental angle through "More effective Environmental Management System through coordination" (free translation). IVL, Birgersdotter et al (2002) were approaching the area from a Systematic Work Environment angle by "Systematic Work Environment in coordinated management systems" (free translation). The most common way to approach this area is exemplified by Schylander et al (2002) that integrate Environment into a Quality Management System. The most common approach since ISO 9001 was the first standard published and therefore the first standard used.

"Kemikontoret" (1997) have collected necessary instructions/routines for chemical companies that want to cover the actual area. There is only a short introduction and some vocabulary within the area, but besides that, instructions necessary for a company with 50 employees are available. The reason is to give a quick-start for companies working in that area. It seems to be a way to fulfil chemical industries ambitions to Responsible Care, an Integrated Management Approach and a ten-point programme. Most certainly a fast way to become certified but the risk is that the journey to the certificate is too short and that this reduces the acceptance. Simply put; The company gets a certificate, but on what grounds?

Another example of similarity between quality and environment is Dennis (1997) who is applying Deming's 14 points to safety and environment. He choose Deming but means that this application of quality principles to safety and environment could have been illustrated by Crosby's four absolutes, Feigenbaum's fundamentals, or Juran's quality triad. He also means that the criteria, which "the Malcolm Baldridge National Quality Award" is based on, are another possibility.

Dennis (1997) has defined a Total Safety and Environmental Management System, by combining EMS (Environmental Management System) and SMS (Safety Management System), but he also includes Quality in form of the "quality toolbox". The overall conclusion is that the three areas are very suitable to integrate, from an Environment, from a Systematic Work Environment and from a Quality point of view.

The book "Att integrera ledningssystem" (In English, "To Integrate Management Systems"), Persson (2006) is describing integration between different parts of the standards; 9001, 14001, AFS 2001:1 and 27001 (Information Security). The author is focusing on demands from the different standards concerning policies, goals, strategies, plans, roles and

responsibility, review, etc. It is probably the book in Swedish that is describing integration best.

In 2007 and 2008 several authors are discussing the similarities between "Lean and Green". Pojasek (2008) is talking about "Framing Your Lean-to-Green Effort" in Environmental Quality Management. Pojasek is also pointing at three web-sites where interested may find information and assistance. At least two of them are focusing on the combination of Lean and Green.

(http://www.epa.gov/greensuppliers and http://www.sme.org.org/leantogreen/)

This can bee seen as integration between a tool from the quality toolbox and environment. Also Soltero (2007) are discussing the use of the quality toolbox in environment purpose. Besides Lean he is talking about Hoshin Kanri (Policy Deployment), Kaizen and Management by Objectives and many other quality tools. This is seen as a proof that environment and quality are suitable to integrate in several ways, not just through standards.

Pojasek (2008) is showing on some tools that may help management-standard users to make the transition to an integrated system. The three Pojasek are pointing at are:

1. The eight quality principles, which, also are associated with one of the widely used business excellence frameworks (EFQM).
2. Integrate performance criteria, derived from a business excellence framework.
3. Use process improvement methods to help to internalize continual improvement.

"Such a system can form the foundation for the organization's journey to business sustainability. In the same article (Creating a Complete Business Management System) he is among other things also mentioning stakeholders. An important, but in Swedish literature rather seldom mentioned group.

Jennifer L. Kraus and John Grosskopf (2008) are mainly discussing auditing of integrated management systems, but concerning motives for integration they are pointing of the process of integration as way to breathe new life into old programs when the novelty of a management system begins to fade after a couple of years. They also use the abbreviation IntMS for an integrated multiple management system, instead of MIMS. In the article "Auditing Integrated Management Systems: Considerations and tips" Kraus/Grosskof also are pointing at disadvantages of management system integration. Their two remarks are:

1. A non-conformance against a requirement of one standard may carry over to another standard and in the worst-case scenario; all registrations could be at risk unless effective corrective action is taken.
2. The learning curve that will likely be required for the organization's staff-members, will not correspond with the requirements of all the management systems involved in the IntMS (MIMS).

The types of audits the authors had found were; fully integrated, simultaneous, overlapping and sequential (one management system first and then another).

Like quality in this study, by reuse of offers, French and Millman (2008) have found that an integrated management system can save money. In this case a product reuse program enhancing sustainability and the bottom line.

3.1 THE DEMING CYCLE

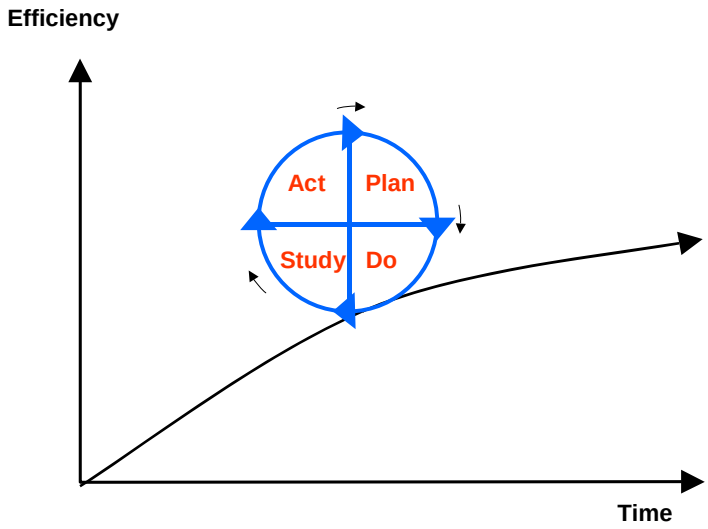


Figure 10. *The PDSA-theory can be used in small isolated projects or to describe the cycle for the management system of a whole company. In this case it is described because the appearance of the Company H management system is based on the theory.*

Due to the answers from Company H and I the Deming Cycle is described. It is also named the Shewhart Cycle, the PDCA Cycle or the PDSA cycle. According to Neave (1990), Deming describes the different parts of the Cycle as follow.

Plan a change or a test aimed at improvement.

Do, implement or carry it out, preferably on a small scale.

Check or **Study** the results. What did we learn?

Act, adopt the change or abandon it or run trough the cycle again, possibly under different environmental conditions.

The Deming Cycle is often referred to in literature concerning Integrated Management. For instance Blücher et al (2001), Nilsson (2000) and Johansson et al (2001,) directly refers to this theory. Besides that it seems to be the origin of both the ISO 9001-model and the 14001-model according to Nilsson (2000).

In different parts of this thesis therefore the PDSA-philosophy is used. The meaning of that expression is to work according to the Deming Cycle, i.e. to follow the four steps above. The theory can be used in small isolated projects or to describe the cycle for the Management system of a whole company. Persson (2006) is referring to The Deming Cycle as a powerful tool to work with all types of improvements. An example can be to set goals during Plan, implement them during Do, evaluate them during Study and Act according to the results. Start all over again.

In literature Check is more frequently used than Study. The author's choice to use Study is based on the fact that it was the term Deming used, and therefore it feels more suitable.

The theory is well known through Edwards W. Deming, Neave (1990) and many others and therefore there is no deeper discussion about it. Instead interested persons may read some of the work about the "Improvement cycle".

One comment however. Usually the PDSA-philosophy is described as if the Cycle is starting with Plan. The author's experience is that improvement always has to start with Study. Especially when coming to a new company. One must know at what level the company starts before it can be decided where to go and what to aim for. After that it is time to act, i.e. to make basic adjustments, find some Quick Hits and then plan for the continuous work, i.e. the long time "Nirvana solution":-).

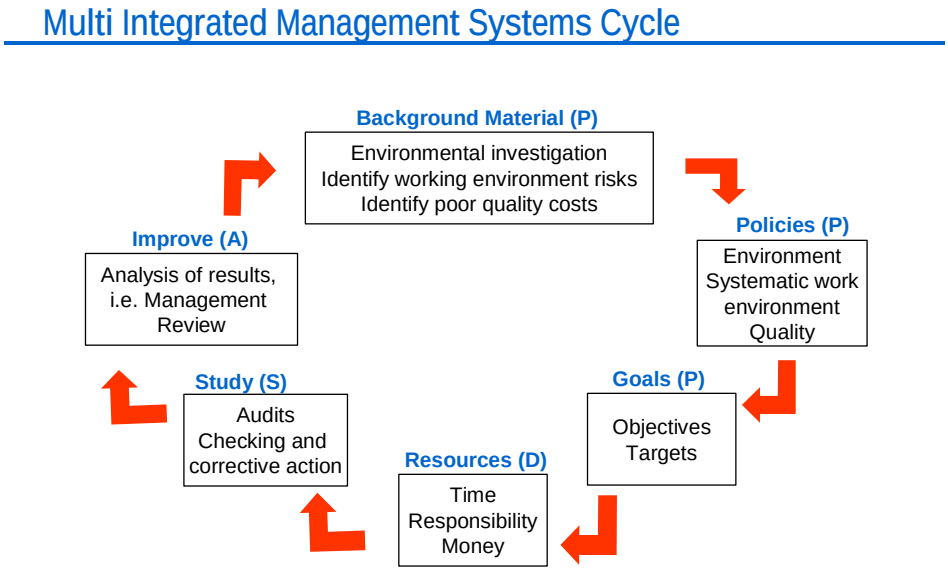


Figure 11. *The picture shows the PDSA-philosophy in a more detailed way that is a part of ever management system.*

The PDSA-philosophy (Plan, Do, Study/Check and Act, i.e. the Deming Wheel, Edwards W Deming) in a management system is showed clockwise above. It is the author's vision of a system. To make the system work properly, background work is fundamental, mainly related to environment and systematic work environment (environmental aspects and risk analysis). This must be done at every place where the organisation is represented. According to ISO 9001 it is not necessary to find costs due to poor quality, but it is an advantage if it is done. Based on these facts and core values an integrated policy or a policy for each area is written.

Based on this background work, even goals for each area are established. According to ISO 14001 there has to be a plan that shows how the goals shall be achieved. There also has to be two kinds of environmental goals, short-term and long-term goals. Since this structure has to be done concerning environmental goals it is easiest to do likewise with quality and systematic work environment. In order to fulfil the goals there has to be resources available which, is one of the things that are described in the plan for how to reach the environmental goals. Without resources practical possibilities to reach the goals are missing. These plans, often named programs, are checked during audits of ISO 14001.

The result from the audit is reviewed, by the company's management group, as a part of the review of the system (Management review). At this occasion is also discussed if any policy needs modification, new targets, what resources are needed to reach these goals,

next years audit-plan, etc. It is very important that this meeting is properly documented, since it is setting out the direction for the system for next year.

Some possibilities and advantages with integration are according to Persson (2006), free translation:

- All employees have one management system only, and an understanding that it is one company.
- It becomes obvious that management, employees, material and economic recourses and processes together form a system.
- Mission, policy and goals are coordinated and become known for all.
- The company take into consideration demands and wishes from owners, customers, suppliers, society and media.
- The way to lead the management system is based on company needs and not based on some extern rules.
- The company do not have several management systems, only one.
- There is only one system to maintain.
- More consideration is taken to economics and laws in an integrated system than would be the case in a management system for quality only.
- The risk for sub optimization in some part of the system decreases.
- It gives a more complete basis for decisions.
- The system can be expanded to fulfil extended demands.
- Standards are used mainly as sources for advice and ideas and secondary for certification purposes.
- It should be possible to limit the number of steering documents for the company.

Some world of advice from Persson (2006), a free translation is:

- Do not start with too many standards, start with the aspects that are most important, and expand the system later.
- There must be sufficient recourses available to perform the task.
- Involved must early be informed.

- Proper information and/or education should be prepared.
- Responsibility for questions concerning quality, security, etc must be established.
- It may become more difficult to focus on one aspect alone.
- Do not have too detailed steering documentation. Bureaucracy must be kept as low as possible, because of maintenance of the documents, etc.
- It may be a large step for the company if it already has a certified management system certified against one aspect.

3.2 WEB BASED SYSTEMS

The only systems studied in this thesis are (mainly) web-based. Procedures are then usually showed on an Intranet, i.e. a local Internet reachable for everyone within the company or organisation. Intranet however is a larger issue than an integrated management system. The system is only a part of the intranet most companies and organisations have. Advantages besides having everything on paper are obvious. The system becomes easier to reach and easier to keep updated. Having all pages correctly updated is very important. An alert person to run updates is necessary.

According to Johansson et al (2001) electronic documentation system in Scanias plant was very successful and made it easier to find information. The connection between different parts of the company also increased. Besides that it was also an instrument to make process analysis, and it also gave better focus to goals and finally it facilitates educating.

The above-mentioned study, Johansson et al (2001), also shows that updates were much faster with an electronic system. One company only used 20 % of the previous used time and the other company in the study claimed that it only took 15 minutes to make an update in the electronic management system. A disadvantage is that the rapid update process makes it easy to forget to inform employees about changes or that the information is given in such a way that it is not received and/or understood properly.

Disadvantages with web-based systems are that they require computers, access to the company intranet and users with experience. In many companies that is impossible conditions to fulfil. In many cases binders therefore are preferable.

3.3 DIFFERENCES BETWEEN THE STANDARDS

A large part of the literature studies have been standards. For an enumeration, see References/Standards, in the end of the thesis, where more than twenty standards are mentioned.

According to Woodside et al (1998) it should be noted that topic similarities should not be confused with similarities in substance. For instance the policy statement in ISO 9000 is a statement of intent, whereas in ISO 14001, it is a statement of commitment. In terms of document control, ISO 9000 is very prescriptive, whereas ISO 14001 is purposefully not. Control of test equipment in ISO 9000 is, likewise, very detailed, whereas the equivalent of this requirement in ISO 14001 – calibration of monitoring and measurement equipment – is very brief (one sentence) and very flexible, like some other standard-demands within specific areas described by Persson (2006).

3.4 THE CORE IN MIMS

When we are comparing the different standards ISO 14001 (14K), ISO 9001 (9K) and OHSAS 18001 (18K) we find a lot of similarities, i.e. the Core in Multi Integrated Management Systems. Those found by the author are:

- Policy Statement – 4.2 (14K and 18K) 5.3 (9K)
- Objectives - 4.3.3 (14K and 18K) 5.4.1 (9K)
- Resources, Roles, Responsibility and Authority – 4.4.1 (14K and 18K) 5.5.1 and 6.1 (9K)
- Documentation - 4.4.4 (14K and 18K) 4.2.1 (9K)
- Control of Documents – 4.4.5 (14K and 18K) 4.2.3 (9K)
- Control of Records – 4.5.3 (18K) 4.5.4 (14K) 4.2.4 (9K)
- Competence; Training and Awareness – 4.4.2 (14K) 6.2.2 (9K)
- Internal Audit – 4.5.4 (18K) 4.5.5 (14K) 8.2.2 (9K)
- Management Review – 4.6 (14K and 18K) 5.6 (9K).

This is proving one of the original reasons, the Standard Connection. (The others were the Natural Connection and that there is one place to find information.) This is the "Core in MIMS (Multi Integrated Management System)".

3.5 SOME EXPERIENCES AS CONSULTANT

The author has chosen to include some general lessons learned about management systems and change during the time as consultant within the area. Since this time occurred before the study it is a part of "Introduction" even though it might as well be "Result".

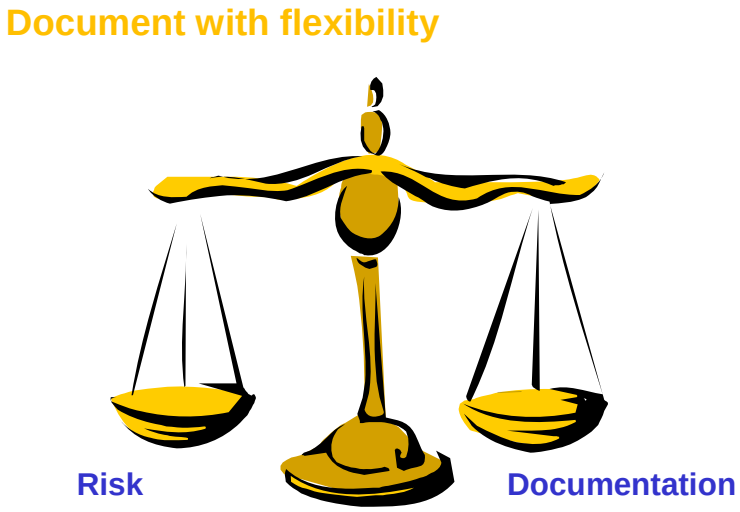


Figure 12.*More documentation is needed in areas where there is large risk. On the contrary, less risk demands less documentation. To focus on areas with large risks may also be used as an effective way to reduce the number of pages.*

One important change from ISO 9001:1996 to ISO 9001:2000 is that there are fewer shall-demands in the text, only six. The interpretation done by several companies are that all areas don't have to be that well described. Areas with low risk or experienced or well educated work force for instance. This is a similarity with systematic work environment when there is an even larger focus on areas with large risks.

To focus on areas with large risks may be used as an effective way to reduce the number of pages. However, electronic systems and search engines make the number of pages less important.

The important message with the figure above is that everything does not have to be that well described. But, it has to be well motivated why some parts are excluded.

