External forces influencing the e-business strategy of Siemens OCW

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Abstract

The Internet and e-business have had an enormous impact on many companies and there has been much research on how e-business influences its environment, but little can be found on how e-business is influenced by its environment. The aim of this thesis is to give an overview of the macro-environment and industry forces influencing the e-business strategy of Siemens OCW and the impact of their future developments. This will be used to extend the findings of the e-business strategy check, a Siemens internal method for developing an e-business strategy. Further a method for future analysis of the macro-environment influences and a suggestion on how to incorporate it in the check is given. The e-business strategy of Siemens OCW consists of four topics: e-procurement, e-collaboration, knowledge management and industry portals. The influences found on macro-environment level are standardization issues, globalization, influence of the business cycle, lack of trust in e-business and legal influences. On the industry level the high bargaining power of customers and suppliers and the lack of data standards have influence. The most important recommendations are that Siemens has to view the industry portal from customer viewpoint, that they have to follow the XML-developments closely and that knowledge management implementation should be done very carefully in the current economic situation. Further Siemens has to develop an e-business strategy for their industry groups (I&S, A&D) and include environment analysis more extensively in the e-business strategy check. This thesis presents an adapted version of the PESTEL framework, named e-business PESTL framework, as a method for structural analysis of macro-environment forces in the future, which can also be incorporated in the e-business strategy check.

Tell me, I forget; Show me, I understand; Involve me, I learn.
Old Chinese saying

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Acknowledgments

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Last but not least I want to thank my family who gave me the opportunity to study in the first place and kept supporting me during my whole study period, even after switching two times from the navy to electrical engineering and finally to industrial engineering and management. I also owe my girlfriend Aiyue Lin a great deal, because she was always there for me during the six months I worked on this thesis.

Chapter 1

Introduction

This chapter will introduce the background of the research conducted and the research problem which has been the starting point of this research. Further the scope of the research will be given, as well as an overview of the organization of this thesis.

1.1 Research Background

Since the introduction of e-commerce and e-business we have seen the market following a hype until the so-called 'bursting bubble' of the dot-coms (see figure 1.1 and section 4.1.3).

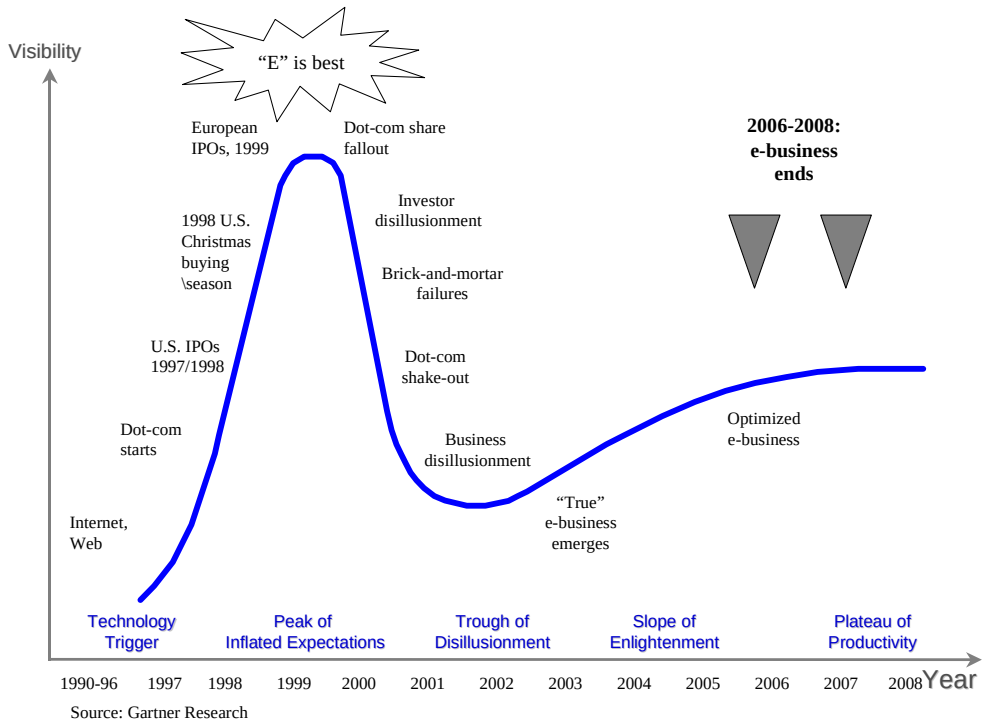


Figure 1.1: Hype Cycle for ebusiness

Some authors state that we are now in the deepest point after the hype and that now the hype is over, the real e-business era can begin:

"*...although the hype is over, the actual impact of Internet on business, has only just begun.*" [36];

"*...over the next year or two, a steady stream of new, Internet-based services will come on-line, providing significant cost savings over traditional, internal systems and offering new opportunities for collaboration among companies.*" [28];

"*Companies may be saying, Our core business is in trouble right now, so we have to shore that up. They lose sight of the fact that e-commerce could be a tool to reach their core-business objectives.*" [34].

There has already been a lot of research on e-business strategy and the impact of e-business on industry and business processes [18, 31, 52], but this view has always been to look what the impact of e-business on other factors is. In line with the positioning school of Porter [50–52], which states the importance of external analysis, the aim of this research is to take a step back from the impact of e-business and try to look with the 'old-fashion' way of strategic analysis, of which a macro-environment and industry analysis are the starting points to find the opportunities and threats for an organization [32]. The main goal of the research is to look into the influence of industry and macro-environment forces on a specific e-business strategy. This e-business strategy is developed during the *e-business strategy check* which has been performed with Siemens Industrial Solutions and Services, Oil & Gas, Cement and Water, hereafter referred to as Siemens OCW, during this research.

Big organizations like Siemens have kept investing in e-business, also after the hype, in order to create a solid e-business infrastructure. For the implementation of e-business practices in the business units, Siemens has developed the e-business strategy check, a method to develop an e-business strategy which supports the business strategy of a business unit. This e-business strategy check is a straightforward method to get from the business strategy to an e-business strategy and results in a roadmap with e-business projects.

Siemens OCW has started the e-business strategy check in June 2002 and was interested in looking in extending the standard e-business strategy check by looking which external forces influence their strategy. This resulted in the research objective stated below.

1.2 Research Objective

The research objective of this thesis were established in co-operation with the mentors at Siemens I&S, Mr. Michael Koolman and Mr. Karl-Heinz Niedermeier, and the supervising committee of the University of Twente.

The research problem is defined as follows:
"Which external forces influence the e-business strategy of Siemens OCW and how

can future developments of these forces be assessed?"

This research problem addresses the initial explorative analysis on which forces influence the current e-business strategy of Siemens OCW, where an distinction can be made between macro-environment forces, on which the organization has no influence, and industry forces, which can be partly influenced by the organization.

The second part of the research problem addresses the issue of analyzing future developments of the found forces, and incorporating this environment analysis in the e-business strategy check. The research problem will be broken up into several research questions in section 2.5.

1.3 Scope of research

The scope of the research is Siemens OCW, the business unit of Siemens Industrial Solutions and Services which focusses on building electrical equipment solutions for the oil and gas industry, the water and waste water industry and the cement industry. The part of Siemens OCW that serves the cement industry is not taken into account, because of signals (which have proved to be right) that this part of Siemens OCW would not be continued in the current form.

During the research the focus has been on influences of forces outside the organization of Siemens, but some issues found relate to internal issues. Where mentioned these issues are seen as so important that they needed to be mentioned.

1.4 Organization of the thesis

This report consist of 7 chapters. In overview:

- Chapter 1 gave an introduction to the research, described the research objective, the scope of the research and the organization of the report.
- Chapter 2 will describe and justify the methodology used, translate the research problem in research questions and discuss the conceptual framework used.
- Chapter 3 will give a description of the organization in which this research has been conducted. It will describe the broad structure of Siemens AG and will go into detail in the business unit OCW (Oil & Gas, Cement and Water) where the research was conducted. Also Siemens own methodology used to develop the e-business strategy, the so-called e-business strategy check, will be described and discussed.
- Chapter 4 will give an overview of the current research on e-business and strategy as can be found in academic and popular literature. Further an overview of the macro-environment forces influencing e-business will be given.

- Chapter 5 will present the gathered data of the participant observation during the strategy check, the interviews and the workshop conducted. Also the results of the industry forces analysis will be discussed.
- Chapter 6 will analyze the gathered data and describe the important influences of the macro-environment forces and the industry forces on the e-business strategy of OCW with opportunities and threats and will give advice on how to cope with these influences.
- Chapter 7 will give the conclusions of this research, as well as some recommendations for Siemens OCW management and the e-business strategy check. Further this chapter will give some implications for theory and further research.

Chapter 2

Methodology

Chapter one has given an introduction to the research and described the research problem and the scope of the research. This chapter will give an overview of what methodology means and which methodology is used in this research. It will describe the research purpose, the research approach and the research strategy as used in this research. Further the research problem will be split up in more detailed research questions. Finally the conceptual framework of the research will be discussed.

The definition of methodology used in this thesis is given as followed: An methodology can be described as a blueprint for fulfilling the objectives [of the research] and answering the [research] questions [11].

2.1 Research purpose

The purpose of the research has to do with what the researcher expects to have at the end. Yin [71] distinguishes three types of research: exploratory research, descriptive research and explanatory research. The latter one is also referred to as causal research [11].

Exploratory research tend towards loose structures with the objective of discovering future research tasks. It is particular useful when the researchers lack a clear idea of the problems they will meet during the study.

Descriptive research is about the questions who, what, when, where and how of a topic.

Explanatory research tries to explain relationships among variables. This will go mainly in the why question of a topic. This type of study is also known as Explanatory research.

The research of this thesis is mainly explorative and descriptive. The explorative part is because there has been little research on the influence of macro-economic and industry forces on the e-business strategy so far. Therefore this part has to be explored first. Secondly the research will take a descriptive form, where the influence on the specific e-business strategy of Siemens OCW will be described.

2.2 Research approach

The main consideration with chosing the research approach is that of qualitative versus quantitative research.

Quantitative research is often formalized and structured. The results from quantitative research have to be measurable and presentable in figures. Quantitative research is very much controlled by the researcher and relies heavily on statistical methods of proof. In this kind of research only few variables can be taken into account, but with a broad scope or sample.

Qualitative research is about data that appears in words rather than in numbers. They may have been collected in a variety of ways (observation, interviews, extracts from documents, participation, tape recordings) but they remain words. These are then analyzed, which is defined as three concurrent flows of activity: data reduction, data display, and conclusion drawing/verification [40]. Central in qualitative research is to reach a deeper and more complete understanding of the data collected and the problem studied.

This study has a clear qualitative approach, as it studies a phenomenon in depth. The goal is to get a deeper understanding of the topic of macro-environment and industry influence on e-business strategy.

2.3 Research strategy

Yin [71] lists five primary research strategies: experiments, surveys, histories, analysis of archival information and case studies. Each of these strategies have certain advantages and disadvantages, summarized in table 2.1. However, these advantages and disadvantages depend upon three conditions:

- the type of research questions asked
- the control an investigator has over actual behavioral events
- the focus on contemporary as opposed to historical phenomena

Table 2.1: Conditions for research strategies

Research Strategy	Form of research question	Requires control over behavioral events?	Focuses on contemporaty events?
Experiment	How, why	Yes	Yes
Survey	Who, what, where, how many, how much	No	Yes
Archival analysis	Who, what, where, how many, how much	No	Yes/No
History	How, why	No	No
Case Study	How, why	No	Yes

Because in this research the researcher has no control over the topic researched, the experiment strategy is not applicable. Archival analysis and history research

also do not apply, because of the qualitative character of the research and the need to look into the future. This leaves us with survey and case study research. The case study is generally superior when answering the how and why questions about a specific topic, when the researcher has little control over the behavioral events and when the event under investigation are contemporary [71]. This is clearly the case in this thesis, which incorporates the e-business strategy check and current developments with Siemens OCW.

Case studies can take the form of single and multiple case studies. The evidence from multiple cases is often considered to be more compelling, and the overall study is therefore regarded as being more robust. In addition, the validity increases with the number of cases selected.

This research will have the form of a single case study, a choice that had to be made because of time and resource constraints. The single case that will be used is that of the e-business strategy of Siemens OCW.

2.4 Data collection method

Yin [71] has listed six forms of, what he refers to as, sources of evidence for collecting data. These are documentation, archival records, interviews, direct observation, participant observation and physical artifacts. Each of these sources have their strength and weaknesses, which are listed in table 2.2

The author has used participant observation as the main source of information on the case. This choice was external determined, because the mentors of Siemens wanted the author of this thesis as additional (unbiased by Siemens culture) team member. This participant observation is used to gather data on the e-business strategy of Siemens OCW and to get a good insight in the e-business strategy check method used to get to the e-business strategy and roadmap.

In addition to this interviews with people within Siemens have been conducted on the perceived relationships between environment forces and the e-business strategy of Siemens OCW.

Table 2.2: Six sources of evidence and their strength and weaknesses

Source of evidence	Strengths	Weaknesses
Documentation	*Stable*:can be reviewed repeatedly *Unobtrusive*: not created as a result of the case *Exact*: contains exact names, references, and details of an event *Broad coverage*: long span of time, many events and many settings	*Retrievability*:can be low *Biased selectivity*: if collection is incomplete *Reporting bias*: reflects (unknown) bias of author *Access*: may be deliberately blocked
Archival records	(Same as above for documentation) Precise and quantitative	(Same as above for documentation) Accessibility due to privacy reasons
Interviews	*Targeted*: focuses directly of case study topic *Insightful*: provides perceived causal inferences	Bias due to poorly structured questionnaires Response bias Inaccuracies to to poor recall *Reflexivity*: Interviewee gives what interviewer want to hear
Direct observations	*Reality*: covers events in real time *Contextual*: covers context of event	Time consuming *Selectivity*: unless broad coverage *Reflexivity*: event may process differently because it is being observed *Cost*: hours needed by human observer
Participant observation	(Same as for direct observations) Insightful into interpersonal behaviour and motives	(Same as for direct observations) Bias due to investigator's manipulation of events
Physical artifacts	Insightful into cultural features Insightful into technical operations	Selectivity Availability

2.5 Research questions and approach

In order to make the research problem more useable it is split up in more aggravated research questions, which also give a roadmap for the research.

In the first research question the topic of external forces is addressed and spit up in two types of external forces, macro-environment and industry forces, and their influence on e-business. Thus the first research question is:

RQ1: *Which specific macro-environment and industry forces influence an e-business strategy?*

In order to answer the first question the PESTEL framework and the five-forces of Porter are chosen to describe the macro-environment and industry forces. The reason to choose for the PESTEL framework is because it gives a structured way to order the macro-environmental forces, in terms that are clear and understandable for the management of Siemens OCW. The choice for the five-forces model of Porter is because this is a standard model for industry analysis in strategic literature and also well known for people with a management background. For the macro-environment analysis the input of the literature research, the interviews, and the workshop have been used as a basis for the analysis. The industry analysis is based on the insights on the industry gained during the e-business strategy check, the customer and competitor analysis performed during the e-business strategy check and conversations with people within Siemens OCW, which cannot be said to be interviews.

In order to find the influence of these forces on the e-business strategy of Siemens it is necessary to know how these forces develop in the future. Therefore the second research question will be:

RQ2: *How are these external forces expected to develop in the future?*

The developments and trends of the found macro-environment and industry forces are analyzed during the literature research, and the interviews. The literature research and interviews have been conducted in a iterative way, as shows in figure 2.1.

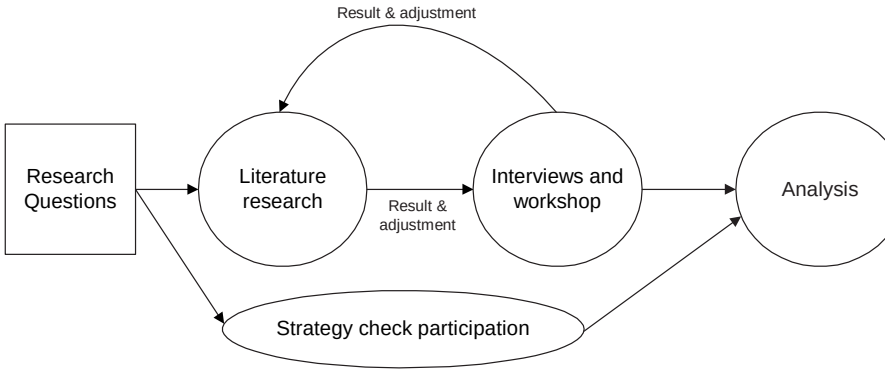


Figure 2.1: Iteration during the research

The research problem focusses on the e-business strategy of Siemens OCW, hence, the third research question is:

RQ3: *What is the current business and e-business strategy at Siemens OCW?*

In order to answer this research question participant observation during the e-business strategy check has been performed. This led to the e-business strategy of Siemens OCW. Important is that this method of observation also gave insight in the underlying forces on which the strategy was build.

The fourth research question focusses the macro-environment and industry forces on the e-business strategy of Siemens, and the fifth research question asks what the future developments of these forces mean for Siemens.

RQ4: *Which macro-environment and industry forces are relevant for the e-business strategy of Siemens OCW?*

RQ5: *What will the future developments of the relevant forces mean for the future of the e-business strategy?*

This part will be discussed in the analysis, in which the effects of the environment forces are described. Also advice for Siemens OCW on how to cope with these forces will be given. Finally the method for future analysis of these forces is addressed in the last research question:

RQ6: *What is an efficient way to identify the change of these forces and to assess the threats and/or opportunities of these changes?*

2.6 Conceptual Framework

This section will describe the conceptual framework used in this research. A conceptual framework explains, either graphically or in narrative form, the main dimensions to be studied - the key factors, or variables - and the presumed relationship among them [40]. Miles and Huberman [40] give some advises on developing a conceptual framework, and state that this can be best done graphically, rather than in text. Furthermore one should expect to do several iterations in the framework. The authors add that the creation of the conceptual framework is most easily done after a list of research questions is made.

Figure 2.2 shows the conceptual framework for the research. It is clear pictured that the influence of the macro-environment forces can have impact on the e-business strategy directly and indirectly. Indirectly means that the entire industry is affected by certain changes in the macro-environment, which then have impact on the e-business strategy. The two-way arrows between strategy/processes and the e-business strategy show that the findings of the e-business strategy also impact the business strategy and the way processes are designed. Because e-business has a great deal to do with optimizing business processes, the e-business strategy is displayed overlapping the business processes in the figure. The influence of the macro-environment and industry forces on the business strategies are not drawn to keep the picture orderly.

Although the scope of this research is on the influence of these outside forces on the organization, the framework also shows that the e-business strategy is influenced by forces in the organization, like the corporate, group and business strategy and the business processes.

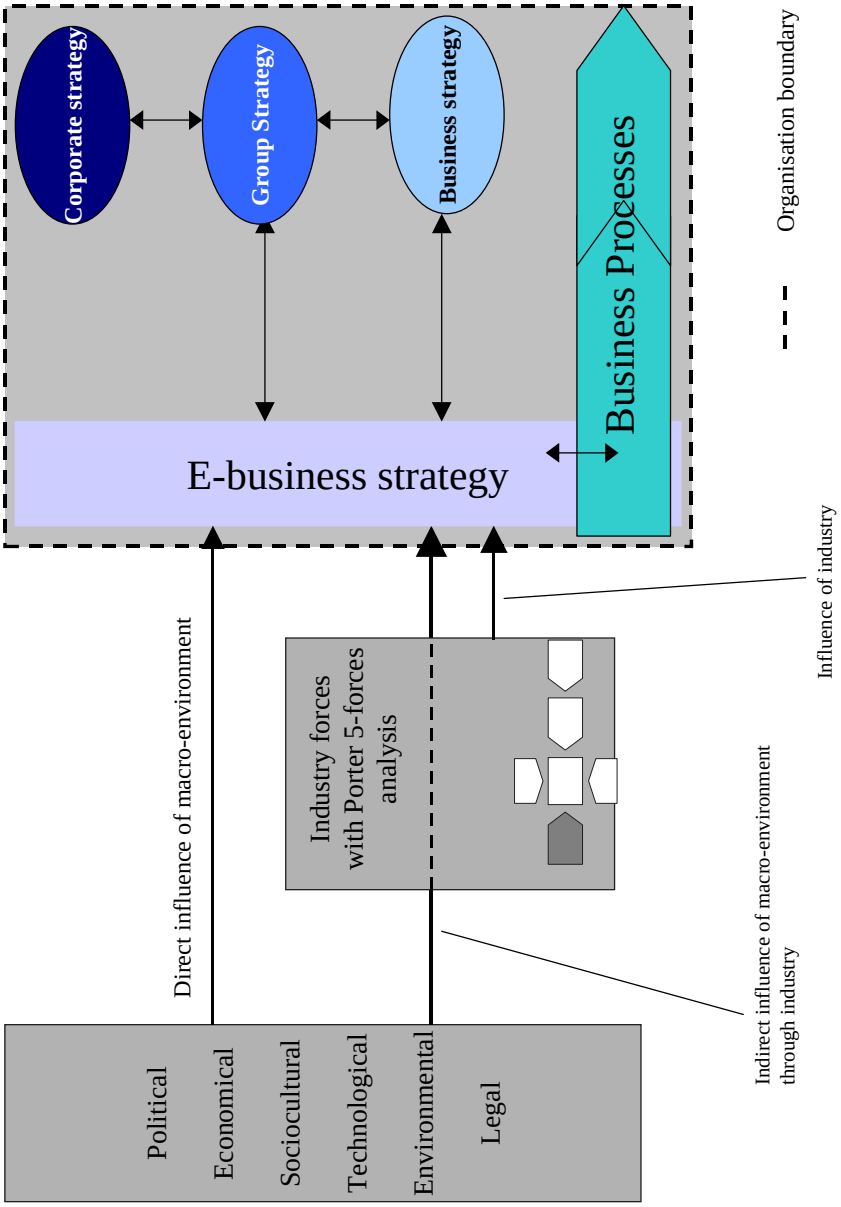


Figure 2.2: Conceptual framework

Chapter 3

Research environment

Chapter one has been given an introduction to the research and described the research problem. Chapter two described the methodology used in this research and gave the conceptual framework. This chapter will give an overview of Siemens and the group Industrial Solutions and Services (I&S), thereby describing the environment in which this research has been conducted.Within this group the research has taken place in the the division Oil & Gas, Cement and Water (OCW), which will be called Siemens OCW in the rest of the thesis. As of the first of October 2002 the structure of I&S has been changed, which has had some impacts on the research, and therefore this change will be described here.

The introduction already mentioned that the research was conducted in line with the e-business strategy check as performed by Siemens OCW during the time the research has been conducted. Section 3.4 and section 3.5 will describe the position of Siemens towards e-business and the method of this e-business strategy check. Finally some remarks towards how the e-business strategy check can be seen in a broader perspective will be made.

3.1 Siemens AG

Siemens AG [1,4] is a multinational company with 484.000 employees in 190 countries worldwide, of which 41% are employed in its origin country Germany. In 2001 Siemens AG earned € 2.1 billion in net income, with a turnover of € 87,8 billion .

Siemens was founded in 1847 by Werner von Siemens, who started in the telegraph business. During the next 150 years Siemens AG grew out to one of the leading technology firms in the world, producing equipment ranging from mobile phones, medical equipment to complete solutions for heavy industry firms like mining and oil & gas companies.

The only companies who can be compared as real competitors in all fields of Siemens' industry business are Asea Brown Boveri (ABB) and General Electric. Other competitors in the different fields range from Philips, Ericsson to Honeywell and Yokogawa.

The corporate structure of Siemens AG is given in appendix A, in which the red square identifies Siemens Industrial Solutions and Services group in which this research has been carried out.

3.2 Siemens I&S

Siemens Industrial Solutions and Services (I&S) supplies electrical equipment as well as drives, automation and IT solutions for many different manufacturing and processing industries and infrastructure systems. Next to this I&S also provides a wide range of technical services. The group has a turnover of € 4.6 billion in 2001, with a result of € 97 million. During this research the group was going through a big change in order to turn the business around. This was a result of the bad performance of the group in the first quarters of 2001/2002. The impact if this turnaround is high: the divisional structure of the group will be changed and ca. 5000 personnel places will leave the company (ca. 3800 by selling of businesses and ca. 1200 by early retirement and layoffs). The announcement of this restructuring has been during the start of this research and has therefore its impacts on the research. In order to understand the complete change the old and new situation at I&S are given below.

3.2.1 I&S before turnaround

The old organization diagram of I&S is shows in appendix B. This chart only shows the operative units, while the changes for the staff-units have not a big impact on the e-business strategy and the new organization for these staff-units has not been altered much. The structure of the operative units is clearly industry focused and contains the following operative business units [65] :

- Metals, Mining and Paper Technologies (MP)
- Oil & Gas, Cement and Water Technologies (OCW)
- Infrastructure and Marine Solutions (IMS)
- Intelligent Traffic Systems (ITS)
- IT Plant Solutions (ITPS)
- Industrial Services (IS)

The business units IS and ITPS are mainly involved as subcontractor for solutions provided by the other business units. For example, when OCW has a contract that includes the design, delivery and service of gas-field pumps the service part will probably be done by IS, which has local presence in 300 locations worldwide.

3.2.2 I&S new structure

The new organizational structure of I&S is given in appendix C. This shows a different structure, where I&S is divided in divisions for Industrial Plants, Industrial Services, IT Plant Solutions and Intelligent Traffic Systems. Within the Industrial Plants lie the different industry sollutions, with a seperate subdivision for engineering, project management and purchasing.

It can also be noticed that the subdivision Cement, that was part of OCW is no more in the picture. This subdivision will be closed down or sold to an interested partner.

In order to cope with the new structure the rest of this report will look into the e-business strategy of the subdivisions Water, Offshore and Onshore technologies. Therefore, in the rest of the thesis, when mentioned Siemens OCW it will mean the oil and gas and the water sections. The research is specifically looking at these industries, but it is expected that the conclusions can also be interesting for the other subdivisions of Industrial Plants.

3.3 Siemens OCW

The oil and gas part of Siemens OCW consist of two relatively separate branches, one for offshore technologies and one for onshore and pipeline technologies. These subdivisions have their own management and are situated in different locations: Oslo for offshore technologies and Erlangen/Karlsruhe for onshore and pipeline technologies. Below the business units which are taken into account in this research are described.

3.3.1 Offshore technologies

Offshore Technologies offers compete electrical solutions and services for the Offshore Oil & Gas industry. This includes the supply of high quality equipment from Siemens factories and services like:

- Consulting
- Project conception, e.g. basic concept, feasibility study, engineering
- Coordination of all commercial and technical activities e.g. financial services, procurement
- Manufacturing and supply of equipment, integration of IT solutions
- Erection, commissioning and final testing

The headquarters for Offshore Technologies is located in Oslo, Norway and has as focus strategy to roll out offshore business on a global scale to leverage Norwegian success. This Norwegian success is based on a strong local market position and the strong international and language skills of the Norwegian employees. Opportunities for the offshore industry are the increasing, large market, the trend to strategic partnering & alliancing in the industry, the new field deep water. Threats include the strong competition, the dependency on the economic environment (oil price development) and the local low-cost competition [19].

3.3.2 Onshore and pipeline technologies

The onshore and pipelines division is located in Karlsruhe and Erlangen, Germany. According to the redefined strategy they have to focus on six selected plant types and develop modular replicable solutions to facilitate engineering and execution. These plant types are

- Pipelines
- Compressor Stations
- Gas Treatment
- Injection Plants
- Terminals
- Tank Farms

The division is doing well on the key success factors for endcustomers, but is behind with the epc-companies[1]. Here the key success factors that need to be improved are in the fields of price, risk sharing and process know-how [19].

3.3.3 Water

The water subdivision is providing electrical solutions to customers operating in the fields of drinking water generation and waste water handling. Provided solutions range from equipment for waste water treatment to pumping stations. These solutions include products as transformers, control gear, electrical motors and automation systems.

The market for drinking water and waste water treatment is highly fragmented; the market leader has a market share of ca. 1.5%. Customers are mainly government owned plants which face the challenges of modernization, increased pressure for environmental control, cost restrictions and the risk/opportunity of privatization. Next to this there are some customers that have water handling for their private industry, but the main focus of OCW is the public and semi-public organizations as main customer.

3.4 Siemens and e-business

Siemens has a clear vision on e-business, which states that Siemens will transform in an e-enabled company with all of its processes e-enabled. As Dr. Heinrich v. Pierer, CEO of Siemens, stated in the annual letter to shareholders 2000 [2]:

"The reshaping of Siemens has now entered a particularly crucial phase. We are networking the Company's entire value chain, internally as well as externally, to

[1]The term epc-company is described in appendix D

include customers, suppliers and partners. As we amplify our traditional core competencies through e-business, we are transforming Siemens into a New Economy company with substance."

A year later, in the annual report 2001, this vision is still strong, as Dr. Heinrich v. Pierer states again in the letter to the shareholders [1]:

"A year ago, I described how we are melding our industrial competencies with the advantages of e-business to transform Siemens into a New Economy company with substance. This effort is continuing. We have made great progress in networking our internal value chain electronically and in linking it to our customers, suppliers and partners. This is enabling us to accelerate processes and cut costs. We are consolidating our competencies in e-business, IT infrastructure and the worldwide standardization of business processes and combining them in the new Corporate Information and Operations unit. Our global electronic network enables us to leverage our Company's vast synergy potential across all divisions and regions better than ever before, giving us a decisive competitive advantage."

This transformation to an e-business company takes place in all parts of the organisation. The Centre of e-Excellence (CoeE) has been set up to provide showcases, assistant and consultancy in the transformation process. This centre developed the 'e-business strategy check', which gives a structured way to come to e-business projects that are in line with and support the business unit strategy. This method will be described in 3.5

Siemens has set four specific goals regarding e-business:

- To will develop a worldwide Siemens e-business culture;
- to build supply chains focussed on customer value with our partners and suppliers;
- to implement a flow of information and knowledge driven by business demand;
- to build a state of the art standardized, worldwide Siemens IT network.

This will be done by focussing on three main elements:

- TRANSFORM existing processes (leads to standardized business models, optimized processes and cost savings)";
- CREATE new business models (leads to new business models, new business opportunities and sales increase);
- SELL Siemens proven e-business solutions (leads to new markets, new customers and increased revenues).

Siemens has also set some quantitative goals for e-business, which are:

- to generate 25% of total sales via e-business;

- to generate 50% of total sales in customer segments via e-business;
- to buy 50% of total procurement via e-procurement;
- to get a 2% cost reduction on the buy-side[2];
- to get a 2.5% cost reduction in the supply chain;
- to get a 0.5% cost reduction on the sell-side.

[2]cost reduction percentages are of of turnover

3.5 E-business strategy check methodology

For the development of e-business strategies Siemens is using the e-business strategy check methodology, developed by Siemens Management Consulting (SMC). The idea behind the e-business strategy check is that this methodology provides the business unit with a clear view on e-business and a straightforward way to identify e-business projects that support the current strategy. The result of the strategy check should be a roadmap with e-business projects that support the business strategy. The findings of a strategy check will also influence the overall strategic thinking in the business unit regarding e-business. The different modules with their proposed end-products are listed in table 3.1. Appendix E describes the different modules in more detail and also gives a graphical representation of the modules.

Table 3.1: Modules and end-products of strategy check

Module	End-product
Team kick-off	Core team's common understanding and support
Business strategy analysis	Clear picture of current business strategy
Business e-readiness check	Business e-readiness compared to benchmarks(best-of-best / -breed)
E-experience workshop	Managements understanding of e-business impact on their business
E-business strategic discovery	Set of e-business scenarios and strategic responses
Scenario selection workshop	Selected business scenario and strategic responses for the business unit
Solution formulation	Set of described e-business solutions to enforce strategic responses
Decision workshop	Selected e-business solutions for the business
Implementation planning	Implementation plans and teams
Kick-off implementation	Start of implementation of e-business projects
Customer analysis	Deep understanding of customers e-business needs and activities for sound e-solution formulation
Competitor analysis	Understanding of competitors' e-strategies for development of competitive strategic responses and solutions
E-awareness	Management e-know-how and active commitment

3.6 E-business strategy check in broader perspective

The name strategy check is somewhat misleading because it suggest that the current strategy is being checked for compatibility with e-business influences, which

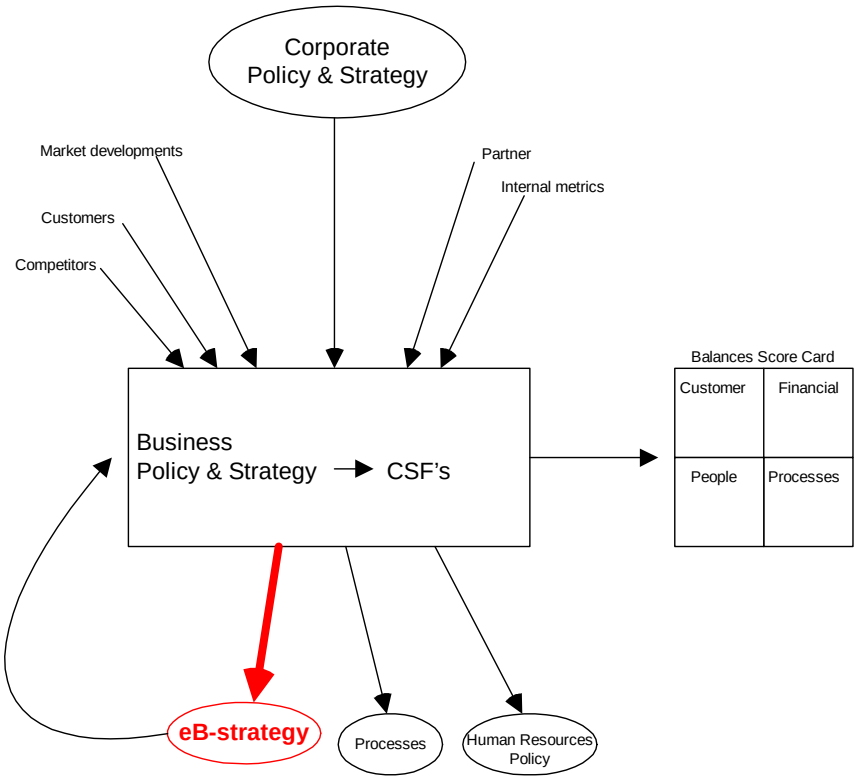


Figure 3.1: Placement of the e-business strategy check

is not the case. The goal of the e-business strategy check is to formulate an e-business strategy as support for, or specification of, the business strategy. Figure 3.1 shows how the e-business strategy check is related to the business strategy. Here the e-business strategy check is displayed as the big red arrow, which is the path from business strategy to the specialized e-business strategy with projects that support the business' critical success factors. The arrow back to the business strategy shows that e-business can also change the business strategy because of new possibilities or competitive advantages. This is the current situation, where the e-business strategy is still somewhat loose from the business strategy and there is no integration. Figure 3.2 shows the future vision of the e-business strategy for 'tomorrow'. In this vision e-business will become an integral part of the business strategy and we no longer talk about e-business, because it is all normal business.

