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MASTER'S THESIS

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ABSTRACT

Actors in the Norwegian oil and gas sector are under siege. Competitive positions are being challenged and many companies experience fundamental issues in terms of profitability, efficiency and order inflow. In parallel, observations point towards projects on the Norwegian shelf being subject to severe delays, cost overruns and quality deviations. Globalization, a high cost level, shortcomings in practices and scarcity of competencies are some attributors to the current circumstances, but this is only scratching the surface.

This research has looked closer at prominent difficulties a particular Norwegian oil service company experiences in work with one of its framework agreements. Through a series of interviews and subsequent analyses, several greater issues were uncovered that impede project work and limit competitive potentials. Predominant effects were seen as reduced efficiency and productivity, and augmented difficulties in terms of realizing projects and creating value.

Under contract rigidness and advantageous potentials facilitated by organizational capability and shared value principles, four challenges were established to set direction towards a competitive edge. These focused on improving profitability, shaping differentiation and strengthening the collaboration within the contractual network.

Furthermore, a series of recommendations were developed in order to overcome established challenges, whilst simultaneously relieving some of the experienced issues. Expectancies of realizing the recommendations included qualities such as improved responsiveness, uniqueness, attractiveness, service quality, profitability, network collaboration and contractual relationships.

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Espen Knoph

Stavanger, June 6th 2014

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ABBREVIATIONS

FEED	Front End Engineering Design
FEL	Front End Loading
FPSO	Floating Production Storage and Offloading
GEM	Greater Ekofisk Modifications
GEMC	Greater Ekofisk Modification Contract
HSE	Health, Safety and Environment
HVAC	Heating, Ventilation and Air Conditioning
ICT	Information and Communications Technology
ISO	International Organization for Standardization
IT	Information Technology
KPI	Key Performance Indicator
KSF	Key Success Factor
MPE	Ministry of Petroleum and Energy
NCS	Norwegian Continental Shelf
NOK	Norwegian Kroner
NORSOK	Norsk Sokkels Konkurranseposisjon
NPD	Norwegian Petroleum Directorate
OPC	Onshore Project Centre
PDO	Plan for Development and Operation
PIO	Plan for Installation and Operation
RDP	Re-Development Project
SDLC	Systems Development Life Cycle
SWOT	Strengths, Weaknesses, Opportunities and Threats

BASIC DEFINITIONS AND TERMS

Behavior	Visible demonstration of some skill, knowledge, personal attributes and competency.
Business cluster	Concentration of interrelated companies, suppliers and entities in a particular field.
Competency	Behaviors that underpin good performance, see 'behavior'.
Efficiency	Measureable concept described by ratio of output to input, which organizations often use to describe completion of or aptitude to complete a task with least amount of effort and time.
Front End Engineering Design	Basic engineering after concept design or feasibility study that focus on technical requirements and rough identification of project investment costs.
Key Performance Indicators	Key business statistics that measure company performance in critical areas and indicate progress towards reaching strategic objectives.
Key Success Factors	Combination of elements needed to achieve one or more sought-after goals.
Knowledge	Understanding obtained via learning.
NORSOK standards	Functional requirements developed by the Norwegian petroleum industry to ensure safety, cost effectiveness and value adding in projects and developments.
Personal attributes	Individual characteristics which are brought to the table when carrying to a job.
Plan for Development and Operation	Prepared by licensees and describes development of a petroleum deposit in terms of production aspects and consequences of development activities.
Plan for Installation and Operation	Prepared by licensees and describes facilities for transport and utilization of petroleum in detail.
Productivity	Measure of efficiency in transforming inputs into valuable outputs, often seen as average output divided by resources spent in the same period.
Skill	Capabilities obtained via practice.
Turnover	In human resource management, quantity of individuals employed to replace the ones that left over a one-year period.

1 INTRODUCTION

This chapter briefly describes the background of the thesis, its objectives and limitations, how the report is structured and research methodology.

1.1 Background

The oil and gas industry is Norway's greatest industry with respect to export, government income and wealth creation. In 2012, it was responsible for approximately ¼ of the total value creation and just under $^1/_3$ of total state revenues (MPE and NPD, 2013). An increased global need for energy and steady activity growth has contributed to a positive industry development, but at the same time companies are facing fundamental challenges.