3.5.1 STABLE PROCESSES ARE NEEDED TO MEASURE

During the initial process mapping it is only necessary to find out where to measure. It takes time to get results with trends that show results, at least two to three years.

The reason is that processes have to be stable before measurement is of any use. If observed in an oscilloscope, an unstable process will give a standing wave, or the system will "dive" (crash). Another way to describe it is that processes have to be standardised. If not

the same thing is measured the every time there is no point to measure at all, because then different things will be compared.

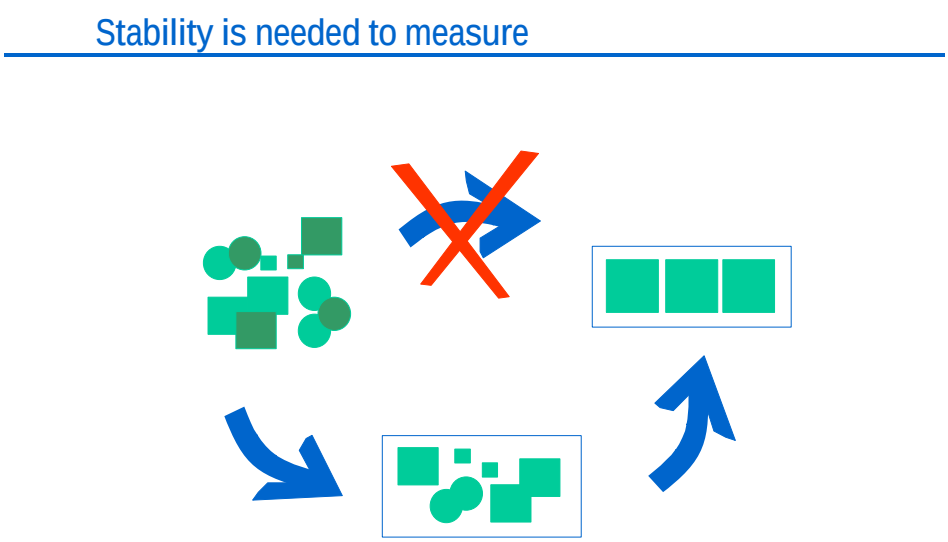


Figure 13. *A process has to be stable before it can be measured on. Unstable processes give unstable results.*

Another way to express figure 13 is:

What is not defined cannot be controlled, what is not controlled cannot be stabilized, what is not stabilized cannot be measured and what is not measured cannot be improved.

3.5.2 CHANGES MAY CAUSE TENSION

An understanding of resistance to changes starts, according to Juran (1999), with the realisation that every change actually involves two changes.

1. The intended change.
2. The social consequences of the intended change.

Therefore we must not forget that all types of changes may cause tension within an organisation. Those responsible for the change are certain about the fact that it is something leading to improvement and they are in a position where they can influence. They feel that this specific change is something positive.

On the other hand there are employees that have not been involved in the planning about this specific change, a change that influences their daily work in a negative way. By some-

one that, they feel, do not know anything about their present situation. They are afraid that this specific change may lead to something negative.

In the company there is now a tension between positive and negative, as shown if figure 14.

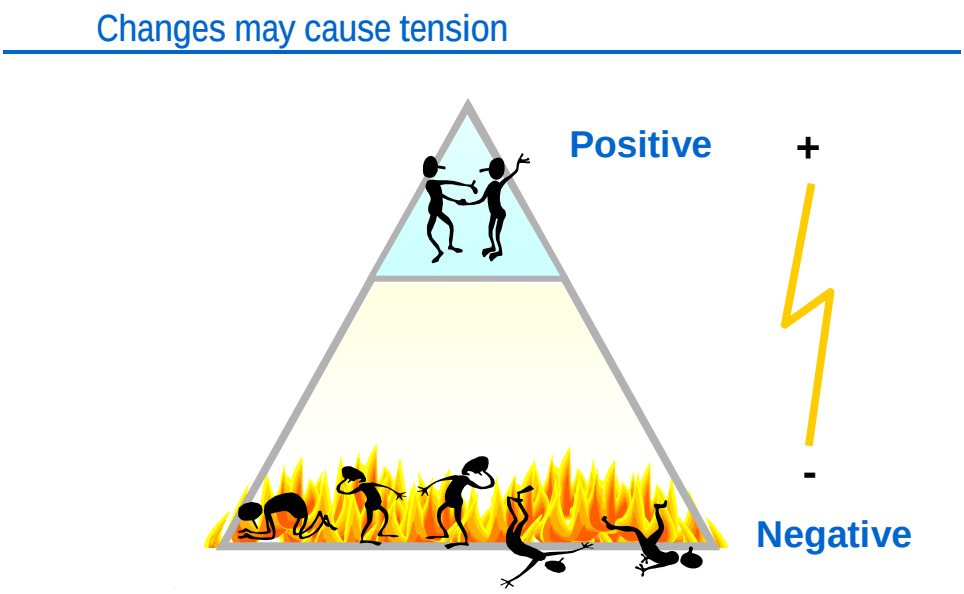


Figure 14. *For those leading a change or designing reorganization it is usually something positive. Those who are affected often think it is something negative. Together this is causing a tension between positive and negative.*

Seen from "the top of the pyramid" above, there are differences between how difficult it is to make employees accept a change. Approximately 20 percent will accept most changes another 20 percent will accept no changes at all. It is very tempting to try to convince employees who are very negative, but usually it is more efficient to try to convince the employees between those two groups, i.e. the 60 percent in the middle.

What persons should be focused on?

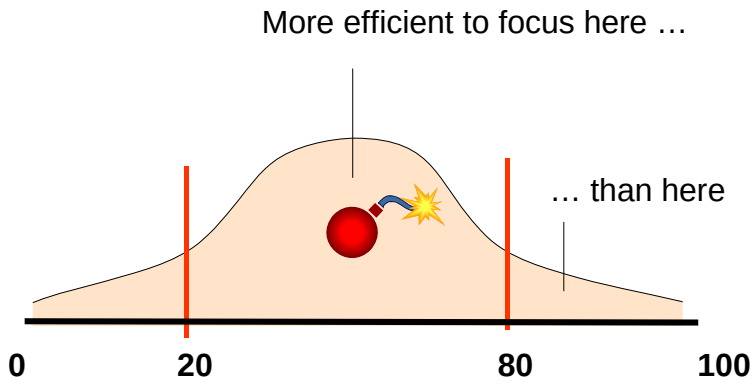


Figure 15. *Usually it is not worth the effort to convince extremely negative people in a group, but it can give an extremely strong supporter.*

4. RESULTS

4.1 VERTICAL INVESTIGATION – FINDINGS IN EACH COMPANY

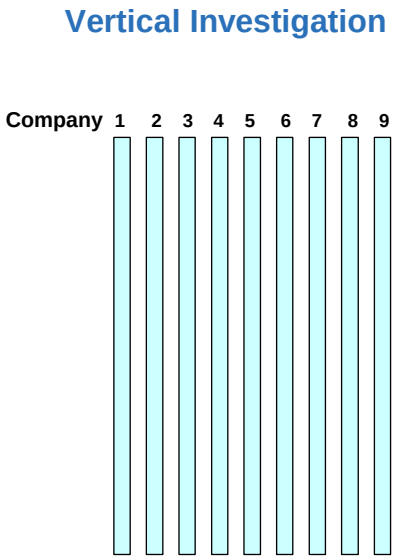


Figure 16. *Below, the findings and answers in each of the nine companies that have been examined are described. The companies are named A to I in order to avoid identification.*

4.1.1 COMPANY A

4.1.1.1 Description of the company

This is a global manufacturing company that has 185 employees at this specific plant. Worldwide the company has 59 plants in 14 countries and approximately 16,500 employees.

4.1.1.2 Type of Multi Integrated Management System

The system consists of approximately 900 small documents in two different parts. One part consists of quality documents and the other part of environment and systematic work

environment documents. The different parts are connected by a number of links. Two different persons are managing the different parts.

4.1.1.3 Certificates

The system is certified against ISO 9001, ISO 14000, EMAS and AFS 2001:1.

4.1.1.4 History about the system

The certification started with ISO 14001. In 1997 ISO 9002 was added (later upgraded to ISO 9001), and year 2000 systematic work environment.

One reason to implement may be that this is an American company and that it was part of a plan to avoid to be sued. A Management system is something necessary for all manufacturing companies and necessary to get quality and deliver the same thing continuously. It secures the personals health and secures that the plant is run properly. The environment part is necessary to secure that there are no bad consequences and pollution for the environment.

4.1.1.5 Responsibility

The person interviewed is Environmental manager and has only worked one month in the company. He is responsible for Environment and Systematic work environment. Another person is responsible for Quality.

There are networks for this type of questions within the company.

4.1.1.6 Processes, structure and content

The system is not process oriented. The part that deals with quality is partly process oriented, but the environment part has approximately the same structure as the standard.

The system does not contain any other types of information than text and OH-pictures.

4.1.1.7 Usability

It is possible to reach the system on the Internet. It is built up with Lotus Notes. Some routines are printed and placed in different places. The Quality manager is the only one allowed to do this to secure that no old versions are used. All original documents are in the system.

4.1.1.8 Strategy

Large documents are more of a problem than many small documents and therefore the system consists of many small documents instead of a few larger ones. There are links between different documents in order to take away documents that are the same. Each document is approximately one A4-page.

The plant has many demands to fulfil from higher levels of the company. There are constantly many things to report on concerning health, security, environment and production to the European Company Headquarter in Germany. The opinion is that this large focus is positive.

4.1.1.9 Business system and reorganisations

The company is on its way to implement SAP R/3 but the Environment Manager has had no contact with SAP. Therefore no integration is done.

No specific acts have been done to avoid consequences from reorganisations. They were working with consequences from the last reorganisation. Communication has to be adjusted because of this.

4.1.1.10 Audits

Audits are performed integrated but the standard for integrated audits (ISO 19011) is not used.

4.1.1.11 Costs

No figures were found. It is difficult to find out figures since the system is a part of the daily work.

4.1.1.12 Vision of optimal system

The dream system would be a graphic picture of the manufacturing plant, with all necessary documents on the right place. The users would just have to "click" on the right place to make necessary documents pop up.

4.1.1.13 Other findings

Continuous improvements are very difficult, but Company A has developed a function for this in Lotus Notes. The person in charge receives the suggestion as e-mail and then some kind of action must be taken. The key to make things work is simplicity.

(The Swedish military forces are also working with integrated management but they never go as far as certification.)

4.1.1.14 Current Situation 2008

In the beginning of 2008 a large process orientation project is run. Earlier processes were more like something between process and organisation oriented. This project, however, is not completed. The plan is that the project will be completed during 2008.

4.1.2 COMPANY B

4.1.2.1 Description of the company

The company has 6400 employees and this specific Business Unit (BU) has 400 employees from Ystad to Haparanda.

4.1.2.2 Type of Multi Integrated Management System

The core of the system is a thin handbook or manual. Besides that, there is one handbook for each process. This means that there are only two places to find information about the system. All information is to be found on the company intranet. Process owners are allowed to print out their process if there are specific reasons, and they also have the responsibility that the cover is updated.

The parts of the overall handbook are:

Organisation, Policy, To work with processes, To work with goals and action plans, To work against continuous improvement, Corrective actions, Document steering, Communication and Meeting structure, Laws and other demands, Audits and Risk analysis.

Some sub-processes are also described: Environment, Systematic work environment, Electric and traffic security.

The handbook is not following any specific standard; the ambition was to write so that all employees would understand. The need for documentation is changed in the quality standard, ISO 9000:2000. According to drafts new versions of ISO 14001 will be "similar". Companies with more than 10 employees have to document every aspect that is a risk. Some benefits are that education and introductions are working better. The company uses the system as a work of reference.

4.1.2.3 Certificates

The system is certified against ISO 9001, ISO 14000, AFS 2001:1, and besides that also electric and traffic security regulations. The BU has listed all environmental laws they have to follow and the list included more than 100 laws in 18 (!) pages. In total there are approximately 2-300 different kinds of regulations the BU has to follow.

4.1.2.4 History about the system

The original reason to create a system may have been an internal competition between different BA: s (Business Area) within the company and also an interested CEO. The recent CEO understands that this is something necessary. There were demands from customers, especially from foreign companies, that a certificate was essential even to submit an offer. If the press would find out that the company did not have this kind of "security"

there would be a lot of comments. Lots of the employees are working under dangerous conditions and security is very important for the company.

After some years the system consisted of 20 different covers that were linked together with a vague structure and it was difficult to follow. A new system is on its way to be implemented although the old system is still partly alive.

4.1.2.5 Responsibility

There are two persons sharing the responsibilities of the system. The person interviewed is responsible for Environment, Systematic environment work and Quality. The other person is responsible for the HR-process, i.e. responsible for wellness and engagement of the employees. To get resources for the work different "councils" have been established. Those serve as advisory boards for the top management, within the areas Quality, Environment, Security and IT. Normally the councils suggest a strategy for top management and also support with material. This strategy to involve employees from different levels of the company has worked out well. The main advantage was that people from the whole company were involved. Suggestions of suitable persons were collected from process owners.

The operational cycles for the councils are: collect, identify and make a priority list and thereafter decide strategy, goals and policy. Top management is then deciding the final strategy based on the material. The results of this are then spread to each process. The councils are also making one operational analysis each by the end of the year, which is showed to top management. It is a systematic approach that has worked out very well in this company.

The quality manager has the overall responsibility for the system. Besides that each process has its own responsibility. The slogan has been "Freedom with Responsibility!" The process owners have then delegated the responsibility between the employees. The question has been "what instructions you need?" The goal has been to make routines as close as possible to the business. Those who are performing the routines may return if they have questions and they have the right to change routines that are not working. There is also a control function within all processes.

4.1.2.6 Processes, structure and content

There is one core process: Product development.

Three main processes: Business, Entrepreneur and Workshop

Five support processes: HR, Purchase, Economy, Administration, IT and Business Development.

Environment, Quality and Systematic work environment are tasks. What that means is that Environment, Quality and Systematic work environment are a part of, and the ground for the processes. They have to be a part of the everyday work to make the processes work.

The system does not contain any other types of information than text and OH-pictures. The Quality Manager has helped another company to develop a system based on photographs. This is especially effective in companies where there are employees from many different cultures.

Before the new organisation there were staffs where all routines were formed. Now approximately 50 % of the original content has been removed. Areas where there are no security risks, high competence or routine, are described less carefully. The company is trying to reduce the number of words and instead write process maps. The reason is that they have found that one side covers approximately as much as eight written pages. The effect of this is that the system becomes smaller and "more user-friendly". Pictures are easier to use for educational purposes. The process mapping is made using Office so that everybody has access to the tool.

Company B only uses five different figures. A square for tasks, a diamond for choice or decision, a rectangular shape that means steering document, one figure for archive and one symbol for document or forms. A risk with a more complex way of describing processes is that no one will understand. There is also a rule, that if it is impossible to describe with the figures above, the process needs to be removed. Everything is mapped top-down. It is also considered what planning is needed for this process and how quality is secured. In every process the employees' experiences are used as a way of finding improvements.

A task force has been educated within each process and the reason is to document processes the same way all over the company. The quality manager's work is to help with education material. In practice the company is working more against Kaizen than ISO since the ambition is to establish a ground for continuous improvements. The quality manager never uses the word "standard" within the company.

4.1.2.7 Usability

The system is to be found on the plant's intranet. For the moment is it not possible to reach the system from the outside of the company. A solution for this is about to be installed, but they have not found that many alternatives on the market to this date.

4.1.2.8 Strategy

The most vital parts of the system are the strategies that Company B decided.

- Engagement and competence
- Competence
- Decisions made on facts.

If the strategies are working well, the whole system is functioning well.

4.1.2.9 Business system and reorganisations

Company B has no business system. The company has an ambition to implement a documentation system during 2005 and there is an assignment specification for this to be done.

Company B has just gone through a reorganisation. During the last 18 months new persons have become in charge of HR, IT and Quality. They all had to start with making their own process map and successively they can now use their ideas to improve the system. The most important things are input, activity and output. Input has to be discussed with the "delivery process" to make sure nothing is forgotten.

4.1.2.10 Costs

The costs for the system depend on what "price system" is used. It is difficult to estimate, but a company with approximately 50 employees should pay no more than 100 000 SEK for consultants. During implementation it is necessary to take in consideration the company prerequisites and what demands there are. What were the previous working methods like, and what needs are there at present? In a larger company there is a larger need for steering. If a standardised system is used the company often ends up with an expensive system that is not working.

In practice, the procedure is that a steering committee (larger company) or a task force (smaller company) is established. During the first meeting one paragraph is gone through and until the next meeting, half a day every third week, the company has to do homework about two or three other paragraphs. The next meeting starts by checking the result of the homework. The advantage is that the system becomes a company product instead of a consultant product. Lots of consultants often make sure that they get a steady income from the system, since they make sure they have a vital function in the it.

The time to build a system is 15-16 half days during 1-1.5 year with this method.