When comparing this view with the research model (see figure 2.2) it can be noted that the research model extends this view by assuming that the macro-environment forces influence the e-business strategy not only through the business strategy but also directly. The important question is to find out if these direct influences are so important that they should be taken into account, or that they are already taken into account enough with the business strategy. The former would implicate that the e-business strategy check should be extended with an environment analysis, which could be put in the framework as a module D which would be conducted

parallel to the customer and competitor analysis (see figure in appendix E). The latter would tell us that the strategy check is taken the environment influences sufficiently into account by using the business strategy as a starting point.

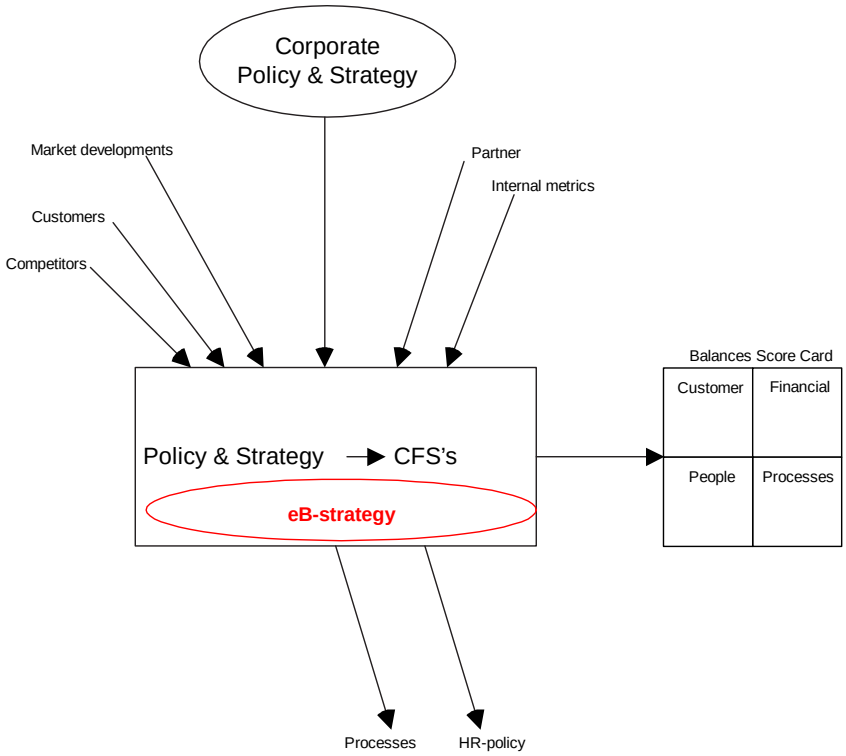


Figure 3.2: Future placement of the e-business strategy

This view can also be looked at from the point of view of the European Foundation for Quality Management which developed the EFQM excellence model [17], which is used by Siemens. Although this model has no special place for e-business, it is highly likely that it can be placed under enablers according to Dr. Forstner, the EFQM and process expert of Siemens I&S. Figure 3.3 shows the EFQM excellence model as given by the foundation. Figure 3.4 shows the possible placement of e-business strategy elements in this model[3].

The placed e-business blocks can be explained as follows: the start of e-business initiatives in an organization should be an initiative from management, which states the importance of the topic and makes sure that there are resources available. To get solid results this idea of 'we have to do something with e-business' has to be founded by an e-vision and e-strategy to put the ideas into place. This requires people with skills, as well as an understanding throughout (at least the affected parts of) the organization on what e-business is and can mean for the business, which we call the e-readiness of the organization. Next to this the technologies should

[3]This insight has risen at the end of the research and will be looked into deeper outside the scope of this thesis

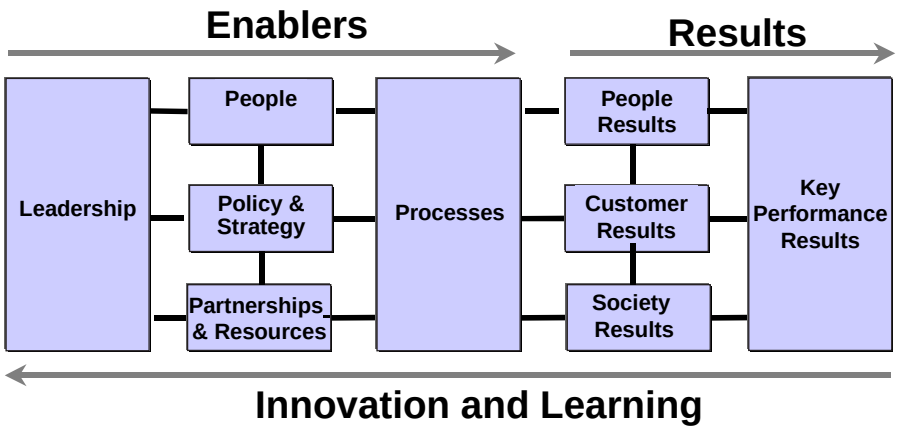


Figure 3.3: The EFQM excellence model

be available to put the e-strategy into action. This results in e-business projects and a change of processes where necessary to make the processes e-enabled.

The e-business strategy check of Siemens tries to fill in the block of e-vision and e-strategy, and make a roadmap with e-projects. It also tries to answer the current state of the e-readiness. When looking at figure 3.4 it raises the question if the e-business strategy check could incorporate all the blocks in the enabler section. This question will not be discussed here because it lies outside the scope of this research.

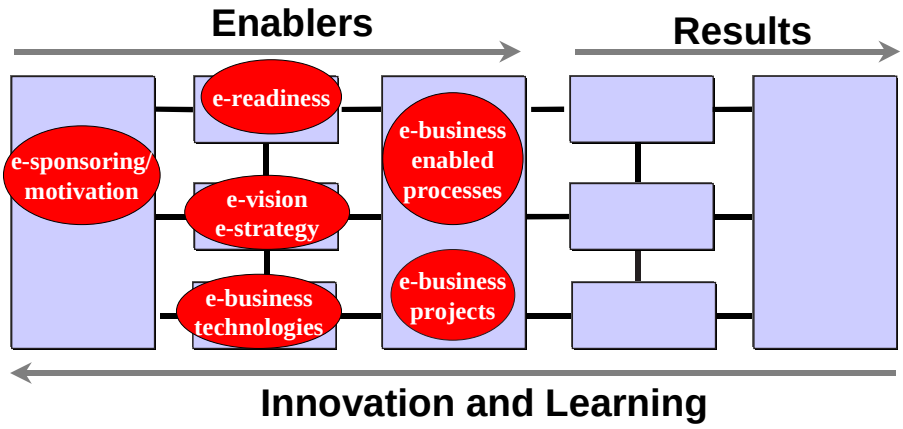


Figure 3.4: Placement of e-business strategy elements within the EFQM excellence model

Chapter 4

Research overview

Chapter one gave an introduction on the research and described the research questions to be answered in this research. After that chapter two introduced the methodology of the research and chapter three described the research environment. The purpose of chapter four is to review the literature on the related topics of this research. These topics are e-business/e-commerce, strategy making, and industry/macro-environment influences on e-business.

Because of the nature and speed of e-business, not only academic literature is reviewed, but also information found on websites with the topic e-business have been taken into account.

First e-business and electronic commerce will be defined, the broad field of impact described and reasons for e-business as found in literature will be given and analyzed. Secondly a look into the field of strategic analysis will be made and the description of the available methods will be given. Finally, the findings of the literature interview on macro-environment forces will be given. It should be noted that only for macro-environment forces the literature research is done, the analysis of industry forces is handled in chapter 6 with the information gathered during the field research.

4.1 E-business and electronic commerce

The arrival and growth of the Internet has forced companies to respond in an unprecedented manner. After several years of extreme opportunism, uncertainty and fear, the challenge has only just begun. The Internet is here to stay - that is clear [36]. The question is how we can use it in such a manner that it helps the organization keep its competitive advantage. This section will describe some of the many insights on e-business and e-commerce of the last years as well as give the definition of e-business that is used during this research.

4.1.1 Definition

Because e-business is a young field of research, and because of the enormous amount of attention the media paid to the subject, it has not always been very clear what is meant with e-business. Various definitions can be found in popular and scientific literature:

- *E-business (electronic business), derived from such terms as "e-mail" and "e-commerce," is the conduct of business on the Internet, not only buying and*

selling but also servicing customers and collaborating with business partners. Whatis.com, 2002 [67]

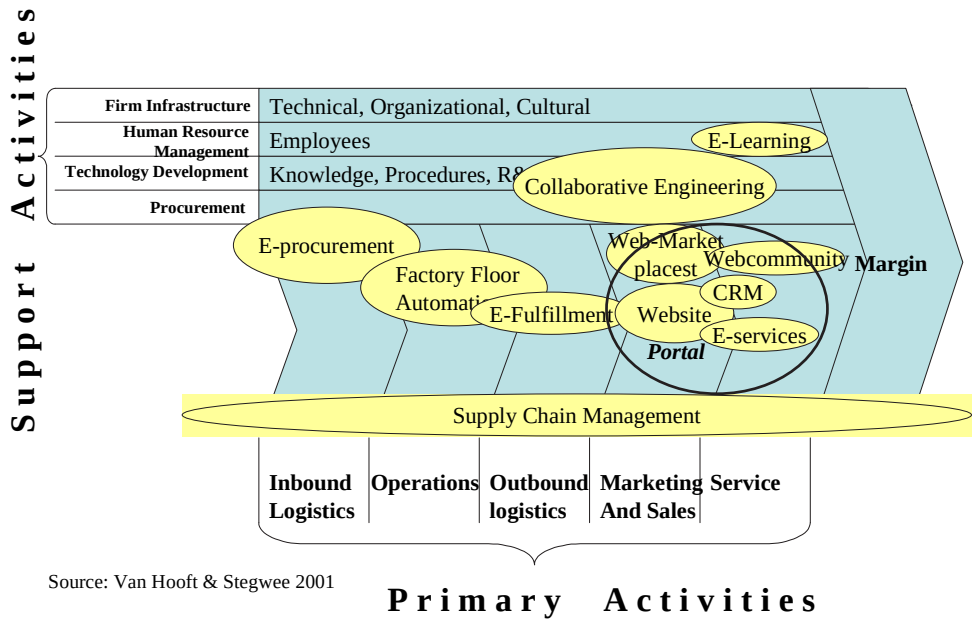
- *E-business is the use of Internet technologies to improve and transform key business processes.* IBM, 2000 [27]
- *e-business is the complex fusion of business processes, enterprise applications, and organizational structure necessary to create a high performance business model.* Kalakota and Robinson, 2001 [33]
- *[E-business is] the use of the Internet and other digital technology for organizational communication and coordination and the management of the firm.* Laudon and Laudon, 2001 [37]
- *E-business: any Internet initiative tactical or strategic that transforms business relationships, whether those relationships be business-to-consumer, business-to-business, intrabusiness, or even consumer-to-consumer. E-business is really a way to drive efficiencies, speed, innovation, and new value creation in an organization.* Hartman, Sifonis, and Kador, 2000 [55]
- *It is important to note that e-business is much more than electronic commerce. E-business involves changing the way a traditional enterprise operates, the way its physical and electronic business processes are handled, and the way people work.* El Sawy, 2001 [14]

When looking at these definitions we see that most of them talk about the use of Internet or Internet technologies to improve internal and external processes. Therefore the definition used in this research for e-business is:

e-business is the use of the Internet and Internet technologies to support and improve both internal and external business processes, and the products and services of the organization

In order to give an overview of the different processes which can be involved in e-business we can use Porter's value chain [49]. Van Hooft and Stegwee have placed different e-business technologies in this framework to give an insight into the reach of these technologies in the value creating activities of the firm [64]. Figure 4.1 shows an adapted version of this. Some of the important terms in this figure are described in appendix F.

The figure does not show all e-business technologies, methods and practices, but gives a good impression of the broad field of e-business. The important thing is that this figure shows that the applications are not bounded in the functional framework of an organization, but 'break the walls' by linking the different parts of the value chain in a realtime environment, in which there is no place for functional thinking. This implies that e-business is not only implementing technology, but a cultural change in the way people are working together. This cultural change is something that has to implemented both inside the company, and in the relationships with customers and suppliers.



Source: Van Hooft & Stegwee 2001

Figure 4.1: The e-business value chain

4.1.2 Reasons for e-business

Gloor [18] argues that there are five obvious reasons why it would be foolish for a company not to embrace e-business. Below these are given, together with the way in which they can be applied to the situation with Siemens.

- *Revenue Increase - The Internet opens up a new sales channel, allowing companies to easily reach new markets that were inaccessible to them before. They also have a cost-efficient way to approach new customer segments. Mass-customization enables companies to create synergistic new product offerings based on their core competencies.*

  During one of the workshops in the e-business strategy check a manager also identified this as an important factor, because of the current problems with new order intake. He argued that the Internet could help attracting more customers. When looking at the water segment a highly fragmented market can be found, with a market share of only 2% for the market leader and a lot of local market leaders, this is a big opportunity. In the new situation at Siemens I&S the internationalization of the water division is also an important issue, in which e-business can be of assistance.

- *Cost reduction - Many processes can be handled much more efficiently over the Internet, starting from design and production, over sales and marketing, to learning and change and management and decision making. On the IT side, the open Internet standards provide an efficient means to reduce costs by reducing IT variety and complexity. Also, once a process has been adapted to operate over the Internet and the infrastructure has been set up, similar processes can be easily derived using the same infrastructure.*

At the start of the strategy check the management of Siemens OCW made clear that the e-business strategy should focus on cutting costs and knowledge management. Pressure from the market and the current economic climate make cutting costs an important issue throughout I&S.

- *Customer retention - The Internet has introduced concepts like mass-customization, and user profiling, allowing companies to get to know their customers much better. Companies get the change to act proactively based on previous action of the customer and to personalize new offerings. Different sales channels can be managed in an integrated way, extending goods like plane tickets to New York with additional personalized offerings like tickets to musicals, limousine rentals, or even information about a special sale in Macy's.*

  In the business of Siemens OCW the contact with customers is very important. Most projects take long to negotiate, but are big in financial terms. The reason Gloor gives here is not that important for Siemens OCW. It is possible to build personalized web portals which give each customer the information they need, but the feeling of trust and intimacy that it needed to make a deal will still be reached through the account managers who know their customers and are trusted by them.

- *Image improvement - By successfully applying innovative technologies in creative ways, an enterprise gets the opportunity to establish itself as a leader among its competitors. Also, as the Internet has become an established way of communication among young and more affluent people, a company gets the change to directly address this highly attractive customer segment.*

  The fact that Siemens displayed itself with the vision of becoming an e-enabled company has a lot to do with its image. For investors and customers this is a signal that Siemens is on top of new possibilities. When looking at Siemens OCW this can not be seen as an important reason for conducting e-business. This has partly to do with the conservative nature of the market in which Siemens OCW is operating. Next to this the 'bursting of the bubble', as the collapse of the Internet hype is often called, has taken off a lot of the interest in e-business for image building.

- *Keeping up - Today it is no longer a question of whether investing into Internet technology is a good or bad thing, but rather it must be done 'because the competition is also doing it' in order to keep the option open. This allows a company to acquire know-how about Internet technologies early, and to direct investments into the areas most profitable to the core company business.*

  This is also the case with Siemens OCW. Customers are asking for collaboration tools, solutions for ordering spare parts online and see Siemens as a company that knows what to do. This is important to keep in mind, that Siemens not only has to keep up with the competition but also with the expectations of their customers. By implementing best practice sharing programs Siemens tries to use the know-how acquired with one project through the whole company.

Concluding it can be said that of the reasons mentioned by Gloor revenue increase and cost reduction are the most important goals for Siemens OCW to conduct e-business. In the corporate vision of Siemens we see that image improvement and cost reduction has been a main reason, which can be concluded by the fact that Siemens has promoted e-business extensively in the media (Siemens will become an new economy company). This is not that important in the industry sector, but for consumer business this is still an important reason. Customer retention in the way Gloor described is not an important reason for Siemens OCW, but e-business must support the human interaction which builds valuable relationships with customers. Keeping up is an important drive for e-business, although most of the companies in the industry do not know where e-business is going. Therefore with Siemens OCW e-business is more customer demand driven than competitor driven.

4.1.3 Development and trends of e-business

The previous sections looked into the definition of e-business and why companies would conduct e-business. Because the goal of this research is to look at the future e-business strategy (by looking at external influences) it is logical to look what literature says about this future development of e-business in general. The Gartner Group, one of the leading research companies on IT and technology, has developed the concept of the 'Hype Cycle' which gives a prediction of the development of e-business. Figure 4.2 shows this hype cycle applied to e-business.

The important conclusion of this model is that we are in the *'trough of disillusionment'* at the moment, which makes it difficult to find sponsors for e-business because of the negative feeling toward the topic. This is due to the disillusionment people have after the dot-com shake-out, the feeling that e-business is dead. Another important conclusion is that in about five years e-business will be integrated into business and will be seen as a normal process. This is where e-business as a specialized topic will end. Appendix G described the hype cycle in more detail and also gives Garter's emerging technologies and trends hype cycle.

This concludes the introduction to e-business. We have seen what e-business is, why companies conduct e-business and how e-business is expected to develop in the next years. The following section will describe the field of strategic analysis, of which standard frameworks will be used to assess the impact of macro-environment and industry forces on the e-business strategy of Siemens OCW.

4.2 Strategic Analysis

This section will describe research on strategic analysis as found in the literature, which will be used as a framework for analyzing the impact of macro-environment and industry forces on the e-business strategy of Siemens OCW. According to Porter [50, 51] and Porter and Millar [49], a firm develops its business strategies in order to obtain competitive advantage (i.e. increase profits) over its competitors.

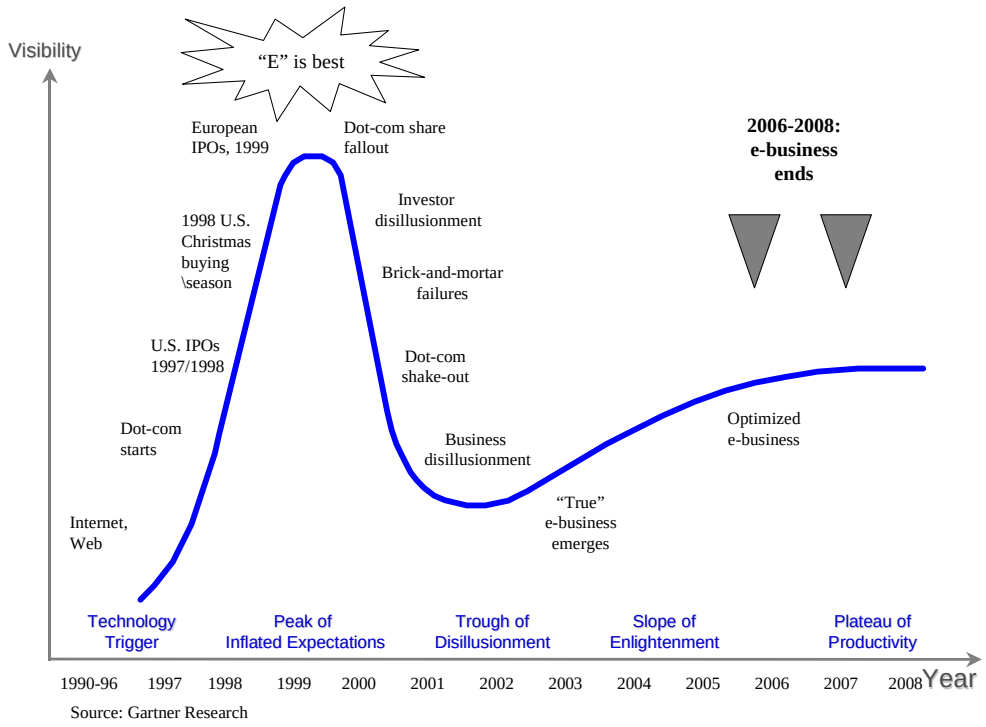


Figure 4.2: Gartner's Hype Cycle for ebusiness

Johnson and Scholes [32] state that strategy can be seen as the matching of the resources and activities of an organization to the environment in which is operates. The former talks more about the goal of strategy making, the latter of how it can be done, which indicates that the organization must know their environment in order to make the 'match'.

Table 4.1 shows the development of insights in strategy analysis as given by Pohl [48], which shows that the latest insights in the field are quite young. Literature on strategy suggests that with strategic analysis the researcher has to look at both the inside and the outside of the firm. Within the firm we can find the resources, competencies and core competencies available to an organization [23, 32]. The environment of the firm can be split up in the industry in which the organization is operating and the macro-environment [32]. The scope of this research is the forces outside the firm, therefore the internal analysis techniques will not be discussed here.

Primarily, there are three strategies firms use to create competitive advantage: overall cost leadership, differentiation, and focus. An overall cost leadership strategy attempts to offer the lowest cost product or service to customers relative to a firm's rivals. This is build on the efficient management of the entire value chain, where cost must be rigorously controlled from raw material purchases to distribution channel delivery. A differentiation strategy positions a company to compete on the uniqueness and value of its products and services. Well-known brand image, a strong reputation and quality products and services are the characteristics of a differentiation strategy. A focus strategy is used by companies to position

themselves in a market niche. In their particular niche they create competitive advantage over rivals through either cost leadership or differentiation tactics [13].

When looking at Siemens OCW we can safely say that the primary strategy is differentiation. Siemens solutions are known for their quality and customers come to Siemens OCW with the feeling that they will get the solution they want, even if it takes some time because it has never been done before. For differentiators cost control is also important, they have to keep a level of cost parity or proximity relative to competitors. Differentiators do this by reducing costs in all areas that do not affect differentiation. Differentiators may gain distinct advantages through Internet strategies by providing highly tailored customer management systems to enhance sales efforts, provide rapid feedback to customers and suppliers, and give real-time solutions to service problems. The advantage of differentiation is that firms employing differentiators can create capabilities so specialized for a given customer that the change of customers turning to other solution providers, whether imitations or substitutes, is greatly lessened [13].

Table 4.1: Development of strategy systems

Timeframe	50's/60's	70's/early 80's	late 80's/early 90's	2000+
focus	longtime planning	external opportunities "Industry and Market"	internal resources "Firm"	value orienting, integration, external opportunities, internal resources, business models
content	anticipation on developments	attractive markets, competitor advantages, diversification (Porter)	capabilities, core competencies, resources (Hamel-Prahalad)	capital Market, concentration on core competencies (outsourcing), e-business
assumptions	trends are external forced	" We can do everything" the future is predictable	the decision is made internally	value creating through concentration and integration
centralizing	middle	high	high-low	high-low
planningcycle	ca. 10 year	5 years	3 years	permanent, triggered

4.2.1 Industry analysis

The industry of a firm is defined as 'a group of firms producing the same principal product' [32]. An often mentioned way to analyze an industry is the five-forces analysis of Porter [32, 50]. In 1980 Porter described in his book Competitive

Strategy a structured method to analyze the overall attractiveness of an industry, which made the link between strategic management and the economic theories of industrial organization. This method states that this overall attractiveness of an industry is determined by five underlying forces of competition: the intensity of rivalry among existing competitors, the barriers of entry for new competitors, the threat of substitute products or services, the bargaining power of suppliers, and the bargaining power of buyers. This framework is given in figure 4.3.

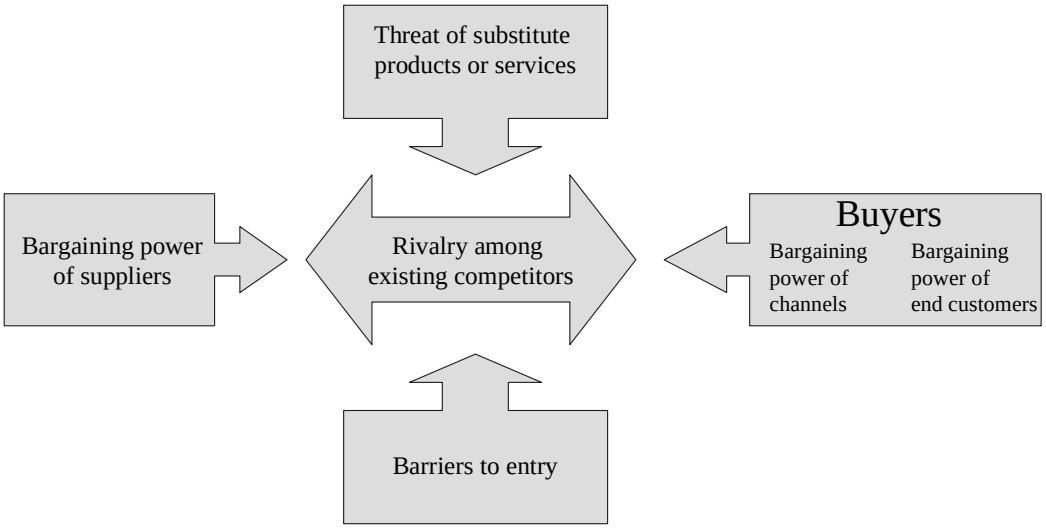


Figure 4.3: Porters 5-forces framework

Johnson and Scholes say about Porter's five forces analysis that it must be used at the level of strategic business units, it should not be used to just give a snapshot in time, but to understand how the forces can be countered and overcome in the future. When analyzing the barriers of entry one can look at the capital requirements for entry, the needed experience, the legal constraints and the importance of brand name. When analyzing the bargaining power of buyers and suppliers one can look at the concentration of buyers and suppliers, the availability of alternative sources of supply for customers (how many other suppliers are there?), and the threats for forward or backward integration. Competitive rivalry is affected by the number of competitors, the extend to which competitors are in balance , and exit barriers [32].

Porter is in his article "Strategy and the Internet" [52] not so positive of the advantages of the Internet. He argues that the internet is not necessarily a blessing. It tends to alter industry structures in ways that dampen the overall profitability, and it has a levelling effect on business practices, reducing the ability of any company to establish an operational advantage that can be sustained.

4.2.2 Macro-environment analysis

The environment of an organization in business is described by Andrews as "*the pattern of all the external conditions and influences that affect its life and development*" (Andrews in [41] p. 47). For the analysis for the macro-environment Johnson and Scholes [32] suggest the PESTEL framework, which is used to categorize environmental influences into six main types: political, economical, social, technological, environmental and legal. This method will also be described in the section below.

The PESTEL framework provides a summary of some of the questions to be asked about key forces at work in the macro-environment [32]. Political factors are government stability, taxation policy, foreign trade regulations and social welfare policies. Economic factors are business cycles, GNP trends, interest rates, money supply, inflation, unemployment and disposable income. Sociocultural factors are population demographics, income distribution, social mobility, lifestyle changes, attitudes towards work and leisure, consumerism and levels of education. Technological factors are government spending on research, government and industry focus and technological effort, new discoveries/development, speed of technology transfer and rates of obsolescence. Environmental factors are environmental protection laws, waste disposal and energy consumption. Legal factors are monopolies legislation, employment law, health and safety and product safety regulations.

A first look at this overview rises the thought in which way these influences have impact on the e-business strategy. Johnson & Scholes state that the importance of these factors will differ for different organizations. In order to define the macro-analysis for the e-business strategy each of the six forces of the PESTEL framework will be reviewed with found literature in section 4.3. It can be expected that not all of the factors mentioned by Johnson and Scholes will have an impact on e-business. As indicated by research question six this research will try to formulate a method to periodically analyze the macro-environment for e-business, of which an adapted version of the PESTEL framework for e-business could be a part. This will be discussed in chapter seven.

4.3 E-business macro-environment

With the PESTEL framework as guide this section will analyze academic and popular literature and websites in order to identify macro-environment forces which influence the e-business strategy.

4.3.1 Political factors

General

Jarvenpaa and Tiller [31] argue that technology and management strategy choices are increasingly tied to the political, social and regulatory environment in which e-business finds itself. They quote Steve Case, Chairman of AOL:

I believe over the next few years the future of the Internet will be determined more by policy choices than technology choices.

Steve Case, AOL Chairman (Wall Street Journal, 12 July 1999, A22)

This indicates that there is an important influence of politics on the e-business strategy of organizations. But where does this influence sits? The PESTEL framework as described by Johnson and Scholes [32] suggest that we look at government stability, taxation policy, foreign trade regulations and social welfare policies. Below the first three are looked into for e-business, the latter one is not taken into account because of the low perceived impact on e-business. One point that is taken into account which is not mentioned in the PESTEL framework of Johnson and Scholes is the government attitude towards a development, in this case e-business.

Government stability

When looking at government stability it is easy to understand the impact on a 'normal' business strategy. Especially with the oil and gas branch, with a lot of important customers in less stable regions like the Middle East and Asia, this is an important topic. When looking specific information on government stability influences on e-business nothing was found in the literature, though it can be expected that government instability influences the possibilities to implement an e-business strategy. This can be the result of changing legal frameworks, trade policies, privacy regulations etc. Therefore government stability will be seen as an underlying force that influences other macro-environment forces.

Taxation policy

Taxation policy on the other hand, is a hot topic in discussions on e-business [25,26, 46]. Because the nature of the Internet, which allows for example somebody in the USA to sell something to all other countries, it is very difficult to determine under which tax jurisdictions a product or service should be regarded, e-business is in nature multi-jurisdictional. This is especially the case with the real e-companies[1], who can exist without global constraints and sometimes even without a physical presence. These organization are the 'born global' firms [26].

The Organisation for Economic Co-operation and Development (OECD) gives principles which should guide governments in their approach to e-commerce. This is done with the Taxation Framework Condition – agreed in Ottawa in 1998 – which states that e-commerce should be treated in a similar way to traditional commerce and emphasizes the need to avoid any discriminatory treatment. This Framework was welcomed by member countries, non-member economies, and the business community [44, 45].

The European Union is also addressing the issues around taxation policy, but this addresses currently only B2C transactions: *The aim of the [European] Commission's proposal in relation to VAT on electronically delivered services is straight-*

[1] I assume that the authors mean with real e-companies, companies that do all or more than 80% or their business online

forward to rectify a number of shortcomings in the existing EU VAT rules, which were never designed to accommodate online business. E-commerce was simply not envisaged when the current tax laws were drafted. The existing rules in relation to place of supply of electronically delivered services give a perverse result which common sense alone would justify remedying [60]. The proposal is currently being discussed in the council.

Foreign trade regulations

With foreign trade regulations a problem at the heart of e-commerce trade comes to the surface, that is, the definition of goods and services. If a book is ordered online, but is delivered physically, there is general agreed that, for the purposes of international trade rules, it is a good. That makes it subject to the international rules for trade in goods, the GATT (General Agreement on Tariffs and Trade). However, if the book is delivered electronically - downloaded onto the computer of the customer - there is no agreement whether this digital product should be treated as a good under the rules of the GATT, or as a service, which would make it subject to a GATS (General Agreement on Trade in Services) regime.

Not a trivial distinction, since there are important differences between the rules covering goods and services, including the type of market access granted and non-discrimination between national and foreign suppliers. For example, discrimination against foreign suppliers is, in general, forbidden for trade in goods, but not for trade in services. The status of these e-products is as yet to be agreed by member governments in the WTO [43].

Because of the nature of the business of Siemens OCW they work with products as well as services, integrated in solutions, which makes it very important to take into account under which rules Siemens is working. Because of the experience of Siemens OCW with international projects, not to much problems are expected with these trade regulations.

Government attitude towards e-business

The acceptance and promotion of e-business by a government can give it a good impulse, thereby helping turning the negative attitude given by the de-hype. The European Summits at Lisabon (March 2000) and Feira (June 2000) put an European initiative for e-government on the agenda. It consists of four main tasks [59]:

- firstly, the development of Internet-based services to improve access to public information and services;
- secondly, the improvement of transparency of public administration by using the Internet;
- thirdly, full exploitation of information technology within public administration;
- fourthly, establishing e-procurement.

This shows the importance given to the use of the Internet in their processes by politics at a European level. Further initiatives that can be mentioned are for example "Nederland gaat Digitaal" [63] in The Netherlands and "the office of e-Envoy" [20] in the United Kingdom.

One important development in Germany, which is traditionally an important (home) market for Siemens is BundOnline2005. This is the eGovernment initiative of the Federal Government of Germany, and has a clear objective. All services of the federal administration will be available online by 2005. The most important impact on the e-business strategy of B2B companies like Siemens OCW will be the electronic procurement of public authorities.

The Procurement Office will announce public invitations to tender on a central Internet platform (e-awards). In the future, providers will be in a position to inform themselves rapidly and easily about the Procurement Office's entire investment projects. Search engines will facilitate this process even further. Interested parties will be able to download and process relevant data.

Just by a mouseclick, firms will be able to transmit their bids to the Procurement Office. This will be done in a secure manner, and competitors will not be able to read these bids. The awards for the most economical bids and confirmations of orders will also be sent to clients via Internet. The Internet not only helps to save time and administrative cost; it also provides for more transparency in competition. In addition, it will be possible to simply pool individual orders into larger lots. This way, the Procurement Office will achieve lower prices quoted by its potential contract partners. Topical studies have shown that the state will rapidly be able to save billions by online tender procedures. And the tax-payer will also benefit [8].

These government initiatives help building trust in the possibilities of e-business, as well with consumers as with companies. Next to this the BundOnline2005 initiative offers an interesting new channel to sell solutions, especially in the water industry.

4.3.2 Economic factors

Johnson and Scholes [32] suggest that we look at Business cycles, GNP trends, interest rates, money supply, inflation, unemployment and disposable income. A review of the literature showed the importance of the business cycle, the investment climate and the market potential of e-business.