Traditional business models are being challenged as market and industry evolve, competitors change and foreign companies enhance competitive pressures. In recent time, the majority of contracts for new builds have gone to Asia. Cost aspects and insufficient capacity in Norwegian companies have been some of the influencing factors towards this shift. The industry's ability to maintain and develop its level of competence is reduced when major contracts are awarded to players that contribute less in terms of value creation in Norway (Stubholt et al., 2013). Project portfolios of Norwegian companies gradually shrink, consequently influencing business' priorities, investment and risk propensity, number of jobs, rate of employment and surrounding academic milieus. Potential long-term effects may appear as diminished ability to win upcoming contracts and reduced capability to satisfy needs with respect to future work. For example, accommodating future necessity for maintenance and modification on aging installations.

The cost level in the Norwegian oil and gas industry has seen strong and steady growth relative to other countries. Cost challenges can be found in several areas contextual to projects, for example in fabrication, engineering, project management and administration. The price of an engineering hour in Norway is considerably more costly compared to other parts of Europe, hence an important question arises; does the current productivity level justify the high cost level? (Stubholt et al., 2013). In parallel, companies experience tighter profit margins and find it harder to protect their revenue streams. As much as 50 percent of oil service companies experience declining profitability, regardless of the high investment level on the Norwegian Continental Shelf (NCS) (Helgesen, 2013a).

Prices and monetary values are made more tangible through a comparison of contract values for topside construction yards. Cost of employing a Norwegian construction yard is at 390 NOK/kg compared to 300 NOK/kg for Asian yards, a difference of 90 NOK/kg (Stensvold, 2013). This may seem as a small magnitude out of context, but numbers start to build if one considers the weight scale that projects in the oil and gas industry deal with. For example, the topside weight budget for Gjøa's platform was exceeded by 3 000 tons, a noteworthy weight increase.

Several projects on the NCS have been subject to significant delays. Recurring reasons have been among others quality deviations, poor follow-up and non-conformance to Norwegian standards and requirements. Development projects from 1990 until recent time (excluding Yme) had an average delay in production startup of 7.3 months relative to what was submitted in the Plan for Development and Operation (PDO) (Aker, 2012). The aforementioned cost picture changes when different parties are linked to the extra costs and value loss they have caused, whereas comparable values then become 440 NOK/kg for Norwegian yards and 502 NOK/kg for Asian yards. Though a more detailed cost picture tilt in favor of Norwegian yards, major improvement potentials still exist. (Stensvold, 2013).

Project work on the NCS is a demanding process for the companies involved. No projects are identical, and work often encompasses intricate tasks and customization of solutions. Engineering activities have become increasingly pressured by budgets and plans. Challenges are enhanced as more split-location engineering is used and there is more complexity in current work practices, documentation and requirements. A pragmatic example is the job of industry welders, who currently have to deal with five times the amount of drawings compared to ten years ago (Ramsdal, 2013).

Over the last decade there has been a steady increase in the number of engineering hours needed to realize projects. Paradoxically, utilization of Information Technology (IT) tools to support project processes have not explicitly enhanced productivity and efficiency. Estimates indicate that 20-50 percent more engineering hours are currently needed per ton compared to a decade ago (Helgesen, 2013b). Underlying reasons for this are compound and not necessarily easily explained as efficiency is influenced by factors such as regulations, industry practices, complexity, contract conditions and company culture.

Actors in the industry have long set out to enhance competitiveness through improvement of tangible assets such as internal processes and systems. Intangibles assets such as workforce competency, company reputation and industrial relationships have often come second in line. Acknowledging this problem, practices have gradually evolved and become more human-focused and network oriented (Allee, 2009). Some may hold the companies responsible for reduced competitiveness, pointing towards their inability to utilize internal structures and resources in coping with dynamic market variables. Others might direct their attention towards globalization and the fact that capable players are emerging abroad. Nevertheless, issues and challenges have to be addressed in order to survive in an ever-changing competitive business environment.

1.2 Study objectives

This thesis will explore relevant issues that are frequently experienced in a project environment. Findings will be foundational in developing recommendations that should enhance the competitiveness of a company.

In order to achieve the abovementioned, research will look closer at a selected contractor in the oil service industry. More specifically, project related issues the chosen contractor experiences in one of its framework agreements. The following objectives are established:

1. Identify and describe factors and qualities that create competitive advantages for 21st century organizations
2. Pinpoint relevant issues a selected contractor experiences in the work with one of its framework agreements
3. With basis in findings, establish a set of challenges that aim to improve the contractor's competitiveness
4. Develop a set of recommendations designed to help overcome identified issues and established challenges

1.3 Limitations

The thesis is delineated by the following:

- Principle focus is on the Norwegian oil and gas industry
- Research primarily targets issues experienced by a selected contractor
- Implementation of recommendations is not part of the scope
- Research refrains from going deeply into content and design of the chosen framework agreement due to the confidential nature of such contracts

1.4 Thesis structure

Chapter two gives an introduction to the Norwegian oil and gas industry in terms of drivers, characteristics, activity aspects and economical aspects. It also presents relevant information with respect to a selection historical development projects on the NCS.