For company B cost for certification is the large cost of the system, approximately 75-100 000 SEK a year. Those who are working in the company with the system are 1.5 persons. Besides that there are education and internal audits.

The costs are something necessary to make the business work and develop smoothly. The impression is that purchase, service, maintenance and production have decreased during the last 20 years. For instance no "production employees" are educated now. An integrated system is a way to maintain the production and maintenance standards.

4.1.2.11 Vision of optimal system

The system has to be built on values and strategies and be a natural part of the daily work, i.e. the routines. Besides that it has to be accepted. If it is something that is perceived as something hard to work with it will die. Sometimes it is a better idea to tear everything down and start all over again instead of trying to fix something out of order.

4.1.2.12 Other findings

The interviewed person enumerated six other companies that are working with Integrated Management. According to the interviewed person there is no point in using rewards. Continuous improvements have to be a natural part of the daily work.

When making a system it is not a good way to start with deciding how many instructions have to be made. The important thing is to find a need for every page that is made.

Laws are something that rarely work properly within most management systems. For instance less than 5 % of the companies in Sweden are following systematic work environment laws, according to the quality manager. For most companies it is very difficult to find out what laws the company has to take in consideration. Lost of companies don't even find out that they are following the laws. The interviewed person is referring to a study that shows that there is no difference between certified and not certified companies. Most certified companies often stay with identification. Certification bodies haven't taken that role. Very few companies don't even know the name of the most known environment law, and that goes for large companies as well. The recommendation is to start with a few laws and find out what they mean. Another problem is that laws change relatively often. The service to give companies information about changes has recently started.

It would be helpful if there was a "forum" for companies where they could get advice, a forum where all companies were free to admit what they have done wrong, without consequences. If the company, for example, dug down a barrel ten years ago, they would not want to tell that to authorities today because of fear of negative consequences. Today it is way too bureaucratic to get help.

4.1.2.13 Current Situation 2008

The former Quality Manager has moved on to another company.

Industrial Division and Production have recently become one organisation due to a reorganisation in order, to become a more complete supplier. A consequence of this is that two, or actually four, management systems have to become one. This work is presently being performed. Mainly the new system will be based on Production's management system. Therefore there is no overall manual in the new system as there was three years ago, but the differences between the systems are not that big. Audits have already been integrated and also Management review. But concerning policies, etc some work still is necessary to do. However, there is an ambition to strive against more integration. Other areas are planning, document handling, non-conforming products and using the same auditors for both environment and quality and integrated audits.

The work flow is that the Environmental system is fetching documents from a system named Doc, where most documents are stored, environmental manual, general description of the system, routines, etc.

Concerning the system the main difference is that there is now a more distinct Management process. Handling of aspects concerning environment and quality are described in many of the sub processes, for example the routine "Polluted pulp when handling" is described during the offer, and when the task is performed.

The system is based on ISO 9001 and ISO 14001, but is not certified yet. Concerning Systematic work environment, AFS 2001:1, the interviewed person thinks it is strange that it is possible to become certified against a Swedish law, that all companies are supposed to follow!

Concerning laws the system has all laws in one place. Laws are usually difficult to submit in a proper way. They are usually extremely large documents, difficult to handle efficiently.

The system is difficult to reach outside of access to the intranet. Therefore in machines etc there are folders. Besides the described system there is also a digital project-handling folder, and the economy system Agresso.

4.1.3 COMPANY C

4.1.3.1 Description of the company

The company has 1200 employees and 5 Business Areas in 12 countries.

4.1.3.2 Type of Multi Integrated Management System

The core of the system is a framework, a manual, where paragraphs similar in different standards are collected. The manual is the core of the system, figure 17. The framework can fulfil demands from almost every standard, by adding small pieces for a specific purpose into it, as shown in figure 18. The approach uses the fact that there are similarities between different standards. Several different sources claim this to be one of the best systems in all of Sweden.

It is difficult to find out the exact amount of pages in the system, but the manual is divided in 15 different parts, and the Environment part is divided in 20 different parts.

4.1.3.3 Certificates

The system is certified against ISO 9001, ISO 14000, QS 9000, "Säkra papper" (bank), GMP (medicine), EMV (cards) and soon ISO 17799 (information security). The reason for not being certified against AFS 2001:1 is that they think it is a part of ISO 14001. In the beginning of 2008 the number of certificates are 10 (!).

4.1.3.4 History about the system

The certification started with ISO 9001 in 1993 and then continued with systematic work environment. Reasons for the work were customer and management demands. Those working with Marketing saw the need for Environment certification and supported that work. The market is faster now and there is no time for "adjustments", instead products have to function immediately therefore quality is very important. This "Matrix" gives acceptance for the system from different parts of the company, and a stronger acceptance than it would have been for several different systems.

4.1.3.5 Responsibility

The person interviewed has Environmental education and started within the company with a final degree work 1994 and is now responsible for all, above-mentioned, disciplines and also Ethics. In the company there is one responsible person for this in each country. There are several networks between people in different countries working within the same area. There has to be someone responsible in each country that gets, and distributes information. In total there are 20 persons responsible to run the system.

They have annual meetings and usually similar problems. When a problem is identified it is usually easy to find proper education for the employees involved in this specific process.

The Nordic countries have meetings several times each year for "internal bench-marking". An example of question dealt with is how to perform a Management review according to ISO 19011.

4.1.3.6 Processes, structure and content

The system consists of three to seven different main processes depending on Business area. The framework, i.e. the manual is the most important part of the system. It only has seven different headings.

Those are:

1. Preface
   - Scope
   - Definitions

2. Structure and building-up
   - Document Management
   - Processes and symbols

3. Policy
   - Policy for Sustainable Development
   - Policy for Ethics and Morals
   - Policy for Information Security
   - Policy for Information system
   - Policy for External Information
   - Policy for Purchasing

4. Management processes
   - Organization
   - Business concept, targets and strategy process
   - Customer requirements
   - Legislation and other requirements
   - Continual improvement
   - Information/communication
   - Management review

5. Main processes

6. Support processes/functions
   - Human Resources
   - Quality
   - Environment
   - Risk management
   - IT and infrastructure
   - Procurement
   - Finance
   - Project Management
   - Information

7. Measurement, analysis and improvement
   - Audits
   - Complaint handling
   - Internal deviations
   - Continual improvements inclusive tools

Figure 17.*The content of company C: s manual. The system is built up around the manual and the system is certified against ten (10!) different standards.*

4.1.3.7 Usability

Not every part of the system is on the Intranet, lots of the material is still only available on paper. The reason is that their belief is that different medias have to be used according to how familiar different employees are with computers. Another reason for this is that new versions give a very important dialog about the system. Communication, dialog and to talk about the system is very important to make it run smoothly and for it to get accepted by the employees faster.

4.1.3.8 Strategy

The strategy when developing the system has been to keep it simple and reduce the number of documents. Things that are the same should only be found in one place. Company C likes 9001:2000 since it gives the opportunity to reduce the number of pages and instead educate employees. Their way of dealing with this is that they have more documentation in departments where more employees are new.

According to the interviewed person a Management System has to be simple and it is very important to get commitment. Therefore, it is important with committed ambassadors who have respect from management or are a part of management themselves.

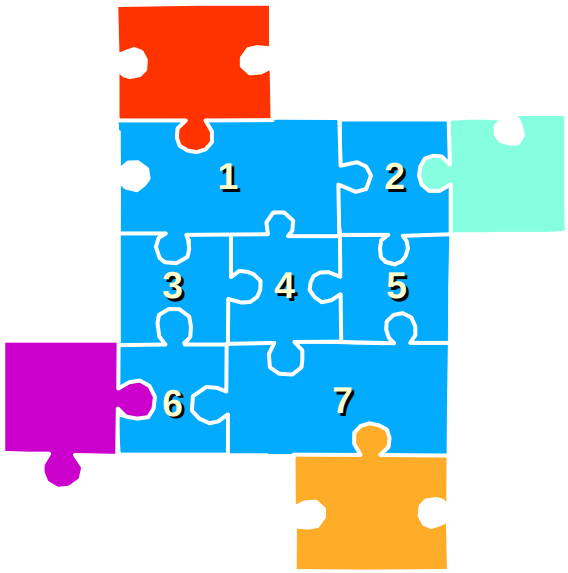


Figure 18. *The manual is consisting of seven paragraphs that are fulfilling demands in different standards by adding pieces for specific purposes. This framework reduces the number of pages within the system.*

4.1.3.9 Business system and reorganisations

Company C has a business system. They are the only company in this survey that uses Movex from Intentia. The system is not yet integrated with the Business system. However some routines only exist in Movex.

They have had several reorganisations, but since the processes are developed from the Mission, the system has not been changed due to reorganisations.

4.1.3.10 Audits

Group leaders and safety controllers do the audits together. The company has several persons trained to perform internal audits. Usually, people are used from the process before and after. One important observation is that the interactions between different processes have begun to work properly, which is one of the most vital things to make the system work well.

Earlier different audits have been "disturbing" the organisation due to different audits because of different purposes and different certificates. This also resulted in several different "action plans" due to different purposes. Now there are only two types of audits: Audits and "Internal controls".

When performing audits teams are put together from different parts of the company and these are allowed to "take some time". These teams consist of one person from each area the audit will cover. Besides that Internal controls are performed four times a year.

A trend is that more and more laws and regulations demand the company to do Internal controls for different purposes. Therefore environment authorities were invited to the last ISO 14001 audit to minimise the disturbing of the organisation. Instead of two audits only one was necessary.

4.1.3.11 Costs

No figures about costs of the system were found. Every part of the development has been seen as a separate project and has had to carry it own costs. The opinion is that lack of a system would be more costly, due to cost of lack of quality etc.

4.1.3.12 Vision of optimal system

An own specific workspace for each employee linked to necessary processes for each person.

As a start, Company C has initiated a project to integrate their Movex business-system with their Manual.

4.1.3.13 Current Situation 2008

The former manager is now working in another position. Implementations during 2006 are: Work with an integrated operational system that will continue during 2006, the employee survey, **"**A Great Place to Work**"** will be implemented, and health and attendance will continue to be followed up. Implementing new measurements of the Satisfied Customer Index to strengthen customer follow-up. "Graphic driving licence" for employees in customer centres will also be carried out.

The Swiss Branch of the company is to be certified in accordance with PS 9000. Operations in Germany and Åstorp will change over to the ISO/TS 16949 standard during 2006. Work based on Lean Manufacturing will continue. Internal auditors are to be trained to carry out value-creating run-throughs. Surveys of environmental returns and pack aging waste continue. Respect Forum, the intention is that transport shall be carried out in as cost-effective a way as possible with reference to the environment, social aspects and work efficiency. Different types of training according to the above mentioned.

4.1.4 COMPANY D

4.1.4.1 Description of the company

Company D is a manufacturing company with 25-30000 employees worldwide, and 7-8000 in Sweden. At this specific plant there are 130 employees.

4.1.4.2 Type of Multi Integrated Management System

The system is web based and centred on an opening overall process chart.

4.1.4.3 Certificates

The system is certified against ISO 9001, ISO 14000, and AFS 2001:1. Besides that even something called "FSE-certificate", a specific certificate for this kind of industry.

4.1.4.4 History about the system

According to the Quality Manager, the certification started with ISO 9001 in 1996 and then the decision was taken to continue with Environment and Systematic work environment in 1999. It took 1 to 1.5 year, but this time was necessary in order to get acceptance from employees.

The motives for the Management System were to get a better internal control and structure. The company is "better" with a certificate. They need something that is "pushing", the business forward. Another reason was to get a more structured way of working. Environment is more in focus than quality.

4.1.4.5 Responsibility

The interviewed person has worked within the company for a long time in different positions and is now Quality Manager. All changes are going through him and he has an own "development webpage" where he makes all changes, which then are copied to the company's Intranet. The Quality manager is running the system. Most questions are also addressed to the Production Manager who is responsible for the production running smoothly.

4.1.4.6 Processes, structure and content

The system is centred on an opening overall process chart. Besides that, there are general guidelines, i.e. rules that are the same for everybody. For instance how employees should park cars, etc.

The system consists of 2-300 different routines in four different systems. No actions have been taken to reduce the number of pages.

The system does not contain any other types of information than text and OH-pictures.

4.1.4.7 Usability

Every part of the system is available on the Intranet, and the main reason is that it is up to date all the time. No paper copies are generally allowed, but still there are some at different places.

It is possible to view the system as long as there is contact with the Internet; however it is necessary to have contact with Company D: s Intranet.

4.1.4.8 Business system and reorganisations

Company D uses SAP R/3 as their business system. But the Quality manager has no contact with the system. The business system is not integrated with the management system.

No specific actions are taken to "insulate" the system against reorganisations.

4.1.4.9 Audits

The latest version of the system is burned onto a CD during audits. It is distributed to auditors during audits. Different companies are used for certifications within the company. This unit is using Semco/Decra, and other units use DNV.

4.1.4.10 Costs

The cost to develop the system is approximately 250 000 SEK, spent on consultants and literature. Besides this there is a 50-65 000 SEK each year running cost. This cost is the same as one lager reclaim.

4.1.4.11 Vision of optimal system

The Quality manager is satisfied with the structure they have today, but he would like to remove 75 % of the text. It would be enough with simple guidelines. But then it would be necessary with a lot more internal communication within the company and everybody have to see each other as "customers".

4.1.4.12 Other findings

A reclaim handled correctly can turn a negative experience for the customer into a positive one.

4.1.4.13 Current Situation 2008

The former Manager is now retired.

A project to develop a more simple structure is going on right now, and will give an up to date system constructed by a cross functional team. The goal is that the project shall be finished during the spring 2008.

4.1.5 COMPANY E

4.1.5.1 Description of the company

Company E is a global and producing company, among the largest in the world in its specific area. The company has 43 000 employees worldwide, and in this specific plant 730 employees.

4.1.5.2 Type of Multi Integrated Management System

The system is based on processes, and especially the management part has been thoroughly examined and documented. The number of pages is approximately 1500-2000 because large parts of the system are from the time when everything had to be documented. Company E has the only integrated policy found among the examined companies. The operations manual is based on the criteria in the Malcolm Baldrige Award, results excluded.

4.1.5.3 Certificates

The system is certified against ISO 9001 (as early as 1989), ISO 14000, and EMAS and will soon be certified against OHSAS 18001. They are working on having employees who are "long time healthy" and the Swedish King has been there to find out how they are trying to achieve this.

During this year the company has begun to reduce the number of certificates when several plants have to "share" certificate. This is done in many places all over the world. However, this is only done at a local level. No larger grip for the whole company has been taken.

4.1.5.4 History about the system

The certification started with ISO 9001 as early as 1989, and then continued with environment. The company has worked a lot with the "soft" parts during the last 15 years. Soon, the company will also be certified against OHSAS 18001. The OHSAS parts took two years too implement, and then they thought they had a well functioning system when they started.

The largest market for Company E in the end of the 80s was UK. The original reason for the work was customer demands. After a while they discovered that structure was improving their performance. The standards of today are better reflecting the benefit for the company. ISO 9001:2000 is for instance more similar to USK (The Swedish Excellence Award). The company is also working with the Malcolm Baldrige Award to make it easier to compare results all over the world.

4.1.5.5 Responsibility

The company has just made a reorganisation within this area. There are three different departments. Environment, Systematic Work Environment and Fire, etc are now called Environment and Safety. There is another department called Development and then there is TQM, which is thought to be "a hub to boost" changes. In total 12.5 FTE (Full time employees) are working within this area. Examples of what the TQM department is handling are internal audits, mini diagnoses, goals and strategies, improvement of management system, continuous improvements, excellence models and external audits.

4.1.5.6 Processes, structure and content

The system is based on a main process, sub-processes and tasks. By integrating they are avoiding "parallel worlds". They have a system, which consists of, and can handle all steering documents. All employees can read everything and it is possible to link documents to different processes. A local consultant constructs this by using Visio and Office.

In the organisation there is a "spread document responsibility". By that is meant that those who are working within a specific area also are the owners of documentation within that area.

The system does not contain any other types of information than text and OH-pictures.

4.1.5.7 Usability

Now there are no files. Everything of the system is, since spring 2003, on the Intranet. Everyone has access, but most employees are only allowed to read and not edit or submit their own routines or processes.

4.1.5.8 Strategy

The main office demands each plant to work with TQM and integration. The strategy is one business and one management system.

The key-factors to success are commitment and participation among all employees.

Company E has five important values on which the management system is resting. To communicate them easier they are visualised and given names, presented below:

Kurt Customer focus

Presley Present results

Ann Responsibility (Ansvar)

Adam Humans in centre

F.U. Ture Future focus

4.1.5.9 Business system and reorganisations

Company E has no business system, they have many small specific systems instead. One business system, which covers the whole company, would be a step back. There is one unit with SAP as a test in one of the Nordic countries. They have recently implemented an "overall delivery system". When implementing a new system all figures from the old system disappears and measuring has to start all over again. However, the ambition is to implement a common platform for the whole organisation.

Reorganisations usually do not have that much influence. What is needed are new organisation and new roles. The main process is the same.

4.1.5.10 Audits

One large cost is audits, se below.