Business cycle

The general economic situation and the economic performance have a big influence on the e-business strategy. In times of economic downturn the pressure on cost-reduction and increased efficiency are high, although there is little budget to implement long-term focussed projects, like knowledge management. This means that an e-business strategy has to focus on small incremental steps that go toward

the long-term goal, but are each cost-controllable and give quick return on investment. In the end this will probably mean that the total expenses to reach the long-term goal are higher, but more controlled.

E-business investment climate

When the economic situation is important for the e-business strategy because of the ease in which projects are started it is good to look at these investments a little bit closer. Forrester [53] (see figure 4.4) gives a distinction in three fases of investment in e-business, where the first five years are clearly defined as a learning phase, where *experimentation* with the new and unknown technology takes place. The second phase is *rationalization*, where promises on possible future profits and measurements in eyeballs (how many people take a look at your site) do not count anymore. This phase is characterized by focus on return on investment, cost efficiencies and real hard evidence of profit (this can be seen as, the 'old economy' values take meaning again in the 'new economy'). This phase is the same as the 'trough of disillusionment' in the gartner hype cycle. Because of the increasing uncertainty companies investment decisions are taken more carefully. Calcagnini and Saltari [10] give empirical evidence for the relationship between higher perceived uncertainty and lower investments, where uncertainty is described in uncertain future demand. This could mean that it will be difficult to find sponsors and budget for e-business projects in the current uncertain time, which is supported by experiences during the e-business strategy check at Siemens OCW.

The third phase is described as *renewed innovation*, where the benefits of e-business are seen in the removal of boundaries between companies and more intercompany collaboration. This goes to the 'platform of productivity' in the gartner hype cycle.

Figure 4.5 shows the IT investment in the US and Europe, compared to the spending as it would be with the average growth curve. This picture also shows the effects of the e-business hype and de-hype, where it is clear that the US has been influenced more than Europe.

From these figures it can be concluded that at the moment we are still in a phase of stagnation in IT (e-business) investments, which is also logical in the context of the economic climate. This will have impact on e-business strategy making because in the rationalization phase in which we are now the e-business strategy must focus on real benefits, like cost efficiency, increased competitiveness and good return on investment for e-business projects. Because the field of e-business is still so young this can be a problem, because of the lack of proved calculation tools and mechanisms for e-business projects.

E-business market potential

When looking at e-commerce an often made distinction is between Business-to-Consumer (B2C) and Business-to-Business (B2B) e-commerce. The use of the term e-commerce here identifies that we are talking about the transaction side of e-business with suppliers and customers. For Siemens Oil & Gas we will look into

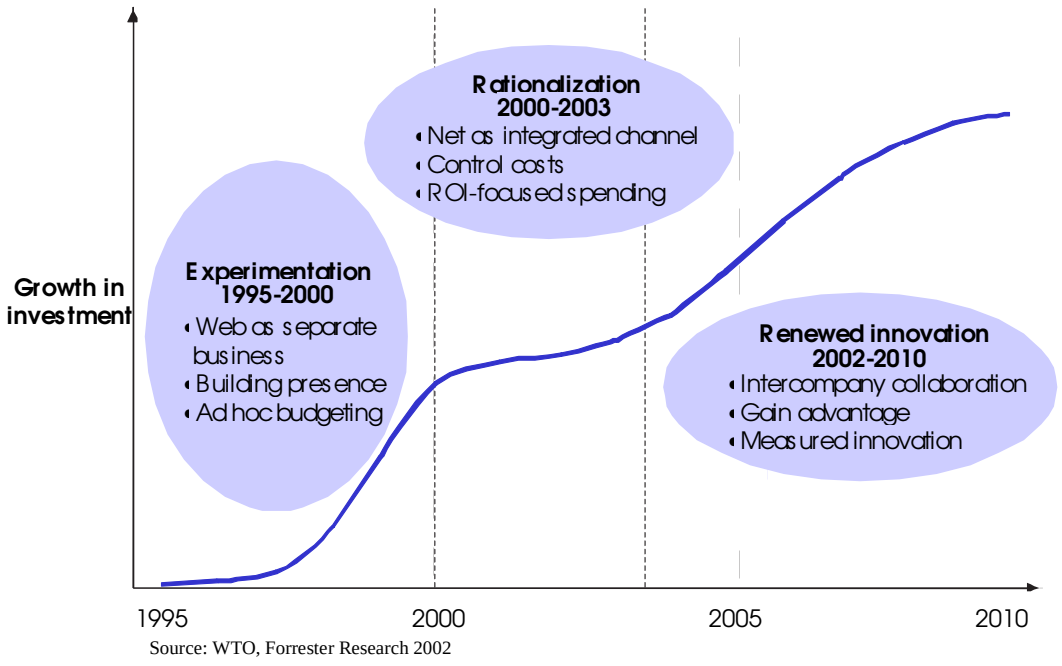


Figure 4.4: Three fases of net investment

the B2B side of e-commerce. Table 4.2 and figure 4.6 show the estimated volume of B2B e-commerce as given by different research agencies (Research by Siemens AG 2001 [3]).

Table 4.2: Estimates of Worldwide B2B e-commerce 2000-2004 (in Billions)

	2000	2001	2002	2003	2004
eMarketer	$226	$449	$841	$1,542	$2,775
AMR Research	-	-	-	-	$5,700
Computer Economics	$3,068	$5,232	$6,815	$9,907	-
Forrester Research	$604	$1,138	$2,061	$3,694	$6,335
IDC Research	$213	-	-	-	$2,233
Gartner Group	$203	$953	$2,180	$3,950	$7,290
Morgan Stanley Dean Witter	$200	$721	$1,378	-	-
Goldman Sachs & Co.	$257	$740	$1,304	$2,088	$3,201
Ovum	$218	$345	$543	$858	$1,400

Although the estimated amounts vary quite a bit, we see that most research agencies expect a yearly growth of 100 to 200 percent. This gives us an indication of the importance of the B2B e-commerce market and the need for a company to use its opportunities. These numbers can also be used to show management which is not enthusiastic about e-business which potentials there are.

Concluding it can be said that the e-business investment climate is highly influ-

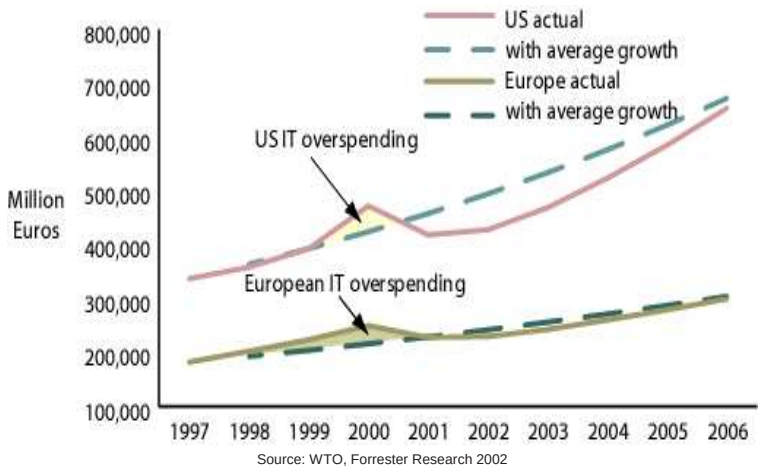


Figure 4.5: IT spending growth in millions of euros

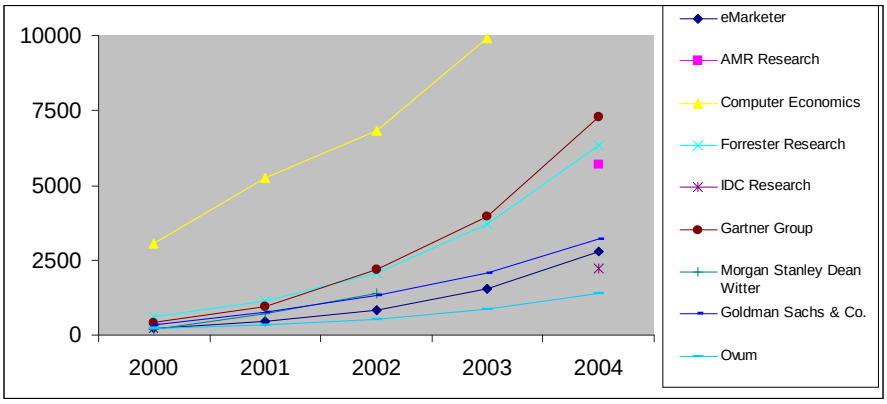


Figure 4.6: B2B e-commerce forecasts to 2004 (in Billions)

enced by the business cycle and the dot-com crash. Therefore it is suggested to use the hype cycle, mentioned in section 4.1.3, as an indication for the future development of the e-business investment climate. This also overlaps with the phases described in figure 4.4, where the phase of renewed innovation overlaps with the 'slope of enlightenment' and 'plateau of productivity' of the hype cycle.

4.3.3 Sociocultural factors

When looking at the sociocultural factors in the macro-economy we find several factors influencing the e-business strategy. Johnson and Scholes [32] suggest population demographics, income distribution, social mobility, lifestyle changes, attitudes towards work and leisure, consumerism and levels of education as sociocultural forces influencing an business. Literature research suggested different sociocultural forces that influence e-business, including trust and e-readiness as most important forces. These will be looked at on a general level outside Siemens, but will also have impact in the internal strengths and weaknesses of the organization.

Trust

The de-hype of e-business, the current economic downturn and the increasing fear for terrorism have made trust an important issue in e-business. Lack of trust is one of the greatest barriers inhibiting online trade between buyers and sellers who are unfamiliar with one another (Jupiter Consumer Survey Report: Retail 2001 in [56]). Consumers, feeling the pressure of economic downturn and terrorism, bought mostly from the most trusted sites during the 2001 holiday season [66]. This shows trust as an important issue in Business-to-Consumer e-business, but it would be foolish to state that this is not the case in Business-to-Business e-business. But what exactly is trust? In simple terms, trust can be defined as the belief by one party about another party that the other party will behave in a predictable manner [38]. Two important elements of trust by a focal party about the other party are: (1) the perception of risk and vulnerability by the focal party in dealing with the other party and (2) the expectation that the other party will behave in the interest of the focal party [9].

When looking at trust in e-business we should see why there is a difference between online and offline trust. In offline trust the distinction between trust in the organization (financial liability, name of the brand, experience with the organization) and trust in the person one deals with, in the case of Siemens OCW the (corporate) account manager and sales force. The object of offline trust is typically a human or an entity (organization). In online trust, typically, the technology (mainly the internet) itself is a proper object of trust [56].

Because in the B2B world the online interactions will mostly be accompanied by offline interactions, it is important that the building of trust in these two 'channels' is consistent. This also means that the information given on a website or industry portal and the information known to and available to the salespeople who interact with the customers have to be the same, there is a need for a single source of information for customer interaction. For example, if the website talks about products or services which the company provides, and the salesperson cannot answer questions about it because he is not informed that the product was mentioned on the internet, this will give the customer the feeling of a bad organized supplier, which will harm both online and offline trust.

Shankar et. [56] all suggest the use of the stakeholder model for viewing online trust. They state that online trust and its relationship with its antecedents and

consequences can be viewed from the perspective of multiple stakeholders such as customers, employees, suppliers, distributors, partners, stockholders and regulators (see figure 4.7). These different stakeholders have a different orientation on the way they see trust (see table 4.3). This impacts the e-business strategy because it will be necessary to include actions to build trust into the implementation projects. This is the case as well for projects with external stakeholders, like customers, suppliers, distributors, and regulators, as with projects with internal stakeholders, like employees, partners, and stockholders. The different view on trust of the stakeholders makes it necessary to set priorities if they are conflicting. Internal trust is also a prerequisite for implementing e-business projects with external parties. If the own employees have no trust in an e-business application an external party is also unlikely to have it, especially if the employees show their lack of trust.

It should be noted that with trust shown by employees also the trust in necessity of projects plays a role. If people see no use in using e-business it can also be seen as a lack of trust. Trust is also influenced by the government attitude towards e-business (see section 4.3.1) and, related to this attitide, the legal environment (see section 4.3.6).

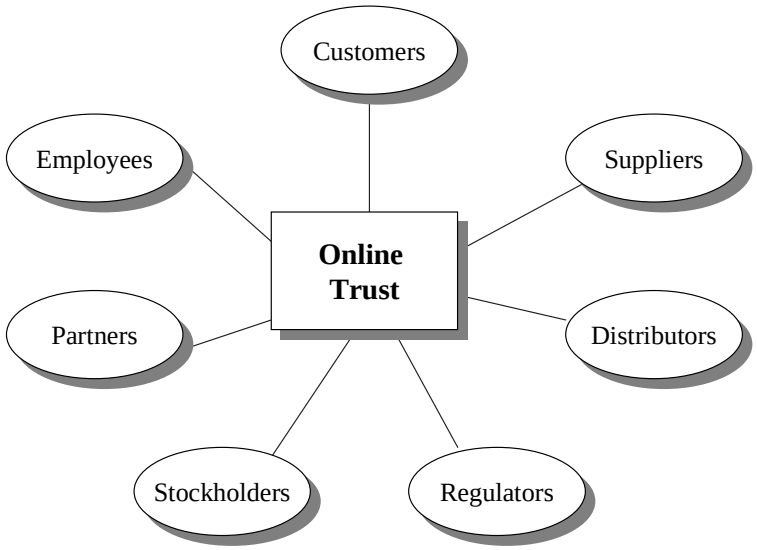


Figure 4.7: Stakeholders Involved with Online Trust

Table 4.3: Different perceptions of trust of stakeholders

Stakeholder	Orientation
Customer	How trustworthy is the firm's Web site for doing business, making purchases, getting customer information, and getting service? How safe is the transaction and my personal/company information that I give on the web site? How comfortable do I feel in my online experiences with the firm?
Employee	How accurate and reliable is the information to employees? How transparant are the company policies? How competent is the service for employees? How receptive is the company to employee feedback and interactions on the Web?
Supplier	How competent is the company in its Web site interactions with suppliers? How confidential is the information sharing? Do I have preferential access to important information about the buyer? Is the firm trustworthy for online collaboration? Is the online information reliable? Is the online information consistent with offline information?
Distributor	How competent is the company in its Web site interactions with distributors? How confidential is the information sharing? Do I have preferential access to important information about the buyer? Is the firm trustworthy for online collaboration? Is the online information reliable? Is the online information cosistent with offline information? Is the website a channel complementor? Are lead referrals accurate, current and screened for potential?
Partner	Can I expect the firm's Web site to promote my offering? Is my trust enhanced online as a result of the partnership? Do I have preferential access to important information about my partner? Can I depend on the company's Web site to accurately present my information?
Stockholder	How accurate and timely is the information on company's activities and performance? How transparent is the company's strategy and performance on the web? How complete and unbiased is the information? Can I identify vulnerabilities as well as successes?
Regulator	Is there adequate information on compliance of regulations on the Web site? Is the company transparant online in its compliance of relevant laws? Does the Web site conform to privacy regulations? Do the company and its Web site securely protect financial and credit card information? Do the company and its Web site have a reliable and fair mechanism for addressing failures or violations of regulations?

E-readiness

The second important influence found in literature is the so-called e-readiness, which describes the extent to which a country, region or organization is conducive to Internet-based activities. It can be stated that trust is a part of e-readiness, but this research will use trust for more individual issues and e-readiness for the general readiness of a country or region. This e-readiness is also part of the e-business strategy check, where it looks specifically at the e-readiness of employees in a certain business unit. The Economics Intelligence Unit [61] developed a model to determine a countries' e-readiness. This model takes six categories of data into account:

1. Connectivity and technology infrastructure;
2. Business environment;
3. Consumer and business adoption;
4. Social and cultural infrastructure;
5. Legal and Policy environment;
6. and Supporting e-services.

It should be noted that the EIU only gives out the end-scores of the e-readiness. Therefore the data presented below also includes political, legal and technological factors. The e-readiness rankings for the 60 largest economies is given in figure 4.8.

When looking at the percentage of Internet users in a country this can also give an important indication of the acceptance of Internet in that country. This thesis states that the higher the percentage of Internet users, the more likely e-business will be accepted in the country. Figure 4.9 shows the percentage of internet users around the world in 2002 as found by TNS Interactive [30].

The so-called Internet Hype has also influenced the perception of people in regard to e-business, as well the e-readiness of countries (there is nog e-business minded culture anymore) as the trust of people in e-business projects. Pieper et al. [36] describe the public perception on the Internet after the fall as a negative hype, which they describe as the pendulum swings back, right through the center, called reality, towards what could be called a *de-hype*. The impact of this de-hype can even be more damaging than the hype itself, because necessary investments to gain the real benefits of e-business are not made. During the strategy check performed with Siemens OCW the effect of the de-hype was very clear, as some of the employees responded with *"e-business? That is dead I believe."*.

Concluding can be stated that trust and e-readiness are required to implement an e-business strategy and to find the sponsors and budget needed for this implementation. A corporate culture that is open to change and innovation will probably have less problems implementing e-business projects. The development of hype cycle mentioned in section 4.1.3 can give an indication on the sociocultural factors of trust and e-readiness.

E-readiness ranking (of 60)	*2001 ranking*	Country	E-readiness score (of 10)	E-readiness ranking (of 60)	*2001 ranking*	Country	E-readiness score (of 10)
1	*1*	US	8,41	31	*30*	Poland	5,52
2	*10*	Netherlands	8,40	32	*33*	Malaysia	5,50
3	*3*	UK	8,38	33	*35*	South Africa	5,45
4 (tie)	*11*	Switzerland	8,32	34	*36*	Brazil	5,31
4 (tie)	*6*	Sweden	8,32	35	*31*	Argentina	5,14
6	*2*	Australia	8,30	36	*32*	Slovakia	5,00
7	*9*	Denmark	8,29	37	*47*	Venezuela	4,91
8	*12*	Germany	8,25	38	*38*	Colombia	4,77
9	*4*	Canada	8,23	39	*40*	Peru	4,43
10	*8*	Finland	8,18	40	*37*	Turkey	4,37
11 (tie)	*7*	Singapore	8,17	41	*48*	Bulgaria	4,25
11 (tie)	*5*	Norway	8,17	42	*43*	Sri Lanka	4,03
13	*13*	Hong Kong	8,13	43	*45*	India	4,02
14	*16*	Austria	8,10	44	*52*	Romania	4,00
15	*14*	Ireland	8,02	45	*42*	Russia	3,30
16	*19*	Belgium	7,77	46	*46*	Thailand	3,86
17	*15*	France	7,70	47	*44*	Saudi Arabia	3,77
18	*20*	New Zealand	7,67	48	*40*	Egypt	3,76
19	*22*	Italy	7,32	49	*39*	Philippines	3,72
20	*16*	Taiwan	7,26	50	*50*	Ecuador	3,68
21	*21*	Korea	7,11	51	*49*	China	3,64
22	*24*	Spain	7,07	52	*54*	Indonesia	3,29
23	*26*	Greece	7,03	53	*50*	Iran	3,20
24	*25*	Portugal	7,02	54	*52*	Ukraine	3,05
25	*18*	Japan	6,86	55	*56*	Nigeria	2,97
26	*23*	Israel	6,79	56	*58*	Vietnam	2,96
27	*27*	Czech Republic	6,45	57	*60*	Pakistan	2,78
28	*29*	Chile	6,36	58	*54*	Algeria	2,70
29	*28*	Hungary	6,05	59	*57*	Kazakhstan	2,55
30	*34*	Mexico	5,67	60	*59*	Azerbaijan	2,38

Figure 4.8: E-readiness rankings, July 2002.

4.3.4 Technological factors

Johnson and Scholes [32] give government spending on research, government and industry focus and technological effort, new discoveries/development, speed of technology transfer and rates of obsolescence as possible forces influencing an business. When looking at technology influences on the e-business strategy we can make a distinction between technologies per se and the underlying developments. In the beginning e-business was mainly technology driven, but the current general feeling is that e-business is not about technology but about a new way of working. Having said that, it is still important to keep an eye open for technological developments which can provide opportunities or threats to a company's e-business strategy. By choosing the right technology, that is the one which will become the accepted standard, companies can save valuable money and time. The Gartner group, mentioned before with the hype cycle, have created the hype cycle of emerging trends and technologies, which provides a snapshot of the position of a set of technologies in the inevitable cycle of hype and disillusionment that accompanies a technology's path to maturity [22]. This complete hype cycle is described in appendix G, here the most interesting developments will be described. The choice for the technologies described is influenced by the interviews held and the results of the e-business strategy check.

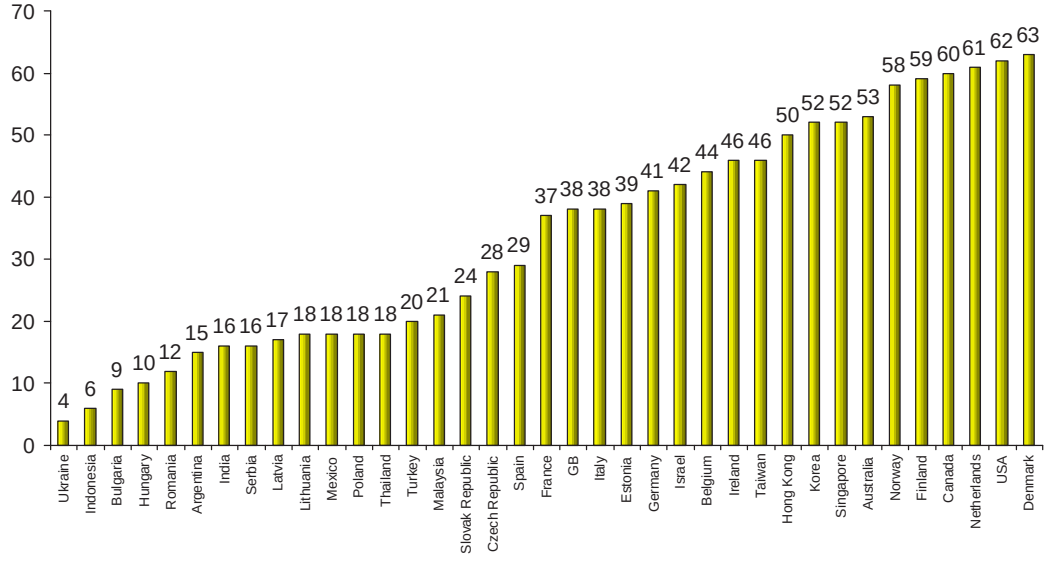


Figure 4.9: Internet users around the world 2002 in %

Web services

Web services are mentioned as the next big thing in e-business. IBM believes web services are a catalyst for the next generation of e-business, that of dynamic e-business [16]. Sun Microsystems also mention web services as the latest in the development of ever more modular and distributed computing [39].

But what are web services? The term "Web services" is used to describe a collection of technologies – an alphabet soup of technical standards and communication protocols – that together use the Internet to get computer programs to talk to one another. This means that programs can use (parts of) other applications over the Internet to perform a certain task. An example, which will describe it better, would be that an internal ordering application (in their SAP ERP system) of for example Shell would contact an application on a Siemens OCW server, that would provide the catalog function. This way changes in the catalog and even changes in the way the catalog is structured are of no concern for Shell, because they source the entire application from Siemens.

The technology and adoption are still young, as shown by the placement in the Gartner Hype Cycle (see appendix G), but businesses should already consider adopting it and make sure they are ready for the requests of customers for web services, which can be expected in the next two to five years. The placement near the peak of inflated expectations in the hype cycle warns to act with caution in adopting the technology and to not overestimate its value.

Standards

Standards are important for the economic feasible adoption of electronic commerce. They are not an technological development per se, but are a driving force for efficient technological development. Since the adoption of EDI by the mainstream businesses a lot of research has been conducted on standardization of the information exchange between different parties. Without standardization, each system of N nodes would have $N*N$ data exchange ways [12]. A system or network would then become so complex that it is not manageable anymore and more important the cost of exchanging information between parties would be simply to high. Classical EDI systems therefore use a standard format to exchange business information. Such a standard is very rigidly defined, and therefore hard to adapt to new situations. With the eXtensible Markup Language or XML this has changed. Because of the big perceived impact of XML this standard is described separately below.

Tena Allain, chairperson of the Petroleum Industry Data Exchange (PIDX) Standards Subcommittee and ExxonMobil's global e-business architecture, estimates that standards will contribute to at least a 5.0 percent reduction in transaction costs for the industry [15]. Recognizing that 5.0 percent is much more conservative than most analysts' predictions, Allain says the savings would still justify the expense associated with creating standards.

XML

The eXtensible Markup Language (XML) promises to become a very important standard for exchanging information on electronic networks. Gartner predicts that through 2005, XML will serve as the key foundational technology for improving the functionality and scope of e-business by enabling advanced Web-based processes, including information and application integration, cross-platform content delivery, contextual search and JIT software delivery, with an 0.8 probability[2]. While XML provides the means of exchanging data, it does not define what data to exchange. XML is needed to satisfy a set of technical needs, data specifications need to meet business needs, which vary from company to company and industry to industry. Therefore one of the biggest problem with XML is that different industries and interest groups are working on specific XML standards for their interest. The explosion of similar standards is a real problem because it breaks the interoperability. The idea is that the common standards should be driven by a large committee and everybody should accept a common standard[3].

XML is so special because it doesn't have the rigid form of a standard as was known so far. An XML message is consisting of two parts: the message content and the message definition, which specifies the structure of the message as well

[2] 0.8 probability is defined by Gartner as follows: "This will happen, barring exceptional circumstances. The major schematics are in place, and this planning assumption forms a major piece of our scenario. We would be quite surprised if it failed to happen, but a degree of uncertainty exists. We have a good idea of the timing. "

[3] Stated by Ivan Kurtev, researcher on XML at the University of Twente

as providing meaning to different parts of the message. The message content contains the information carried in the message [12]. This approach makes it possible to describe any kind of information in an XML message, which makes it highly flexible for exchanging information between parties that do not constantly exchange information.

In the industry of Siemens OCW there are several initiatives to build a standard XML definition. The Petrotechnical Open Software Corporation (POSC) is an international non-profit organization of which one of the goals is to promote information sharing and business process integration in the industry. POSC has different XML projects, which are mainly oriented at standard XML specifications for exchanging exploration and production (E&P) data. Another development is PetroXML, which is a set of XML schemas developed by Transzap, Inc. This is the oil industry's first set of XML schemas specifically designed to empower industry participants in end-to-end automation of oil field operations. The new set of schemas represent a starting point for the building of a business-to-business e-commerce community that spans many oil companies and their vendors [29]. More important are probably the efforts of the American Petroleum Institute (API) and the PIDX, who have developed the Petroleum Industry Data Dictionary (PIDD), which hopes to establish a repository of preferred meanings of business and technology terms for the petroleum industry. The PIDD-project will develop a single tag set under the umbrella of the ebXML standard, which is developed by the Organization for the Advancement of Structured Information Standards (OASIS) and the United Nations to create a technical framework for all electronic business data.

Currently, the leading XML standards efforts are vendor or consortium backed. Microsoft Corp. (BizTalk); Commerce One Inc. (xCBL); Ariba Inc. (cXML); the Organization for the Advancement of Structured Information Standards (ebXML); and the electronics components industry (RosettaNet) are each pushing their own flavor of XML. Within Germany there is another important development with BME Cat, an initiative for the development of a standard for electronic data transfer for electronic catalogues.

All these different initiatives make it necessary to follow the developments closely. Good communication with customers and suppliers to adapt one standard are a way to keep an eye on the developments.

4.3.5 Environmental factors

Environmental factors that can influence the e-business strategy are pressure from Non-governmental Organizations (NGOs) and government to decrease the amount of used resources. Paperless offices and paperless invoicing and ordering can be helpful to this, although there is no literature on this topic found. This topic will not be considered in the rest of the research.

4.3.6 Legal factors

Johnson and Scholes c [32] mention monopolies legislation, employment law, health and safety and product safety regulations as possible macro-environment forces that can influence strategy making. Literature on e-business and law suggest as important forces the way to handle electronic contracts and transactions, dispute handing and privacy. Next to this the issue on trust has an important legal aspect, which will also be discussed here.

General

All businesses are tied to local environments and hence to local legal frameworks, whether they are brick and mortar firms or new organizations undertaking electronic commerce [25]. In traditional industries, regulation is often considered for monopolies; to address windfall profits; to manage externalities and information asymmetries; to ensure continuity or availability of service; to control excess competition; for public goods and situations of scarcity and rationing and for circumstances where bargaining power is unevenly distributed or for other social policy aims [25].

One of the specific problems with the law is that is takes considerable time to formulate policy and establish it in a legal framework. Therefore the law is always considerable behind the developments in the market, where with the current speed of development the business environment changes every year. Still it is important to have a solid legal framework to solve disputes, which gives stability to the business and a higher level of trust.

Ndubizu and Arinze [42] conclude in their research on legal determinants of the global spread of e-commerce that quality legal rules and their enforcement positively associated are with e-commerce revenues. Therefore it will be important to watch the legal developments in the e-business field.

Electronic contracts and transactions liability

Presently one of the greatest challenges for B2B e-commerce is providing the means for tracing accountability and verifying what happened during online transactions. Since the first days of commerce, buyers and sellers have known each others identities, first through face-to-face contacts, and later through letters, phone conversations and trusted intermediaries. This knowledge allowed for research into the past histories of the trading partners and helped in solving disputes when deals went wrong [54].

The current developments in the business world, where the accountability of established firms is ever more questioned due to cases for corporate fraud (Enron, Wordcom), is another reason that an electronic version of the old 'paper trail' is needed.

Dispute handling

The topics mentioned above are about delivering proof in case of problems with transactions or contracts, that are accepted by a dispute handling authority. To get that far that proof can be shown, it first has to be clear which institute is seen as the accepted party to handle disputes. E-business makes working across borders easy, which raises the question under which legal 'umbrella' an organization is operating.

Determining which legal framework one operates in is difficult because through e-business, companies are able to operate in a more global environment. Even for companies like Siemens, who are historically international oriented, e-business is changing the possibilities. Before the ease of communication and exchanging information most of the operations were handled by daughter companies in the regions (other countries than Germany), which had a good understanding of the local legal environment. Now it is possible to do a lot of business from outside that legal environment, which increases the need of understanding different legal environments. For B2C transaction on the Internet the European Union gives an indication on dispute handling: "*The current text stipulates that the competent court is always the one of the consumer's country of residence – independently of what both parties agree (this is different in business-to-business contracts)*" [60].

The ease of working in another legal environment makes it also more easy for an organization to escape a legal environment if it is not 'nice' enough. In particular, if governments make the environment less amenable to internetbased companies then they can relocate, with greater ease than traditional companies, to other locations outside that particular jurisdiction, with knockon effects for the local economy (Angell 2000 in [25]). These knockon effects will affect the varying interests of the state, including economic growth and taxation, as well as surveillance capabilities.

This is more the case for the real e-companies than for brick-and-mortar firms, that is established firms that incorporate e-business in their already existing organization, like Siemens. But also for the traditional companies relocating parts of their processes can be interesting, for example to avoid high wages or taxes or to get close to highly skilled workers, like for the software industry in India or for callcenters in Ireland.

Privacy and security

Privacy is an important topic in discussions on e-business because of the direct impact it has on people. But when looking at business-to-business e-commerce the issue is not that relevant. Here the issue is more on security than privacy, it is not good for business if information about your (business) customers are on the street. Especially in cases like e-bidding, where companies are very interested to know who is bidding what, it is important that the data is protected sufficiently. Because the policy makers have little interest in protecting businesses from each other, in contrast with protecting the consumer, the legal arrangements on this issue can be neglected.

Something that is of concern of policy makers is the liability in electronic contracts and negotiations, like the mentioned e-bidding, which has been discussed above.

Trust

Trust as important factor for e-business acceptance is already mentioned with the sociocultural factors (see 4.3.3). Trust itself is a sociocultural factor, but in building trust legal factors play a significant role. The OECD gives the following attention points for building trust in e-business [47]:

- Consumer protection
- Privacy protection
- Security and authentication
- Taxation
- Trade policy and market access
- Competition law and policy
- Electronic finance
- Access to and use of the information infrastructure.

Of these consumer protection, privacy protection and competition law and policy are legal factors. Consumer protection, is not relevant for this study as we talk about B2B e-business. There can be found little on privacy protection in B2B e-business in the literature, but sensitivity of communication is very important in B2B e-business. Competition law can play an important role when companies are starting to act more as one organization by using collaboration tools and tightly integrated production and ordering systems, but in the current situation this is not the case.

4.4 Summary

This chapter has given an introduction to e-business, strategic analysis, industry analysis and macro-environment analysis. E-business has been defined as the use of Internet and Internet technologies to support and improve both internal as external business processes, and the products and services of the organization. This implies that we talk about more than just selling a product over the Internet like Amazon.com. A review of literature on strategic analysis suggested using Porter's five forces framework for analyzing the industry and the PESTEL framework for analyzing the macro-environment. With the macro-environment analysis we found political, economical, sociocultural, technical and legal forces influencing e-business. Because environmental forces have no perceived impact, therefore this will not be taken into account further. Table 4.4 summarizes the impacts found in the literature study.

Table 4.4: Macro-environment forces found in literature

Political	Economic
- Taxation policy - Foreign trade regulations - Government attitude towards e-business	- Economic climate - E-business investment climate
Sociocultural	**Technical**
- Trust - E-readiness	- Web services - Standards - XML
Legal	
- Trust - Liability of electronic contracts - Dispute handling regulation - Privacy and security	

Chapter 5

Data presentation

Chapters one and two have given an introduction to the research, defined the research problem and the research methodology. Chapter three described the research environment where this research has been conducted and also gave an introduction of how Siemens is looking at e-business. Chapter four described in general prior research on e-business and strategy, as well an overview of literature on the topic macro-environment forces influencing e-business and their development. This chapter will describe the e-business strategy as defined for Siemens OCW, thus answering research question three, and the industry forces as found during the research, thereby answering the second part of research questions one and two. This information was gathered using participant observation during the strategy check, which has been carried out in June and July 2002. During the strategy check a workshop was used to gather the views of different stakeholders within Siemens OCW on external influences on e-business. Further interviews were held with e-business experts within Siemens, which is described in section 5.4 this gives an indication of the view of Siemens on the topic. Finally this section will described the industry forces influencing the e-business strategy in section 5.5.