Chapter three consults relevant literature in the quest to articulate the background for competitive pressures and what competitive advantages really are. Content converge towards a concept for competitive advantage that can boost the competitiveness of 21st century organizations.

Chapter four establishes a basis for the case study. Here, relevant information about the contractor and chosen framework agreement is presented.

Chapter five presents research findings, more specifically descriptions of industry concerns and issues experienced in work with the framework agreement. The contractor's strengths, weaknesses, opportunities and threats relative to work with the agreement are also presented.

Chapter six encompasses a discussion. Here, reflections are made on the current industry situation and how competitive pressures influence the selected company. A set of challenges and recommendations are also presented that aim to enhance company competitiveness.

Chapter seven contains brief concluding remarks of the research.

1.5 Methodology

The following sources were used to collect and assemble information and data:

- Relevant literature from books, journals and reports
- Industry reports related to the subject matter
- Topical articles from the public domain and media
- Company internal documents
- Interviews with key personnel
- Relevant websites

Articles, reports and a review of historical development projects on the NCS enabled identification of trending issues experienced in the industry. This knowledge was foundational in the development of interview questions to further pinpoint specific issues experienced by the contractor.

According to Burnard (1994, p. 111) it is possible to conduct either "structured" or "unstructured" interviews to collect data on subjective experiences and opinions. A structured interview normally has a simpler analysis process as grouping of responses are made easier. Unstructured interviews are not constrained by a definite interview schedule, leaving room for the interviewer to pursue leads that become apparent during the interview process. Though such interviews are better for depth exploration of a subject, analysis of unstructured data is more difficult. An unstructured interview method was used in this research.

Key employees from both contractor and customer companies were interviewed. The purpose was to obtain information that could help evaluate aspects from both sides, thus shaping a more detailed picture of issues experienced in work with the framework agreement. Questions and interview sessions were designed and conducted in Norwegian. However, questions have been translated into English for the purpose of this report. The question template used to conduct interviews can be found in its entirety in Appendix A, Table A-1.

E-mails were sent to the participants prior to the interview sessions, thus giving the initiated parties the option to prepare. The correspondence contained; (1) general information about the study, (2) explanation that questions were based on industry issues, and (3) developed interview questions. It was recommended that each participant at minimum looked at the questions ahead of the interview session.

Interviews also helped to uncover information towards a Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis of the contractor's approach to the contract. In general, such an analysis helps to assess a company's position and future growth as it identifies internal strengths/weaknesses and external opportunities/threats imposed by the market of operation. It should be acknowledged that a SWOT analysis is highly subjective and must therefore be perceived as a guiding tool rather than instructions to follow blindly (Team FME, 2013).

Interview sessions were recorded and transcripts were created. The systematic approach presented by Burnard (1994) was used for content analysis. A brief summary of this approach is shown directly below.

1. Clean transcript text – remove material that is repetitious or does not relate directly to subject at hand
2. Create "meaning units" – divide cleaned transcript into sentences, short paragraphs or 'information packages' that can stand on their own and make sense
3. Develop a category system – look for patterns in the responses and create category labels that describe category content
4. Ensure validity – at least two methods can be used; researcher can either get a qualified individual to analyze the data and compare results afterwards, or show analysis to interview participants to get their opinion (the latter was used here)
5. Ordering – sort meaning units under associated category
6. Explain data – as data have been transformed into sections that describe certain points or opinions, look for further patterns and use these as basis for further explanation and writing

2 INDUSTRY OUTLINE

This chapter gives a brief introduction to the Norwegian oil and gas industry in terms of drivers, characteristics, activity aspects and economical aspects. It also includes a review of issues and learning outcomes connected to the five historical development projects; Gjøa, Tyrihans, Skarv, Valhall Re-Development Project (RDP) and Yme.