4.1.5.11 Costs

No figures about costs of the system where found, but "It's not for free." Costs can be divided in extern audits and support of the electronic system.

4.1.5.12 Vision of optimal system

It would be helpful if it was possible to see the whole criteria text and describe it at the same time. Besides that to directly see what routines, which are linked together and answers to a specific question, and to see actual results and be able to get information about trends. This would give useful information to management, what is linked together, etc. These things are difficult to visualise in text.

4.1.5.13 Other findings

The company has the only integrated policy found among the companies examined in this study.

Their "Integrated Operations Policy" is shown (see next page). It is the only company in the study with an Integrated Policy.

4.1.5.14 Current Situation 2008

The company is certified against more standards today. FSC, PEFC, SS 627750 and ISO 22000 have been added. Year 2005 the company won USK and became best unit within the Business Group. Year 2006 the company also was a finalist for the EFQM-award. The company has developed audits with the certification body (DNV) to cower main parts of the award-areas. This gives more focus on business.

"Company E shall be leading producer of … on a global market. Our operation will be transparent and holistic, in harmony with our holistic values.

Customer focus: We will always deliver the right quality in our products and services when it comes to evaluating our operation, and customer satisfaction is what counts. Our products shall always fulfil current product safety legislation.

Performance: We will achieve a good level of profitability to guarantee our future and to create shareholder value by working towards the high goals we have set in line with our strategy.

Responsibility: We will live up to our principle of sustainable development throughout our operation. We meet or beat the limits and requirements made in legislation. We work proactively to reduce hazardous emissions to air and water, landfill deposits, noise and odour, to ensure safe handling of chemicals and to minimize transport. We shall make optimum use of raw materials and energy.

Emphasis on people: Our employees are our prime resource and motivated people create success. We work actively to prevent and reduce any risks in our working environments. We build on the factors that lead to committed, motivated and satisfied co-workers.

Focus on future: We focus on the future and know that continuous improvements will get us there. We take the first step."

Company E
Mr Boss
President

4.1.6 COMPANY F

4.1.6.1 Description of the company

The company has 110 000 employees in 100 countries. The business area has 1500 and this specific unit has 300 employees, and can be described as a software company.

4.1.6.2 Type of Multi Integrated Management System

The core in the system is the delivery process. All other processes are small, but the delivery process is complex and also includes and covers production. The system consists of approximately 100 different document titles consisting of instructions and technical decisions. The different groups of documents are:

- Organisation and resources
- Management responsibility
- Measurement, analysis and improvement
- Main processes (Development, Sale, Delivery)
- Sub processes.

The delivery process can last as long as 2-3 years. There is a tool for delivery in Excel.

The routine describing the process is used during the delivery and is archived with documentation from the project. Besides that there are "skeletons" adapted to the project. The skeletons save a lot of time during the project. They are a "company group-tool" and are identical all over the world. Some of the skeletons are: documentation plan, communication plan and quality plan. It is only needed to fill in actual production data and 80-90 percent of the contents in the documents are ready and can be recycled. The skeletons are also installed on all company laptops hard drives.

4.1.6.3 Certificates

The system is certified against ISO 9001 and ISO 14001. During 2004 OHSAS 18001 will be integrated.

4.1.6.4 History about the system

The core of the system was constructed as early as 1993. Reorganisations added new management systems to the original and during one period of time there were as many as 8 different systems within one specific business area. After a reorganisation, two units tried to integrate their two different systems for tree years before they understood that it was impossible and decided to split up the different systems.

The reasons to be certified are that it is a group decision, and often it is necessary to do business. Company F was selling to state institutions all over the world and offers were analysed by consultants and often a certificate was a necessary "entrance ticket".

4.1.6.5 Responsibility

Company F has no separate organisations for environment and quality. One reason is that there is not that much to do concerning environment. The company is a software company and consists of lots of offices. The important environment aspects are at other plants. Therefore there are 1.5 persons running the system. The work with the system is mainly to be aware of changes of deliveries and customer demands and changes due to reorganisations.

From the company headquarter nothing is required to make the system run. There are some global process maps and other areas sales and marketing. Even for project management there are descriptions, excel tools, process maps and detailed tasks. There were also skeletons and a checklist describing 17 steps of project management. The whole group had to follow this checklist, but now other adaptations are allowed.

4.1.6.6 Processes, structure and content

Processes, see "Type of system".

According to company F the most vital parts of the system are:

1. Policy, management has to decide what quality is, etc.

2. Every organisation has a defined mission. How the organisation shall be structured with roles, etc to make sure the organisation has enough competence for this mission.

3. Main processes, i.e. how does the company earn money? Beside main processes, there are a lot of sub-processes and activities to support those main processes.

The system is based on the fact that every manager has a responsibility that is defined. This has to be defined again during reorganisations, therefore descriptions of what to do have to be made for everybody. Method of doing this in a simple way is described. (It is a table and based on this processes are mapped.)

Originally, the system consisted of four thick covers. When the two companies would become one, it resulted in eight thick covers with instructions. Then actions where taken to reduce the number of instructions. When computers became more common, the content was restructured to fit computer screens. The goal was to show as much as possible on the screen. By using process descriptions, the number of pages could be reduced from 15 to 1. Instructions are supposed to support, not to exactly describe how the work should be done. In ISO 9001:2000 there are only six routines that shall be documented.

In Company F there are two types of process mapping, Word-documents and pictures. The unit is only doing simple process mappings. Most processes are documented this way.

Input	Pos	Activity	Output	Support	Executed by

Figure 19. *An example of the content in a basic process mapping is shown above.*

In the delivery process there are also skeletons where what is done within the project can be marked out. This works as a quality record for the project.

The system does not contain any other types of information than text and OH-pictures. According to the interviewed person these types of descriptions are working better in producing companies.

4.1.6.7 Usability

There is a homepage and a Notes database. The database is mostly used for administrative purposes, audits, etc. It is possible to reach the management system through the Notes database. There is also another database, Customer Complaint Resolution Process, easily reached by all employees and one for internal audits. Customer Support Centre also has one to take care of service and make sure customer complaints are taken care of correctly.

4.1.6.8 Business system and reorganisations

The system is linked with SAP R/3, and R/3 is a part of the processes. SAP support with forms that shall be filled in, etc. This is the only link.

The company has recently gone through a reorganisation, but there was not much needed to do due to this reorganisation. All that was needed was an extra audit.

In practice a system is placed above other systems. The business area consists of seven units, and each unit has it own management system. The "business area system" decides the frames, i.e. policies, description of the system, identification number system, authorities and responsibilities, security, export regulations, etc.

Within the business unit units the system consists of the business area system, and its own "unit instructions".

4.1.6.9 Audits

There are some second part certifications, but less visits now than before. Some customers, however, certify suppliers according to quality and environment aspects approximately every third year. Customers visiting their suppliers are less frequent than earlier. Usually it is nuclear companies with special quality demands that visit the company. There is a business manual that describes the system, which is sent to customers so they will understand how Company Fs management system is working.

Internal audits are performed every second month and the process is as follows.

Input: Calendar

Task: Plan for next audit

Output: Document

Executed by: Quality manager

Plan audit until ready.

4.1.6.10 Costs

No figures about costs of the system were found. Every part of the development has been seen as a separate project and has to carry its own costs. The opinion is that lack of the system would be even more costly, due to cost of lack of quality, etc.

Reorganisations make it impossible to find the correct figures. Systems are "recycled", and the old system is used in the new company with rather small changes.

4.1.6.11 Vision of optimal system

The company has such a system but more engagement is needed. Things have to be demanded from the system in order to make the function excellent. Beside this, it is necessary to be able to measure results. With excellent processes it would be possible to measure and find the right way, how to be more efficient, etc,

According to the interviewed person it is difficult to make people read instructions and therefore the system has to be more "interactive".

To summarise, engagement is the most important factor. Changes have to be possible to be made in less than an hour.

4.1.6.12 Other findings

According to Company F all large companies are working with integrated management (and 10 examples were given). Not all of these can be found in the Yellow Pages, since there is a cost of 10 000 SEK to be there.

The most difficult part of the work is to implement the system and it is easier to implement in large projects than in small. Besides that there are differences in different parts of the organisation. At the latest audit the company got three "remarks", and it has been approved of all customers. The quality manager think implementation is approximately seven out of ten. He doesn't understand how the company would function without the system. Besides that this is a demand within the group, and if they don't have certificates anymore they also have to tell customers.

4.1.6.13 Current situation 2008

The former company no longer exists and the former Manager is retired. The company has been divided into four sub units – Network Management, Power Generation, Substations and Substations Automation.

Yearly audits are performed to assure the company's certificate and compliance with ISO standards. Company F is SOX-compliant and has through this process developed its processes and introduced a vast number of internal controls and audits. This has further strengthened the control of the company's processes. Internal, group audits have increased to assure that the group has efficient and reliable sub-units. Internal group audits cover all Business Processes including Sustainability and Health & Safety. These audits are performed yearly up to every third year. SOX-audits are performed several times a year.

The company has introduced a company wide program for operations development. This has strengthened the vertical and horizontal communication as every employee is invited to co-manage the company. 5% of the total working hours are spent on operations development. It has a direct impact on the Management System, which content is constantly adjusted as the processes and working routines are developed. The company's strategic targets and development focus is well known by more or less all employees.

4.1.7 COMPANY G

4.1.7.1 Description of the company

The company has 40 000 employees, this part has only approximately 100 employees but is the formal owner of large parts of the assets of the company.

4.1.7.2 Type of Multi Integrated Management System

The structure of the system seems to be taken from a traditional Quality handbook, i.e. a "binder-approach" transformed from the time before Internet. However the company has used the possibilities with Internet-navigation in an interesting way. Starting from a HTML-page the user start to find the current geographic part of the company and then it is possible to find current manufacturing plant. When identified, the correct table of contents of the manual for that particular manufacturing plant pops up. That is basically the same manual for all manufacturing plants but with different emergency procedure, with different emergency exits, etc. The construction makes a system, which is using the fact that there are not that large differences between manuals for different manufacturing plants. This makes an own specific system for each plant despite the fact that 95% of the material is the same in all manuals.

4.1.7.3 Certificates

The system is certified against ISO 9001, ISO 14000 and AFS 2001:1.

4.1.7.4 History about the system

This system named KAM-system was the first system certified against AFS 1996:6, ISO 14001, and the then new ISO 9001:2000 in Sweden in the beginning of 2001. The company has a strong history concerning systematic work environment.

4.1.7.5 Responsibility

One person is responsible for all three disciplines.

4.1.7.6 Usability

The system is on the company Intranet, and therefore possible to use even when employees are travelling.

4.1.7.7 Strategy

The strategy when developing the system has been to keep the structure from the quality manual that all employees are familiar with and to use this structure on the intranet. Another strategy has been to make a specific manual for each plant in the company. The core

of the system is that only systematic work environment, i.e. emergency exits are different in different plants.

4.1.7.8 Business system and reorganisations

Company G has SAP R/3 as business system. The integration consists of parts of the processes. The two actual processes are Purchase and soon also Assessment. The integration however is only within the document structure.

4.1.7.9 Audits

An external company within the same group is also doing internal audits. The team consists of one specialist from each discipline.

4.1.7.10 Costs

No figures about costs of the system where found. Every part of the development has been seen as a separate project that has to carry it own costs.

4.1.7.11 Vision of optimal system

An optimal system of course has to be web-based. The recent business system can never get an acceptable usability and can never take this place. The problem within the group is that we make too large solutions. As document system the company group, for instance, use Documentum, cheap for the group per user, but in reality used by very few and therefore expensive.

4.1.7.12 Current Situation 2008

The company has expanded Environmental documentation for each station through an "Environment Book". Environment and Systematic work environment risks have been identified for all stations (projects called MOR and AMOR). A portal is constructed outside the company firewalls and in this portal there are links to documents in the certified management system for suppliers.

An education to secure similar workflow for "Systematic work environment follow up rounds" in the whole company has been made.

Cross-functional improvement teams have been established. They are focusing on parts of the standard specific focus areas. A special "toolbox", that has Excel sheets for follow-ups and presentations, has been developed for this work.

4.1.8 COMPANY H

4.1.8.1 Description of the company

The company has 650 employees in 8 Business Areas.

4.1.8.2 Type of Multi Integrated Management System

The system is built up like the Deming Cycle, around plan, do, study, and act.

4.1.8.3 Certificates

The system is certified against ISO 9001, ISO 14000 and AFS 2001:1. Besides that also Trans Q, a specific certificate against specific customers.

4.1.8.4 History about the system

The certification started with ISO 9001 in 1995 and then they continued with environment 1997. Systematic work environment is from 2001. The reason for certification was customer demands. But the company would have had the system anyway.

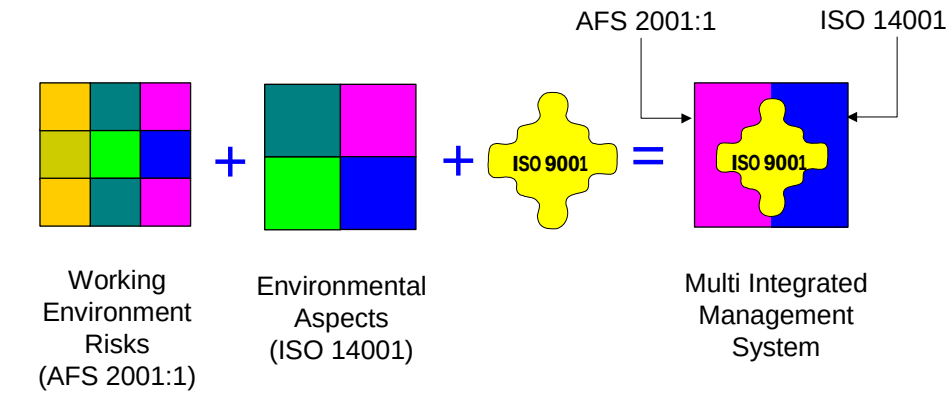


Figure 20.*The Multi Integrated Management System is built around an original ISO 9001-system. The most important Systematic work environment risks and Environmental aspects are included in the system. It has been built up and developed during seven years and during this time gone from covers to the company Intranet.*

4.1.8.5 Responsibility

There is one system and one person is running the system, but there are different specialists with responsibility for each part of the system.

4.1.8.6 Processes, structure and content

The system is process oriented and consists of a small number of instructions, all together approximately 300 pages. Initially, the size of the system was reduced, but now it has a tendency of growing again. The structure of the system is designed to be as user friendly as possible and therefore the need of reading the instructions is limited. The processes of the company are documented and process owners are appointed for each main process

4.1.8.7 Usability

Everything in the system is available on the company Intranet and therefore also available on the Internet to all employees.

4.1.8.8 Strategy

The strategy is to create a system that saves administrative time for those working in the company. That gives them time focus on issues that create value for the company.

4.1.8.9 Business system and reorganisations

Company H has an internally developed business system, and the management system is integrated with this system. A result of this is that offers, etc will be able to receive the correct address direct. The company can also follow up on goals directly in the system. It is possible to se how much is currently offered to different customers, etc.

The system is built up in such a way that changes in the organization do not call for revision of the system except for the text in the instructions.

4.1.8.10 Audits

The company has several persons trained to perform internal audits. Since the company is selling this service this is no large problem.

4.1.8.11 Costs

The system is generating money for the company. An example of this is that the system saves one hour each time an offer is made. The company makes usually between 1000 to 1500 offers each year, with a low figure as 500 savings becomes: 500 hours less, multiplied with 500 SEK each hour gives a total saving of 250 000 SEK per year! And there are more examples of savings.

4.1.8.12 Vision of optimal system

According to the Quality Manager the system is rather close to the optimal system. The implementation of the system needs to be better.

4.1.8.13 Other findings

Six other companies working with Integrated Management were mentioned.

4.1.8.14 Current situation 2008

A new updated, and renamed version of the management system was presented in October 2007.

A consultant has been responsible for the work, since the quality manager is now retiring. Process descriptions, logbooks, model for management and a database have all been revised. Besides that, a structure to identify problems with tasks and processes, with two levels of responsible persons has been implemented. A new start page for the company Intranet has also been created.

A folder to present the work was also available when the new version was presented.

4.1.9 COMPANY I

4.1.9.1 Background

The management system in company I covers Quality Management, Environmental Management and Health and Safety Management.

The group is oriented towards the EFQM Model (European Foundation for Quality Management) and takes into account the requirements of International standards ISO 9001, ISO/TS 16949 and ISO 14001; E co-Management and Audit Scheme (EMAS); acknowledged workers protection management rules (depending on location: OHRIS = Occupational Health and Risk Management System or British Standard BS 8800).

Company I has ISO 9002:1994 and ISO 14001:1998, and ISO 9001:2000. The Quality Management System is based on TS 16949 (Automotive version of ISO 9001) but they have no plans to go forward to certification.

The reasons to implement a system were:

1. It was a group requirement
2. "The company does not simply wish to fulfil the demands made of us by customers, employees, shareholders and ultimately society itself in terms of quality. They in fact set out to generate enthusiasm for our company and its products in all we do. This implies that products, support services, the image of the brands and the company are judged by customers, employees and partners to be outstanding. They only achieve this corporate quality by means of the appropriate quality of processes – the effective, efficient and sustainable design and implementation of all processes within the company. This includes work protection for employees and the protection of the natural environment."