5.1 Corporate and Group e-business strategy

Siemens' corporate vision on e-business is clear but very general stated. Therefore it can be expected that this is not one-to-one applicable for the industry segments like Siemens OCW. Conversations with Mr. Karl-Heinz Niedermeier, manager of the I&S e-business and process support team, and with Mr. Michael Koolman, e-business manager of Siemens OCW, suggest that the strategies are formulated on business unit level because they have to be linked to the (sometimes very different) business strategies. Information on the intranet website of Siemens CIO, the Group Corporate Information and Operation, gives us the three focus points as also given with the e-business strategy check: Transform, Create, and Sell:

E-business at Siemens involves all of the company's Groups and Regions. The e-business strategy implemented by the Center of E-Excellence (CoEE) has three parts:
- transforming existing business
- creating new businesses
- marketing proven e-business solutions.

Siemens has three major advantages in implementing its e-strategy:
- the high profile and strength of the Siemens brand
- a global business organization with a presence in more than 190 countries
- the networked know-how of more than 440,000 employees worldwide.

The goals that Siemens has set for 2003 were to get 25% of all its revenues through e-business, with even 50% for consumer products. All processes have to be aligned with e-business, e-procurement will be set up globally and 50% of the procurement has to be done through e-procurement. It should be noted that experts of the e-business department are not expecting that this goal will be reached by industry focused groups, like Siemens I&S. They argue that all these goals are set for the whole of Siemens and therefore too general defined. Differences between B2C and B2B operations, product business, service business and solutions business all make it difficult to set one goal.

Around the coffee machine conversations also suggested that the result of a strategy check is more or the less always addresses the same topics, and therefore is in effect more about proving the necessity again and increase awareness and interest with management and employees. This opinion expressed by an semi-external consultant should be nuanced a little bit. Influences that also address this topic are the availability of tools and examples on e-business, and very important, the influence of consultants who moderate the workshops and have their own expectations on the outcomes of the check.

5.2 Siemens OCW e-business Strategy

The result of the strategy check is used as a starting point for analyzing the influences of macro-environment forces on the e-business strategy of Siemens OCW. Appendix H describes the different steps of the strategy check and their outcomes. At the end the team identified four cross topics which are important for the whole business unit: e-procurement, e-collaboration, knowledge management and industry portal/webpresence. These topics are described below, together with the projects that need to be implemented for each theme.

5.2.1 E-procurement

The necessity for e-procurement comes out of the organization itself. Analysis showed that although there has been already put a lot of money and energy in e-procurement, the people are not using the tools available. Procurement is done by Procurement Logistics Services (PLS) which is the acting partner for Siemens OCW in case of procurement.

The goal of the project is to extend the e-awareness within Siemens OCW, as well at the headquarters as in the regions, on the topic of e-procurement. This requires getting an overview of the buyers in the organization and the introduction of global reporting.

Key values of extending e-procurement within OCW are the reduction of process costs in the entire procurement process, create an advanced tendering and quotation process feasible by e-procurement tools and procedures. Problems which have to be overcome are the reluctance to use the tools, partly because people do not see the use of it, and the problem that the current tool in use (Pronet) is not available in English, which makes the international use of it difficult.

5.2.2 E-collaboration

The strategic necessity for external e-collaboration comes from customer requests: Kvaerner has requested Siemens Offshore in Norway to do a pilot with online collaboration in one of the next projects. The necessity for internal e-collaboration has emerged because of the different locations of Siemens Oil and Gas (i.e. Houston, Erlangen, Singapore, Karlsruhe, Oslo). Further global projects e-collaboration can assist in more cost-efficient project handling. Also the 'best practice sharing' within Siemens plays a role, because of the good experiences with Siemens ICN[1] and SBS[2], where knowledge can be reused in this project.

> The goal of the project is to establish a singe tool for online collaboration within projects and daily business processes. Also should, based on this selected tool, a pilot project with a selected pioneer customer (Kvaerner) be started to learn about the possibilities of external e-collaboration.

Key values of the project are, for internal e-collaboration, the use of a single source of information, the reduction of storage costs, the benefit of bringing experts together and the decrease in travel expenses. For external e-collaboration the stated key values are increased intimacy with the customers and thereby customer binding and the reduced response times for questions and project decisions, which can shorten the project durations.

A hurdle with the project is that at the moment different tools for e-collaboration are used within I&S (e-Room in Norway, Proflow in Erlangen and Karlsruhe, Lifelink in Erlangen). When the decision is made to migrate to one single tool, their is a big change that people resist giving up 'their' tool. Another challenge is that people might think that e-collaboration is only about implementing a tool and teaching people to work with it, and don't see that an important part is about a change in the way people work together and the culture.

During the strategy check a cost/benefit calculation was made for project S3, internal collaboration with Offshore in Oslo. This calculation estimated € 300.000 cost savings on travel expenses for 20 sales people and 80 engineers. A critical remark should be made here, that this calculation is not made academic valid, it is really an estimation. This calculation is just one argument for the use of a online collaboration tool, the real benefits lie in the possible time savings and reduction of non-conformance costs.

[1] Information and Communication Networks
[2] Siemens Business Services

Example: e-collaboration project

Just after the e-business strategy check at Siemens OCW was finished a first e-collaboration project involving Siemens OCW was presented. Under the name Siemens Industrial Development Project (IDP) a community will be build on the Sharenet platform to support the work for a big project in Asia, by enhancing the information and document flow and using a single source of information. Due to the size this is done cross-functional, cross-divisional and cross-country and it has been agreed on to do all communication for the project using the collaboration tool.
Recently also other projects have been incorporated in the IDP platform.

5.2.3 Knowledge Management

Knowledge management is seen as an important topic within Siemens. This can be concluded out of the corporate initiatives like Sharenet and Best Practice Sharing (see section 5.1). Also within I&S the project KM@I&S has given attention to the topic and the management of OCW clearly identified it as a important topic because of the specific working field of OCW, building unique solutions for its customers.

The goal of the project is the development of a lessons learned database for Offshore, Onshore and Water. Next to this, steps should be taken to share information on projects (which projects are done at the moment, which are offered), knowledge on tendering and standards.

The key values of the project are the reduction of non conformance costs (which is already a topic with OCW's productivity improvement program or PIP), the reuse and sharing of knowledge (lessons learned), creating an overview of available expertise and the solving of the 'leaving experts' problem.

The big risk is that people are reluctant to share knowledge, out of fear of becoming obsolete when their specific knowledge is shared with everybody. Especially in the a situation with restructuring of an organization it will be very hard to get people to share knowledge. Another problem is the same as with e-collaboration, that knowledge management is not about implementing a tool but about a cultural change.

5.2.4 Industry Portal

The need for an industry portal is coming out of different directions. The customer analysis shows that customers value a single point of entry for all online interaction with Siemens, just like they develop their own portals. Also the comparison of the web presence of Siemens with that of competitors like ABB showed that on the competitors website it is much easier to find information about products and solutions for a specific branch or industry.

A very important driver of the industry portals is the project 'Industry Maps' which is driven directly by Siemens Corporate in Munich. This project is an effort to present the solutions and product that Siemens offers in a more transparent way to the customers, by mapping the Siemens solutions to the plant life cycle requirements. With Siemens OCW this is done by identifying the different plant types that customers in the oil and gas branch need, and break down that plant in the different solutions needed for that plant. This way a complete overview of the available solutions and products needed for that planttype and provided by Siemens is given. Furthermore it gives a good overview of the gaps in Siemens' portfolio for internal use. Also the industry map project will force different divisions within Siemens to work together to create these overviews and thereby increase internal communication and hopefully prevent internal competition (two different offers from Siemens towards the customer).

> The goal of the Industry Portal Oil and Gas/Water is to create a single interface to interact with customers in the Oil and Gas and Water industry via the Internet. This portal includes all necessary functions to: inform the customer, transact with the customer and eventually also collaborate with the customer in projects.

The key values of the project are: creating customer intimacy in order to build a long lasting relationship with the customer, to create efficiency gains by automating product related business processes (i.e. spare part ordering) and to provide a single entry point for the customer to all Siemens solutions (I&S, A&D).

There are some risks identified during the e-business strategy check for the project, which include the reluctancy of employees to participate because of fear of becoming obsolete (especially in the sales force) and the big problem of aligning all the different Siemens groups for a single industry focused approach.

Important is that the oil and gas portal will be the lead project, after which a lot of the work can be copied and applied for a Water portal. *Just before the end of this research the decision to implement the industry portal for oil and gas was made by the board of Siemens and I&S. For now this is only the information part, based on the industry maps, but there are plans to incorporate e-collaboration and a sell-side part in this portal in the future.*

5.2.5 E-business roadmap

The result of the whole strategy check is summarized in an e-business strategy roadmap, which is shown in figure 5.1. The projects mentioned in the different 'lanes' are the single projects that lead to the project vision.

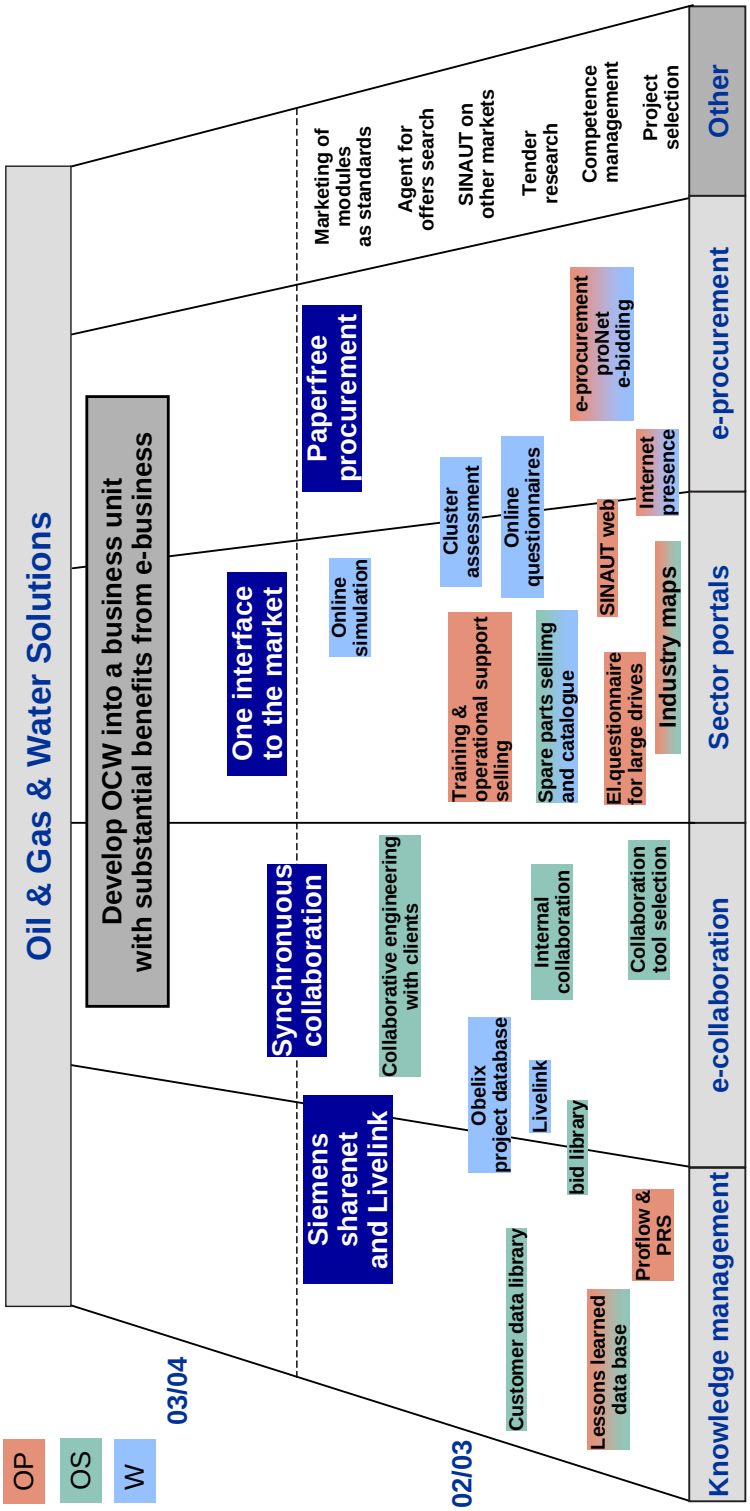


Figure 5.1: E-business strategy Roadmap for OCW

5.3 Workshop

During the strategy check the opportunity workshop has been used to do a small workshop exercise with the participants on the topic of this research. The participants were asked to write down anything they could imagine which had to do with macro-environment influences on the e-business strategy and put each idea on a single post-it note. Then these notes were put in a matrix with the time to impact on the e-business strategy (nearby, further away) and the intensity of the impact (high impact, low/moderate impact).

The results of this workshop exercise are described in appendix I. Some of the conclusions that can be drawn from this workshop are that the most important impacts as seen by the participants (which is classified as high impact, near future) are economic and sociocultural. The economic influences mentioned are the *current economic situation*, which leads to a conservative attitude of customers and companies (taken as the *business cycle*) and the *globalization*, with pressure on costs and expectation of customers for a global suppliers. On the sociocultural level the impact of the type of business of Siemens OCW is seen as important because of the *required personal contact*. Related to the economic recession is also the fact that people are *e-tired*. An very interesting point mentioned is the change in thinking when a *younger generation*, grown up with technology, *comes in decision making functions*.

Interesting to see is that overall the technological factors are not regarded as having a high perceived impact. Legal forces are seen as not having an impact in the near future, but *EU regulations*, *data security/encryption laws* and the *future of public tendering* are seen as having high impact in the distant future. Political forces mentioned were political restrictions for trade with certain countries and the project BundOnline 2005, which addresses the online tendering initiative of the German government. The latter one can become important for the Water branchs.

The most interesting topics mentioned are (in my opinion) *the influence of a younger generation when they come into decision functions* and the *importance of personal contact in the business of OCW*, although this is more an industry force.

The distant perceived impact of the legal forces is consistent with the findings of the literature research, which suggest that it takes considerable time to formulate policy, and the rapid development in and short existence of e-business have not given any time for this yet. The low perceived impact of technological forces can be explained by the background of the participants, which is mainly commercial or oil and gas specific technical. Therefore their knowledge of technological developments which can influence the e-business strategy is low, which is reflected by the mentioned influences, all of them are very abstract.

Concluding it can be said that the participants of the workshop, who can be taken as cross-section of Siemens OCW, see economic and sociocultural forces in the near future as most important. Further they expect legal influences not to have impact in the near future and see technological influences as having no important impact. Very interesting is to see that only few political influences are mentioned,

which could indicate that the participants see no role for politics in e-business.

5.4 Interviews

During the research interviews have been conducted with experts on e-business inside and outside Siemens I&S. Within I&S interviews have been conducted with Dr. F., e-business manager of Siemens Industrial Services (I&S IS), and Dr. S., responsible for IT Strategy with Siemens I&S (I&S GIO OI2). Outside I&S interviews have been conducted with Mr. Q., responsible contact person for the energy and petrochemical industry hub Trade-ranger.com, and Mr. G., head of the e-business department of Siemens Power Transmission and Distribution (PTD). The full transcripts of these interviews can be found in appendix J, below only the most important findings are listed.

Interviews can be conducted in three ways: open-ended, focused or structured. In the open-ended interview the key respondents are asked for facts as well as for their opinions. The focused interview is also performed in an conversational manner, but has a semi-structured set of questions which guide the interview. This set of questions is derived from the case study material. This type of interview takes only a short time. The structured interview is best suited for surveys and uses a structured questionnaire to conduct the interview. This could be done to identify why there are anomalies in surveys [71].

The interviews conducted in this research have taken the form of focused interviews, where the PESTEL research framework was used as the structure. This is done because the goal has been to verify the findings from the analysis and leave place open for comments of the interviewees. Also the anticipation was that the interviewee's don't have much time to spare in due to the current re-organizing, which has been confirmed later during the interviews.

Political forces

Trade barriers, which are linked to the globalization of business, can hold back e-business. Because of the experience of Siemens OCW with doing international business this is less important here, but for e-business in general an important issue.

The educational system has an important impact on the knowledge and experiences people get with technology in general and e-business and the Internet specific.

Economical forces

The business cycle is important for the possibilities to do innovating projects. In times of economic decline, like the current time, the tendency is to stop projects with some risk and focus on small projects with clear goals and low risk.

Siemens I&S is regularly in the situation where other departments sell products internal and external, in some cases also to the customers of other internal groups.

This puts pressure on the contacts with customers, because Siemens is sometimes its own competitor.

Sociocultural forces

Globalization is mentioned by Mr. Q. as an important force on business. With e-business this raises questions on how to cope with different cultures when starting international industry portals and online collaboration projects around the world.

Also mentioned is the importance of education in building trust and experience with e-business. All interviewees mentioned that the biggest obstacles in implementing an e-business strategy or project are not technological but cultural. Because of the disillusion after the e-business hype people are reluctant to trust projects that 'smell' like e-business.

Technological forces

Although Mr. G. states that technology is no longer a barrier for e-business, but that developments should be watched for opportunities. With that he sees web services as the biggest impact on e-business. Standards are also an obstacle, but with PTD the choice for XML is clear, only the definition of the business language can give problems. Mr. Q. also sees standardization as the most important technological issue for e-business.

Legal forces

For a company like Siemens I&S, which operates in the business to business market, the validity of contracts is very important. For electronic contracts an often used method to authenticate digital information is to use a trusted third party. Dr. S. indicates that because of the size and reputation of Siemens, Siemens is often seen as a trusted party itself. Mr. G. states that the positive impact of regulations is often that smart entrepreneurs use holes in the regulation to do smart business, using the legal framework in ways not intended by the policy makers.

5.5 Industry description

This section will describe the industry and market of Siemens OCW, which are defined as:

The industry of Siemens OCW consists of companies that produce and integrate electrotechnical equipment into solutions and projects for the oil and gas offshore, onshore and pipeline industry, as well as the water and waste water industry.

The market of Siemens OCW consists of the industry of Siemens OCW with their customers. These customers are for oil and gas EPC companies[3] *and investors*

[3] see appendix D

(oil and gas companies). For water these customers are public and semi-public water companies, as well as Original Equipment Manufacturers

This description will be done using Porter's five-forces model, which is described in section 4.2.1. Next to this a description of general trends in the industry will be provided.

5.5.1 Competitor rivalry

During the strategy check an analysis of the internet presence of Siemens and its competitors was done. For this analysis the websites were reviewed and evaluated on the following five criteria: structure/usability, general service, e-procurement, e-ordering and after sales service. For the latter three it was looked how much information could be found on the availability of these services with the organization. These analysis resulted in spider graphs showing the position of Siemens and the competitor, of which one example is shown in figure 5.2 for Siemens and ABB for the oil and gas market.

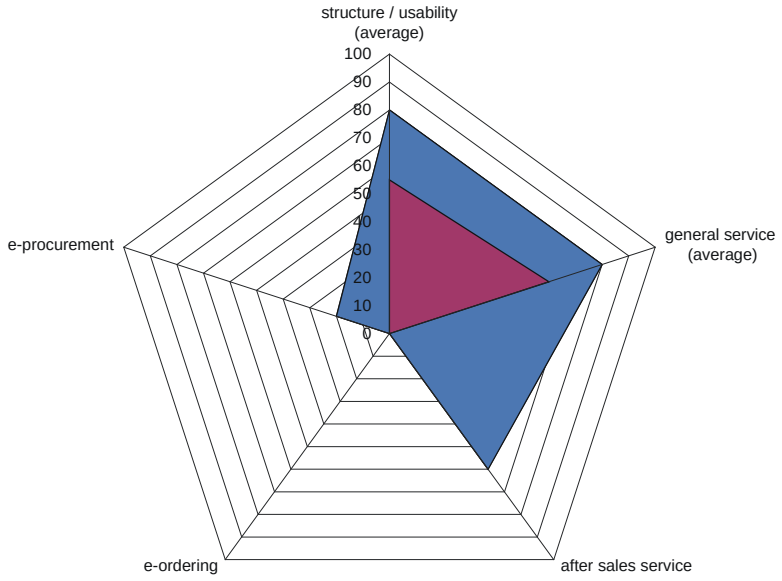


Figure 5.2: Internet presence ABB (blue) vs. Siemens (inner red) in oil and gas market

It should be mentioned that this analysis, conducted by a work student working for the I&S e-business department, looked at the websites reviewing information a non-informed new customer would see. If a company scores low with e-procurement this means that not much is mentioned on the website about this topic, it is possible that the company is operating an extranet for its customers. Still the analysis

gives an overview of the completeness of the website, and the position of Siemens compared to its competitors on the total score (see figure 5.3) shows that they are in the middle field.

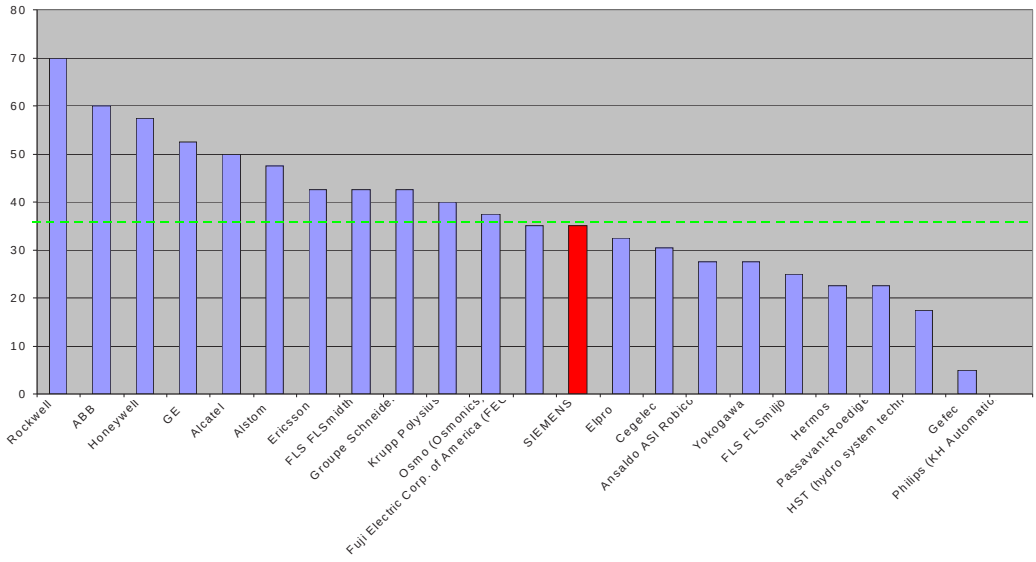


Figure 5.3: Comparison of Siemens and competitors Internet site

This analysis is done because Siemens sees their competitors as currently better players in the e-business field. The industry maps project, together with industry portals, should bring Siemens a quantum leap further.

Because of the relatively small amount of companies in the industry it can be expected that customers are able to compare suppliers easily. A special case is that for the bidding on projects a customer often searches a couple of preferred suppliers for the bid. This means that in that case there are only few direct competitors, but becoming a preferred supplier requires good references and image.

In the oil and gas industry the difference between market share of companies is relatively big. Table 5.1 shows the market shares of Siemens and its main competitors for the Onshore & Pipelines (OP), Offshore (OS) and Water (W) industry.

Table 5.1: Market shares in OCW markets

Company	OP	OS	W
Siemens	3.8%	1.3%	0.9%
ABB	14.7%	15.0%	0.9%
General Electric	-	5.0%	1.3%
Foxboro	5.8%	-	-
Alstom	2.6%	-	-
Metso Automation	1.5%	-	-
Groupe Schneider	-	-	1.1%

According to Porter [50] this has a leveraging effect on the competitiveness in the

industry because of the 'coordinating' role of the biggest player(s). Conversations with people of OCW suggest that the competitiveness in the oil and gas industry is still high, mainly because there are worldwide only few big projects, for which the industry is competing intensively.

5.5.2 Barriers of entry

There are some big barriers of entry that will probably hold back new entrants in the oil and gas industry: the projects are financially seen big; the image of a company is very important, buyers will ask for references first; the development of technologies requires a long time and highly skilled staff; because of the global market it is difficult for local players to enter the market. An exception here is the low price part of the market, where customers (mainly Original Equipment Manufacturers) buy only single small products of Siemens. In this market local companies have a chance for market share, but this market is less important for Siemens OCW then for Siemens Automation and Drives, who deliver products in stead of solutions.

In the water industry this is different, here the market is highly fragmented and mainly locally based, which leads to a low barrier of entry. In this market the biggest competitor has a market share of 1.3% of the total market, compared to 0.9% market share of Siemens OCW. Therefore the barriers of entry in the water industry are lower, because of the many local customers it is easier for a national or regional company to start in the business. The investments and knowhow barriers do still exist here, but companies that work in similar technical areas could step into the market.

5.5.3 Bargaining power of customers

Because of the size of the projects Siemens OCW is doing in the oil and gas industry the power of the customers is very big. Most customers are multinationals with more than one project and loosing a customer is no option because of the small customer base. Another indication of the power of customers is the importance of good references in the industry of Siemens OCW. If a project has big problems, this experience will be communicated easily in the 'old boys and girls network' of the oil and gas industry. Projects are often also joint ventures between big players (i.e. Shell and Diamond Gas for a big project in Asia).

In the water industry this is a little bit different, because here the customers are mostly local water companies which are public owned or recently privatized. Therefore the market consists of a lot of small buyers, which undermines their bargaining power. There is a development in the market, mainly because of privatization of former state owned water companies, towards concentration. This will also increase the bargaining power of the customers.

Because of the power customers in the oil and gas industry have they can demand many things from their suppliers. The example of trade-ranger.com shows that Shell is demanding Siemens to join their preferred marketplace, if they wish to stay

a preferred supplier. Another important demand from customers is that they, if they would work with an electronic catalogue and ordering system with Siemens, want to order all products through it, including spare parts which come from other suppliers. This means that Siemens has to integrate these products and suppliers in their ordering system, all the way to giving out the order to its suppliers.

Below a recent example of the bargaining power of customers is given.

Example of bargaining power in the oil and gas industry

For the project X, a oil and gas project of a total investment of 10 billion US dollar, Siemens has been faced with the requirement that equipment will be purchased by On Line Bidding (OLB). This means that Siemens, who is on the list of preferred suppliers for the project, would have to bid against other suppliers using an reverse-auction like tool on the Internet. Within Siemens there is the general feeling that OLB is not good for business because it only drives down the price, even though a buyer in some cases does not choose for the lowest bid.
After expressing this feeling towards OLB to procurement managers of the project, a clear signal was given that there was no option for alternative methods of bidding:

The .. default method of tendering will be online bidding. [...] If you are not prepared to participate with the online bidding we may have to consider cancelling the RFP [Request for Proposal] with yourselves.
from: email to Siemens regarding online bidding in project X

This clearly shows the power customers have to dictate methods towards their suppliers, in this case for e-bidding.

The example of e-bidding is also one indicator of an important trend in the oil and gas industry towards price competition. Customers want to have the products comparable before the bidding starts, so they can choose the best price/quality offer. Another recent example is the case of customer Knauf, that requested Siemens OCW to deliver catalogue information for its own internal procurement marketplace.

5.5.4 Bargaining power of suppliers

In order to analyze the bargaining power of suppliers of Siemens OCW we have to distinguish suppliers of standard material and suppliers of specialized products. Siemens has a lot of power over suppliers of standard materials, like cables, which it orders with wholesalers. For some materials customers demand certain products, because they want only standardized spare parts to reduce inventory. These can include things like switches, sensors, etc. This increases the power of suppliers of these products, unless products are distributed by a lot of wholesalers. The other supply category consists of specialized products, which can only be supplier by one of very few suppliers. These suppliers have a high bargaining power over Siemens.

This impacts the e-business strategy in several ways. In order to provide an up-to-date catalog to customers, which also includes parts that are not produced by

Siemens, Siemens I&S has developed a standard for its master data on products, based on the standard available fields in the SAP Materials Management (MM) module. It only uses part of the fields available, which are different from other groups like Automation and Drives. Suppliers are asked to deliver their catalogues digital in this format, but few have done this sofar. The migration of supplier data into the master data used within Siemens costs ca. 1 million euro each year, as well as a delay in delivery of information.

Next to these external suppliers we can also see the Siemens group Automation and Drives (A&D) as a supplier. This group has a lot of power because most key products used in the solutions build by Siemens OCW are supplied by A&D.

5.5.5 Threats of substitution

As well in the Oil & Gas as in the Water industry we can find marketplaces that focus on the equipment procurement side for oil and gas and water companies. Mentioned before for Oil and Gas is Trade-ranger.com, but others are oilandgas.com and wateronline.com, auqatechtrade.com for the water industry. Currently marketplaces like Trade-ranger.com and wateronline.com are only offering products, but Request for Quote (RFQ) services are already offered. This can make these marketplaces important competitors for Siemens' own marketplaces, especially because many customer are part of the coalitions behind these marketplaces and will probably ask Siemens OCW to use their tools.

5.5.6 Market and industry developments

Trends in the water industry are privatizing of former state owned water companies and concentration in the branch. Increasing use of water in western countries, interest in environment friendly solutions and increase of population and therefore water usage in developing countries are important trends in the market[4].

Another trend is the ongoing standardization and modularization of the solutions, services and systems in the industry. This is driven by cost reduction objectives and by requests of customers that want to reduce their spare part inventory.

Something that is mentioned during the workshop (see section 5.3), and also mentioned by a regional sales manager in the customer analysis, is the importance of personal contact and trust in the business of OCW. The sales manager argued that he has a close connection with his customers and that building a good relationship, which not only includes talking about business, is essential for him. This has an important impact for the e-business strategy implementation, which should take this personal contact into account and support this.

A general remark towards the market is that most of the projects done by Siemens take place in less developed countries, which have access to the big oil and gas fields, like Kazachstan, Libië and Iran. Most of these countries have still little on infrastructure to conduct e-business and often political embargoes for trade pose

[4]According to business strategy analysis performed during the strategy check

problems. Also, during a project it is frequently so that supplies are needed locally in a short time, which will require a project manager to contract local suppliers.

5.6 Summary

This chapter described the findings of the research within Siemens. The e-business strategy of Siemens OCW as found with participant observation during the e-business strategy check contains of four topics: e-procurement, e-collaboration, knowledge management and industry portal. Results of the workshop and interviews have given an indication of macro-environment forces as seen by Siemens, as well which influences are seen as most important. Table 5.2 summarizes these findings. Of these forces the most emphasis by Siemens has been on sociocultural and economic influences.

Table 5.2: Macro-environment forces found during workshop and interviews

Political	Economic
- BundOnline 2005 - Trade restrictions - Trade barriers - educational system	- Business cycle/current economic situation - Globalization
Sociocultural	**Technical**
- e-tiredness - Personal contact - Younger generation in power - Globalization - Building trust and experience	- Web services - Standards - XML
Legal	
- EU regulations - data security/encryption laws - future of public tendering - Contract liability	

The industry analysis has given an overview of important forces in the industry of Siemens OCW using Porters five forces analysis. The results are summarized in figure 5.4. Important is to recognize the bargaining power of the customers, which is very high, and the need for personal contacts and good references before a deal can be made. Furthermore the developments in the industry towards standardization and modularization are important trends that will also influence the way e-business can be used.

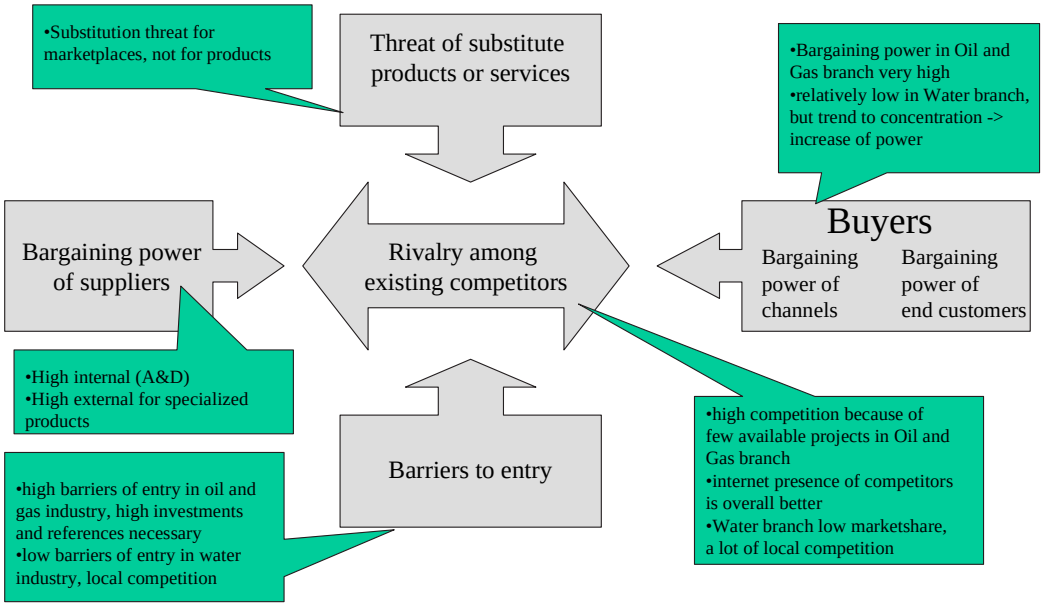


Figure 5.4: Industry forces summary

Chapter 6

Analysis on strategy check

The literature research in chapter four indicated possible macro-environment influences on the e-business strategy. Chapter five described the e-business strategy of Siemens OCW, which has the four focus topics e-procurement, e-collaboration, knowledge management and industry portals.

Chapter five also described the results of the management workshop held with Siemens OCW management and interviews with e-business experts with Siemens. These results gave an indication on which macro-environment and industry influences are seen as important by Siemens.

This chapter will combine the findings of chapters four and five and will give an overview of the important forces on the four topics that form the e-business strategy of Siemens OCW. This analysis will be presented in the form of opportunities and threats, where possible strong and weak points in the e-business strategy of Siemens OCW will be discussed. Furthermore suggestions will be made on how to use or overcome the opportunities and threats found.

6.1 E-procurement

6.1.1 Opportunities for e-procurement

Forces that could bring opportunities for e-procurement on macro-environment level are the standardization (of information and data formats) in e-business and XML, and the economic pressure on reducing costs (as result of the business cycle). On industry level we see forces towards standardization and modularization of solutions, systems and services, and the demand of customers to order all their products through one tool.