2.1 Industry drivers and merits

Industry drivers are changes or trends that cause industries to evolve and change. They vary from industry to industry, and may be perceived differently from company to company. For example, drivers in the public health care sector may be noticeably different from those in the privatized manufacturing industry. Although industry drivers vary, Sama Rubio et al. (2012, p. 3) identified a few that are governing for companies in the oil and gas industry:

- Efficiency
- Risk mitigation
- Margins and cost control
- Labor shortages

Activities, processes and work tasks are often evaluated in respect to efficiency. Efficiency is included as an element of performance, a feature companies often attempt to measure and quantify. Performance measurement has been defined by Moullin (2002, p. 188) as the process of "…evaluating how well organizations are managed and the value they deliver for customers and other stakeholders". In principle performance measurement assesses how well specific parameters are reaching predetermined target results. If a process, function or area does not meet estimated targets it is put under scrutiny in order to uncover related causes and make improvements accordingly.

There are high risks associated with the oil and gas industry. For example, oil spills or other accidents can have dire consequences in terms of environmental damages and loss of lives. The level of uncertainty and complexity increases as companies venture into new areas, make more rapid decisions and rely on increasingly complex solutions. Risk management is necessary to gain control and mitigate risks to an acceptable level in the operational environment. In a larger perspective, Beattie (2012) stated that companies in the oil and gas industry have to assess and manage among other political risk, geological risk, price risk, supply and demand risk and cost risk.

Cost is an important component when companies evaluate profitability and feasibility of new projects (MPE, 2011). It is a powerful driver in the capital-intensive oil and gas industry. Kumar and Markeset (2007, p. 275) explained the term 'cost driver' as "…a major cost that dominates the total costs of the activity". Cost drivers are often seen as regulatory requirements (e.g. insurance and certification costs), technical systems (e.g. operation and maintenance costs), and workforce and organization (e.g. salaries and training costs).

Margins and cost control are essentially functions that help companies and projects to stay within budgets. A budget is merely a control measure which allows companies to manage, assess and improve the efficiency of its projects and departments. Keeping track of profits makes it is easier to determine the course of a company, i.e. if the company is doing better or worse. Companies can control costs, but revenues cannot be controlled as they are functions of interaction with customers. Revenues can, however, be influenced through, e.g. marketing and growth. Margins and cost control essentially boils down to keeping companies from spending more money than they earn.

Sama Rubio et al. (2012) stated that lack of manpower will be critical in the future. They argued that factors such as an aging workforce, a rise in energy demand and further intensification of operational requirements will force companies to utilize more automotive solutions. Furthermore, the industry is at a point where numerous workers with solid experience is about to enter retirement. In this context, Sama Rubio et al. (2012, p. 7) stated: "…we are rapidly losing our most experienced people, and a substantial experience gap will occur".

Norway's oil and gas industry is recognized as a global leader within development of technology. Stringent requirements to Health, Safety and Environment (HSE) have been one of the major drivers for this development. Contextually, a multitude of competent players have had key roles in finding new and innovative ways to overcome issues and challenges. Products and solutions developed for the NCS have in many cases been adopted in other industries and countries. Other areas of excellence include research, education, and collaborative work between fields and professional communities (Rystad Energy, 2013). In light of the aforementioned, deductions can be made on the fundamental merits that make up the Norwegian oil heritage:

- Intense HSE focus
- Solid industry competence
- Advancements within innovation and development of technology

2.2 Activity level and workforce growth

Rystad Energy (2013) studied the activity level of approximately 1 300 Norwegian oil service companies through the period 2006-2012. There were clear indications that activity on the NCS has been high in recent times. The workforce has seen a strong and steady growth in the period 2006-2012 as seen in Figure 2-1 (Rystad Energy, 2013, p. 10). In 2012, oil service companies had about 162 000 workers employed as opposed to 110 000 workers in 2006.

The total number of employees situated onshore and offshore had an average annual growth of 6.6 percent as shown in Figure 2-2 (Rystad Energy, 2013, p. 87) on the next page. Looking isolated at offshore employees, this population saw an average annual growth of 9.3 percent as seen in Figure 2-3 (Rystad Energy, 2013, p. 87).

Rystad Energy (2013) explained the growth as a result of increased drilling activity that created a greater need for offshore personnel and support vessels. Additional contributory factors included operators outsourcing services to external companies, and increased needs of maintenance with respect to aging installations.