The history of the system is briefly: The last-but-one iteration of the Group 'Quality' Manual in 2001 integrated the separate systems. Procedures are now being revised due to convergence across all plants in our division. This opportunity was taken whilst switching to a Matrix-Certification, i.e. certification of the division jointly rather than on a plant-by-plant and standard-by-standard basis.

The numbers of employees are:

- 700 in the investigated plant
- 5000 in the division
- 100 000 in the group.

Do you have different organisations for Environment, Health and Quality?

Different departments are responsible (e.g. for both ensuring implementation and audit), however this is converging, as it is becoming part of the EFQM assessment cycle.

The number of persons running the system is approximately three people fulltime covering documentation control, audits and follow-up, although there is a bigger team trained for EFQM assessment.

4.1.9.2 Usability

The system is available on the company intranet.

Is it possible to reach the system outside the company, if dial-in access is granted, and it is possible to view at the system from Sweden from a subsidiary that has access to our Intranet or if dial-in access is granted to the particular user.

All the employees are definitely required to use the system. This does not mean they need to always have access to the Intranet system. They have interpreted 'using' the system as following directives, i.e. working to process, being trained, etc.

4.1.9.3 Structure and Content

The system is based on processes. Key processes are defined within the division, based on the Quality Manual that is based on the EFQM model. Company I thinks the policies are its cornerstones, but even these rely on leadership for setting them and review.

Actions to reduce the size (number of pages) of the system have been taken. With the convergence work and switch to Matrix Certification, the company attempted to summarise all their processes in (maximum) 2 pages. This has given a good level of process transparency and helped to identify interfaces (the areas that are traditionally weak). This has given opportunities to reduce the number of pages and thereby simplifying the system, which is inevitable and desirable. However they had to explain this was an evolution and that the previous iteration was not unnecessary.

The system is web-based. Large advantages of web-based applications that are not always fulfilled with such systems (but that we have used) are hyperlinks from document to document and other web applications, such as records and target reporting, etc. Also, a number of standard documents can be downloaded.

The support needed by top-level management is direction (provided in the form of policies and strategies). Also a level of understanding of shareholder needs that the systems deliver is needed. Hopefully, an understanding that the business needs and the system deliverables are in accordance with one another will exist!

4.1.9.4 Business system

Company I uses SAP as their business system. The business system is integrated with the management system, but not directly. The business system is integrated to the processes, which are integrated to the requirements of the management systems. For example, if they find a scrap batch of material, they can quarantine it through the SAP system so that it cannot be used for production, therefore protecting the customer. At the same time they

can recharge the cost of the scrap back to the supplier if necessary to reclaim costs, so the shareholder element of the stakeholder balance is covered. A record of this event is a bi-product of these actions, but is also necessary for the system. Finally they measure the performance of the processes using this information against targets.

4.1.9.5 New organisations

Large organisations usually experience frequent reorganisations. With Matrix Certification, Company I has become process-oriented instead of organisation-oriented. The objective was to provide insulation against reorganisations. However this will only be tested in the future. The process convergence work means that processes (and standard operating procedures) are defined irrelevant of the organisational structures.

4.1.9.6 Costs

It is difficult to tell what the system costs to develop. They started as a brand new plant with a brand new workforce and a brand new product. They needed to develop, agree, test and implement processes in order to meet customer needs. The agreed method of doing this also fulfilled management system requirements, but would have been done anyway irrespective of them. It probably took 24 months from start to end.

The system should pay for itself in terms of the level of control and improvement they get from it, so therefore costs are negligible. One could calculate costs such as certification body expenses and salaries for the three employees mentioned above, but this is a short-sighed view. If there was no value and therefore no return on investment could be calculated, then would we be doing it? Because of this, the value of the system is greater than the costs involved in running it.

The system is a necessary investment, as well as a group requirement. However, the results suggest it is benefiting and therefore it is a good investment.

4.1.9.7 Current situation 2008

No contact with the responsible person has been possible, despite a number of attempts. Therefore no update of the material has been made.

4.2 HORIZONTAL INVESTIGATION – SUMMARY QUESTION FOR QUESTION

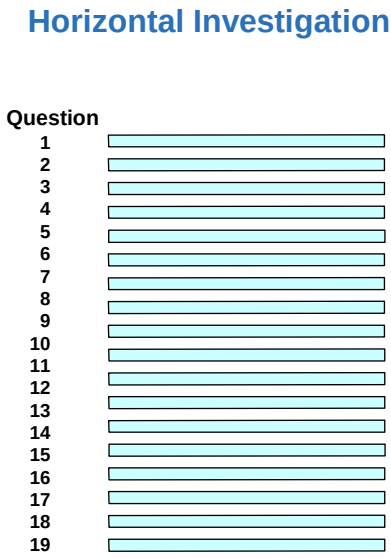


Figure 21. *Besides the summary for each company there is also a summary for each question. This summary is called a Horizontal Investigation. Below the summary there are also detailed answers for some of the questions.*

Below findings are described in each of the questions that have been examined and have been presented in Vertical Investigation. The summary is named Horizontal because it is comparing findings within the same area, but in different companies. Below the summary, there are also, on some questions, detailed answers from each company. It may be seen as a way to check the summary. The chapter may be seen as a summary of Vertical Investigation.

4.2.1 HOW LARGE THE COMPANIES ARE

The certificates in this study covers units with between 100 to 1800 employees. The company sizes behind the certificates are between 400 to110 000 (!) employees. Six of the units have 300 employees or more. The remaining three are all parts of worldwide company groups. In reality, the largest company certificate covers the second smallest company in the study.

Detailed answers

Company A: 140 employees in this specific plant, 16500 worldwide.

Company B: 320 permanent and 70-80 extra during the summer season, 6400 in Sweden.

Company C: 1800 employees, 5 business areas in 12 different countries.

Company D: 7000-8000 in Sweden, 25 000-30 000 worldwide.

Company E: 800 in the two plants the certificate is covering, 43 000 worldwide.

Company F: 300 employee in the unit, 1500 within the division and 110 000 in the company.

Company G: 130 employees in the unit, 40 000 in the Group.

Company H: 500 employees in the unit, 40 000 in the Group.

Company I: 700 in the plant and 5000 within the division, more than 100 000 worldwide.

(All figures from 2004.)

4.2.2 WHEN THE SYSTEMS WERE CERTIFIED

The first system was certified in 1989 and Systematic work environment (AFS 2001:1) was integrated in 2001. The companies, which are now integrating systematic work environment, are focusing on OHSAS 18001. Two of the company groups are reducing the number of certificates by only allowing one company to certify within the group.

Detailed answers

Company A: Environment (ISO 14001) first but the Environmental Manager did not know when, quality 1997, and systematic work environment 2001.

Company C: Quality first, in 1993, and then they started with Systematic work environment. The company has chosen not to certify against Systematic work environment, because they think it is a part of Environment. This is the company with most certificates of all.

Company D: The Company got a Quality certificate (ISO 9001) in 1996, and Environment and Systematic work environment in 2001.

Company E: The Company got Quality, a draft, in 1989 (most certainly the first in Sweden, maybe in the world?), EMAS 1995 and ISO 14001 in 1997. The company has just got the certificate for OHSAS 18001. This took two years although they already thought they had a well functioning system.

Company F: The original system was constructed in 1993. For a while there were 8 different systems within the division, certified by 3-4 different companies. Now there is only one system for the whole division.

Company G: All three parts of the system (14001, 9001 and AFS 1996:6) were certified 2000. The certification company thinks it was the first integrated in the world with ISO 9001:2000, but the company says "at least in Sweden".

Company H: The company got Quality 1995, Environment 1997 and Systematic work environment (AFS 2001:1) 2001.

Company I: The systems where integrated in the "Quality" manual in 2001. The procedures were then revised due to convergence across all plants in the division. This opportunity was taken whilst switching to Matrix-certification, i.e. certification of the division jointly rather than on a plant-by-plant and standard-by-standard basis.

4.2.3 WHAT IS INTEGRATED IN THE DIFFERENT SYSTEMS BESIDES ISO 9001, ISO 14001 AND AFS, THE MOST COMMON FIRST

EMAS, FSC (wood, paper standard), PEFC (wood) is most frequent with two cases.

Besides that Electric- and traffic security laws (traffic security from the railway inspection), SS 627750 (energy), ISO 22000 (hygiene), ISO/TS 16949 (an Automotive version of ISO 9001) and BS 8800, QS 9000, PS 9000 (medical), Secure Papers (bank), GMP (medical) and EMV (card), Trans Q, (a certificate against some customers) and the EFQM and Malcolm Baldridge Award.

Company F: SOX 2007.

4.2.4 WHAT IS PLANNED TO INTEGRATE

OHSAS 18001 is planned in two cases (company E and F) and in one case ISO 17799 (Information Security, company C).

4.2.5 THE REASONS TO BECOME CERTIFIED

The two main reasons are customer demands and company group requirements. That a certificate is necessary even to make customers an offer is mentioned in six cases (mainly demands from foreign customers).

A central company group requirement is the reason in four cases.

Some detailed answers

Company B: Besides that, originally it may have been an internal competition. If accidents happen and there is no system, the press would like it. The security is necessary because

lots of the employees are working in a dangerous environment, with high voltage and dangerous chemicals.

Company D: A reason was to gain better internal control and structure. Another was to minimise damages on products.

Company E: The reason to integrate Malcolm Baldrige is to make it easier to compare results and customer satisfaction all over the world.

Company I: Certification was due to a wish to generate enthusiasm for the company and its products.

4.2.6 HOW LARGE THE SYSTEMS ARE

The size of the systems varies from 200 to 2000 pages.

Detailed answers

Company A: In all, the system consists of approximately 900 pages, in two different systems.

Company B: Initially twenty covers but now one "ground book" and besides that one cover for each process.

Company C: Difficult to say, 15 "parts" of the manual and 20 "parts" of environment and systematic work environment.

Company D: It is approximately 2-300 routines on max 300 pages.

Company E: It consists of 1500-2000 documents. It was created when everything had to be documented. And since this mentality is still left, it is difficult to remove documents.

Company F: It consists of approximately 100 documentation-ids consisting of instructions and technical decisions.

Company H: There are a small number of instructions on max 300 pages.

4.2.7 IF THERE ARE DIFFERENT ORGANISATIONS FOR ENVIRONMENT, QUALITY AND SYSTEMATIC WORK ENVIRONMENT

The responsibility is often divided between two persons, but in four cases there is only one person responsible.

Detailed answers

Company A: There is an environmental manager and a quality manager, with specific knowledge in each area, but only one system.

Company B: One person is responsible for environment, systematic work environment and another for quality.

Company C: There is one responsible person for environment, ethics, quality and security and besides that one contact person in each country.

Company D: One person manages all changes. Besides him, also the production manager is responsible.

Company E: Environment and security is one part (8 persons) and TQM (5 persons) another.

Company G: Our company has one person responsible for all three disciplines.

Company F: No, there are no separate functions. However the company is not that active concerning environment, because there is not that much to do.

Company H: There is one system and one person is responsible, supported by three specialists.

Company I: Different departments have responsibility (e.g. for both ensuring implementation and audit), however this is converging, as it is becoming part of the EFQM assessment cycle.

4.2.8 IF THE SYSTEM IS AVAILABLE ON THE COMPANY INTRANET

All systems, except one, seem to be in electronic form on a company intranet. Most of them are reachable outside the workplace. At least two of the systems are built with Lotus Notes.

Detailed answers

Company A: Yes, it is available through Lotus Notes. The original is in the system. Only the Quality Manager is allowed to print out new versions and put them in covers to make sure that only the latest version is used. It is possible to reach the system outside of the company network.

Company B: The system is on the Intranet, but it is not possible to reach it outside the company yet.

Company C: Not all parts. All employees are not that used to computers. The dialogue when creating the new versions is very useful. Some of that dialogue may disappear in an electronic system.

Company D: Yes, the system is available when the company network is reachable.

Company E: Yes, it is on a server everybody can reach.

Company F: There is a homepage and a notes database.

Company G: Yes, the system is available.

Company H: Yes, it can be done.

Company I: Yes, if is dial-in access is granted.

4.2.9 IF THE MANAGEMENT SYSTEM IS INTEGRATED WITH ANY BUSINESS SYSTEM (SAP R/3, ORACLE, PEOPLESOFT, ETC)

Five of the companies have SAP R/3, but it is only partly integrated in three cases. It is usually integrated through document steering. It is remarkable that in two cases the managers responsible for the management system says they have nothing to do with the business system. One company has Movex and the remaining companies have no business system at all.

Detailed answers

Company A: SAP R/3 but I have no connection to that.

Company B: We are planning to implement SAP R/3 but I don't have any connection to that work.

Company C: Movex (Intentia) and some of the routines only exist in Movex.

Company D: No, there is no business system.

Company E: No business system, but a test is performed at one plant in Finland.

Company F: We have SAP R/3, which is part of the processes. What forms to be used, etc.

Company G: SAP R/3 and purchase and another process are integrated, but only through document steering.

Company H: Not any standard system. We have built one.

Company I: SAP R/3 but the business and management systems are not connected directly. The business system is integrated to the processes, which are integrated to the requirements of the management system.

4.2.10 IF THE SYSTEM IS BASED ON PROCESSES

Only one company had a system that was not was based on processes, at least not the part covering environment and systematic work environment. The remaining eight companies had process-based systems.

Detailed answers

Company A: No, the system isn't based on processes. Environment and systematic work environment are following ISO 14001. The quality part of the system is more based on processes.

Company B: Yes, there is a core process.

Company C: Yes, there are 3-7 main processes depending on business area.

Company D: Yes, there is a process chart.

Company E: Yes.

Company F: Yes, one core process and three main processes.

Company G: Yes.

Company H: Yes, it is following ISO 9001:2000.

Company I: Yes, key processes are defined within the division, based on the Quality Manual, which is based on the EFQM model.

4.2.11 WHAT THE MOST IMPORTANT PARTS OF THE SYSTEM ARE

The most vital parts of the system are that there are policies, a manual and review.

Detailed answers

Company A: It is the significant environment factors, responsibility and communication, corrective actions and continuous improvements. The key to make things work in reality is simplicity.

Company B: The process oriented organisation gives the opportunity to structure documentation against processes instead of against specific persons within the organisation. Besides that we have modules for audits and improvements.

Company C: The framework (the manual) , i.e. system structure, document steering, policies, management and steering processes, NKI, laws and other demands, support processes (measurement, analysis and improvement).

Company D: The most important thing is that it gives more structure to the work, and a "control system". Besides that internal audits are used, to make sure not too many shortcuts are taken.

Company E: The strategies for the company, i.e.:

- Commitment and competence
- Communication
- Decisions based on real facts.

If these are functioning well, the system is working well.

Company F: The three most vital parts of the system are:

1 That management must establish a policy, what they think about quality, etc.

2 That the organisation has a defined mission. How it shall be organised, etc. And that it is secured that there is suitable competence within the organisation for this mission.

3 Main processes. What are we earning money on? Also a lot of different activities and who has the authority to perform them. Who of above mentioned competences shall make offers? Who has the authority to sign this offer, etc? We also have activities that are supporting our processes. Besides that, we have some "support instructions", for instance purchase, export control, etc.

Company G: The homepage for each plant, but mainly based on the same manual for all plants.

Company H: The most important thing is that everyone is giving information to the "log book". It is necessary to get results showing that our goals are fulfilled.

Company I: The policies are the cornerstones, but even these rely on leadership for setting them and reviewing them.

4.2.12 IF ACTIONS HAVE BEEN TAKEN TO REDUCE THE NUMBER OF PAGES

The best way to reduce the number of pages seems to be:

Two companies focused on the fact that there are only six "shall-demands" in ISO 9001:2000. Areas where there are small security risks or high competence are not necessary to describe well, and pictures instead of written are used in these cases.

Detailed answers

Company A: There is a "cross linking" to take away text that is overlapping. The number of pages doesn't seem to be a problem. A larger problem is too large instructions; therefore they are purposely kept short, in general approximately one page.

Company B: 50 % of the pages have been taken away. Areas where there are small security risks or high competence are now not that closely described. Another method is to use more pictures and write less. The company has found out that one page with pictures equals eight written pages. The pictures are also easier to use during employee educations.

Company C: Pages were taken away when the new system was introduced. Now there are only 6 shall-demands, the focus has shifted to education instead.

Company D: No, have thought about it but nothing is done yet.

Company E: No, the number of pages seems to increase instead.

Company F: Originally there were eight covers with instructions. Some instructions have been reduced from 15 pages to 1. Too large instructions are not read. Instructions shall support, not explain exactly how something is done. ISO 9001:2000 is reducing the number of shall-demands. Now there are only six.

Company I: With the convergence work and switch to Matrix Certification, the company has attempted to summarise all processes in (maximum) 2 pages. This has given a good level of process transparency and helped to identify interfaces (the areas that are traditionally weak). This has given opportunities to simplify the system and reduce the number of pages.