Increased standardization of information- and data-formats is an important opportunity because it reduces the cost of connecting electronically to ones suppliers, which makes e-procurement interesting for ordering with smaller suppliers. Important is that it is clear which standard is adopted in a certain industry, so the suppliers can deliver their data in one format to all customers and Siemens can expect data to be delivered in one format. XML has high promises for this, but there are also problems. The technology is so flexible that almost any organization or industry group can develop and declare its own "standard." If several versions of XML emerge within the same industry, it becomes more costly to share data. **Therefore Siemens should participate actively in the development of one standard XML-schema on their suppliers side.**

The current economic situation puts pressure on organizations to reduce costs, which is the main claimed benefit of e-procurement. This development will require the procurement office to reduce the amount of suppliers and get volume per supplier on a level that automation is economically feasible, which increases the possibilities for e-procurement.

Standardization and modularization of solutions, systems and services will also decrease the amount of different material parts used, therefore increasing the volume of parts needed from one supplier, and increase the possibilities for e-procurement. Further it will decrease the amount of different (internal and external) suppliers needed, which also helps bringing procurement costs down (negotiating, contracting).

All these issues should lead to electronically attached suppliers, where standard parts ordered in the ERP system result directly in a message to the supplier, all with up-to-date prices. This linkage is also necessary to deliver electronic spare part ordering catalogues to Siemens OCW's own customers (see 6.4.1).

6.1.2 Threats for e-procurement

Threats for e-procurement imposed by macro-environment forces are problems with electronic contracts and problems with getting all suppliers on one standard for information and data exchange. Industry forces that could influence e-procurement negatively are the bargaining power of suppliers and problems because frequently local suppliers are used, also in less developed regions that do not have a infrastructure for e-business, or local suppliers that are needed ad hoc.

The problems with the legal system, including unclear regulations on electronic contracts, is not too big because Siemens has mostly long-term contracts with suppliers, which also include arrangements for discounts when a certain amount of products is bought in a period of time. Also for e-bidding on the supply-side, Siemens works with a pre-qualified set of suppliers with who contracts are signed before the bidding.

The negative effect of the high bargaining power of suppliers can be seen in connection with the opportunity given by standards for exchanging information. Siemens has their own internal master data standard for material, and requests suppliers that they deliver their product information in this format. Two problems arise here, firstly most suppliers do not deliver the data in the format, and secondly, the format is Siemens specific, even though it is build on standard fields of the SAP ERP system. **Therefore it makes sense that Siemens starts looking for or working on a standard that can be adopted by the industry (suppliers of electrical equipment manufacturers), based on an open XML standard.** This would make it more interesting for suppliers to deliver their data in this format, because they can do so for more customers than only Siemens.

This still leaves the problem open that suppliers find it to costly to fill in all requested data. Therefore Siemens should try to increase its power over their suppliers, i.e. by using more generic parts that can be supplied by different suppliers. This could be accelerated by the standardization and modularization.

The problem with lacking infrastructure in countries where Siemens is operating is a problem, which asks for good consideration if parts of a project has the potential for e-procurement.

Therefore Siemens should concentrate on using e-procurement for the headquarters (i.e. Erlangen, Karlsruhe and Oslo) and regional business centers (i.e. Singapore, Houston) first, and leave the local project sites out of the picture for the moment.

6.2 E-collaboration

6.2.1 Opportunities for e-collaboration

In the macro-environment we can find the following opportunities for e-collaboration: the government attitude towards e-business, which is positive shown by the cases of BundOnline 2005 and e-Europe, the increasing globalization, which requires people to work in international and flexible teams, and the younger generation that comes into power, which could turn around the negative attitude towards e-business. From the industry we see customer requests to do collaboration with the customer in projects. Due to the high bargaining power of the customers this is an important force.

The government attitude towards e-business and the younger generation which comes in decision making positions are external forces that support a more positive attitude towards e-business, but it can be expected that this influence is not enough to turn the negative attitude during the bad current economic situation.

Globalization is a very powerful force and makes it especially in the branch oil and gas where Siemens OCW is operating important. The example of the Industrial Development Project (IDP, see section 5.2.2) shows how global projects can be supported by e-business tools to overcome problems with information distribution, different versions of documents and time/place separated team members.

The request of the customer Kvaener for external e-collaboration in projects is a very strong driver for e-collaboration with external parties, and the results could be used to show benefits for other projects. Because of the current economic situation it is very important that cases that show clear benefits are available. **Therefore the e-business department of Siemens I&S should analyze the case of IDP and the possible future case of Kvaerner to generate a solid case with metrics, which can be used to show the benefits of e-collaboration.**

6.2.2 Threats for e-collaboration

Threats for e-collaboration in the macro-environment can be found mostly in the sociocultural forces: lack of trust and e-readiness, e-tiredness. Further the bad e-business investment climate makes it difficult to find support and budget for e-collaboration project. This negative attitude towards e-business can be brought back to two main influences: the current economic situation, which brings a general

negative feeling towards investment decisions, and the influence of the de-hype, which increases this even more for e-business. Minor influences are the lack of a solid legal framework for e-business, the lack of standards and the increasing globalization which makes the business world even more complex. This correlation is graphically shown in figure 6.1. The issue of globalization brings also a direct threat to e-collaboration, because difference in cultures and work methods can lead to problems.

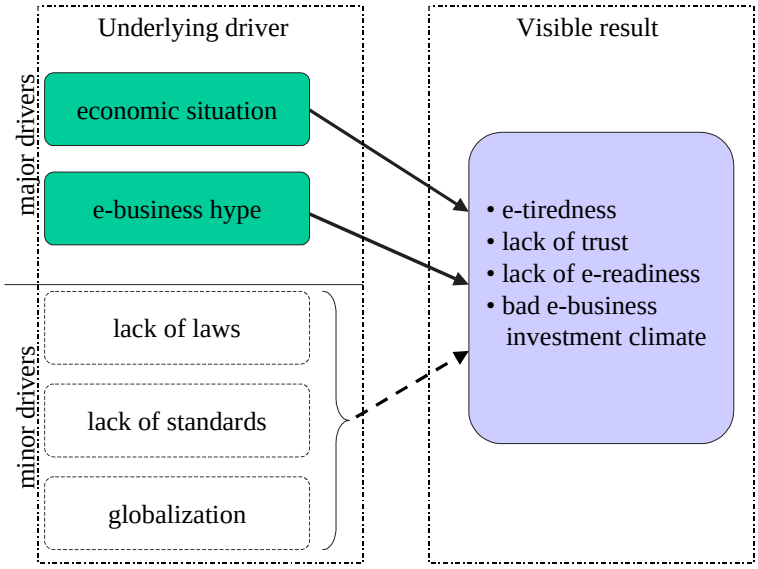


Figure 6.1: Forces correlation

This correlation suggests that a negative attitude towards e-business remains until the drivers become more positive. The predictions of the Gartner group suggest that the hype cycle will start to rise again in 2003, but this if the economic situation keeps low this can be expected to happen later. Some of the points mentioned in the section opportunities above do pose positive influence on the visible result, but the negative drivers are still too strong. **In order to overcome this problem Siemens OCW should start their projects in small groups with good training and support, and must try to get solid business cases that show the benefits of e-collaboration.**

The threat that cultural difference will lead to problems is not only applicable on e-collaboration, but is important for international projects in general. **Therefore it is recommended that Siemens OCW uses the experience of their employees, by involving people with experience in international, cross-cultural projects in the implementation of collaboration processes.**

6.3 Knowledge Management

6.3.1 Opportunities for knowledge management

Important macro-environment forces that propose opportunities for knowledge management are the same as with e-collaboration, namely globalization and younger people getting in decision making positions. On industry level we see that the trend towards standardization and modularization of products and solutions is making sharing knowledge on these products and solutions more interesting.

The branch in which Siemens OCW is active, engineering of specialized electrical equipment solutions for its customers, makes knowledge management explicit an important theme, because the knowledge about the customers' business and engineering knowledge is the core competence of the company. The trend toward standardization and modularization shifts the development of solutions from complete specific solutions for each customers to solutions that contain mostly configured modules and some specialized parts (80/20 principle). This makes exchanging information about these modules and standard solutions important, so that the lessons learned from failures are used in the whole group. With complete specialized solutions this is also important, but the chance that a problem has arisen before with another project is lower.

6.3.2 Threats for knowledge management

For knowledge management the same threat exist as for e-collaboration, namely the negative attitude towards e-business. In general, just like with e-collaboration, due to the current economic situation and the effects of the de-hype, the attitude towards e-business projects is negative. This makes is difficult to start projects where the outcomes are not clearly statable in the form of Return-on-Investment.

Next to this impact of the current economic situation, the negative attitude towards e-business projects, a second more important threat for knowledge management can be seen. Because of the bad economic situation the job markets are difficult and unemployment is rising. This makes people fear for loss of their job and gives a general protective attitude in the business. Therefore projects that require employees to share their knowledge, which is their key value for Siemens, will be looked upon as ways to loose people. The reluctance to share knowledge is already a major obstacle in normal times, but with job cuts on the way people will be even more protective on their knowledge.

Therefore Siemens should not start big knowledge sharing projects at this moment, but should start with deploying knowledge management tools and training in small groups of employees who are already used to talk with each other about their experiences. Also the suggestion of Mr. G. during the interviews can be taken into consideration, namely embedding knowledge management into normal work processes, in order to overcome the feeling that one is giving away ones knowledge.

6.4 Industry Portal

6.4.1 Opportunities for the industry portal

With the industry portal we see in the macro-environment globalization and pressure on reducing costs (driven by the current negative economic climate) as important drivers. In the future, development of web services can be an important opportunity for Siemens. At industry level we see that customers are requesting a more transparent look on Siemens which should be viewed from their perspective.

Globalization and pressure on reducing cost make customers look for more economic feasible ways to procure their products. These considerations are comparable with the considerations Siemens is making on their procurement side. **Therefore it can be interesting for the industry portal team to talk to procurement in order to understand the way of reasoning of the customer.** Furthermore customers want to have a single interface towards Siemens on which they can find all information on available solutions, systems and services, as well as connections to ordering tools. The fact that most customers of Siemens OCW are also operating globally makes the internet a logical choice for such an interface.

When implementing product catalogues (in the solution business most likely for spare parts) with ordering possibilities Siemens can take industry standard XML-schemes to format the information, thereby making it possible to use one standard for internal and external binding of marketplaces. This is displayed in figures 6.2 and 6.3. Figure 6.2 shows the current situation at Siemens I&S, where there are four different channels on which transactions are made. The Siemens Sellside is currently being developed as part of the industry portal, the Siemens-customer extranets exist currently in the form of EDI connections. Customers have requested Siemens to deliver their catalogs to their internal procurement marketplaces (i.e. Knauf) and to third party marketplaces which are used by the customer for their procurement (i.e. Trade-ranger). These requests can not be ignored due to the high bargaining power of the customers.

Therefore it is *essential* that Siemens OCW makes sure that it can bind to its own marketplaces as well as to external marketplaces (third party's and customer marketplaces), preferably with an industry standard XML-scheme and based on a single source of information.

6.4.2 Threats for the industry portal

In the macro-environment we could see legal issues to become a threat for the commerce part of an industry portal. Furthermore standardization issues can become a threat when no single standard arises. On the political side taxation policy can become problematic. The bargaining power of customers and the signs that the big customers already have their own procurement marketplaces can become a threat for the commerce part of the industry portal. As described under opportunities it is essential that Siemens OCW adapts to the wishes of the customers, otherwise the risk that competitors take that place is high.

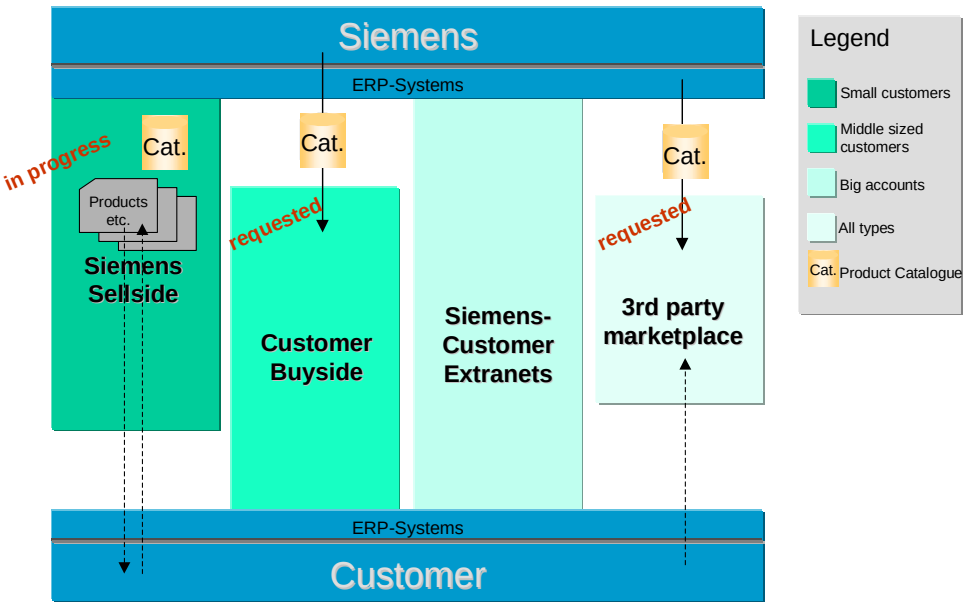


Figure 6.2: current situation information exchange with sellsites

Legal issues can become a threat for cross-organizational e-business activities because of the uncertainty about the legal framework in which the activities are regulated and the arrangements for dispute handling in case of problems. **Therefore it is recommended that Siemens appoints legal issues in off-line contracts with its customers, especially in the are of European law regulation. Further international agreements on e-business tax should be followed.**

The issue around standardization is also described under opportunities, but it can also be a threat to Siemens. Different standards in the industry which are used by Siemens' customers can increase costs, because exchanging information will require transformations of data. This is no threat for the industry portal directly, but for the overall strategy for electronic commerce it is. **Therefore it is recommended that Siemens I&S follows the discussions on standards for exchanging catalogue information very closely, and preferably gets actively involved in the discussions and/or the standardization committees.**

The future around taxation for products and services that are sold online is not yet clear, but the Taxation Framework Condition of the OECD can give a direction. The European Union also gives a direction on taxation and e-business, but this is for B2C business (VAT), and therefore not interesting for Siemens I&S. **Here again it is recommended that Siemens follows developments in taxation policy closely.**

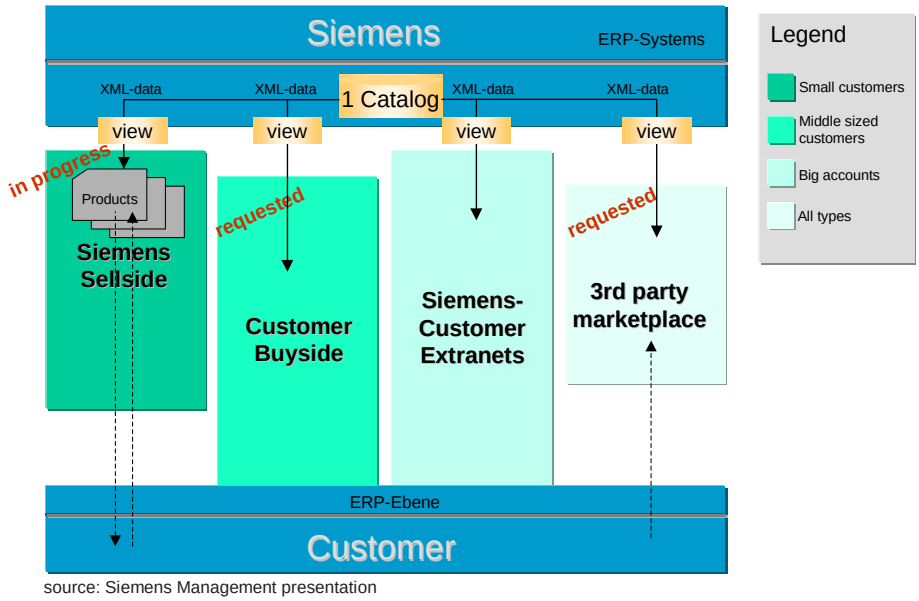


Figure 6.3: Possible simplification in information exchange by using XML

6.5 Summary

This chapter has tried to answer the research questions four and five, hereby describing which macro-environment and industry forces are relevant for the e-business strategy of Siemens OCW and describing how opportunities and threats posed by these forces can be used. The most important recommendation given in this chapter involves the industry portal, because this project is the biggest and nearest. Therefore the most important recommendation of this chapter is that Siemens should build the industry portal in such a way that the information used can be easily used to fulfill request of customers for use in their own marketplaces, preferably with industry standard XML-schemes. For this, as well as for the e-procurement side, following industry standard XML-scheme developments, as well as active involvement in the discussions on standardization in the industry, is necessary. Furthermore it is important that the team that implements the industry portal looks at issues from a customer perspective, and therefore discussions with Siemens I&S' own procurement department can give valuable insights in customers' considerations.

The most important positive and negative influences on the four e-business strategy topics are described in table 6.1 as opportunities and threats.

Table 6.1: Most important opportunities and threats

Topic	Opportunities	Threats
e-procurement	- standardization - XML-adoption - pressure on reducing costs - standardization and modularization of products - demand of customers	- liability of electronic contracts - standardization issues - bargaining power of suppliers - local suppliers
e-collaboration	- government attitude - BundOnline 2005 - globalization - younger generation into power - request from customers	- lack of trust - lack of e-readiness - bad investment climate
knowledge management	- globalization - younger generation into power - standardization and modularization of products	- lack of trust - lack of e-readiness - current economic situation
industry portal	- globalization - web services - pressure on reducing costs - requests of customers	- legal issues - standardization issues - taxation policy - bargaining power of customers

Chapter 7

Conclusions and recommendations

This chapter will give the main conclusions and recommendations of this thesis. First the conclusions regarding the six research questions as stated in chapter two are discussed. This section describes the found macro-environment and industry forces, the main impact of these forces on the e-business strategy of OCW and gives a method for analyzing these forces in the future. Secondly the recommendations for the management on the e-business strategy of Siemens OCW are given. Thirdly, the implications for theory are given and finally, possible future research topics are presented.

7.1 Conclusions

The research started with the research problem, which is repeated below:

"Which external forces influence the e-business strategy of Siemens OCW and how can future developments of these forces be assessed?"

In order to answer this research problem six research questions have been stated, which asked for research into macro-environment and industry influences on e-business in general, applying these influences to the specific e-business strategy of Siemens OCW and analyzing which opportunities and threats these influences proposed for the e-business strategy of Siemens OCW.

Macro-environment forces and trends

The first and second research questions asked for macro-environment and industry forces influencing an e-business strategy in general and the expected future development of these forces. These have been looked into in chapter 4, the research overview and resulted, together with the findings of the interviews and the workshop, in the macro-environment influences shown in table 7.1. These are ordered according the PESTEL framework.

Table 7.1: Macro-environment forces influencing e-business

Type	Force	Trend/influence
Political	Taxation policy	The OECD proposes to handle taxation on the Internet in a similar way to traditional commerce. Important question for this topic is the question in which taxation framework the tax has to be paid.

Table 7.1: Macro-environment forces influencing e-business

Type	Force	Trend/influence
Political	Foreign trade policies	Distinction between service and goods is getting unclear with online transactions. WTO members have not yet on these topics yet.
Political	Government attitude towards e-business / BundOnline 2005	Related to trust mentioned below the attitude towards e-business of governments can increase awareness and trust. Government projects indicate that this 'promotion' is increasing (i.e BundOnline2005, e-Europe).
Economic	Business cycle / economic climate	In times of economic downturn getting support and budget for e-business projects is more difficult. Especially long-term projects with hard to measure benefits (i.e. knowledge management) will have a hard time from this.
Economic	E-business investment climate	The e-business investment climate can be expected to become better, when following the projections of the e-business hype cycle and the prediction of Forrester reseach (see figure 4.4).
Economic / Sociocultural	Globalization	Projects are becoming more and more global oriented, which requires special attention to issues of culture and infrastructure availability.
Sociocultural	Trust	Trust in e-business (projects) is currently low because of economic situation and the e-business dehype. This influences willingness to fund projects and acceptance of these projects.
Sociocultural	E-readiness	Related to trust, but also incorporates the experience of potential users with technology, available infrastructure, etc.
Sociocultural	Younger generation into power	There are more and more younger managers coming into decision making positions, which will make the management level more open for new technologies because the new managers are very familiar with them.
Technological	Web services	Web services are said to make e-business easier by sharing (parts of) programs over networks. According to Gartner the deployment of web services can be expected to be in two to five years.

Table 7.1: Macro-environment forces influencing e-business

Type	Force	Trend/influence
Technological	Standards	Standardization in industries is ongoing because of the cost-reduction potential for all players, but there is a risk for several competing standards, which makes it difficult to choose the 'right' one.
Technological	XML	Accepted as important standard for e-business, but implementation in industry specific content agreements is still in progress.
Legal	Trust	Good arrangements for dispute handling and consumer protection are important helpers for building trust in e-business. Legal frameworks are still behind the ctual developments, because of the long time it takes to form policy and the insecurity on the direction of e-business.
Legal	Electronic contract liability	With electronic contracts and transactions it is important to have liable records of the transactions, including means of identifying the trading parties. Recent developments with corporate credibility (i.e. Enron, Worldcom) make records even more important
Legal	Dispute handling	Cross-border activities via the Internet ask for clear rules for dispute handling.
Legal	Privacy and security	In B2C business privacy is very important, but security is also in the B2B business essential for good and trusted e-business

Industry forces

The analysis of the industry, as described in chapter 5, has been done using Porter's five forces framework. The results of this analysis are displayed in figure 5.4. Here the most important forces are the high bargaining power of customers and suppliers for the oil and gas branch. Interesting enough for the water branch the bargaining power of customers is still low, because of the highly fragmented market with many small local customers. In this branch the competition by local suppliers a bigger threat. Another important issue that has been found is the upcoming of marketplaces for the specific industries, which could take an important role in making products more comparable for customers and take over the role that Siemens' own marketplaces want to play. Also the demand of customers that Siemens has to bind its systems to the customers' own marketplaces is, because of the high bargaining power of customers, an important development. Finally the importance of personal contact in the market for oil and gas is an important aspect that needs to be taken into account.

E-business strategy of Siemens OCW

The third research question asked what the current e-business strategy of Siemens OCW is. This strategy has been developed during the e-business strategy check and resulted in four focus topics: knowledge management, e-collaboration, industry portal and e-procurement. These topics are also driven by corporate and group initiatives, although clear choices on tools and further actions are limited.

e-procurement: Siemens OCW has the tools for e-procurement available, but they are not often used. Goal is to increase the use of e-procurement to cut procurement costs.

e-collaboration: Use of e-collaboration tools can be used to cut travelcosts, increase information sharing and bring experts together. Also e-collaboration with customers is planned, bringing reduced response times and increased customer binding.

knowledge management: Knowledge management is essential for Siemens OCW and can help to reduce non-conformance costs, reuse knowledge and solve the 'leaving expert problem'. Planned projects are lessons learned databases and best practice sharing.

industry portal: Building one internet interface to the customer containing all functions (information, collaboration, transaction). Pushed by the industry maps projects and bringing customer intimacy and cost reduction in order process and order handing (spare parts ordering).

Impact and trends on e-business strategy

The impact of the found influences on the four focus topics of the e-business strategy is analyzed to answer the fourth and fifth research questions. Table 7.2 shows the most important opportunities and threats for the four e-business strategy topics, as found during the analysis in chapter 6. This analysis resulted in recommendations, of which the most important ones are discussed in section 7.2

Method for future development analysis

The final research question was to provide an efficient way to analyze the influence of macro-environment and industry forces in the future. In order to answer this question for macro-environment forces, this thesis presents an adapted version of the PESTEL framework suggested by Johnson and Scholes [32]. This so-called e-business PESTL framework is shown in table 7.3 and can be used as a guidance to analyze the macro-environment for influences on an e-business strategy. The framework contains the forces that are found having influence on the e-business strategy of Siemens OCW, but it is expected that the framework can be used in a broader situation, because of the general character of the topics in the e-business strategy of Siemens OCW. With these forces it is important to see the link between

Table 7.2: Most important opportunities and threats

Topic	Opportunities	Threats
e-procurement	- standardization - XML-adoption - pressure on reducing costs - standardization and modularization of products - demand of customers	- liability of electronic contracts - standardization issues - bargaining power of suppliers - local suppliers
e-collaboration	- government attitude - BundOnline 2005 - globalization - younger generation into power - request from customers	- lack of trust - lack of e-readiness - bad investment climate
knowledge management	- globalization - younger generation into power - standardization and modularization of products	- lack of trust - lack of e-readiness - current economic situation
industry portal	- globalization - web services - pressure on reducing costs - requests of customers	- legal issues - standardization issues - taxation policy - bargaining power of customers

the low trust in e-business projects of employees and external stakeholders and the economic situation and de-hype, as described in section 6.2.2.

For the industry analysis the standard five-forces framework of Porter is found to work fine, and is therefore suggested to use for future industry analysis.

In relation with the e-business strategy check it is recommended that an extra module is added, module D, in which the macro-environment and industry analysis is conducted. This module can be performed parallel to the customer and competitor analysis and use their results.

Table 7.3: proposed e-business PESTL framework

Political	Economic
- E-business foreign trade policy - Taxation policy - Government attitude towards e-business	- Economic climate - Hype cycle development - Globalization
Sociocultural	**Technical**
- Trust - Education - Globalization - e-readiness/e-tiredness	- Standards - XML development - Infrastructure development - Technological developments (Web services
Legal	
- Tax regulation for e-business - Privacy and security laws - Dispute handling regulation - Liability of electronic contracts	

7.2 Recommendations

The influences found have already an impact on the developed e-business strategy. Also general observations not related to the research problem showed some issues on which recommendations can be made.

- The strong power of the customers in the oil and gas sector, as well the existence of dedicated marketplaces founded by those customers, have an important impact on the industry portal oil and gas. It is likely that big customers will require Siemens to adjust to their procurement portals in stead of using a Siemens industry portal for procurement (i.e. Knauf, traderanger). Therefore it is recommended that the necessity of a transaction part on the industry portal is researched more deeply before starting a project with it. This issue is different for the water sector, where Siemens could gain competitive advantage by offering e-business solutions to the industry consisting of many small, local customers, like sparepart ordering through the web with short delivery times, which reduces inventory costs for their customers. This extra service can make Siemens more interesting than their competitors. When the trend to more concentration continues, Siemens already has a foot in the market and this means the possibility for contracts with one company with many locations. Further this is in line with the plans to extend the international market of the water division.

- Related to the adaption to customer marketplaces mentioned above, it is strongly recommended to look more closely in the possibilities of web services and the use of industry standard XML-schemes. If Siemens can provide a web service that their customers can integrate in their marketplaces or ERP-systems, this can be a competitive advantage. This is also interesting internally because Siemens has a lot of 'internal supplier' - 'internal customer' relationships which could also use the same web service. For the use of standard XML-schemes it is essential that Siemens participates actively in the development of these standards and adapts its internal processes to make use of these XML-schemes. It is expected that if Siemens OCW misses this development they will get behind competition dramatically.

- Because of the current economic situation and the reorganization within Siemens I&S a lot of employees within Siemens OCW are not sure about their job security. This increases the already existing reluctance to share knowledge, the one asset that makes an employee valuable. Therefore it is strongly recommended to suspend big knowledge management initiatives for the moment and focus on knowledge sharing in small groups, in which the participants know and trust each other and thereby introducing the topic stepwise. Furthermore knowledge management initiatives should be embedded in normal processes, in order to make them more natural for employees. It is also very important that the meaning of knowledge management is communicated to the responsible managers, because as long as they see knowledge management as an non-important issue, it is not possible to convince their employees to participate.

- The lack of a clear and integrated e-business strategy for I&S is a problem. Especially with issues on platform choice, project planning and best practice sharing it is important to have a clear statement where I&S wants to be in two years and how they want to get there. At the moment there is a general e-business roadmap for I&S, but this contains only the projects which are done by the different business units, and then even only the ones that are known. It is therefore recommended that the I&S e-business staff develops an overall e-business strategy and that the management of I&S makes a clear statement of where to go, at least for the division IP. This can also be important when aligning the e-business strategies with different groups responsible for industry like I&S and A&D. Projects like the industry portal make is necessary that the internal views on e-business align.

- Two additions to the e-business strategy check are suggested: firstly, the addition of an extra module that does a macro-environment and industry check based on the e-business PESTL framework described above and the five-forces analysis of Porter. This could take the form of an module D that runs parallel to the customer/competitor analysis. Secondly, adding the explicit e-business vision at the end of the strategy check that in addition to the roadmap, which described the how, gives answer to the question where the journey is going.

- Because of the importance of the feeling towards e-business and trust for all projects it is strongly recommended to put extra effort in communicating good results in the organization. This should preferably be of projects conducted within Siemens OCW, but in the beginning good stories about other e-business projects can also help. Therefore the projects on collaboration with Kvaerner and the case of the Industrial Development Projects should be followed closely by the e-business department in order to use them as example cases.

- Related to the latter is the attitude of management towards e-business specific and innovation in general. For the implementation of innovative technologies or processes it is important that management supports it. This requires a top-down attitude change, as well as a change of the way performance is graded. This involves a change of culture, which can take a long time, but is essential for the company. If this is done only on short-term financial performance, the management will not be motivated to look to long-term competitive advantage that can be gained with innovation.

- The internal structure of Siemens I&S is also a problem for transaction through e-business marketplaces, because products sold through an internet marketplace will come on the credit of the central organization, and not on the regional sales manager who has to deal with questions and problems of the customer. Furthermore mostly the regional sales manager is the one with the good customer contacts, and should not be 'punished' if he asks a customer to use an online ordering tool, which lowers the ordering costs for Siemens. Discussions with a sales manager suggest that this is the most important reason why the sales force objects to e-business solutions.

7.3 Implications for theory

The aim of this research has been mainly explorative in way that it tried to look into the influence of macro-environment and industry forces on the e-business strategy. This view on e-business has not yet been looked into in literature, and therefore adds insights on the topic. The point of view that the environment does influence the e-business strategy is proven to be right, although the influence found is smaller than initially expected. This can be explained by the mainly internal oriented approach taken during the strategy check, and the current unstable situation. This unstable situation will increase risk-evasive behavior, which will mean focus on projects in the internal environment which make them more predictable and controllable than projects which also link to the external environment.

This thesis gives a empirical starting point of external influences on e-business strategy and can serve as a base for further research. The results suggest a link between the attitude towards e-business (influences by economic situation, trust and experience) and the way a e-business strategy is set up, and therefore is influenced by external factors. It is suggested that in times of uncertainty because of the economic situation and the reflections of the de-hype, the developed e-business strategy is mainly oriented inside and hence, less influenced by external factors.

7.4 Implications for further research

The research performed has given rise to many questions, therefore a small selection of possible future research topics is given below:

- To extend the research on influence of macro-environment and industry factors on e-business strategy to cases in different industries in order to find general forces. This will strengthen the validity of the research as discussed in chapter 2.
- to look into the relationship between economic situation and the orientation of a developed e-business strategy (internal/external focussed);
- to look into the useability of the proposed e-business PESTL framework in other cases;
- to investigate how the strategic choice of an organization (cost leadership, differentiation, focus) influences the attractiveness of e-bidding by their customers;
- to investigate the impact of the web services technology on the future of industry portals and e-marketplaces.