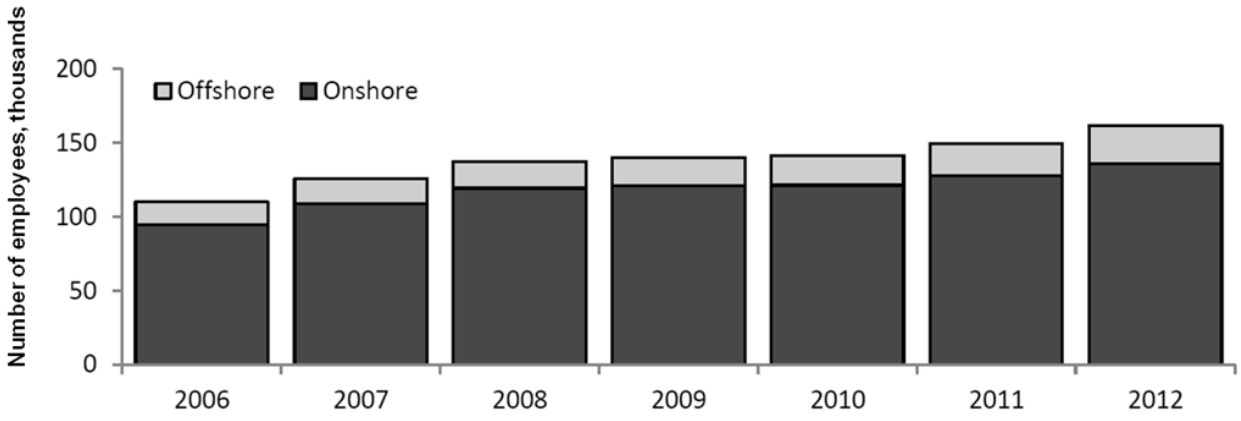


Figure 2-1 Bar graph showing total number of employees in Norwegian oil service companies in the period 2006-2012 (Rystad Energy, 2013)

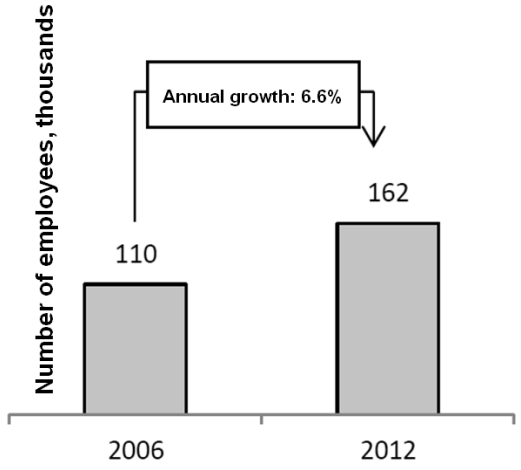


Figure 2-2 Bar graph showing annual average growth of employees in Norwegian oil service companies in the period 2006-2012 (Rystad Energy, 2013)

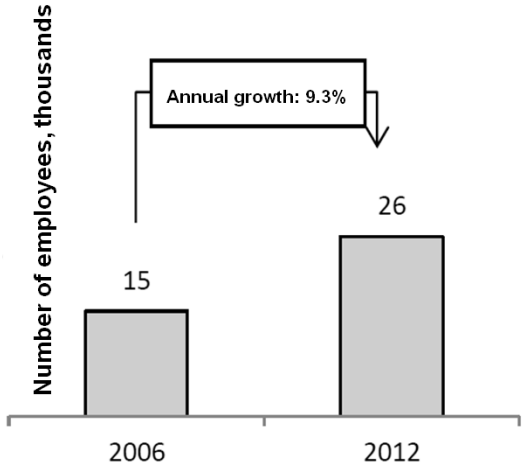


Figure 2-3 Bar graph showing annual average growth of employees in Norwegian oil service companies situated offshore in the period 2006-2012 (Rystad Energy, 2013)

2.3 Revenues and profitability

In the same study as aforementioned, Rystad Energy (2013) put company revenues under scrutiny. Figure 2-4 (Rystad Energy, 2013, p. 10) shows that the income level had a steady growth in the period 2006-2012. There was a close to negligible dip in 2010 as a result of the financial crisis in 2009-2010, but this did not have severe impacts as seen in other industries. In 2012, oil service companies created total revenues of NOK 580 billion, whereas NOK 450 billion of these were made in the oil and gas sector. 80 percent of these NOK 450 billion were attributed to onshore activities, and the remaining 20 percent were due to offshore activities. Compared to 2011, the companies experienced an average revenue growth of 14 percent. This number was however heavily influenced by revenue growth in the 20 largest service companies in the sector. These companies had an average growth of 18 percent in the period 2011-2012.