4.2.13 IF THE SYSTEMS CONTAIN OTHER TYPES OF INFORMATION BESIDES TEXT AND OH-PICTURES

None of the companies in the study used any other media than text and OH-pictures.

Some detailed answers

Company B: No, but I have helped another company to make a system consisting only of pictures. It was showing important steps in the production line. It is functioning especially well in multi-cultural organisations.

Company H: Documents that are filled with correct addresses, etc. Information is fetched from different servers depending on who is opening the document.

Company I: We are using hyperlinks from document to document and other web applications, such as records, target reporting, etc.

4.2.14 IF SUPPORT IS NEEDED FROM TOP-LEVEL MANAGEMENT

The support needed from top-level management is mainly direction and guidelines.

Detailed answers

Company A: In the plant this is management's tool to find out how the company is functioning. From London is the demand that they shall work with TQM and integrated management.

Company B: Support is needed for education.

Company C: Top-level management are needed to formulate the framework, i.e. the manual.

Company D: No.

Company E: They are writing global policies and give guidelines. They have for instance decided that all plants shall be certified against ISO 14001.

Company F: There are group-instructions that we have to follow.

Company H: As usual support.

Company I: Direction (provided in the form of policies and strategies and captured in the manual). Also a level of understanding of shareholder needs that the system deliver is needed. Hopefully an understanding that the business needs and the system deliverables are in accordance with one another will exist.

4.2.15 IF ANY ACTIONS HAVE BEEN TAKEN TO PROTECT THE SYSTEM FROM REORGANIZATIONS

The only way to prevent this, used by more than one company (3-4), is to base the system on processes, which are not changed due to reorganisations.

Detailed answers

Company A: They cause chaos in the system. Right now the communication instruction is changed, due to the last reorganisation.

Company B has just got several new responsible persons for HR, IT, etc and all new responsible person has to start by making an own process map.

Company C: The fact that the processes are formed from the business idea means that they are not changed due to reorganisations.

Company E: The only thing that happens is that new work descriptions are needed.

Company F just had a reorganisation but only needed to make an extra audit. In practice an "over system" was created. The system for the division seems to be securing the stability on lower levels since they are partly consisting of the divisions system.

Company H: They have been very small so far.

Company I: With Matrix Certification, we have become process-oriented, not organisation-oriented. The process convergence work means that our processes (and standard operating procedures) are defined as irrelevant of the organisational structures.

4.2.16 IF THEY ARE AWARE OF OTHER COMPANIES WORKING WITH MULTI INTEGRATED MANAGEMENT SYSTEMS

It seems to be widely spread among companies in Sweden to work with integrated management. Two companies were mentioned more often, i.e. the Defence and Telia. Some specific names, of contact persons, were also given in other companies, but they have not been contacted due to lack of time.

Detailed answers

Company A: Försvaret (The Defence), but they are not certifying their systems.

Company D: Other plants in the group. At least they bought an expensive system.

Company E: Other plants in the group.

Company F: All large companies are working with this. Volvo, Saab, Ericsson, Telia, Siemens Elema, Ernest and Young, Fargersta Stål, Försvaret, Bofors.

Company H: Microsoft in Sweden (Systematic work environment), Posten, Riksskatteverket, Vägverket, SE-banken, Telia (Skanova).

Company I: Yes (but no names where mentioned).

4.2.17 HOW MUCH A SYSTEM COST TO DEVELOP AND RUN

The cost to develop a system is 100-250 000 SEK for a consultant and the total sum is approximately 1 million. When running the costs are personnel costs (1.5 persons a year) and external audit and costs for the certificate (75-100 000 SEK a year). Besides that there are some costs for maintaining the system (all figures from 2004).

Detailed answers

Company A: Integrated with so much that it is difficult to know, but personnel and system cost seem be the largest ones.

Company B: For a company with 50 employees, the cost of a consultant shouldn't exceed 100 000 SEK. How did they work before and what needs are there? A lager company usually needs more management (steering). The certification cost is now the large part, 75-100 000 SEK a year. 1.5 persons are working with it and besides that there is education and internal audits.

Company C: No, but every project shall carry it own costs. We haven't calculated the cost and have not calculated about the lack of our MIMS, most certainly a much larger cost.

Company D: Approximately 250 000 SEK on consultant and literature. Besides that, 50-65 000 SEK a year, but this year we have external audits which probably makes it a little bit more expensive.

Company E: It is definitely not for free, but not that expensive when running. The costs are external audits and support of the electronic system.

Company F: What would it cost not to have a MIMS? Since the system is developed a long time ago and there have been reorganisations it is impossible to track the costs. One person is working full time and one is working part time on it.

Company H: From paper to computer, one million (SEK). The budget each year is 1.5 million (SEK).

Company I: Difficult to tell. We started as a brand new plant with a brand new workforce and a brand new product. We needed to develop, agree, test and implement processes in order to meet our customer needs. Our agreed method of doing this also fulfilled management system requirements, but would have been done anyway irrespective of them. It was 24 months from start to end.

4.2.18 IF IT IS A GOOD INVESTMENT

All companies think it is a necessary cost and don't see how the business would work well without it. All of them are convinced that the lack of it would be even more expensive.

Detailed answers

Company A: It is something necessary for a production company, needed to secure quality and to continuously deliver an identical product to all customers.

Company B: Absolutely. It is a way to visualise the company. Everybody is given the opportunity to see the whole picture and to read everything. The system makes all work in the same direction.

Company C: We have not calculated about the lack of it, but it would most certainly be a much larger cost than to having it.

Company D: It is not a large cost, we need to maintain and improve the structure.

However, our results suggest it is benefiting us and therefore it is a good investment.

Company E: It is a cost necessary to make the business run and develop.

Company F: Very difficult not to have. I don't see how that could work. What would the customers say if we didn't have it? If the certification disappears, we have to inform them about it. It is necessary to be effective.

Company H: The company is earning money on this.

Company I: It is a necessary investment, given to us as a group requirement, from the Head Quarter.

4.2.19 WHAT THEIR DREAM SYSTEM WOULD LOOK LIKE

It would often be enough with better acceptance of the systems that the companies already have. It has to be easy to make changes and easy to supervise. One interviewed suggest that it should be built up around some kind of excellence model, another around the Deming cycle and yet another to have a graphic system, where the documents are shown on the right place in the production plant.

Detailed answers

Company A: The optimal scenario would be to have a graphic system where the documents are shown on the right place in the production plant. That would make them easy to find for the employees.

Company B: It has to be built on strategies and be a natural part of the daily work. It also has to be accepted by everyone. Sometimes it is better tear everything down and to start all over instead of making adjustments over and over again.

Company D: I would like to take away 75% of the present text. If all employees were really interested only the main parts would be enough. Everybody would take responsibility and see each other as customers. Dialogue would be the key word.

Company E: To be able to visualise the criteria text and describe it. To be able to directly see what routines are answering a specific question and be able to see current results. What is our status right now? Then, the system would be really useful for the company management.

Company F: I think we need more "commitment". It is necessary to demand things from the system, in order to make it work really well. It is necessary to measure results. To have an active system would be great, because instructions at present are seldom read. The system also has to be changed continuously. A change in the system should not take more than maximum one hour.

Company G: A web-based system, easy to change. R/3 is too difficult and can never get the right usability. The mistake we often make in this group is that we construct large solutions, cheap for the company but with few users.

Company H: We are close, but there are still things left to do. The system must be accepted and used in the whole company.

Company I: It would be something built up around the Deming cycle.

4.2.20 CURRENT SITUATION 2008

4.2.20.1 Five new Managers

In 5 cases there has been a new person responsible for the system since the previous contact three years ago, and another manager is about to retire. Approximately half the group has moved on to other places within the companies or to another company, and the other half has been retired.

4.2.20.2 Focus areas; Audits, Systematic work environment and new certificates

Focus areas in 2007/2008 are audits, systematic work environment and new certificates.

Audits are developed in different ways to become more efficient and to serve as a useful tool for areas mainly related to business. In one case by including more areas related to the

excellence model "USK", in one case related to SOX, in one case value-creating run troughs and in a fourth case to secure similar audits in the whole company (concerning Systematic work environment).

Systematic work environment is another area in focus. Three of the companies are describing specific projects related to Systematic work environment, concerning audits, risks or internal studies.

Besides that three of the companies have described implementation of new standards. No specific standard can be described as "the standard of the year". SOX is mentioned among the standards for the first time.

4.2.20.3 Reorganisations, process orientation and re-designed management process

In two cases there have been re-organisations that have been so large that new management systems have had to be built.

In two cases re-designed management processes have been described. In one case, a more defined structure has been built up, to identify and act against different problems as early as possible. In another case it was supposed to be more distinct.

In two cases there are ongoing process orientation projects, etc that are supposed to be finished during the end of 2008.

5. A GENERAL INTEGRATED MANAGEMENT SYSTEM

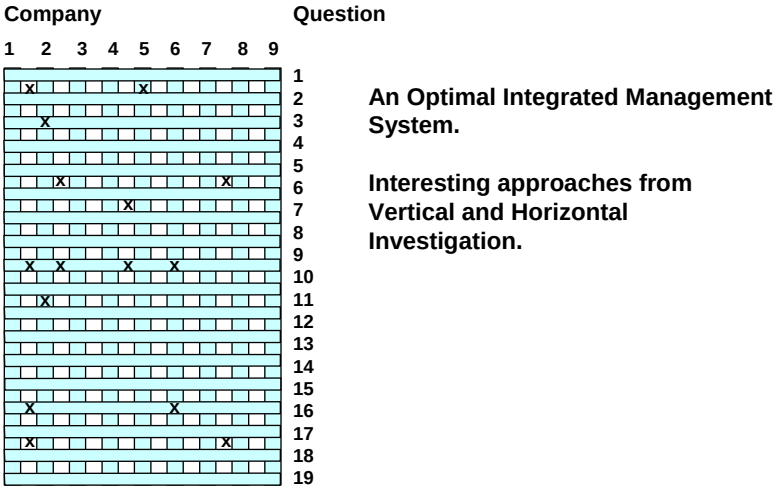


Figure 22. *From the investigation of company A-I, have been selected some approaches in order to, create a General Integrated Management System. Originally, the ambition was an "Excellence System" or an "All Star System", but a General Management System is a better description. It can be used to improve a system or as input in the project plan when constructing a new system, or in some cases a vision to strive for.*

Below is a description of an "average"/general multi integrated management system for a company with 950 employees certified in 2001. This chapter may be seen as a description of a general present system, an IS-system. In the chapter "Optimal Influences" some aspects that are part of a SHOULD-system are presented. Compare with process mapping, defined in Common Concepts (in the end). The system contains of pieces from company A to I. In some cases, single pieces have been taken from one single company and in other cases several companies have had the same approach.

The Core in the integrated system, described in 6.18.1, is:

- Policy
- Organization
- Roles/responsibility
- Goals/objectives/targets
- Processes
- Operational control
- Documentation
- Legal and other requirements
- Purchase
- Corrective action
- Communication
- Education
- Checking
- Audit
- Management review

The two main reasons to become certified are customer demands and group requirements.

The most common other standards (besides ISO 9001, ISO 14001, AFS 2001:1) are PEFC, FSC and EMAS. Next standard planned to integrate is OHSAS 18001.

The system consists of approximately 1000 pages and is available on the company Intranet. There is no other media than text and OH-pictures.

The most vital parts of the system are policies, a manual and review.

All workflows, above a predefined risk-level, in the company are process mapped, i.e. all the important processes, with a risk factor, are described.

The company has examined impact on the environment and identified factors necessary to reduce for a "sustainable development". How to reduce all significant environmental factors are described in different programs, one for each of these important factors. In the case where there is no program for an important factor, there are at least goals and objectives for the factor. There are also targets for quality.

Relevant laws for the company have been identified and for some of the laws investigations have been made to follow up the relevance and the actual meaning for the company.

Among those laws is "Miljöbalken". To secure that correct laws are available the company is buying that service from an external specialist, who continuously updates the list of laws needed to follow.

In the manual there are, among other things, descriptions on how the company takes care of all "shall-demands" in ISO 9001. Those are:

1. Documents needed by the organization to ensure the effective planning, operation and control of its processes, paragraph 4.2.1.
2. Records needed by the international standard, paragraph 4.2.1.
3. Control of nonconforming products, paragraph 8.3.
4. Corrective action, paragraph 8.5.2.
5. Preventive action, paragraph 8.5.3.
6. Internal audit, paragraph 8.2.2.

The whole system is to be found on the company Intranet and available for all employees. A change is possible to do in less than an hour. The system is constantly updated with actual organizational changes. There is an organizational structure within the company that identifies and act rapidly against upcoming problems. Information about changes is spread all over the company through the company Intranet and by default all employees have the system as their start-page.

1.5 persons per year run the system. One is a "Management Representative" and has the overall responsibility and the other person has a more operative back-up function. The support from top-level management is mainly direction and guidelines.

The cost to develop and implement the system is approximately 1 Million SEK. The company thinks it is a necessary cost and could not see how the business would work well without it.

With better acceptance the company has its Dream System.

Every third year there is a new responsible person for the system. Focus areas (in the end of 2007/beginning 2008) were audits, systematic work environment and new certificates.

6. DISCUSSION

6.1 ASPECTS ON THE SIZE OF THE EXAMINED COMPANIES

The size of the companies behind each certificate varies from 100 to 1800 employees. The large companies that the author meant to find were found. Many of the companies are part of company groups. To be part of a company group seems to increase the possibility of becoming certified. Examples are almost all companies in the study; Armstrong, ABB, BMW, Stora Enso, SCA and Vattenfall.

6.2 ASPECTS ON WHEN THE COMPANIES WERE CERTIFIED AND AUDITS

Many of the certificates are rather old in the certification context; almost all are from 1989 to 1999. The examined companies have usually started with 9001, then 14001 and then integration with other standards. Some answers in the study may have been affected by the fact that the first certificate was rather old. For instance all of the selected companies have developed their own system instead of using, for instance, Qualiware or any other similar program to make construction easier. The selected companies already had a system to start from and are also large companies with large resources. None of the selected companies have mentioned this type of "support program".

In 2004, two of the company groups had started with work closer to one selected certification company. The reasons to select one company are most certainly to reduce costs for the company groups and to "streamline" audits. In 2007 one focus area seems to be audits. The goal is now to make audits more efficient. Instead of having clean records, the ambition is to find as many notes as possible. At least this is the situation for some of the examined companies.

ISO 19011 does not seem to be used, even in the cases when audits are performed integrated.

6.3 ASPECTS ON WHAT IS INTEGRATED BESIDES ISO 9001, 14001 AND AFS (SYSTEMATIC WORK ENVIRONMENT)

What standards that are integrated beside the three standards mentioned above seem connected to what area a specific company is working in and there are a lot of specific standards. The exceptions are EMAS, also an environmental standard, and EFQM and the

Malcolm Baldrige Baldrige Award. They are two awards for improving the companies, but also integrated concerning description of the system and recently audits. In 2007 SOX was mentioned for the first time among integrated standards. Besides that, focus seems mainly to be on Systematic work environment, i.e. OHSAS 18001.

That Six Sigma and/or Lean Production was not mentioned is surprising, but maybe it hasn't been mentioned when talking of standards since no specific questions were asked about Six Sigma and/or Lean (?).

6.4 ASPECTS ON REASONS TO BECOME CERTIFIED

That customer demands and company Group requirements would be two important reasons is not a surprise. That improvement not was mentioned is interesting. At least it should be a reason in the author's world.

6.5 ASPECTS ON HOW LARGE THE SYSTEMS ARE

The reason for this question is that integration usually means large systems, sometimes too large. Maybe the fact that most management systems are web-based, mean that the number of pages does not matter too much nowadays. This was maybe a larger issue when management systems where placed in binders. The author's suspicion was also the reason for the question if any actions have been taken to reduce the number of pages.

The smallest size a certified system that has been found is eight pages. The problem with this system is that it is too small to be easy to understand and is used in a small company outside this study.

6.6 ASPECTS ON IF THERE ARE DIFFERENT ORGANIZATIONS FOR ENVIRONMENT, QUALITY AND SYSTEMATIC WORK ENVIRONMENT

The reason for this question was to find out how deep the integration really is and if it is necessary with a specific organization for each area, and also to find out the balance between each area. Usually there seems to be no need for separated "background" organizations, but the responsible often have to have support for some of the disciplines, depending on their own experience and knowledge.

6.7 ASPECTS ON IF THE SYSTEMS ARE AVAILABLE ON THE INTRANET

Not surprisingly almost all management systems are on the company Intranets. (Intranet is a company Internet.) In one case parts of the system are not on the intranet. There are

reasons why it is not possible to have all information in the electronic world. If it, for instance, is necessary with instructions in vehicles, then it is often difficult to have that in electronic form, and there have to be some other solution, usually binders.