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Appendix A

Siemens Corporate Structure

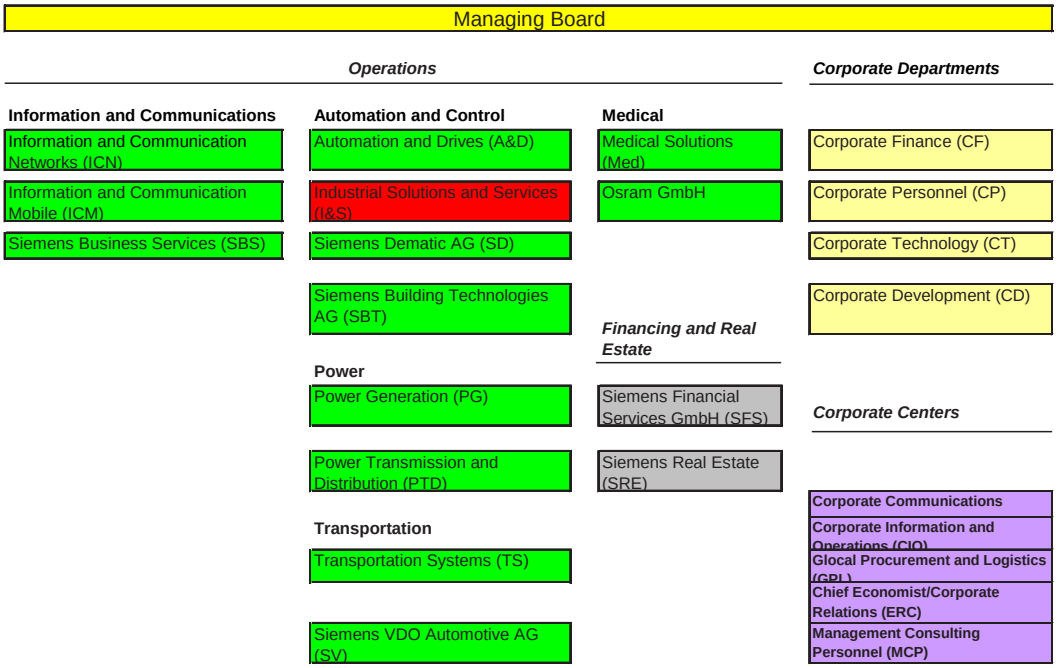

Figure A.1: Siemens Corporate Structure

Appendix B

I&S Structure until 10/2001

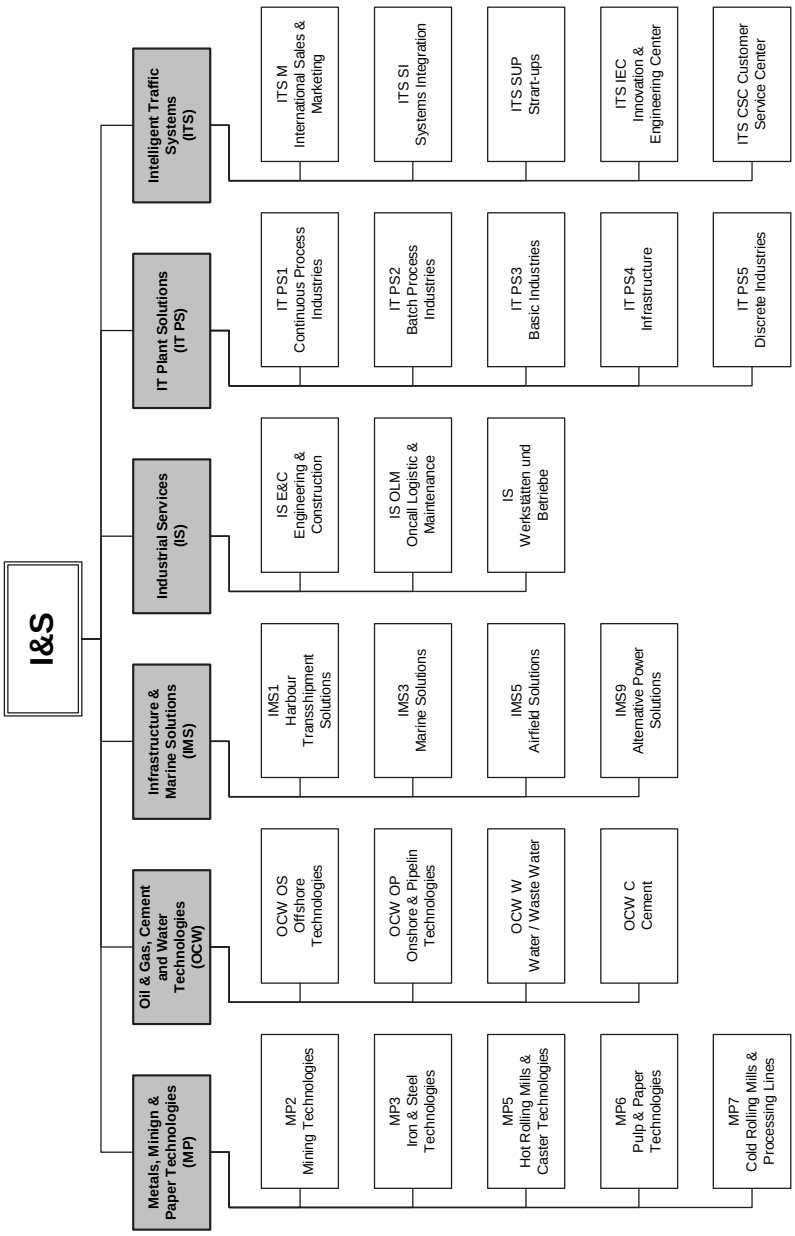

Figure B.1: I&S organizational structure before turnaround

Appendix C

I&S Structure as from 10/2002

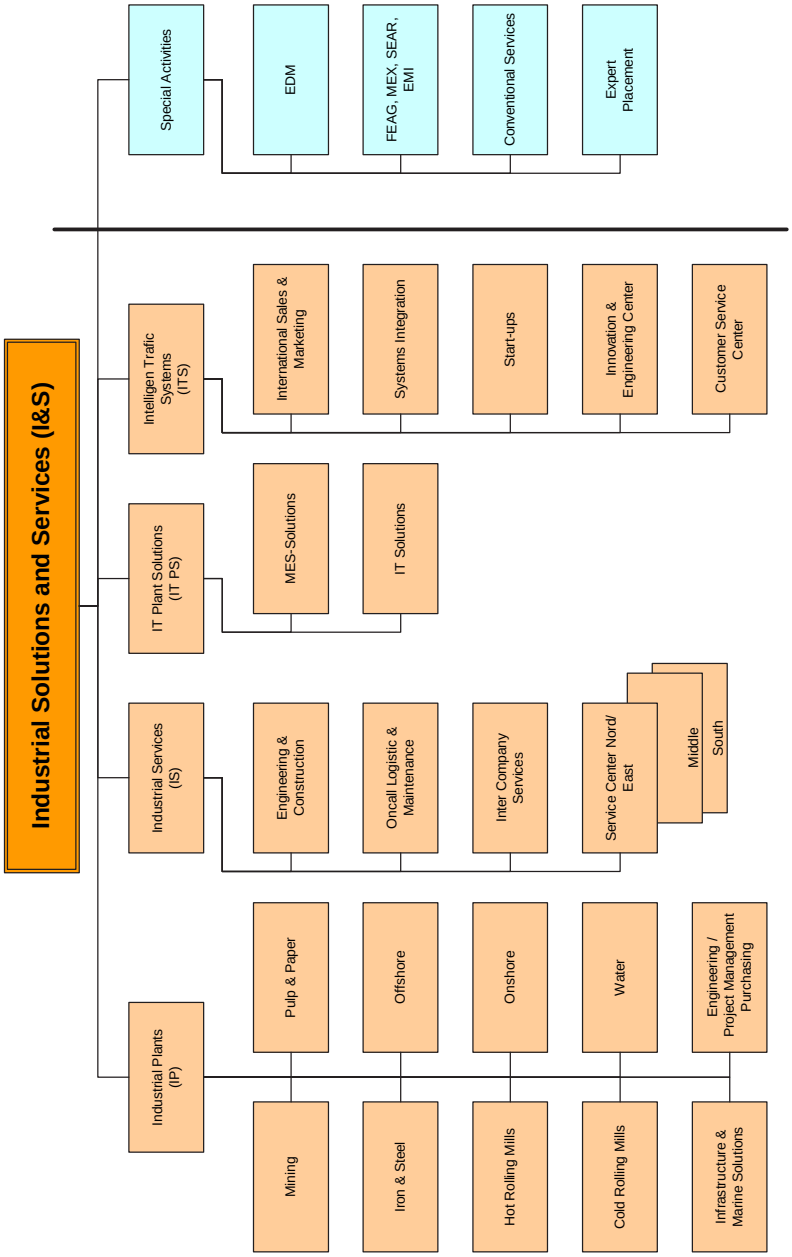

Figure C.1: I&S organizational structure after turnaround

Appendix D

Description of Siemens customer types

In the oil and gas branch were Siemens OCW is operating there are mainly three types of customers. One are the investors, which are mainly big oil and gas companies like Shell, BP and Exxonmobile, as well as local companies like Pemex in Mexico. The second group of customers consists of the so-called EPC-companies, where EPC stands for engineering, procurement and construction. These companies are contractors for the complete construction of i.e. an oil platform or pipeline. Examples of these companies are Bechtel and Fluor Daniel. The thirds group consists of original equipment manufacturers (OEM) who incorporate Siemens technology in their products.

Siemens OCW has ca. 20% of its orders directly from end-customers and ca. 80% through EPC- or OEM-companies. Figure D.1 gives an idea of the relationship between Siemens and its customers.

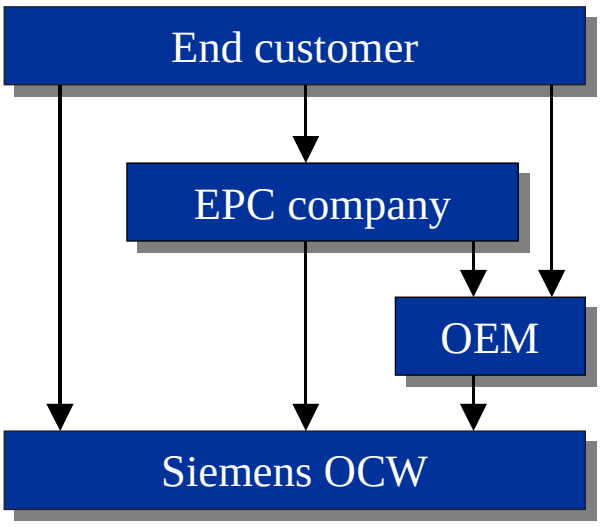

Figure D.1: Relationship between Siemens and customers (example)

Appendix E

e-business Strategy Check Methodology

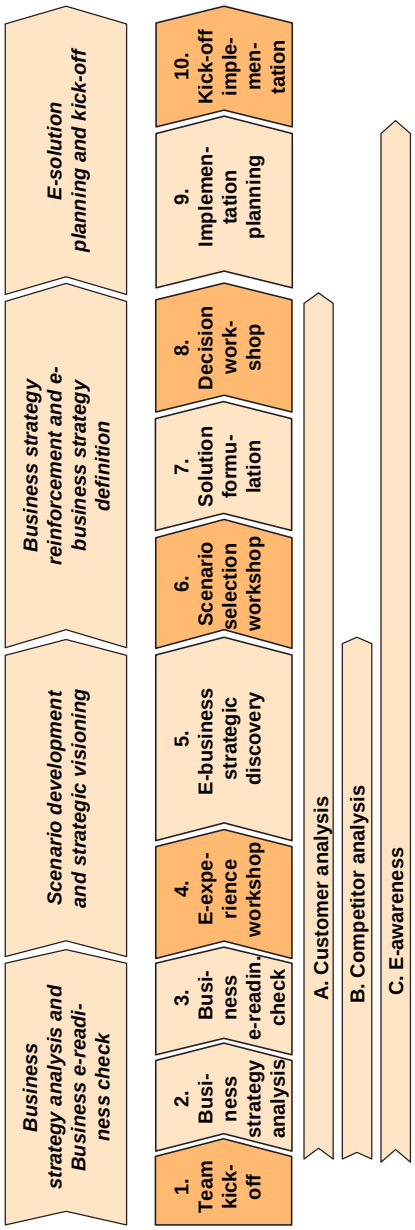

Figure E.1: eBusiness Strategy Check Methodology

To define a clear e-business strategy on business unit level Siemens has developed the methodology *e-business strategy check*. Below the e-business strategy check is described as the official statements say.

Official description

The e-business strategy check methodology is designed by Siemens Management Consulting and has four objectives:

- Business e-readiness check: to determine the current position of the business unit with regard to e-business;
- strategic alignment of business strategy, scenario of future business and concrete actions;
- e-awareness in specific e-business matters relevant for the business leaders;
- e-action, meaning the translation of strategic ideas in concrete e-business implementation projects.

This strategy check consists of 13 modules, which are described below in detail and shown graphically in figure E.1.

Team Kickoff

The purpose of the team kickoff meeting is to get the strategy check team in line with the expectations of the business unit management and to identify the extent in which the strategy check will be applied. It is possible that certain modules will be skipped. The second goal is to make sure that everybody, team members and management/sponsors, speak the same language and are clear on the next steps to be pursued.

Business strategy analysis

The business strategy analysis starts with the clearly defined business unit strategy and the willingness of business unit management to participate in strategy interviews. The goal is to get a clear picture of the current business strategies and to gather ideas on how e-business could support the current business strategy. In order to do this a standard framework can be used in which five steps are taken:

1. Business challenges : What are the key parameters driving industry dynamics and trends?
2. Business success factors : What are the business success factors in the view of business challenges?
3. Business goals : What are the defined business goals?

4. Business strategies : What are the current functional strategies to respond to the business succes factors in terms of sales, supply chain management, marketing, technology, procurement, human resources, ...?

5. E-business solutions : What are the current e-business solutions already implemented to enforce the business strategies?

Business e-readiness check

The business e-readiness check provides an overview of the unit's current status relevant to e-business in comparison to external benchmarks [5]. This is done using Cisco's netreadiness scorecard and questionnaire [57], which gives an overview of the unit's e-readiness in four categories (technology, leadership, governance and operating model and organizational competencies and processes) compared to an external best of breed benchmark. The reason why Cisco's tool is used is because of the large benchmark database it provides. Figure E.2 shows the output of such a measurement.

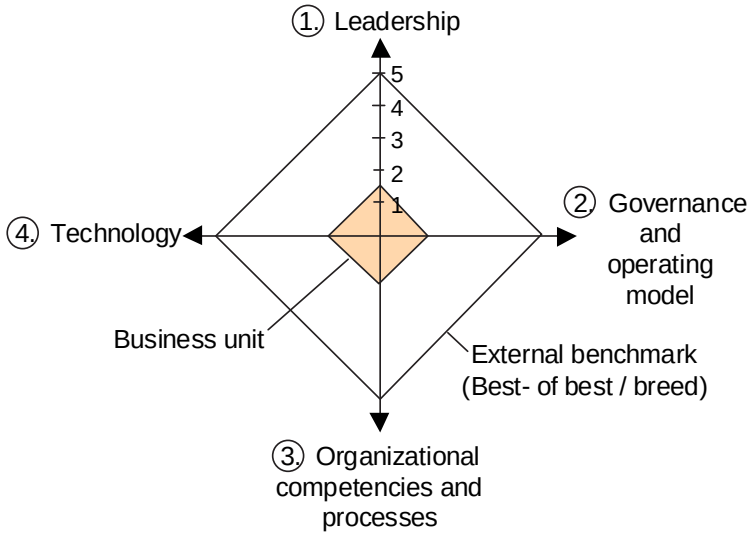

Figure E.2: Critical e-readiness success factors

The three first modules are mainly preparation by the core team. The following sections will include the management of the business unit.

E-experience workshop

The e-experience workshop informs the management team and motivates it to support the project. Herefor the results of the business strategy analysis and the e-readiness check are used. The goals are to create an understanding with the management team (e-awareness) and to enhance the commitment for the project.

Strategic discovery

The strategic discovery's focus is on scenario and response development. The goal is to create internal and external input for the strategic visioning. Internal input for strategic visioning is created with industry analysis, company analysis and e-business analysis, which uses frameworks like Porter's five forces model. External input is created by contact with external experts. The goal of the strategic discovery is to develop different scenario's, based on the input of earlier modules.

Scenario selection workshop

In the scenario selection workshop the business scenario with which the strategy check will continue will be chosen. This will be done in a workshop with the strategy check team, the division and sub-division leaders and if necessary external consultants.

Solution formulation

The goal of the module solution formulation is to create solution profiles for the chosen project, in terms of costs, benefits, impact and descriptions. Also nominated project owners and project teams should be selected, in order to facilitate a quick start after the end of the strategy check.

Decision workshop

The goal of the decision workshop is to select the solutions for the implementation planning, to get the commitment of the management for these solutions, to get the nominated persons responsible for the projects and get agreement on the next steps for implementation. Here the suggested projects can be categorized by two dimensions: potential and easy of implementation.

Implementation planning

The goals of implementation planning are a detailed implementation plan for the e-business projects and management commitment in the form of resources for these projects. The results should be the inventory of the current assets and capabilities, a detailed action plan for the implementation and a resource planning for each project.

Kick-off implementation

The last module is the kick-off for the real implementation of the selected projects. This includes the real start and the monitoring and controlling to secure successful projects.

It should be noted that the strategy check as performed for Siemens OCW has a slightly different set-up, because the initial goal was not to go so far that the projects would be planned precisely. The main reason to do the strategy check was to get the 'ist' and 'soll' state of e-business within the business unit. The management wanted to know where the business unit is at the current time with e-business projects and readiness and what the goal or vision for the future is.

Appendix F

Descriptions of terms in the e-business value chain

This appendix described some of the terms as given in the e-business value chain (see figure F.1). The terms explained are collaborative engineering, portal, supply chain management, e-procurement, e-fulfillment, web marketplaces and customer relationship management. Readers with experience in e-business can probably skip this explanation of terms.

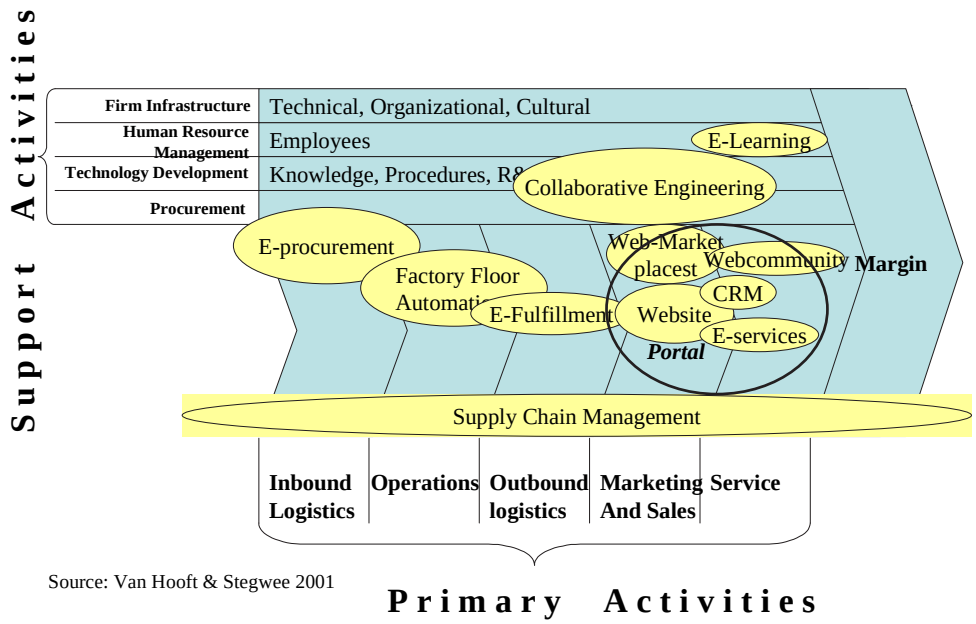

Figure F.1: The e-business value chain

Collaborative engineering

Broadly defined, the field of collaborative computing, encompasses the use of computers to support coordination and cooperation of two or more people who attempt to perform a task or solve a problem together (Borenstein,1992;Schooler,1996 in [6]). This is also named e-collaboration or online collaboration. Borenstein and Schooler give the time/space taxonomy as a means of classification of different e-collaboration method/tools (see figure F.2). In the horizontal dimension we order collaborative tools by the location of participants:they can be either at the same place (also referred to as co-located) or at different places (remote). Similarly

the vertical dimension makes the distinction, whether the interaction happens at the same time (synchronous)or at different times (asynchronous).These dimensions provide four communication scenarios: synchronous, co-located; asynchronous, co-located; synchronous, remote and asynchronous, remote [6].

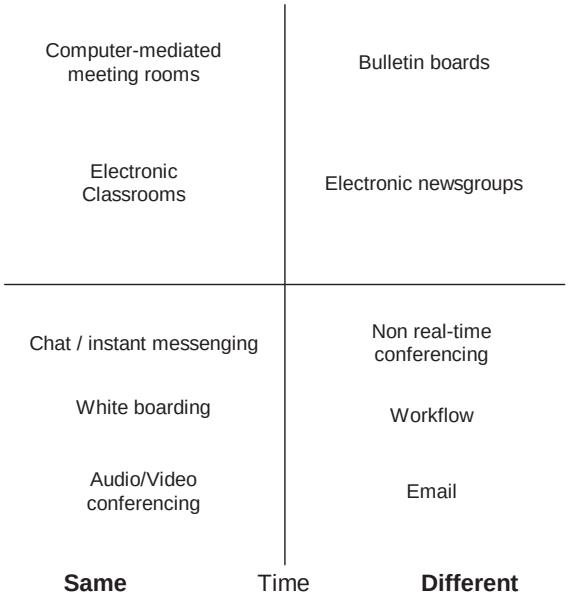

Figure F.2: The time/space classification

Tidd et al. [7] state that firms collaborate for a number of reasons:

- To reduce the cost of technological development or market entry
- To reduce the risk of development or market entry
- To achieve scale economies in production
- To reduce the time taken to develop and commercialize new products

It should be mentioned that they are pointing here specifically to horizontal collaboration, that is firms forming alliances for collaboration in their industry on new technologies, with competitors. These reasons can on the other hand also be applied to collaboration with customers in big projects, to reduce the costs and risks of the project.

Examples of online collaboration in the industry of Siemens can be found i.e. with Bechtel, one of their big EPC-customers:

Cephren's web-based collaboration service, ProjectNet, provides Bechtel's project teams–i.e. contractors, architects, engineers, subcontractors and suppliers–with the ability to share documents, collaborate, and communicate in real time. With ProjectNet, documents, including computer-aided design (CAD) drawings, are being shared instantaneously among the many firms involved in building each Webvan

distribution center, eliminating the expense and confusion of delivering paper documents overnight.

The difference between using ProjectNet and traditional offline tools can be compared to the real time savings of e-mail versus postal mail," said Tim Horst, program construction manager for Bechtel's Webvan distribution centers project. "The ability to send out and respond to information requests within a matter of hours while tracking each response significantly reduces construction delays and crew down-time."

From: Bechtel press release, 7 April 2000

Portal

Portal is a term, generally synonymous with gateway, for a World Wide Web site that is or proposes to be a major starting site for users when they get connected to the Web or that users tend to visit as an anchor site [69]. Within companies like Siemens the term can be used in the form of a Customer Portal, where all functions that customers may need are combined on one website. By using personalization functions organizations can provide very personal pages with information for one customer, which can be a company, a department or even a specific person within a customer company. Another term often heard is Branch Portal, which focuses on a specific part of a companies customer base, like oil and gas for Siemens AG.

The term e-Portal or employee portal is used to describe a single intranet site where personnel of (often large) organizations can find all information they need, like travel-documents, company policies, online learning plans, etc.

Supply Chain Management or SCM

Supply chain management (SCM) is the oversight of materials, information, and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer. Supply chain management involves coordinating and integrating these flows both within and among companies. It is said that the ultimate goal of any effective supply chain management system is to reduce inventory (with the assumption that products are available when needed) [70].

SCM is about effective information sharing and inventory control to streamline operations and coordinate activities throughout the supply chain. Therefore it is often said not to be a real e-business activity, for so far we can talk about that, but a activity that can be supported heavily by e-business. The important benefit will rise when companies are extending their value chain outside the organization boundaries and integrate their processes with that of suppliers and consumers. These interconnected value chains can then act as one single, demand driven, value chain. SCM systems are often heavily related to Enterprise Resource Planning (ERP) systems.

E-procurement

E-procurement is the business-to-business purchase and sale of supplies and services over the Internet. An important part of many B2B sites, e-procurement is also sometimes referred to by other terms, such as supplier exchange. Typically, e-procurement Web sites allow qualified and registered users to look for buyers or sellers of goods and services. Depending on the approach, buyers or sellers may specify prices or invite bids. Transactions can be initiated and completed. Ongoing purchases may qualify customers for volume discounts or special offers. E-procurement software may make it possible to automate some buying and selling. Companies participating expect to be able to control parts inventories more effectively, reduce purchasing agent overhead, and improve manufacturing cycles. E-procurement is expected to be integrated with the trend toward computerized supply chain management [68].

E-fulfillment

E-fulfillment is the synchronization of electronic purchase with product inventory, invoicing, and final delivery. It is the link between customer experience and actual physical delivery of goods or services [24]. One of the most famous and familiar examples is the online tracking and tracing system of UPS, which allows the customer to see exactly when a package will be delivered [62].

Web marketplaces

Web marketplaces are probably the best known topic of e-business because they are so visible. Mostly a separation between Business-to-Consumer (B2C) and Business-to-Business (B2B) marketplaces are made. In the case of Siemens OCW we will talk about B2B marketplaces, because it has only other organizations as customer. With B2B marketplaces we can then again separate them in public and private marketplaces. Public marketplaces are open in the way that many suppliers and many customers present their products there. A schematic representation of private and public marketplaces is given in figure F.3.

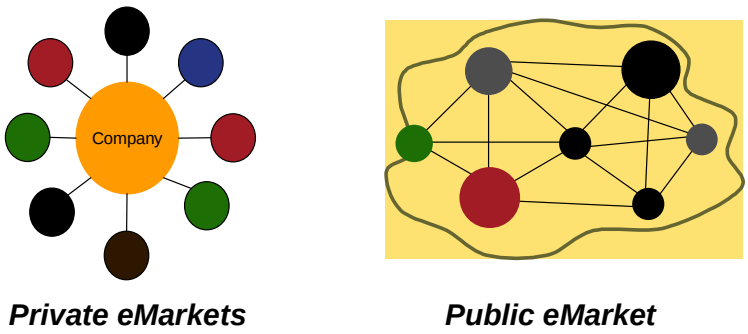

Figure F.3: Private and public marketplaces

Customer Relationship Management (CRM)

Customer Relationship Management (CRM), a combination of business process and technology, seeks to understand a company's customers from a multifaceted perspective: Who are they, what do they do, and what doe they like? It can be seen as a combination of marketing and sales information, whereby the key goal is to have all the information available about the customer available for all interacting with the customer. This can be Corporate Account Managers, call center agents, technicians, etc. Figure F.4 shows the three phases of CRM, which are requiring the customer relationship, enhancing it so the perceived value for the customer is higher and, therefor, retaining the customer relationship, because acquiring a new customer is more expensive that retaining the current customer base [33].

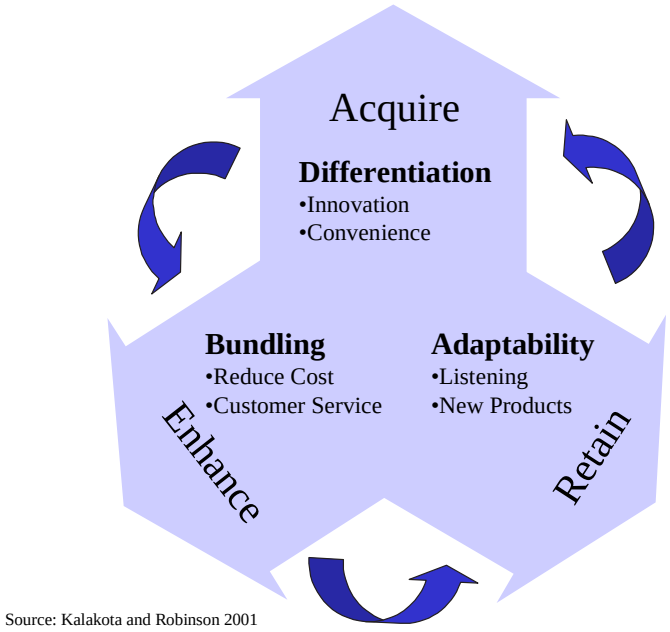

Figure F.4: The three phases of CRM

Appendix G

Gartner's Hype Cycle

Hype Cycle of e-business

The Gartner Group, one of the leading research companies on IT and technology, has developed the concept of the 'Hype Cycle'. The hype cycle shows the visibility of emerging technologies as they go towards their maturity. Figure G.1 shows the hype cycle, which has five distinct phases:

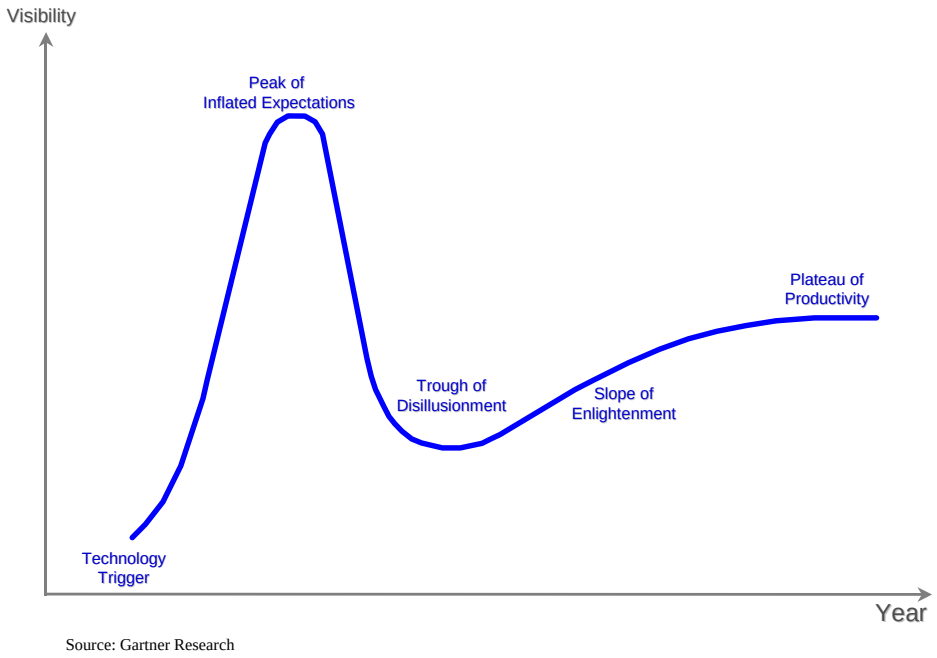

Figure G.1: Gartner's Hype Cycle

1. Technology Trigger: Significant interest by the industry and press is created as a result of an event like a breakthrough or product launch.

2. Peak of Inflated Expectations: A phase that is characterised by over-enthusiasm and unrealistic projections n which publishers and conference organisers play a central role. Some successes, but more failures, occurs as the technology is pushed to its limits.

3. Trough of Disillusionment: The technology does not live up to its over-inflated expectations, and it rapidly becomes unfashionable and is abandoned by the press.

4. Slope of Enlightenment: Better focus and hard work result in a true understanding of the technology's applications, risks and benefits. Commercial standardised methodologies and tools become available to ease the development process.

5. Plateau of Productivity: As the tools and methodologies enter their second and third generation, they are increasingly stable. The real-world benefits of the technology are demonstrated and accepted. The final height of the plateau depends on how broadly applicable the technology is.

Figure G.2 shows the hype cycle for e-business, which makes it easy to see the dot-com shakeout and the fall of e-business in 2000. It also predicts that, as the true value of e-business for organizations arises, e-business will become a mature technology which will eventually be an integral part of business. According to Gartner this will be around 2006-2008, the time were the distinction between business and e-business is over [21].

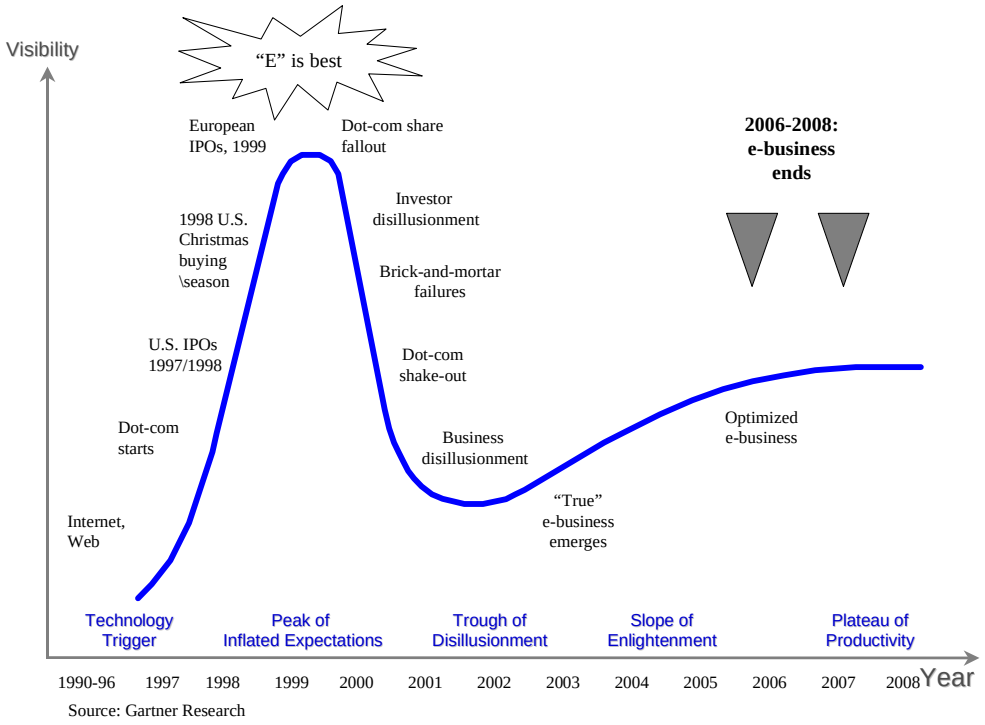

Figure G.2: Gartner's Hype Cycle for ebusiness

Emerging technologies and trends

The Gartner Group has identified a range of technologies in the '2001 Hype Cycle of Emerging Trends and Technologies' [22]. These are mapped on the Hype Cycle to characterize the stage of maturity of these trends and technologies (see figure G.3). Gartner also presents a "radar" screen, which depicts, for each of the technologies and trends, the estimation of business impact and penetration in OECD (Organisation for Economic Cooperation and Development) nations by 2010 (see figure G.4). Below the technologies and trends mentioned in the figure will be described.

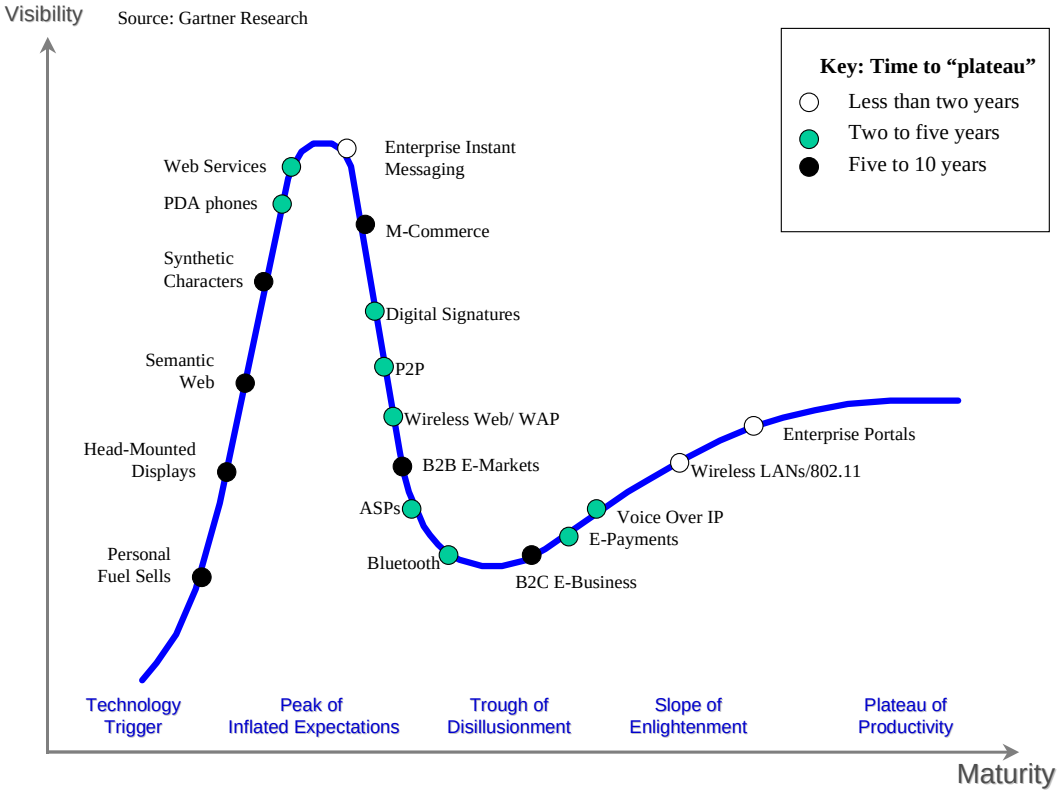

Figure G.3: 2001 Hype Cycle of Emerging Trends and Technologies

On the rise

Personal fuel cell technology is still largely in the development phase, but will represent a necessary upgrade because today's batteries will not meet the power requirements of future "always on" portable devices.