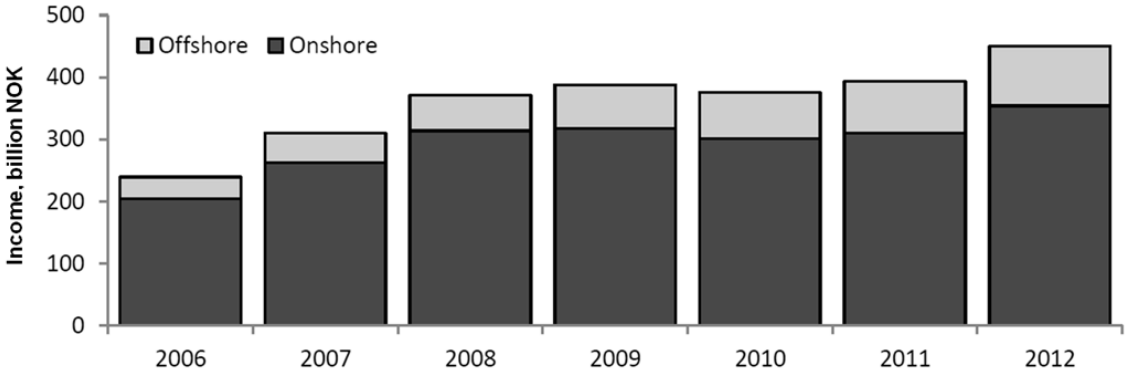


Figure 2-4 Bar graph showing Norwegian companies' income from the oil and gas sector in the period 2006-2012 (Rystad Energy, 2013)

Note that revenues merely reflect one side of the coin, and one must acknowledge that costs need also be accounted for. Relationships between revenues and costs are uncovered by profitability analyses. Inventura (consulting company) analyzed financial statements of 200 service

companies in the oil and gas industry from the period 2008-2012. Findings indicated that although the level of activity has risen in the Norwegian oil and gas industry, as much as 50 percent of the companies experienced reduced profitability. This was highly attributed to factors such as quality deviations, cost increase and problem remediation (Helgesen, 2013a).

2.4 Oil price and investment level

In recent years, the crude oil price has been stable and high as seen in Figure 2-5 (IndexMundi, 2014). Similarly, the investment level on the NCS has seen a steady growth as shown in Figure 2-6 (NPD, 2014). Generally, investment rate has a tendency to grow when the oil price is high. This is because oil companies take advantage of a high oil price to realize projects that require more capital to break-even (Rystad Energy, 2012). Therefore, relationships can be drawn between oil price, investment level and activity level. Realization of large projects, e.g. field developments or upgrades, requires substantial investments. Investment rate and project size in turn determines amount of work that cascades downstream to oil service companies.

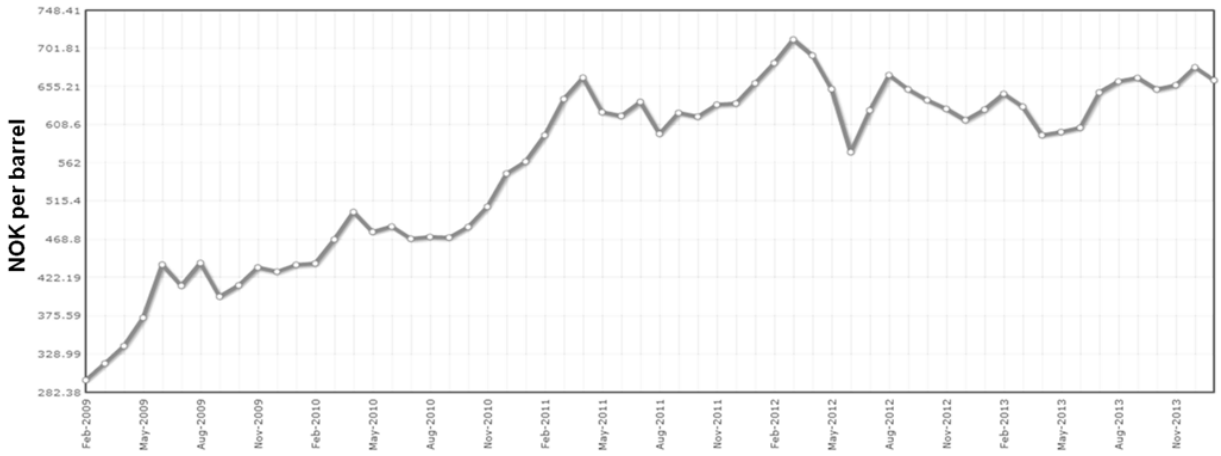


Figure 2-5 Graph showing crude oil price (Brent blend) in NOK per barrel, Feb 2009 - Jan 2014 (IndexMundi, 2014). Notice that the price has been high and relatively stable over the last three years.