6.8 ASPECTS ON IF THE MANAGEMENT SYSTEM IS INTEGRATED WITH ANY BUSINESS SYSTEM, LIKE SAP OR MOVEX

The integration between the different systems was expected to be rather large. But instead there was found to be almost no integration at all. This is rather surprising. One possible explanation is that the two systems are usually implemented with up to ten years difference in time. Another reason may be that business systems are rather new and still developing. In next versions the integration may be larger. It can also be something specific for SAP R/3. Another company with Movex had larger integration between management and business system. This system seemed easier to adjust according to own specifications. The company (H) with a "homemade" business system also had full integration.

6.9 ASPECTS ON IF THE SYSTEMS ARE BASED ON PROCESSES

Since this is a standard demand in ISO 9001, obviously all systems are in some aspect based on processes. Parts not based on processes are related to systematic work environment and/or environment. There are also, in one case, connections to the EFQM model, which is interesting. One company however claimed that they did not have a system based on processes. Since processes are a standard demand the author finds that hard to believe. The purpose with the question was to find out how the companies are working with processes, but the area is large. One aspect concerning processes apart from the actual question have been described under the heading "Some experiences as consultant", but large parts of the findings within this area have been left out since the findings did not have any connection with integration.

6.10 ASPECTS ON WHAT THE MOST IMPORTANT PARTS OF THE SYSTEM ARE

The reason for this question was to find out if the interviewed people thought the same important parts as the author thought (figure 3 and 11). The given answers cover a large spectrum and seem to be depending on each respondent. This made it rather difficult to summarize the question. The only possibility was to summarize on a higher level than originally planned. Simply put, that the framework consists of **policies, a manual and review** is a good answer.

6.11 ASPECTS ON IF ACTIONS HAVE BEEN TAKEN TO REDUCE PAGES

The reason for this question was the assumption that all systems grow and have to be reduced in size after some time. But this seems not to be an especially large problem, or it has at least become a smaller problem when all management systems are on the intranet. Some companies thought that it did not matter at all.

If the number of pages has to be reduced the author thinks that to focus on risks is the best way. This based on the findings in this study, but also on the fact that it on the Orlando conference, where the author was participating 2007, there was a course given in how to reduce the number of pages based on risks.

6.12 ASPECTS ON IF THE SYSTEMS CONTAINS OTHER TYPES OF INFORMATION BESIDES TEXT AND OH-PICTURES

That no company in the study is using any other type of information besides text and pictures is rather surprising. The belief was that at least some company would be found doing this 2007 when the follow up was made. One of the respondents claimed that he had seen such a system in a small producing company earlier. Maybe this is because workflows are usually described with processes, and that videos, etc therefore not are necessary? Or is the reason that management systems are describing on a too high level? Or is the reason that those who are in management positions are not familiar and comfortable with modern information technology? This study does not give the answer why, but the author still believes it would make management systems better and would give better acceptance if they consisted of different types of media.

6.13 ASPECTS ON IF THERE IS NEEDED SUPPORT FROM TOP-LEVEL MANAGEMENT

In a business group with several levels there are several different management systems that cover different areas. On top level the system has to be more general and just point out directions. But in one single case those areas have been described. Management systems in different levels are often not integrated with each other.

The degree of support needed from Top-level management was less than expected. On all education the author has been participating in Top management commitment has been a key-factor. When a system becomes mature maybe Top-level management do not have to be that much involved. That is at least what the answers are indicating. Top-level management mainly has to give directions, guidelines and support. One important factor for this result is most certainly that all systems are mature, i.e. more that ten years old. If the systems had been younger the result most certainly would have been different.

6.14 ASPECTS ON IF ANY ACTIONS HAVE BEEN TAKEN TO PROTECT THE SYSTEM FROM REORGANIZATIONS

The reason for this question is that reorganizations are frequent in all companies. In this study alone, two of the systems examined are no longer relevant due to reorganizations. The normal way to handle reorganizations is to not use any names in instructions, etc. All names are in a separate sheet. The author wanted more tools to handle this type of "normal disturbance". It seems like processes, well used can be an effective tool. To have processes linked to the company "value chain" is the way the author believes this should be handled, together with no names, etc in instructions.

6.15 ASPECTS ON IF THERE ARE OTHER COMPANIES WORKING WITH INTEGRATED MANAGEMENT

At least twelve different companies are mentioned, besides the companies in the study. Many of the largest companies in Sweden are mentioned. This is taken as a proof that MIMS are used in large Swedish companies. Many of the companies mentioned, however, do not seem to go as far as certification.

6.16 ASPECTS ON HOW MUCH A SYSTEM COST TO DEVELOP AND RUN

The belief of the author is that the figures from the study concerning development and implementation of a system may be too low. The reason is that economic follow up is not that detailed within this area. Time is not registered in such a detailed way that it is possible to measure cost properly. Very seldom it takes less than a year to get the certificate. For most companies it takes more than a year, usually 15-18 months. Some "Time-Thieves" are mentioned in figure 23. Only these three together is approximately 6 moths. One company outside this study completed certification in 12 months, without any remarks or notes, but the one in the study used 24 months.

Some ”Time-thieves” – Easy to forget

3 months

The time a system has to be ”up and running”, before certification.

6 weeks

Time between preaudit and certification audit.

6 weeks

Time to make corrections, before a new certification audit is possible.

Figure 23. *When making a plan for implementation, do not forget these “Time-Thieves” in the end of the certification process.*

An example of the costs of a management system is showed in figure 24. This is only one example. The example is on 2 million SEK for a company with 200 employees, but these figures are ten years old and should be larger today. On the other hand there are better programs available on the market today, which might make the project to develop a system faster, and therefore cheaper. All companies in the study have made their own applications. On the contrary those support-programs are not for free. Support-programs have not been a part of this study.

Costs

Certification (98)	
• Pre audit	20,0 kkr
• Certification audit	40,0 kkr
ISO 14001 (98)	0,5 Mkr
New updated version (97)	0,5 Mkr
ISO 9001 (94-95)	1,0 Mkr
Total	2,1 Mkr

Certification costs for a company, in 1998 with 200 employees (kr = Swedish ”kronor”)

Figure 24. *An example of cost for certification of a Company, certified against two standards.*

But the figures when a system is up and running, i.e. 1.5 persons a year and costs for maintenance of the system, external audits and certificate seems reasonable and are most certainly accurate.

6.17 ASPECTS ON IF IT IS A GOOD INVESTMENT

It seems that many of the companies in the study have not thought of this aspect in a detailed way, however all of them say that they do not see how the company could work well without a management system. If any company would stop being certified they also have to inform their customers about this, which they want to avoid. The most well known example in Sweden is SSAB, a company that quit with all standards and started all over again with their management system (more integrated with the economic department). Usually companies don’t do that.

One company in the study however gives concrete examples concerning offers etc. Savings each time an offer/business proposal is made gives lots of money in savings in the long run. Another company answers that the cost per year for the Management System, is equal with one large reclaim. These types of savings are most certainly possible in all companies.

6.18 ASPECTS ON DESIGN OF MIMS, COMBINED WITH WHAT THEIR DREAM SYSTEM WOULD LOOK LIKE

Concerning early types of integrated systems (before this study), the following different types of approaches concerning structure and construction were found.

- The first type is **"**Parallel**",** i.e. that the organisation has parallel systems, basically a system for ISO 9001 and another system for ISO 14001
- "Within the same frame", i.e. environment, systematic work environment and quality are within the same frame but are consisting of different routines or handbooks. Routines for the three different disciplines are placed in separate handbooks in the lower part of the picture, usually below the process map
- "Partly integrated", i.e. that some of the parts are integrated or divided, but most parts are mainly focusing on the three disciplines, environment, quality and systematic work environment

"Trailer system", i.e. some kind of encumbrance without connection to what the company really is doing. There is no real link to the value chain other than the certificate. A way to express this is that the integrated management system is not integrated to the company.

In his study two main approaches to find information were found.

1. A defined structure
2. A powerful search engine

Usually, both are used, but in one case the company said that they only had a search engine. Instead they had approximately 3000 documents, and the most important thing according to them was that each instruction was short. Their slogan was "One page is enough, if it is good."

Concerning defined structure four types are found.

1. Manual Focused Systems
2. Plant Focused Systems
3. Cycle Oriented Systems
4. Other Systems

6.18.1 MANUAL FOCUSED SYSTEMS

Manual Focused Systems (1) are mainly an old "binder", transformed to fit into the electronic world. This seems to be the most common type and is suitable for all sorts of companies and organisations. Usually the system is built up around the "Core in MIMS" (see for example company C, certified against 10 different standards). Another example is company G, which has a very pedagogic system for industries with the same type of core business in different locations, in this case 53 different places. All examples above are centred round the Core in MIMS. The different parts of standards involved are shown in the chapter "Background". In figure 25 they are showed in another way.

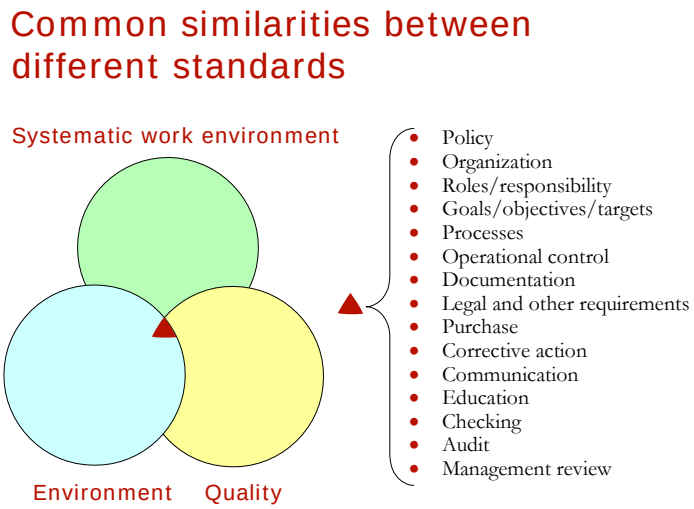


Figure 25. *The "Core in MIMS" showed in another way. The points cover the most usual parts of a manual.*

6.18.2 PLANT FOCUSED SYSTEMS

This example was described as a "Dream Systems". Generally, it seems most suitable for producing companies. The name comes mainly from the type of instructions graphically stored in an image of the production plant 2A in figure 26.

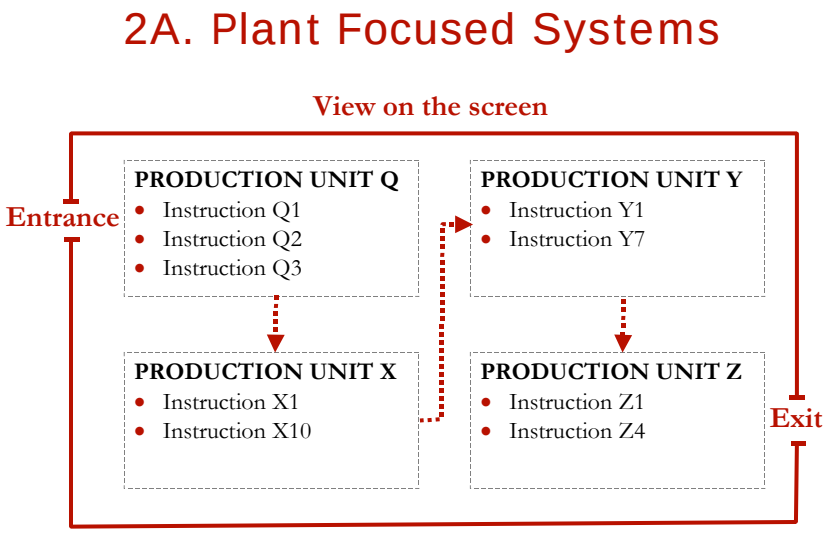


Figure 26. *Imagine the different production units of a plant on a touch screen (2A). Behind each production unit are the instructions to that specific unit. This would also be ideal from a logistic point of view.*

6.18.3 Cycle Oriented Systems

Cycle oriented systems could be different production cycles, but is in this case the Deming Cycle, i.e. plan-do-study (check)-act. In this case a consultant company is described but it was also the dream system for a producing company, see figure 27. Together with the manual approach this is the most common approach.

A Cycle Oriented System

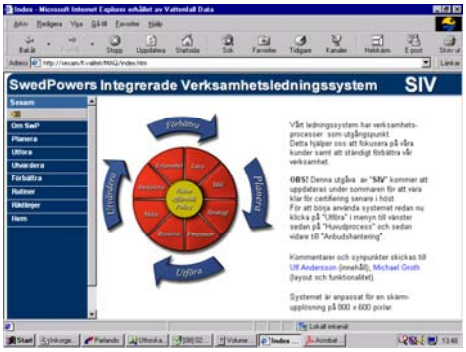


Figure 27. *An example of a cycle oriented system based on the Deming Cycle. Described as a dream system by one of the participating companies, but a reality in another company.*

6.18.4 OTHER SYSTEMS AND FINDINGS

Among other system there are systems built up exactly according to the standard. These systems usually last a very short time. (But it is easy to make audits during this time.)

Another type was built up around some business improvement model, like EFQM, with questions and answers of each criteria at the same place.

Concerning technical possibilities the investigated companies seem conservative. No such example has been found. Two suitable areas would for instance be the CEO explaining the policy, or a group of employees making a short video about an extremely difficult part of the production cycle.

What was missing in the study was systems that were service or product oriented. No one was found. Another finding is that integration with business systems, like SAP R/3, are very poor. The reason for this is most certainly that the two systems are from different times. In this case mature certified systems have been examined, i.e. they are at least ten years old. Business systems on the other hand are rather new. Because of this there is not much integration, yet!

7. CONCLUSIONS

Has the purpose with the thesis been reached, and been fulfilled?

The main parts, i.e. the Core in MIMS, are related to the paragraphs in each standard below.

- Policy Statement – 4.2 (14K and 18K) 5.3 (9K)
- Objectives - 4.3.3 (14K and 18K) 5.4.1 (9K)
- Resources, Roles, Responsibility and Authority – 4.4.1 (14K and 18K) 5.5.1 and 6.1 (9K)
- Documentation - 4.4.4 (14K and 18K) 4.2.1 (9K)
- Control of Documents – 4.4.5 (14K and 18K) 4.2.3 (9K)
- Control of Records – 4.5.3 (18K) 4.5.4 (14K) 4.2.4 (9K)
- Competence; Training and Awareness – 4.4.2 (14K) 6.2.2 (9K)
- Internal Audit – 4.5.4 (18K) 4.5.5 (14K) 8.2.2 (9K)
- Management Review – 4.6 (14K and 18K) 5.6 (9K)

An original ambition was to describe an optimally functioning management system. The main parts of an optimal management system are described below. But a choice, as a scientist, is to call it a general management system. The reason for this is that what is optimal varies from company to company. However, many important factors of an optimal management system are described in the general management system below (a general system is better described in chapter 6).

- The management system cost approximately 1.5 Million SEK to develop and implement
- It take 15 to 18 months to develop and implement
- The organisation has identified and communicated core values to the users
- There is one policy, based on these core values
- All workflows with business and/or risks for employees are process mapped
- All significant environmental factors are taken care of in routines or have goals
- There are also goals for quality (processes are stabile and possible to measure on)
- Relevant laws are identified and followed up
- A summary of the system based on EFQM, including the six "shall-demands" of ISO 9001 (Documents needed by the organization to ensure the effective planning, operation and control of its processes, paragraph 4.2.1, Records needed by the international standard, paragraph 4.2.1, Control of nonconforming products, paragraph 8.3, Corrective action, paragraph 8.5.2, Preventive action, paragraph 8.5.3, Internal audit, paragraph 8.2.2)
- Coordination with the top-level system in the group concerning, policy, description of the system, identification number system, responsibility and authority, control of documents, security and export control regulations policy, description

of the system, identification number system, responsibility and authority, control of documents, security and export control regulations
- Internal audits with the ambition to find as many notes as possible
- The system is on the company Intranet and run by 1,5 persons per year
- The best ways to do things are described, and all employees are accepting and are using the system.
- The system is generating money savings through saving time in many ways (for example offers/business proposals), and in that way the management system is saving money for the company.

The way the respondents' dream-systems are described differs from company to company and manager to manager. In one case, the Deming Wheel, this dream-system was already constructed in another company. Besides ISO, it should also cover the criteria text (from EFQM or Malcolm Baldridge), be more accepted and used than today, and also be a graphic system where the documents are shown on the right place in the production plant and do this on 25 percent less pages than the current system. For more information see 6.18.1-3 and 7.1.

Besides that some findings are that:

Current management systems are not integrated with business systems like SAP R/3. They are just linked together in some isolated areas, i.e. having the same goals. The reason for this is most certainly that the implementations are from different times. MIMS in the investigated companies are at least five to ten years older than the business systems in the same companies.

Powerful search engines have made the number of pages less important than when binders were the only way to store information. Therefore, current management systems have a tendency to be lager than the systems were ten years ago.

Ways to make the system last during reorganisations are mainly to focus the system on processes i.e. the chains of value that are made so strong that they last, and to not use personal names and titles in the system. An organisation chart shall be on a separate place, easy to change without affecting the rest of the system. Concerning processes don't forget that stable processes are necessary to measure. Unstable processes give unstable results.