The semantic Web vision embraces standards and formal languages for semantically marking up content on the Web. The objective is to make the Web increasingly machine-readable, improving searches and system interoperability and,

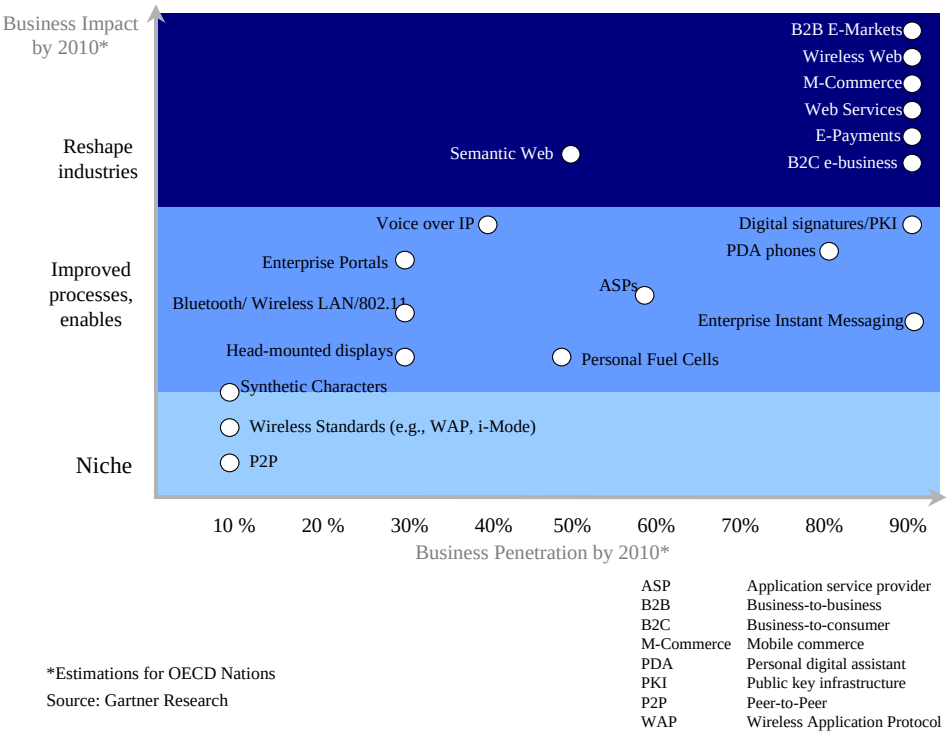

Figure G.4: 2001 Hype Cycle of Emerging Trends and Technologies

ultimately, enabling a new wave of automation. This will likely significantly affect all areas of e-business in the next three to six years.

Head-mounted displays will eventually give people full visual access to computer equipment, preferably while mobile. Variations include retinal scanning displays, which augment a person's visual perception.

Synthetic characters are intended to converse with people in natural language to access online information*e.g., Artificial Live, eGain Communications or Active-Buddy's instant-messenger-based "infobots").

M-commerce - transacting for goods or services via data-enabled mobile phones or PDAs - will be a high-impact trend. It created a good deal of hype recently, but faces tough challenges: security, applications, costs and convenience of applications.

At the Peak

PDA phones, currently combining celluar phones and palm-top functionality, have gained significant visibility. When they provide sufficient features (e.g. more memory, better screens, longer lasting batteries and MP3 players), Gartner expects adoption to increase steeply.

Web services are software components that can be accessed over public networks using generally available ubiquitous protocols and transports - e.g., SOAP(Simple Object Access Protocol) over HTTP - and are being rightly touted as the next big step in Internet software development. Gartner expects significant savings in time and costs.

Enterprise instant messaging is a tool for real-time communication. By 2004, 60 percent of real-time Internet-enabled communication between people via any means, including voice, text or call-and-response, will be driven through instant messaging technology (probability 0.7).

Digital signatures have become increasingly ready for deployment, but the complexities and costs of a public key infrastructure implementation are still preventing significant investments.

Sliding Into the Trough

Peer-to-peer was hyped by the industry as a breakthrough in computing, but is now sliding fast into the Trough of Disillusionment. Design and management complexity will limit potential deployment benefits for general applications until 2004.

The wireless Web has great potential for m-commerce as well as other applications. However, inhibitors include lack of reliability, sufficient bandwidth, security and proven applications development principles.

Application service provider (ASP) models are still immature; their constant evolution is confusing enterprises. The ASP market is still small compared to the overall IT services market, although it has tremendous long-term potential.

Bluetooth is set to become a defining force in portable devices. However, security issues, lack of support in Windows XP, delays in promised products and interference with other communication technology (e.g., 802.11b) are slowing its adoption.

Several e-business trends and technologies are at different stages of the Hype Cycle. *Business-to-business (B2B) marketplaces* and e-procurement are moving into the Trough of Disillusionment fast and we caution that by 2004, viable stand-alone e-procurement application vendors will cease to exist. Survivors will either converge with enterprise application vendors or with e-marketplace vendors (probability 0.8)

A similar downlturn has occurred in *business-to-consumer (B2C) e-business*, where the confusion about return on investment is inhibiting large investments.

Climbing the Slope

E-payments will emerge by 2004 and their adoption will likely be accelerated by several factors. The recent drop in advertisement effectiveness, advances in mobile payment options and Microsoft's new payment option in Windows XP have all brought current business models on the Internet into question.

Voice over IP (VoIP) applications allow for more sophistication and interaction in particularly in the domain of quality of remote audio and video collaboration.

Vendors, not user demand, are driving this market. Enterprises must be cautious about this technology when they adopt is and not be swayed by vendor hype.

Wireless LANs - specifically, 802.11b - have matured in recent years and will provide the primary means of wireless intranet communication for the next several years becayse they satisfy users' demand for high bandwidth at low cost.

Enterprise portals are continuing to mature and are entering their third generation.

Appendix H

Strategy Check

This appendix will describe the e-business strategy as developed with the strategy check for the industry segments offshore and onshore oil & gas and water. Due to lack of time and resources the exact structure of the strategy check as described in appendix E has not been not followed. Figure H.1 shows the structure in which in the end the e-business roadmap was formulated. With the start of the strategy check it was not known yet that there would be overall theme's that came back in all three businesses. Using the input of the customer analysis, the competitor analysis, the business strategy and a look at the current processes of Water, Offshore and Onshore the e-business projects (current and new) were proposed in an Opportunity Workshop. These projects were discussed and there were four overall themes found. For each these cross-divisional themes a roadmap was made and presented at a decision workshop with the management of OCW.

Below the findings of the different stages of the strategy check will be discussed.

Kickoff meeting with management

During the kickoff meeting of the strategy check the team introduced the topic to the management of Siemens OCW. The goal of this meeting was to get a good understanding of the necessity of the strategy check for the management, to introduce the team members and get an idea of the expectations of the management of this strategy check.

Surprisingly the management of Siemens OCW, in the form of Mr. Meilinger and Mr. Sarcletti, made clear that they saw knowledge management as a very important topic for OCW. To know what is known in the regions and to focus on solutions in stead of internal functions is important. It was also made clear that the management sees knowledge management not as a technological but as a cultural issue, which involves extensive change management. They also stretched that is is important to keep in mind the possible new organization of I&S and that the findings should keep in mind the possibility of being used in an international setting.

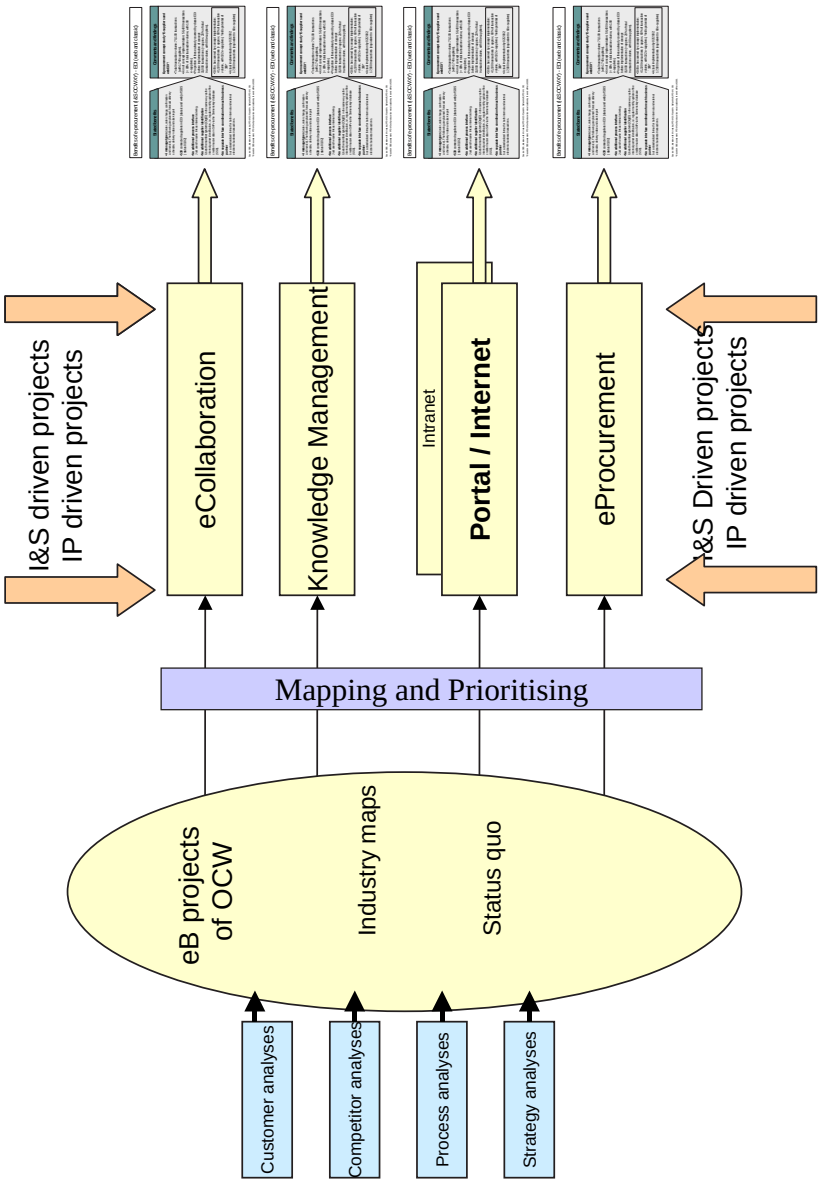

Figure H.1: E-business strategy check adjusted methodology

Customer analysis

For the customer analysis we have used two sources of information, one was direct questionnaires with customers, to be done by the account managers and the other was the analysis of their internet presence and e-business initiatives (mentioned) on their websites. The latter was done for endcustomers and the so-called EPC-companies, who do the engineering, procurement and construction in assignment for an endcustomer.

The results of the customer analysis were quite disappointing, because of the low amount of feedback from the account managers. This indicates that the e-readiness with the salespeople is not yet at a required level, most of them see e-business still as a threat to their position and argue that the customers are not interested in buying solutions via the internet, which indicates the low level of understanding what e-business means. Of the responses that did came back (Fluor, Halliburton, PLE, Wintershall, Shell/Traderanger) the most important issues are:

- Shell, as one of the big end customers, is one of the founding members of Trade-ranger (www.traderanger.com), which is an independent electronic hub founded by 15 of the world's leading energy and petrochemical companies. Trade-ranger enables e-procurement for its member companies and provides catalogue services (standards, creation, trading, invoicing) and value-added services such as auctions, investment recovery and eRFX [58]. Shell asked Siemens to put the products of Siemens Automation & Drives(A&D), who work closely with I&S together, in the catalogue of Trade-ranger. Due to the time it takes to get the legal arrangements and contracts finished and to get the decision of top-management this is not done yet, one year after the request.

- PLE, a German based EPC company, told that they had not really thought of e-business and has no own roadmap or plans. They indicated that initiatives from Siemens would be appreciated.

- Wintershall, also a German based EPC-company, indicated that they had no plans for any new e-business initiatives in the future. At the moment they use the internet mainly to communicate via email.

- Halliburton, a big international EPC-company, says it sees product and solution information available online as very important. They want to see what Siemens offers, not only in products but also in solutions, with the technical specifications.

- Fluor indicates that they are still struggling with finding a good solution for online collaboration.

  Joel Jelinek, VP, Material management/Procurement of Fluor:

  We are struggling at Fluor with identifying a viable, across-the-board e-enabled project collaboration tool that will give us what we need for engineering collaboration (specifically in sharing documents / data in a secure,

> *internet-based environment with our work-share offices), for project management (correspondence storing and monitoring), for document management (for internal and external project documents), AND for procurement (RFQ process, PO process, vendor data collaboration, etc.)*
>
> *So, you can tell, we don't have our ducks in a row as yet. Certainly we have other suppliers who are anxious for Fluor to move forward into a more electronic environment - some of you are miles ahead of where we'd like to be.*
>
> *Are we anxious to have different tools and systems to use for our different commodity / equipment groups / suppliers? No. Are we anxious to get out of the paper environment? Yes.*

The analysis of the Internet presence looks into the quality of the website, which takes into account the organization, the customization, the connectivity, the convenience, the customer care, the communication, the consistency and the content. Figure H.2 shows the quality of the internet site of the epc-companies and figure H.3 shows the quality of the internet sites of the end customers.

The conclusions drawn from these figures are that all main customers have a high quality internet site, which indicates they see Internet as important. Some of the end customers make innovative use of the internet by indirectly promoting the use of their products, like Shell with Shell Geostar, which helps people plan trips with their car, prints out an map and route description which indicate exactly where Shell petrol stations are.

Next to these interviews and the analysis of the web presence of the customers, also input from discussions with customers on the Water exhibition are used. Here customers said that they are interested in the topic of e-business, but have no clear ideas or strategies how to implement it. One of the things they said to value was a clear, single point of entry for all their online interactions and transactions with Siemens. Also they are interested in doing workshops with e-business experts from Siemens, in order to get a better overview of the topic. This implies that they see Siemens as an expert and leading company in the field of e-business.

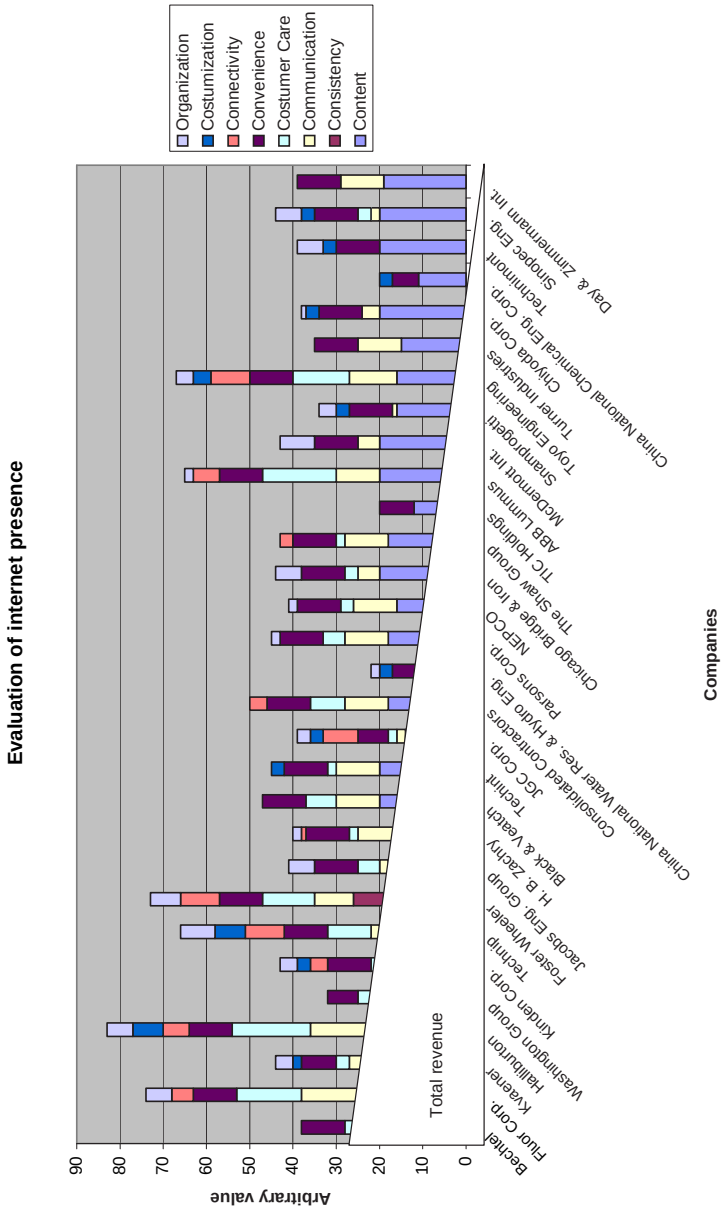

Figure H.2: Quality of Internet presence of EPC-companies

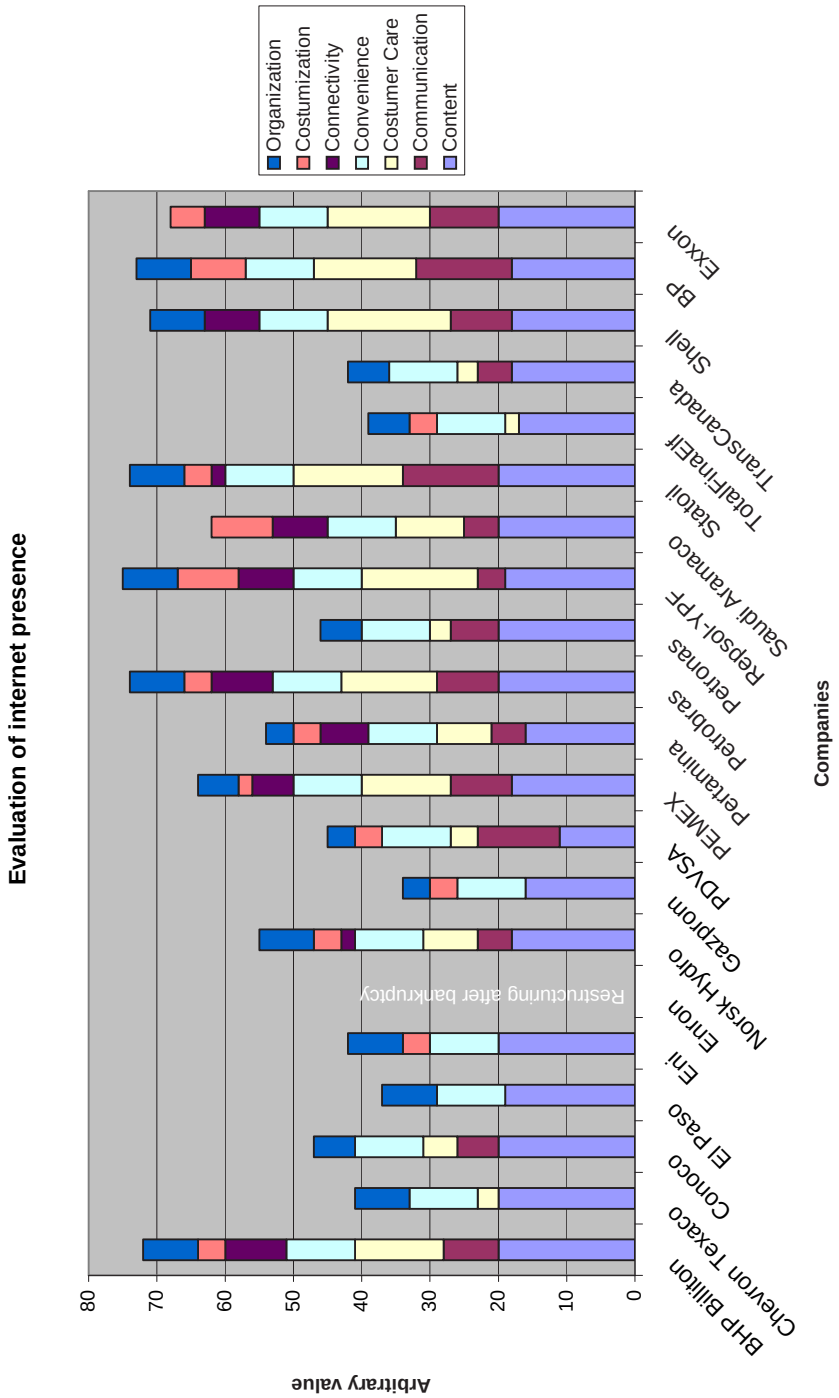

Figure H.3: Quality of Internet presence of end customers

Competitor analysis

For the competitor analysis an comparison the internet presence of Siemens and the main competitors is made. Figure H.4 shows the result of this analysis, which has been performed by a work student at Siemens OCW. This analysis shows that Siemens is clearly lagging behind its main competitors. For a more detailed overview of the competitor analysis [35] can be read.

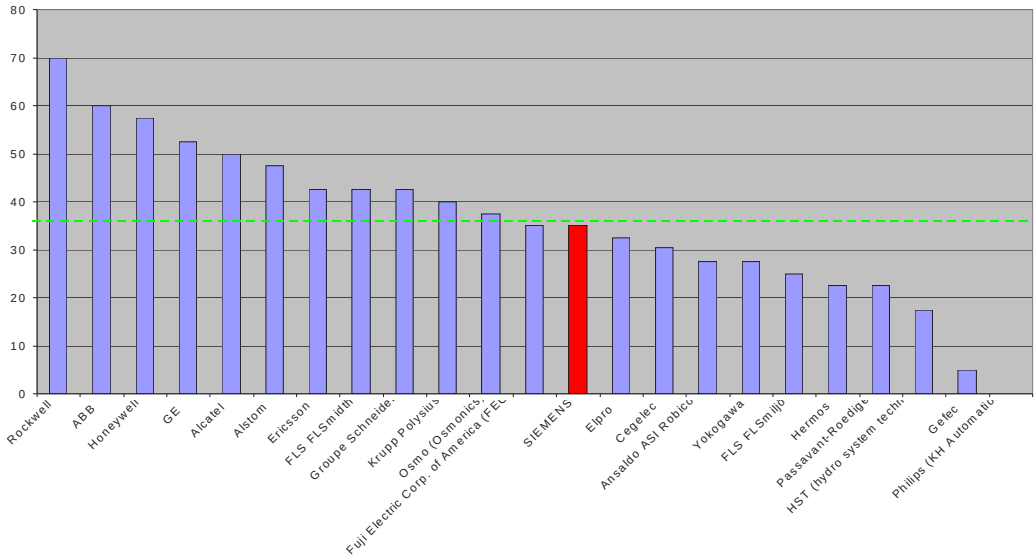

Figure H.4: Comparison of Siemens and competitors Internet site

Business strategy analysis

The analysis of the business strategy gave insight in the important processes on which the e-business projects should be focused and the specific risks that a business unit faces. Because of the restructuring of I&S these strategic results were found using the strategy of 2001. This resulted in the following findings:

Offshore

For Offshore the key success factors are Price, Quality in product, Quality of the product and in on- and intime delivery and the available References. The main strategic targets are cost leadership and increasing the market by rolling out from the strong Norwegian position. This position is build on the good connections with the EPC-companies and end-customers. At the moment Offshore is the third player in the world market, after ABB and GE.

E-business projects therefore should support the efficiency of the processes, the quality and innovativeness of the solutions and the communication and collaboration with customers.

Onshore

For Onshore and Pipelines the key success factors are Price, Project realization time (speed) and the ability to integrate their solutions with other already available platforms. The main strategic targets are the focus on selected plant types: Pipelines, Compressor Stations, Gas Treatment, Injection Plants, Terminals and Tank Farms.

E-business projects therefore should support the efficiency of the processes, the speed in which projects can be handled and the innovation and standardization.

Water

For Water the key success factors are Price, finding a process technology partner and the modularization and standardization of the solutions. Water is with a 0.9% market share the fourth player in a very diversified market, after GE, Groupe Schneider and ABB Utility. At the moment Water is still very regional focused in Germany and eastern-Europe. The big challenge is to extend the reach on an international level, which is also indicated as an important change for I&S in the new structure.

Therefore the e-business projects should support these goals by delivering more efficient processes and tools to help extend the business internationally.

Opportunity workshop

During the opportunity workshop the current e-business projects as are found in the business units are mapped against the business unit strategy. Thereby new possible projects are identified during a brain-storm session. Table H.1 shows the projects identified at the opportunity workshop (S = Offshore, P = Onshore and Pipelines, W = Water).

During the opportunity workshop there were four overall themes found, that came back as important topics in all three subdivisions. Also these themes are defined as important subjects for the whole of I&S. This clustering of the projects in the overall themes is shown in figure H.5.

Table H.1: Projects identified during the opportunity workshop

Project number	Project description
S1	Spare parts and service selling and catalog
S2	Online collaborative engineering with customers
S3	Internal e-collaboration
S4	Bid/No-bid library
S5	Project Selection
S6	CRM Customer data library
S7	Lessons learned database
S8	Competence Management
S9	Selection of a single e-collaboration tool
P1	Sinaut web
P2	Marketing of modules as standards
P3	Sinaut on other online marketplaces
P4	E-procurement -¿ Pronet
P5	Internet presence
P6	Lessons learned database
P7	ProFlow + Project Reference System
P8	Selling Training and operational support online
P9	Electronic questionnaires large drive systems
W1	Internet presence Water
W2	Obelix project database
W3	Online questionnaires
W4	Livelink use for water
W5	Sellside water (spare parts)
W6	Lessons learned database
W7	Research of tenders
W8	Agent to search for offers
W9	Online simulation tool
W10	e-procurement (e-bidding)
W11	Cluster assessment

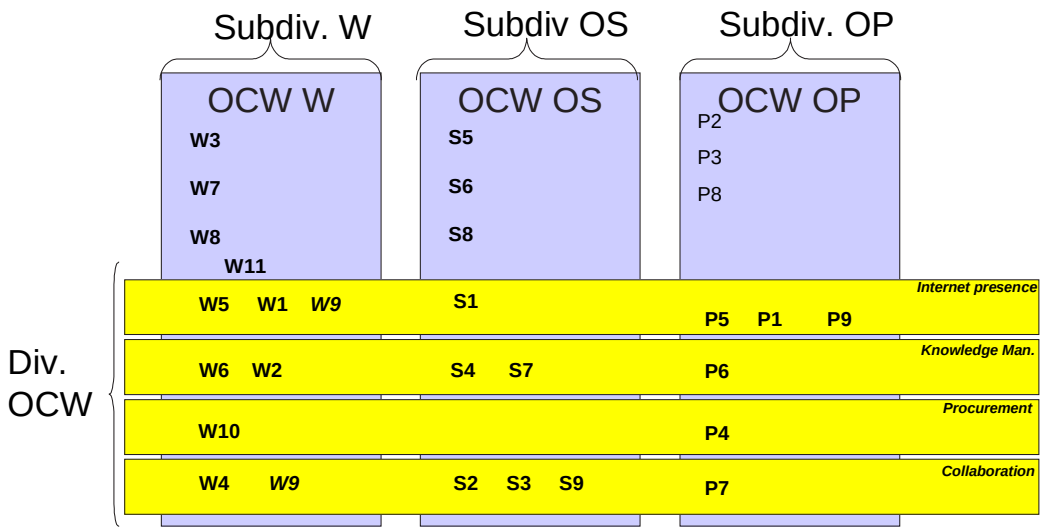

Figure H.5: Clustering of e-business projects

Selection workshop

During the selection workshop the projects were given a periodization. Figures H.6 and H.7 show this process step.

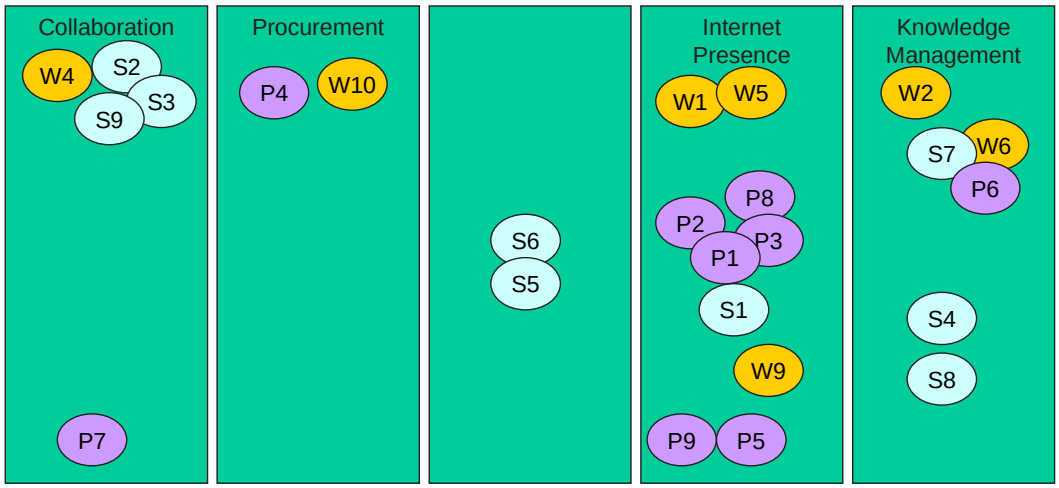

Figure H.6: Clustering of e-business projects

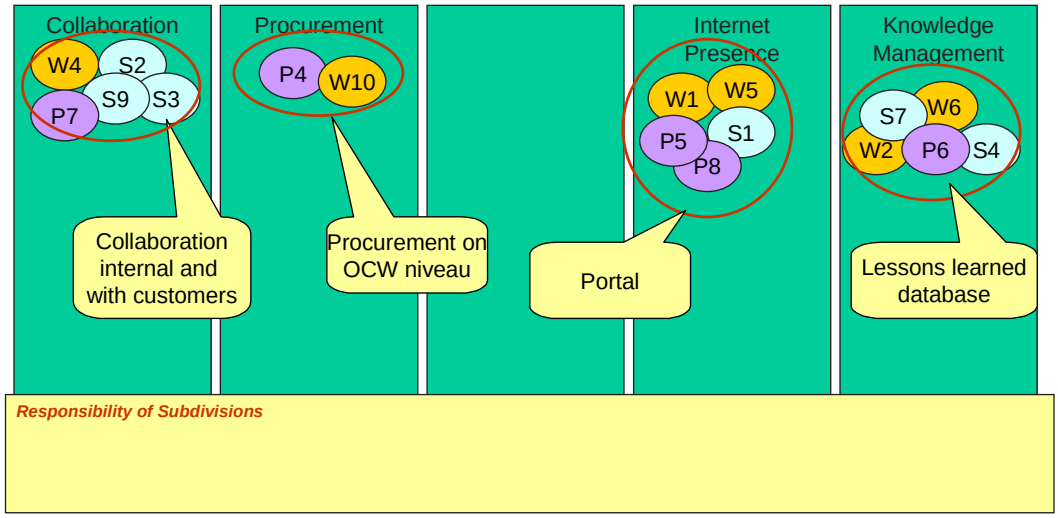

Figure H.7: Prioritizing of e-business projects

Here it was also agreed that initiatives in the four overall themes would be under the responsibility of the division and the single projects that were identified would be under the responsibility of the sub-division. Because of the restructuring of I&S this changed a little bit. The four overall themes are presented to the management of OCW with the strong advice to bring this to the level of the new organizational unit Industrial Plants (IP), because of the increased benefits of the themes when the reach is higher.

Solution formulation

The solution formulation was done by the core team and resulted in a presentation for the management of Siemens OCW. This presentation had the structure as shown in figure H.1. Figure H.8 shows the agenda of the end presentation.

Figure H.8: Agenda of the end-presentation

First an introduction to the reason for the strategy check, the composition of the team and a short summary of the findings. Secondly, the methodology of the adjusted strategy check as performed has been presented. Figure H.9 shows the methodology as presented by the consultant of Siemens Management Consulting.

This methodology presents on a very high level the steps the strategy check team has taken to develop the e-business strategy. It can be noted that the official methodology of the strategy check as described in appendix E has not been followed in all steps. The reason for this was the time constraint, as well as the current situation at I&S with the restructuring.

The results of the analysis consist of the findings of the customer analysis, the findings of the competitor analysis and the strategy analysis. Additional to these analysis their have been some remarks to the processes, which is also seen as important tot the e-business strategy.

This included a short summary of the processes that are currently defined and described within OCW and the tools that are used to support the business processes. At the moment the following processes are defined and described:

- Offer process
- Order processing
- Innovation process

- procurement process

The business process is supported by the use of the tool ProFlow, which is developed internal with I&S. The problem with this tool is that is is not compulsory for all projects to use, nor is it known to all employees that there is a tool to support the business process.

The topics above form the analytical part of the strategy check. Next the four cross-topics, as found during the selection workshop, are presented.

Industry Portal

The need for an industry portal is coming out of different directions. The customer analysis shows that customers value a single point of entry for all online interaction with Siemens. Also the comparison of the web presence of Siemens with that of competitors like ABB showed that on the competitors website it is much easier to find information about products and solutions for a specific branch or industry.

A very important driver of the industry portals is the project 'Industry Maps' which is driven directly by Siemens Corporate in Munich. This project is an effort to present the solutions and product that Siemens offers in a more transparent way to the customers, without the current problems that the customer has to have knowledge of the Siemens internal structure. With Siemens OCW this is done by taking the different plant types that customers in the Oil and Gas branch need, and break down that plant in the different solutions needed for that plant. This way a complete overview of the available solutions and products needed for that planttype and provided by Siemens is given.

The goal of the project is to create a single interface to interact with customers in the Oil and Gas industry via the Internet. This portal includes all necessary functions to: inform the customer, transact with the customer and eventually also collaborate with the customer in projects.