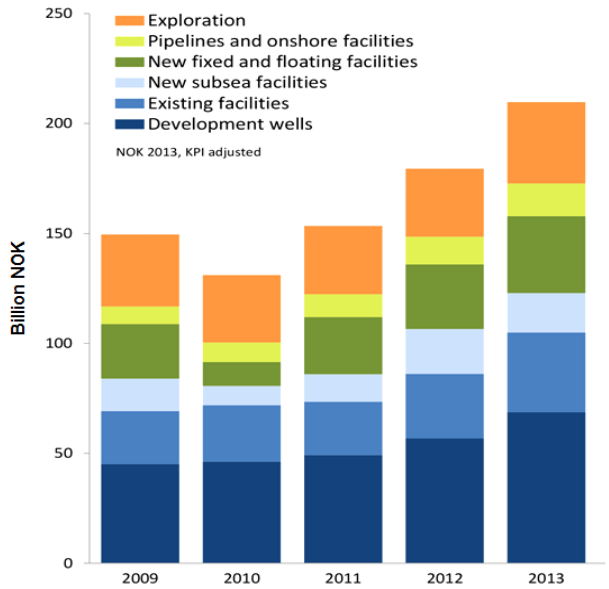


Figure 2-6 Bar graph showing investments and exploration costs on the Norwegian shelf in the period 2009-2013 (NPD, 2014). Notice positive investment growth in the period 2010-2013.

2.5 Review of major historical projects on the NCS

In 2013, the Ministry of Petroleum and Energy (MPE) made an inquiry to the Norwegian Petroleum Directorate (NPD) asking them to conduct a review of projects under development on the NCS. The review was to encompass projects with investments exceeding NOK 10 billion that recently had, or should have had, started production. Following subchapters look into five selected projects in order to understand underlying reasons and predominant issues that caused change in cost estimates, see Table 2-1.

Table 2-1 PDO and Plan for Installation and Operation (PIO) cost estimates for Gjøa, Tyrihans, Skarv, Valhall RDP and Yme development projects. New estimates and related change are subject to discrepancy as they may have been updated over the course of time. Table is derived from those of NPD (2013, pp. 13-14).

Project	PDO/PIO approved [Year]	Original estimates [Million NOK]	New estimates [Million NOK]	Change [million NOK]	Change
Gjøa	2007	31 239	35 135	3 896	+12 %
Tyrihans	2005	14 059	16 627	2 568	+18 %
Skarv	2007	35 632	47 162	11 530	+32 %
Valhall RDP	2007	25 163	46 727	21 564	+86 %
Yme	2007	4 894	14 114	9 220	+188 %

2.5.1 Gjøa development project

Located in the northern parts of the North Sea, Gjøa's development consist of subsea templates connected to a semi-submersible platform that gets its power supply from land, see Figure 2-7 (Oljefakta, n.d.) and Figure 2-8 (Haga, 2011).

Figure 2-7 Map indicating the location of Gjøa (Oljefakta, n.d.).

Figure 2-8 Photograph of the semi-submersible Gjøa platform (Haga, 2011).

The project was rated successful as cost overruns were within the uncertainty limits of ± 20 percent, and the field started production one week after estimated startup. Key project elements were divided into different contracts for; production facility, subsea installations, drilling and completion, power cable to shore, flexible risers, living quarters, platform substructure and platform deck (NPD, 2013).

2.5.1.1 Project experiences

The project experienced design changes in the execution phase, resulting in a 3000 ton weight increase on platform topside. One reason for the weight increase was that subcontractors focused more on timely deliveries that were at agreed-upon cost, rather than making sure their deliveries were within the weight limits (NPD, 2013).

Project engineering activities required more resources and time than what was initially planned. Involved companies experienced difficulties in acquiring enough competent personnel. And there were issues in the start phase regarding reduced efficiency in the split-location collaboration between engineering teams located in Norway and India. It took some time to increase this efficiency (NPD, 2013).

Quality deviations were identified late in the project. Major deficiencies were, for example, encountered in piping components used for the production facilities. Here, a subcontractor had bypassed predetermined procedures for heat treatment of pipes in order to save time. Several piping components therefore had to be replaced on the topside, which was an extensive and costly affaire (NPD, 2013).

2.5.1.2 Lessons learned

In order to make correct decisions with respect to project timing it is necessary to have sufficient grounds of information. Competent and experienced personnel have to be inserted in central disciplines throughout the different phases of a project. This is especially important in early project phases, as non-optimal decisions here can create problems later (NPD, 2013).