Modern technology is not used in the presentations of the systems. No videos or such have been found. There are stories about systems only based on pictures, but none have been found in reality.

In the thesis, no real company names are included but a short summary is that the most pedagogical approach was found at Vattenfall Vattenkraft, suitable for companies with the same type of production in several different places. The company with the manual best using "the Core in MIMS" was according to the author, Strålfors. The most complete and maybe the best system, at least using most parts of the general system, was designed by Stora Enso. The system best linked to an overall group system was found within ABB. Armstong had used modern search technology in their system and also had an interesting

vision of a Dream System. (This question was thereafter asked to all companies with many interesting answers.) SCA had an interesting vision about reducing text and adding pictures to their system. This would mainly be something suitable for producing companies. Banverket used simple, but powerful "Office" symbols for their process mapping. (Next time they were examined a re-organisation had made the work start all over again.) One of the investigated companies had a vision about a system built up around the Deming Wheel and Vattenfall Power Consultants has a system just like that. The most ambitious auditing system was found at BMW. The impression is that BMW want to find as many notes as possible to improve processes, instead of reducing the number of notes and "show a clean record". There are actually three steps to fulfil with a system. 1 To fulfil standard demands, 2 to implement and get acceptance and 3 to improve efficiency, even outside standard demands. One way to do reach step 3 is through audits, and to make better and more effective audits is the way the investigated companies mainly are trying to improve their systems currently. There is a tendency against one company doing all certification within company groups and more designed audits.

In three years more than 50 percent of the managers were replaced. In two cases there had been re-organisations so large that completely new management systems were under construction. In 2007, the focus seems to be on effective audits and implementation of new standards (mainly systematic work environment), and SOX is mentioned for the first time.

7.1 OPTIMAL INFLUENCES, I.E. SHOULD-SYSTEM

In a General Management System (Chapter 5) an "IS-system" is described. In this chapter aspects of a SHOULD-system are described.

Considering what type of system that should be implemented the author suggest a Manual Focused System. There are mainly two reasons. The type is easy to duplicate (in a pedagogic way) if there is some type of production with several plants. In the study company G with 53 production plants is mentioned. Another reason is that correctly used, with a correct "Core" (the Core in MIMS), it becomes rather easy to evaluate the system with new certificates. From 2004 to 2008 company C went from 7 to 10 (!). Different parts of the business certified against different certificates.

In the vision world combined with a Plant Focused System with instructions graphically stored in an image of the production plant as described in 2A in figure 26.

The system is large but has a structure, and consists of rather small documents and a top of the line search engine. There are lots of pictures in order to reduce the number of pages. Areas where there are small security risk or high competence are not described that well.

The company should have one policy covering environment, quality and systematic work environment. One business, one policy is the slogan. Values within the company have been

identified, and also what values the employees want to describe the company with in the future. The integrated policy is based on those values.

Since the organization is a part of a large company group, some things are interacting with, and in some cases copied from, the overall company group system. Those are: policy, description of the system, identification number system, responsibility and authority, control of documents, security and export control regulations.

Processes are constructed from the company's mission and value chain and therefore not changed due to reorganizations. Besides that no names, only functions, are described in the system and the organization chart is only one page which makes it easy to change. Cross-functional teams from different parts of the organization have mapped the processes. Major risks for the employees have been identified and how to avoid them are described in instructions. There are goals and objectives for the most important risks. Since processes are stable, it is possible to measure them and get stable results.

The Management system is integrated with the Business system through targets and with routines that describes workflows within the Business system.

Since the company is international, there is a manual describing how the company is working based on EFQM Award. It contains all of it, except for "Results".

An ambition is to make audits more efficient. Instead of having clean records, the ambition is to find as many notes as possible. Educated employees within the company perform internal audits. They are usually from the process before or after the part of the company that is reviewed. The ambition with audits is to find as many notes as possible in order to improve the organization. During audits "improvement proposals" from employees are also "followed up" and in some cases implemented.

External audits are also held and they are coordinated with visits from society control organizations and sometimes customers, since the company identified that they often have interests within the same area. The reasons are to inflict as little as possible with the production and to give audits higher attention. To reduce costs and streamline audits within the Company Group one company are making all external audits.

The company is working with Lean and all workflows have been reduced to activities that create value. The ambition is that the best way to do things shall be described. Lean is also a link to the Environmental work since it saves resources.

Improvement is an important key word and there is a Six Sigma program to identify and submit improvement projects.

Technical possibilities are used; the CEO explains the policy on the Intranet with a short movie, etc. This is one of many examples of her personal participation. The system is fully integrated with the business system. It is also integrated with the over all company Group system.

There are several videos where different groups of employees are making short videos about difficult parts of the production. The benefits are several, the best way is identified and those who are making the videos become committed.

In vehicles there are portable hand computers available with mobile intranet connections.

The cost of the system is earned if one reclaim is avoided.

The company is actually earning money on the system. An example is the offers (business proposals) that have been more effective. They are now faster and easier to do and don't look different depending on where in the company they come from. The system also secures better recycling of already made offers. The result is that an offer is one hour faster to produce than earlier. The company makes 1000 to 1500 offers a year. This result in savings of 1000 times 500 SEK per hour (1000*500=500 000 SEK) and there are also more similar examples within the company, where the system is generating money savings through saving time, etc.

Since the best way to work is described in the system, everyone in the organization is accepting and using the management system.

7.2 CONTRIBUTIONS

A general management system, with optimal influences has been described. The vital parts, the Core in MIMS, have been covered both in text and in paragraphs relating to the standards, i.e. the connections between different standards.

Examples of content in a manual are found in Company B and C and in the chapter "Manual Focused Systems" where a manual and the core in MIMS are combined.

The Managers "Dream Systems" have been described and presented in Orlando, at the ASQ-conference "ISO 9000 and related standards", at a meeting with SFK ("Swedish Association for Quality") at Wennergren Center and at a Quality Manager conference at Sandholm Associates. To visualise some examples of "Dream systems" see 6.18.1 to 6.18.4.

Present MIMS on the Internet are usually larger than (previous) MIMS in covers, but modern information technology, such as digital images and videos, has not been used in the examined management systems. Furthermore there is almost no integration between investigated MIMS and business systems like SAP R/3. How to make MIMS last during reorganisations is described and common concepts are included as an appendix.

In 7.1 aspects of a SHOULD-system are described.

7.3 FURTHER WORK

The logical next step within this area would be to focus even more on an optimal management system. The description of a General management system in the thesis contains many aspects that would fit well in an optimal management system but to focus more within that area would be interesting. Also to do deeper studies of some the "Best" companies within the study in order to examine if they are functioning as well in reality as they are described. Many of the most interesting systems have not been examined direct, only indirect through interviews in this study. That includes asking questions to other, than those who are working with, and are responsible for the management systems.

Or to focus on what parts of a Management System that are necessary for a successful Six Sigma/Lean implementation.

Another interesting next step would be to investigate what it takes to get the best Security/Quality Management System in the world? Or to focus on the parts of Nuclear Quality that are related to Management systems, but that require a whole lot more support than during this, mainly self financed, thesis.

APPENDIX A - COMMON CONCEPTS AND DEFINITIONS

Activity	A work assignment within a sub-process.
Allocation	Set apart for a particular purpose
Benchmarking	See Process comparisons.
Business system	Soft-real-time business applications, with multi-currency and multi-language capabilities built in.
Control process	See Management process
Customer	The recipient of a product provided by a supplier. The customer could be a new process, end-customer, user, purchaser or who/whatever else the product provides a benefit. The customer can be either external or internal.
Facilitator	Person engaged to train and guide the process improvement team in its improvement activities and in the use of different methods and quality tools.
Function	A group of employees or work assignments within a functional organisation (e.g. purchasing, sales or marketing).
Goal	A goal represents the stage or level to be reached or a result to be achieved. The goal shall be Specific, Measurable, Accepted, Realistic and Timed (SMART).
Goods	Product, in terms of a tangible result that is delivered to the customer.
Guideline	Used for providing instructions and guidance in certain issues.
Improvement cycle	Also known as the PDSA cycle or the Deming Wheel. Consists of four phases: Plan, Do, Study and Act.
In-object	The object(s) that the process converts into out-objects/results.
Inflow	See In-object.
Input	See In-object.

Instruction	Is used to specify mandatory rules. When an instruction includes non-mandatory rules (i.e. guidelines), this is clearly stated in the wording.
Interface	The boundary between processes and sub-processes where change, in the form of the transfer of goods and services, responsibility, authority and information, occurs.
"IS" process	The current status of a process.
Lead time	The time taken for a process to convert an in-object into an out-object/result.
Main process	Process which ads value to goods and services for an external customer. It includes everything from the development of goods and services to their production and sale.
Management process	A process designed to control and lead main processes and support processes with regard to effectiveness and result. The typical out-object from a management process consists of strategies, goals, plans, rules, guidelines and evaluations.
Measure	Refers to the nominal value. E.g. if the measured value is 21 weeks, the measure is 21. See also Measurement, Measured Quantity and Measurement unit.
Measurement	A measurement consists of a parameter and name of whatever is to be measured. E.g. Lead-time (Lead=name, Time=parameter) and Energy consumption (Energy=parameter, consumption=name).
Measurement point	The point in the process where the measurement is taken.
Measurement process	Defining the measurement, collecting data, and calculating, presenting and communicating the result. How a measurement process is to be carried out is defined in a measurement specification.
Measurement specification	States the purpose of the measurement/measurement process, the process to which it belongs, where information/data can be obtained, the definition of the measurement, and how the results are to be presented, communicated and analysed. The specification also states who is responsible for each part of the measurement process.
Measurement	A set of related measures – described by proce-

system	dures/instructions/guidelines for collection, compilation, presentation and communication. It provides useful and up-to-date information concerning characteristics and performance as a basis for improvements.
Measurement unit	The unit the measurement is taken in. The unit of measurement for Lead-time, for example, could be Week, Day or Hour. See also Measurement, Measured Quantity and Measure.
Measured value	Gives the result of the measurement process. Consists of a measure and a measurement unit. E.g. if the measurement is Lead-time, and a measurement gives a lead-time of 21 weeks, the measured value is 21 weeks. See also Measurement, Measure and Measurement unit.
Object	That which is processed step by step in order to finally exits the process as an out-object/result.
Occupational	Connected with their work
Outflow	See Out-object
Out-object	The result of an activity, process or sub-process.
Output	See Out-object
Process	A series of related activities that add value to one or more object(s) in order to satisfy the customer's requirements. A process is continual and repetitive, and in each process there is at least one supplier and one customer. A process has a defined beginning and end.
Process analysis	The evaluation of the process flow in terms of capability, productivity and. effectiveness
Process chart	See Process map
Process comparison	A systematic comparison of internal processes with similar processes in other companies, regardless of industry or sector, with the specific intention of identifying an approach that can be adapted and used in the internal process, i.e. Benchmarking.
Process development Manager	The person tasked by the process owner to manage the continual improvement work and to recommend possible improvement measures to the process owner.

Process flexibility	The ability of a process to adapt to fluctuations.
Process improvement team	A team consisting of people with knowledge and experience of the process. The process improvement team works within an improvement project in order to create or radically change the process.
Process management	Systematic method of organising, leading, controlling and improving the processes of an organisation.
Process map	A schematic diagram showing the logical flow for the conversion of an in-object into an out- object.
Process mapping	A method of graphically describing a process using simple symbols, lines and words.
Process orientation	Perceiving and leading the organisation as a system of multifunctional processes instead of vertical functions.
Process owner	The person who has responsibility for the process and who is charged with seeing the whole as well as the parts, deciding goals, clarifying the expected results, carrying out the continual improvement work and continually analysing the result in relation to the agreed goals.
Process specification	A document describing the demands made on a process.
Process stability	The ability of the process to be robust, i.e. to function well despite sporadic changes in conditions.
Process team	A team tasked with systematically identifying and measuring the result of a process and the continual improvement of the process under the leadership of the process owner.
Procedure	A specified way of performing an activity or process. If a procedure is to be formally controlled, it shall be documented.
Product	A physical product and/or service that is delivered to a customer and is the result of activities/processes.
Project	A defined, budgeted task that has a timeframe and established goals. Projects are non-regular activities and require a temporary organisation.

PROPS	A general model for project management used within Vattenfall, originally developed by Ericsson. For terms such as tollgate, milestone, project sponsor etc., see PROPS terminology.
Service	A product, in terms of an intangible result that is delivered to the customer.
"SHOULD" process	The planned or desired appearance and nature of a process.
Sub-process	Related and clearly demarcated activities within a process. Start and end are characterised by well-defined limits of responsibility or the handing over of responsibility from one unit or area of responsibility to another.
Sub-process owner	The person with responsibility for a sub-process, in the same way as the process-owner is responsible for the entire process.
Support process	A process that serves as support for main processes and management processes. It generates indirect added value for the customer and for the business itself. Examples of support processes include Information, Finance and Maintenance.
Supplier	An organisation that delivers a product to a customer/process. The supplier could be a manufacturer, distributor, importer, or organisation that provides goods or services. The supplier can be either external or internal.
Task	Part of an activity.

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STANDARDS

Some relevant standards concerning integrated management system and environment, quality and systematic work environment are:

SS-EN ISO 9001:2008 Quality management systems – Requirements.

SS-EN ISO 9000:2000	Quality management systems – Fundamentals and vocabulary.
SS-EN ISO 9000:2005	Quality management systems – Fundamentals and vocabulary.
SS-EN ISO 9001:2000	Quality management systems – Requirements.
SS-EN ISO 9004:2000	Quality management systems – Guidelines for performance improvements.

A standard that maybe is more useful than ISO 9001 because it is more extensive. Beside the different paragraphs it also contains explanations and more information about the different parts of the standard. The latest version of ISO 9004 is based on the perspective of interested parties and is thought to become a link between ISO 9001 and EFQM.

SS-EN ISO 14001:1996	Environmental management systems – Specification with guidance for use.
SS-EN ISO 14001:2004	Environmental management systems – Requirements with guidance for use.
SS-EN ISO 14004:2004	Environmental management systems – General guidelines on principles, systems and supporting techniques.
SS-EN ISO 14050:2002	Environmental management – Vocabulary.
SS-EN ISO 14063:2006	Environmental management – Environmental communication – Guidelines and examples.
SS-EN ISO 19011	Audit of integrated management systems.
SS-ISO/IEC 17799:2005	Information technology – Secure techniques – Code of practice for information security.
SS-ISO/IEC 27001:2006	Information technology – Secure techniques – Information security management systems – Requirements.
DIS	Means that it is a "draft", i.e. and earlier, not finished version of the standard.

OHSAS 18001 Systematic work environment or occupational safety and health, not an ISO-standard but is what companies are using.

In Sweden there is a law, AFS (Allmän författningssamling) 2001:1, which all organisations and companies must follow concerning systematic work environment. The former version was named 1996:6.

It is not possible to certify an organisation against AFS only, it is necessary to certify together with an environmental or quality management standard. Therefore automatically a certified HR-system is an integrated management system, in Sweden.

Some other standards, and one decree EMAS, are mentioned below.

BS 7799 British Standard for Information security, similar with 17799.

QS-9000 A standard mainly focusing of production of cars and developed by Chrysler, Ford and General Motors.

ISO 15288 Systems engineering – System life cycle processes. An interesting standard since some consultants claim that the standard is very useful when constructing an integrated management system (Prestandamodulen). The intention was to find at least one such company to investigate to form an opinion about the approach, but this intention failed.

Ebtrust A certificate for safe use of web-based systems. In September 2003 only one company in Sweden were certified against this standard.

SOX American law from 2002 consisting of internal control framework, audit programme, etc. The collapse of Enron together with several other scandals contributed to the creation of the Sabanes Oxley Act, imposing heavy demands on accounting ethics for business listed on the stock exchange in the US. In Sweden the Swedish Code of Corporate Governance was introduced, but instead of being a law, it is based on self-regulation.

EMAS (Eco Management and Audit Schedule) is a European decree as it is possible to register against. More than 200 (205 in August 2003) Swedish companies were registered for EMAS. 2007 the figure however is only 100.

Social Accountability International, SAI, has developed the standard SA8000 focusing on Ethics. For further information see their homepage at www.cepaa.org.

The enumeration could easily have been more extensive. All standards above have been found in different Management Systems and that is the reason for choosing them.

INVESTIGATED COMPANIES

Armstrong World Industries, Holmsund – Tony Ekström, Environmental Manager

ABB Utility Automation Systems, Västerås – Kjell Engberg and Kjell Olofsson, Quality Managers

Banverket, Nässjö – Hans-Inge Almgren and Jonny Sandström, Environmental and Quality Managers

BMW, Hams Hall, UK – Dean Lucas

SCA, Munksund – Leif Nilsson, Quality Manager

Stora Enso, Fors – Ulf Sundberg, TQM Manager

Strålfors, Göteborg – Maria Holmen and Ann-Katrine Hjelmberg, Environmental Managers

Vattenfall Power Consultant (former SwedPower AB), Vällingby – Ulf Andersson, Controller

Vattenfall Vattenkraft AB, Vuollerim – Sören Ek, Environmental Manager