The key values of the project are: creating customer intimacy in order to build a long lasting relationship with the customer, to create efficiency gains by automating product related business processes (i.e. spare part ordering) and to provide a single entry to the customer for all Siemens products (I&S, A&D, ICN etc.).

There are some risks at the project, which include the reluctancy of employees to participate because of fear of becoming obsolete (especially in the sales force) and the big problem of aligning all the different Siemens groups for a single industry.

Of the projects mentioned in table H.1 this project includes the following subprojects:

- W1 - Internet presence Water
- W5 - Spare part ordering Water
- S1 - Spare part ordering Offshore
- P5 - Internet presence Onshore

- P8 - Selling training and operational support online

Important is that the Oil and Gas portal will be the lead project, after which much of the work can be copied and applied as a Water portal.

E-procurement

The necessity for e-procurement comes out of the organization itself. Analysis showed that although there has been already put a lot of money and energy in e-procurement, the people are not using the tools available. The goal of the project is therefore to extend the e-awareness within OCW, as well at the headquarters as in the regions, on the topic of e-procurement. This requires getting an overview of the buyers in the organization and the introduction of global reporting.

Key values of extending e-procurement within OCW are the reduction of non conformance and process costs int he entire procurement process, create an advanced tendering and quotation process feasible by e-procurement tools and procedures. Problems which have to be overcome are the reluctance to use the tools and the problem that the current tool in use (Pronet) is not available in English, which makes the international use of it difficult.

The e-procurement project includes the following subprojects:

- P4 - Use of Pronet as a paperfree support tool
- P4, W10 - Use of e-bidding where pre-requisites apply
- P4 - Use of e-RfQ where pre-requisites apply

E-collaboration

The strategic necessity for e-collaboration comes customer requests: Kwaerner has requested Siemens Offshore in Norway to do a pilot with online collaboration in one of the next projecs, from internal necessity: because of the different locations of Siemens Oil and Gas (i.e. Houston, Erlangen, Singapore, Karlsruhe, Oslo) and the global projects e-collaboration can assist in more cost-efficient project handling. Also the 'best practice sharing' within Siemens plays a role, because of the good experiences with Siemens ICN and SBS, which knowledge can be reused in this project.

The goal of the project is to establish a singe tool for online collaboration within project or daily business processes. Also should, based on this selected tool, a pilot project with a selected pioneer customer (Kvaerner) be started to learn about the possibilities of external e-collaboration.

Key values of the project are, for internal e-collaboration, the use of a single source of information, the reduction of storage costs, the benefit of bringing experts together and the decrease in travel expenses. For external e-collaboration the stated key values are increased intimacy with the customers and thereby customer

binding and the reduced response times for questions and project decisions, which can shorten the project durations.

A big risk with the project is that at the moment different tools for e-collaboration are used within I&S (e-Room in Norway, Proflow in Erlangen and Karlsruhe, Lifelink in Erlangen). When the decision is made to migrate to one single tool, their is a big change that people resist giving up 'their' tool. Another big risk is that people might think that e-collaboration is about implementing a tool and teaching people to work with it, but it is all about a change in the way people work together, the culture.

The project e-collaboration includes the following subprojects:

- S2 - Collaborative Engineering with customers
- S3 - Internal collaboration
- S9 - Selection of a single collaboration tool
- P7 - Proflow and Project Reference System
- W4 - Lifelink use for Water

During the strategy check a cost/benefit calculation was made for project S3, internal collaboration with Offshore in Oslo. This calculation estimated € 300.000 cost savings on travel expenses for 20 sales people and 80 engineers. A critical remark should be made here, that this calculation is not made academic valid, it is really an estimation.

Knowledge Management

Knowledge management is seen as an important topic within Siemens. This can be concluded out of the corporate initiatives like Sharenet and Best Practice Sharing (see section 5.1). Also within I&S the project KMI&S has given attention to the topic and the management of OCW clearly identified it as a important topic because of the specific working field of OCW, building unique solutions for its customers.

The goal of the project is the development of a lessons learned database for Offshore, Onshore and Water. Next to this, steps should be taken to share information on projects (which projects are done at the moment, which are offered), knowledge on tendering and standards.

The key values of the project are the reduction of non conformance costs (which is already a topic with OCW's productivity improvement program or PIP), the reuse and sharing of knowledge and the solving of the 'leaving experts' problem.

The big risk is that people are reluctant to share knowledge, out of fear of becoming obsolete when their specific knowledge is shared with everybody. Especially in the current situation with restructuring and the loss of ca. 1300 jobs it will be very

hard to get people to share knowledge. Another problem is the same as with e-collaboration, that knowledge management is not about implementing a tool but about a cultural change.

The project knowledge management includes the following subprojects:

- W6 - Lessons learned database
- P6 - Lessons learned database
- S7 - Lessons learned database
- W2 - Obelix project database
- S4 - Bid/No-bid library

The result of the whole strategy check is summarized in an e-business strategy roadmap, which is shown in figure H.10

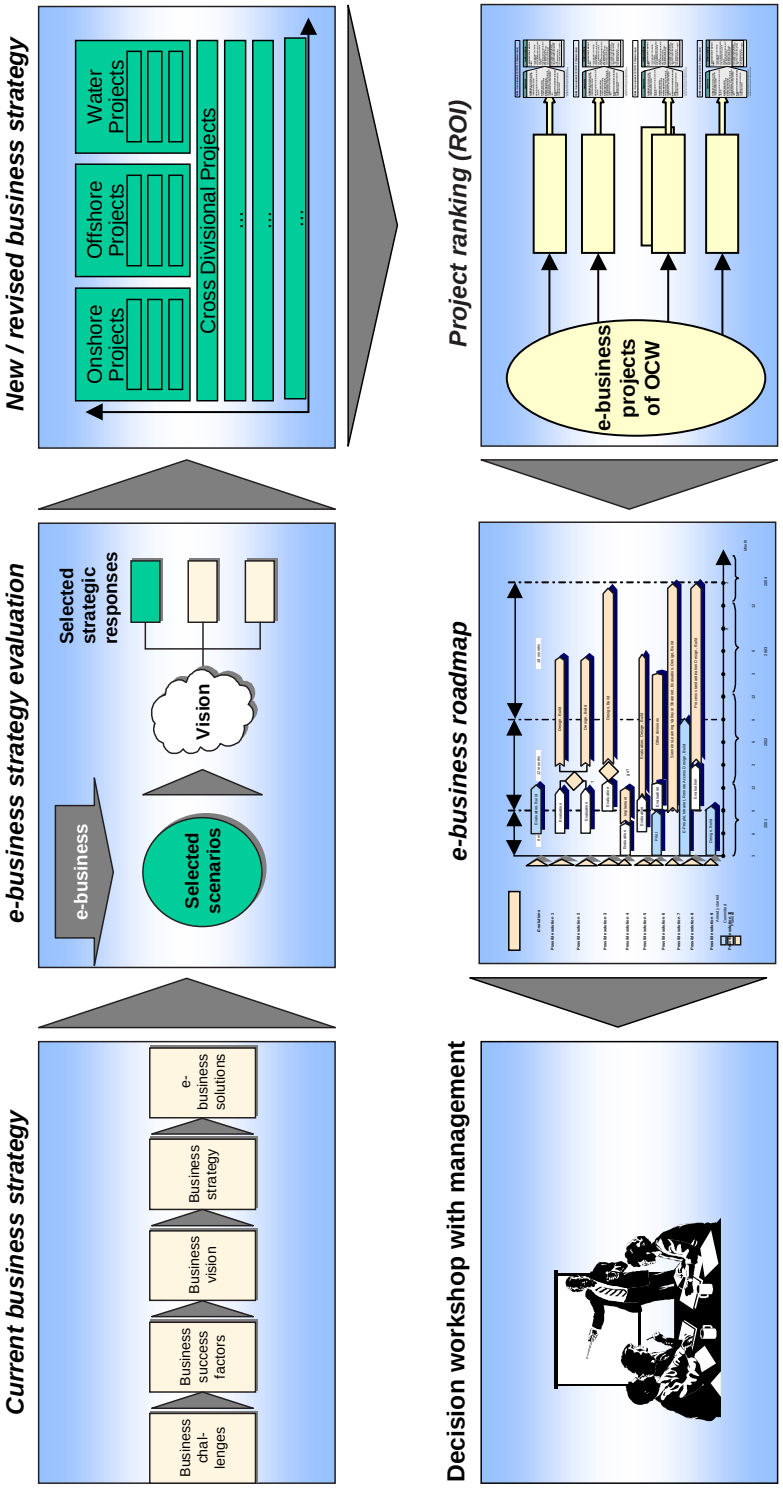

Figure H.9: Adjusted methodology of the strategy check

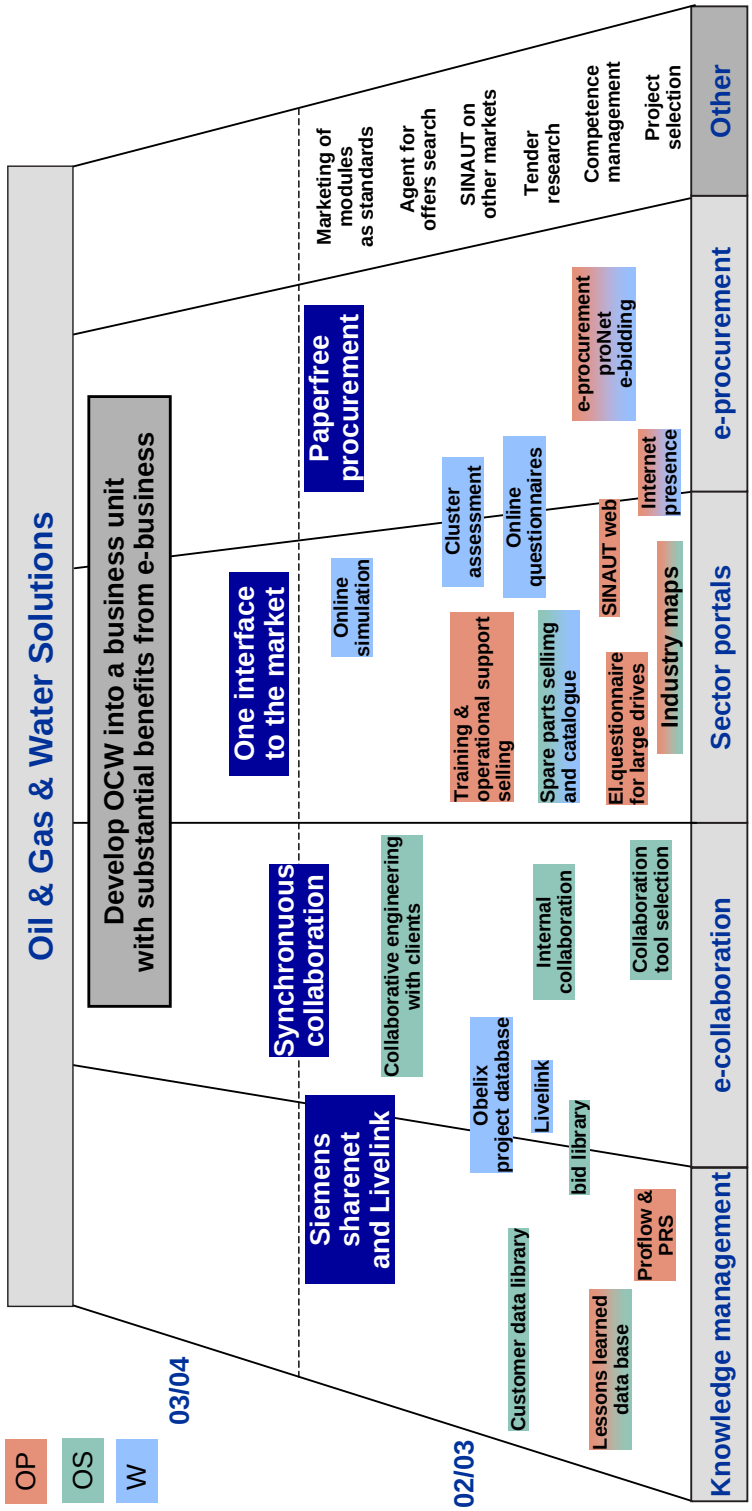

Figure H.10: E-business strategy Roadmap for OCW

Appendix I

Workshop

During the opportunity workshop that was performed in the strategy check the author has tried to do some brainstorming with the present members. Because this could only be done at the end of the day it was hard to get a lot of feedback, but still some interesting results came out of it.

The workshop method used was that the author, in the role of moderator, gave all participants a staple of post-it notes, and asked them to write down anything they could imagine which had to do with macro-environment influences on the e-business strategy, each idea on a single post-it note. The participants were told to categorize their findings in one of the categories of the PESTEL-framework, which was explained before the exercise. After all participants finished writing down their ideas they were asked to put the ideas on the flip-over sheet on which a quadrant was drawn with two axes, one with the time until the influence would impact the e-business strategy (nearby, further away) and one with the impact the influence would have on the e-business strategy (high impact, low/moderate impact).

Figure I.1 shows the matrix used in the workshop. The participants in the workshop were Mr. Miedreich, Mr. Bekker, Mr. Niedermeier (I&S e-business consultants), Mr. Koolman (OCW e-business manager), Mr. Bertsch (OWC Marketing and web presence), Mr. Johansen (OCW Offshore e-business), Dr. Pirsching (OCW Water e-business), Mr. Bielenberg (OCW Onshore and Pipelines sales), Mr. Heil and Mr. Guthier (OCW Onshore and Pipelines) and Mr. Boog (SBS Management Consulting). This big group gave the opportunity to get an overview of the entire working field of OCW, excluding Cement.

Table I.1 shows the influences, as mentioned by the participants of the workshop. Double mentioned influences are left out of the list. Figure I.2 shows the aligning of the different influences to impact and time horizon.

Quadrant one in figure I.2 shows the influences that will, according to the workshop participants, influence the e-business strategy highly in a nearby time. Below numbers between bracelets refer to the figure. In this quadrant we see that the economic situation (9 and 6) is perceived as having and important impact. This can be seen in line with the globalization of the economy and the higher pressure on reducing costs (17,18). On the sociocultural level, their is mentioned that personal contact with the customers is seen as very important (4). Because most of the project done for customers are big projects where the outcome is not always sure, the customer likes to work with the suppliers they know. Also seen as important is the tiredness of the Internet, as the participant described it. With this is meant that the people (customers, employees, management etc.) are tired of the whole 'fuzz' about the Internet and don't want anything to do with it. This

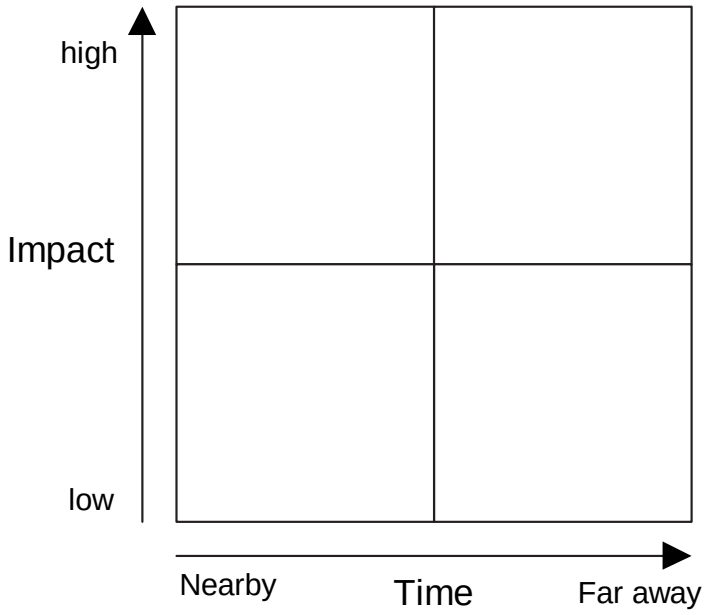

Figure I.1: Matrix as used during the opportunity workshop

is what is also known as the de-hype [36]. Also important is the so-called 'not invented here' syndrome, which is known typically in technology developing firms. On the technological side we find surprisingly no issues in quadrant one.

Quadrant two shows issues which, according to the workshop participants, will become important influences in the distance future. Here a lot of legal issues are shown (7,12,20), like the regulations made by the European Union, the laws on information and data security and the way public organizations should provide their offers. This is also very much in line with BundOnline2005, of which one important part is to put all biddings for big governmental project on the Internet (1). As an important technological influence in the future will be the connection between online and offline services (2). This would indicate a total integration of e-business with normal business, like predicted by Gartner [22]. The sociocultural influence mentioned is that in about five years we will see more and more people in higher management positions who are known very well with the Internet, e-business and so on (3).

Quadrant three shows the influences that are expected soon, but will have limited impact on the e-business strategy. Here we see more technological influences, like the development of broadband technology (8), the available infrastructure in less developed countries (2) and the need to keep in touch with technology, because faster innovation cycles make technology obsolete quickly (23). Also political forces, like restrictions of local governments like in China, and the problems with sanctioned countries like Libië can be found in this quadrant (24,25). The economic development in Germany is seen as an influence on e-business, but not

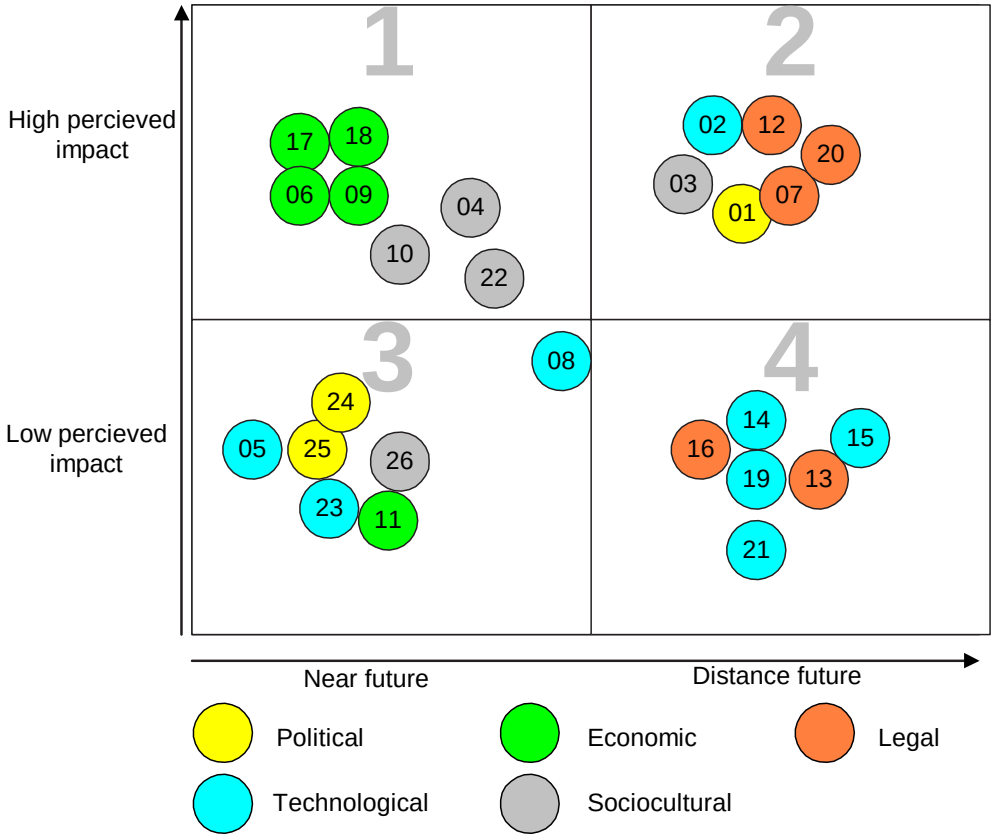

Figure I.2: Mapping of the environmental forces to time and impact

extremely big (11). The fact that global firms should have a strong web presence is seen as an influence now, but not with a very high impact (18).

Quadrant four shows the most technological influences, ranging from the development of the infrastructure for e-business (14,19), the technological solutions to security problems (15) to the performance of competitors on a technological level (21). Next to this we only see legal issues, which include the problems with the reliability and trustworthiness of electronic mail (13) and the special contract regulations for foreign products sold over the internet (16).

Table I.1: Results workshop - forces important for e-business strategy

Num.	Type	describtion
01	Political	Bund online 2005
02	Technological	Connection offline with online service
03	SocioCultural	The young generation becomes in more powerful places
04	SocioCultural	Personal contact is important
05	Technological	Bad infrastructure of less developed countries
06	Economical	Conservative attitude of customers and companies
07	Legal	Public companies and public tendering
08	Technological	Broadband technology
09	Economic	Regression
10	Sociocultural	The 'not invented here' syndrome in Germany
11	Economical	Economic development in Germany
12	Legal	Information & Data security laws
13	Legal	Problems with legal reliability of electronic mail
14	Technological	Improved speed of networks
15	Technological	Technological solutions for security and authentication issues
16	Legal	Contact regulations for foreign products sold over the internet
17	Economical	Global pressure on reducing costs
18	Economical	Global companies, customers expect the information of the company on the internet
19	Technical	Faster computing power and networks
20	Legal	Regulations by the EU
21	Technological	Technological state of the art with competitors
22	SocioCultural	People are e-Tired (tired of the e-business hype with unfulfilled promises)
23	Technological	Faster innovation cycles make solutions quicker obsolete
24	Political	Restrictions of local governments (China)
25	Political	Sanctioned countries (no export allowed, i.e. Libie, Iran)
26	Sociocultural	Fear for radiation with mobile business

Appendix J

Interviews

This appendix will give a full description of the interviews held in order to find out which forces are seen as important by Siemens I&S as well as by other divisions. On request of Siemens the names of the interviewed persons are only given as abbreviations.

Mr. Q., responsible for Traderanger.com contacts

Mr. Q. is the responsible contact with Siemens Automation and Drives (A&D) for the Trade-ranger project (see also H). The interview with Mr. Q. was held on Thursday the 6th of June, at the beginning of the research, and used the PESTEL framework as base for the discussion. Mr. Q. identified the following important macro-environment forces for the e-business strategy:

Political influences

- The view of politicians and governments in regard to maintain competitive trading
- The ways in which email and electronic agreements are seen as legal binding contracts
- Identifying people over the Internet is lately also an important topic. This has of course a lot to do with the legal binding of electronic contracts and emails, because if the sender cannot be uniquely identified there can be no legal binding. The government plays an important role in creating an infrastructure for this.
- In general, the acceptance of and confidence in IT systems and the Internet of politicians and the government plays an important role
- Trade barriers can give some trouble when selling goods via the Internet. As an example the struggle between the European Union and the United States is mentioned.

Economical influences

- Of course the expanding of the euro area is an important factor. At the moment we can have problems with currency risks, when doing business with countries like i.e. Nigeria.

- Something which is not so pleasant for Siemens, but what is happening too much is that we are sometimes competing with our own internal colleague departments. It is possible, because of lack of up-to-date information or even lack of knowing contacts exist, that customers buy a solution from Siemens I&S, and then buy spare parts directly from an other group, because they provide better prices that a service contract with I&S. In the worst case scenario it is even so that different parts of Siemens participate in the same bid and drive the price down. These practices can have a big influence on the urge to get good and up-to-date information to the sales departments, actually to the entire concern. Customer Relationship Management systems can become very important for this.

Sociocultural influences

- How do we handle our international websites? Mr. St. Quintin has the feeling that it is often forgotten that a website of Siemens [like an Industry Portal] is viewed in the whole world. Especially in the oil and gas business there is a lot of business with strict islamic countries like Kuwait and Saudi Arabia. If our sites show young and beautiful business women, this will probably offend our customers in these regions. These small cultural things can be very important in Siemens' international business, but most of the websites are still made here in Germany.

- Another important sociocultural aspect is the willingness of our customers to participate in the decision process. If we would deploy online configurators, where customers can configure their own solutions and instantly buy the solution like they designed, it means that the customer is taking over part of the decision making process that lied with us before. This is purely psychological, because in the old situation our engineer would use the same configurator to design the solution, based on the customers input. But in the latter case, the customer has the feeling that our engineer knows better what he is doing.

Technological influences

- Probably the most important technological impact is that of standardization. It is very important that the industry comes together and defines a common technical standard for describing equipment and documentation. Just using all the same screws and bolts is not the biggest issue, it is more the way products and solutions have to be documented. At the moment we put a lot of effort in rewriting our own internal documentation and manuals into the standard of different customers, which of course cost a lot of time and money.

- Also an important technological questions is where the technology is going, especially in terms of mobile applications, broadband Internet etc.

- Next to standards for the products and solutions it is also important that there are standards for storing the information about products, like the data necessary for marketplaces. XML can become very important in this, if you believe the popular information sources.

Environmental influences

- The push of environmental organizations on reducing waste. Simple things like pallets that are used only one time, this is a big source of waste and also costs. The reason is that it is simply more work to administrate the information needed to use them more than once than buying a new one.
- E-business can be used to reduce the amount of paper used in i.e. transactions, sales and engineering. This could be used as a promotional part in our environment policy.

Legal influences

- Traceability of goods is getting more important, at the moment we see it in the agricultural sector, but it could also easily be extended to industry products, especially with such critical industries like power generation, oil and gas etc., for liability. This is also for Siemens an opportunity to get more involved in the service and maintenance business and the buying back of second hand equipment, which can be sold again in low-budget countries.

Dr. F., e-business manager of I&S Industrial Services

Dr. F. is in his role as e-business manager of I&S Industrial Services (I&S IS) responsible for the e-business strategy of this division. The interview was held at Tuesday, the 11th of June. The interview was short, but Dr. F. mentioned the following influences:

Political influences

- Trust, and the whole discussion around digital signatures and privacy is mainly a political issue. Things like when software manufacturers gather information about the habits of the users are violating that trust, so there is need for clear rules about what is allowed and not.

Economical factors

- Within the division Industrial Services there is a tendency to provide services to other I&S divisions, to divisions outside I&S but within Siemens and to external customers. The risk is that sometimes services are offered to a customer through i.e. OCW, but the customer also asks for an offer directly

with us. This means that we have to be very careful with the customer contacts.

- Other economic trends are that there is clearly a trend to focus on our core business [this can also be seen in the restructuring] and that therefore non-core competencies are outsourced. This means that we get more relationships with providers, not only as supplier of materials but also as supplier of important elements of our business process. Therefore the relationship with these suppliers has to be very good, you cannot easily switch from a party that has invested in getting to know your business. The same can be said of course for our customers, who outsource important parts of their service and maintenance to us.

Sociocultural influences

- One important sociocultural influence is that we are going to a knowledge society. Especially with Siemens knowhow is becoming more and more important, and to get the right knowhow on the right place can be very difficult. IS has ca. 20.000 employees, spread over 300 locations worldwide. Without the proper infrastructure sharing knowledge is merely impossible.

Technological influences

- The discussion on digital signatures has also an important technological part, because without the proper technological infrastructure to support legal measures taken by the government.

- Standards will also be very important for the future of e-business. Dr. F. thinks we will see consolidation of the industry in the next two years on the subject of non-product catalogs.

Dr. S., IT and strategy for I&S

Dr. S. is head of the department I&S GIO OI1, which is responsible for IT strategy and organizational services. This includes Knowledge management, SAP-strategy, Datamanagement and I&C Roadmaps.

During a short one hour interview with Dr. S. the findings of the literature research on macro-environment influences were discussed. Some important factors Dr. S. identified in the field of e-business are:

Political influences

- Education system (German: Bildungswesen), which has an important impact on the acceptance of e-business by the younger generation. Because Siemens is still mainly based in Germany the educational systems of Germany is very important for Siemens. Things like the kind of courses given at colleges and

universities and the availability of computers and Internet at ground- and highschools are important. Because of the economic downturn the pressure on the jobmarket is now a little bit lower, but it is still hard to find qualified and trained employees for IT and e-business projects.

- Regulation issues, especially for the telecom sectors. In a lot of countries with which Siemens is conducting business the telecom sector is still controlled by the government. Even in countries that have recently privatized the former public telecom companies the influence of the government is still high, which has been recently proven with the auction of the frequencies for the third generation mobile phone networks (UMTS).

- Infrastructures, which is closely related to the influence of the government on the telecom sector. Especially in the less-developed countries can the lack of a good telecom infrastructure impact the possibilities to use e-business technologies. [Mr. Koolman of OCW has said that in some cases this resulted in projects where satellite communication was necessary to finish a project.]

- Specific for the Oil and Gas industry is of course the political situation and stability in the important regions, like the middle east and now more and more Russian and the far East (China). But also international agreements like the Kyoto agreement influence the Oil and Gas industry.

- Of course the export regulations influence our business with countries in for example the Middle East to which we cannot export all our technology, or software. But for those situations that we sell software or some other information goods over the Internet we will first have a legal agreement with the customer, which will identify him, in order to prevent these things.

Economical influences

- The development of the business cycle is a very important factor on e-business. In this time when the economic climate is not so good the people are not so willing to invest in projects where the outcomes are not clearly defined in financial gain. So long-term projects, but probably with a high return, like knowledge management are more difficult to initiate.

- The euro has certainly had a good impact on the ease of with which we can do business within the euro-adopting countries. Because I&S has been a very international group for so long this has not only impact on e-business strategy, but on our whole business. But for things like selling spare parts or service hours over the Internet this will certainly be helpful.

- Multinational companies like Siemens are becoming more flexible because of internet technology and have more and more possibilities to conduct business anywhere in the world. Dr. Simon does not expect the whole business to go to low wage countries, but the use of more international teams with experts from places where they are available is now more easily. This does of course

implies that the appropriate infrastructure and tools for i.e. collaboration are in place, and that is exactly the direction we are going.

Sociocultural influences

- The most important influence on e-business in the sociocultural area is probably that of education. The more people are known with the Internet the more they will accept it as a normal technology that can be used in everyday life and business. This has of course close relationship with the education policy of governments.
- Another interesting thing is the attitude towards leisure and work, as mentioned in the framework. The experience of Dr. Simon is that using Internet is for young people less like work than the old-fashion jobs. They surf the Internet seeking for information, and that is most of the time also considered leisure time. This could mean that the line between work and leisure is fading.
- The levels of education have also a lot to do with the jobmarket. More and more companies are putting their support or software development centers in countries with highly educated but low wage workers, like India for software development. This is on the one hand made possible by e-business, but it also increases the need for transparent ways of working, so the customer doesn't has the feeling it is communicating outside its own country.

Legal influences

- Legal validity of electronic contracts, which has a lot to do with the legal regulations in different countries and the availability of a infrastructure that uses certificates to proof the identity of people or organizations. Important was that Dr. Simon noted that because of the sheer size of Siemens and its strong name, the public key infrastructure of Siemens is trusted by other parties.
- The whole discussion on the encryption of data has an important impact on the e-business strategy. Because some countries, like the United States of America, demand that the key for strong encrypted messages which are send to or from companies in that specific country, is given to the government, we will never exchange all information digital because of fear for industrial espionage. In such a case we will simply send someone with the data on a cd or disk. This is of course a blockage to the use of the medium Internet.
- Intellectual property has become a very important topic with the upcoming of the Internet. This has an important legal factor, as well as a technical factor with the development of technologies to prevent copying. As long as there are still countries where somebody can put a server publishing stolen information over the internet, and there is nog agreement with that country, this will remain a problem.

Mr. G., head e-business for Power Transmission and Distribution

Mr. G. is head of the staff department e-business at Siemens Power Transmission and Distribution (PTD) and therefore responsible for coordinating and supporting the e-business initiatives within this group. The interview was held at Tuesday, the 27th of August. Mr. G. identified the following important forces:

Political influences

- Mr. G. identified that in his eyes, most political forces that influence the e-business strategy and possibilities are not the ones intended by the government, but often the differences in regulations that create a gray area where smart entrepreneurs make use of. As an example he mentioned the online selling of drugs from countries like Spain, which require a doctor specification in Germany but are freely available in other countries. Because of European regulation the medicine can be exported freely within the EU.

- Internal politics are much more problematic that external politics. Simple things like who is the owner of a product description? the global product manager, the region manager or the account manager for a big customer? When working with things like industry portals, which is a normal website in the eyes of PTD, it is very important that somebody is responsible for the whole concept.

- The government as promotor for e-business has a relatively low impact. Things like Bundonline2005 are more a PR-thing for the whole e-business concept. Some things that the government does what promotes the use of e-business is not intentional. Take for example the work environment here in Germany, with the high wages and the difficulties to find good personnel. With e-business infrastructures a lot of the software coding is moves to countries like India, but that sure was not the intention of the government.

Economical influences

- Within PTD the impact of the current economic situation has not been so big. This is mainly because they work in a three-month cycle where every three months something has to come live. Because of this the management has not cut the budgets.

- Also the dot-com crash did not influence as is such a big manner as many others. This was because we already started e-business before it was introduced in 2000 as a company wide initiative, just on the top of the e-business hype according to the Gartner plot. Because PTD started more as a group-initiative than with the Siemens corporate e-business initiatives, PTD was able to keep a steady course.

Sociocultural influences

- Cultural issues are the most important barriers in e-business rollout.
- Knowledge management is a good theory and the tools are also good and available, but the process is not so good. People do not want to share their knowledge. PTD tried to embed knowledge management practices in the normal processes, like the possibility to comment on an article on the intranet. This input is then used in the knowledge management efforts.
- Globalization is an important topic, but mostly because it generates such a high level of insecurity. People do not know how they can handle the multiple cultures, multiple legal frameworks etc.

Technological influences

- Technology is not longer a barrier, the real barrier is the process, although it sounds like a cliche. The problem lies in all those small processes that are built up over time, and now we are connecting them and find out that they do not get along that well.
- When looking at technology trends there will be a big impact by webservices. At the moment PTD is rebuilding their own product catalogue as a web service, which then can be re-used online within PTD and eventually also by external parties, like the ERP systems of our main customers. This is so important because it moves e-business away from the browser, which is still an obstacle for many people. Because it is a very technical issue it is not so hyped as the whole e-business concepts, only in the tech magazines one can read about it.
- Standards can give some problems, but then at the level of defining very basic concepts, like the business language (US English or UK English already gives a big difference) and the definition of attributes and values. XML is not really a standard, but now it is for PTD the only language to describe content, because of the flexibility.

Legal influences

- Legal influences are high at the moment, but not as you expect it. They are hindering because nobody knows what it will be in the future. Then there are two ways to go, one is to be paralyzed and do nothing and the other way is to make a decision and continue in the hope that it was the right one. Especially strict laws on privacy and security could become a killer for e-business.