Having a competent follow-up team on the construction site can help to reduce the risk of deficiencies in the quality of deliveries. Emphasis is put on the fact that contractors, especially foreign contractors, must take the necessary measures to attain a deep understanding of Norwegian regulations and standards (NPD, 2013).

Pre-qualifying relevant contractors before contracts are awarded can help to secure a project's affiliation with competent companies and thereby reduce project risk. This is, however, not a guarantee for excellent deliveries as the example where a subcontractor bypassed a procedure showed (NPD, 2013).

2.5.2 Tyrihans development project

Situated in the Norwegian Sea, Tyrihans' development comprises of a set of subsea templates that connects to the Kristin field, see Figure 2-9 (Oljefakta, n.d.) and Figure 2-10 (Johansen, 2010).

Figure 2-9 Map indicating the location of Tyrihans (Oljefakta, n.d.).

Figure 2-10 Photograph of a subsea template used in the development (Johansen, 2010).

The project utilized new technology for injection of raw seawater and special pumps performing this work. Overall, the development was rated successful as it kept within budget uncertainty limits of ± 20 percent and production started as sheduled. Key elements of the project were divided into different contracts for; subsea facility, delivery of umbilical, pipelay, modifications, and new technology for subsea production systems (NPD, 2013).

2.5.2.1 Project experiences

The project fell behind plan as the operator underestimated complexity of the modification work. Delays resulted in activities starting without having completed the necessary technical drawings. This lead to work being executed in wrong order and much of this had to be redone. Here, a major influencing factor was shortage of competent personnel due to an exhausted labor market. Additionally, weight estimates were off by a factor of two, thus doubling the installed weight (NPD, 2013).

2.5.2.2 Lessons learned

A key success factor for the project was a well-defined scope of work in the PDO. Furthermore, identification of major risk elements (i.e. qualification of new technology) led to direct contracts with suppliers, which turned out beneficial. More focus should have been directed towards understanding the modification complexity. And the lack of competent personnel on contractor-side could have been avoided if the availability of staff had been verified before contracts were awarded (NPD, 2013).

2.5.3 Skarv development project

Sited in the Norwegian Sea, Skarv's development consists of an anchored Floating Production Storage and Offloading (FPSO) unit with oil and gas being transported via oil carriers and pipelines respectively, see Figure 2-11 (Oljefakta, n.d.) and Figure 2-12 (BP, 2013a).

Figure 2-11 Map indicating the location of Skarv (Oljefakta, n.d.).

Figure 2-12 Photograph of the Skarv FPSO unit in operation on the field (BP, 2013a).

The project cost overrun was at 32 percent, well above uncertainty limits of ± 20 percent. Production startup was postponed from mid 2011 to turn of the year 2012/2013 due to significant project delays. Key elements of the development were divided into different contracts for; construction of production facility (South Korea), construction of turret as a subdelivery for the production facility (Singapore) and construction of subsea equipment (NPD, 2013).

2.5.3.1 Project experiences

Construction of the FPSO unit in South Korea experienced challenges with respect to Norwegian requirements and standards. The contractor did not focus enough on this early in the construction phase, nor did the operator. As a result, deficiencies were detected late and costs were driven in the quest to meet requirements (NPD, 2013).

The FPSO unit came as scheduled from South Korea to Norway for mechanical completion. At that stage several leaks were discovered in the turret. Serious project delays arose mainly stemming from poor follow-up of the turret produced in Singapore. Due to delays the weather window for connecting riser to the FPSO unit on the field was lost. A decision was made to keep the special crane vessels for installation on the field to take opportunity of new weather windows. Leasing special machinery of such magnitude was a costly affaire (NPD, 2013).

Cost overruns and delays were in hindsight also attributed to insufficient completion of the engineering part, leading to changes throughout the course of the project (NPD, 2013).

2.5.3.2 Lessons learned

The risk of delays and cost overruns could have been reduced by pre-qualifying contractors before awarding contracts (NPD, 2013). However, as mentioned earlier, this does not guarantee premium deliveries.

Optimal, accessible and well-operable installations can be achieved by including input from operational staff in early project phases. It is emphasized that such personnel should have a say early on as changes can be implemented in design/planning, thereby reducing the need for change orders in later project phases (NPD, 2013).

The operator chose to terminate some of the supplier contracts as unfavorable results developed with respect to promised deliverables. Courage to sever ties and make changes was important for realization of the project. Cost overruns and delays could have been more formidable had this not been done (NPD, 2013).

Communication is key when it comes to implementing changes in the construction phase. Accepting changes without assessing them properly can lead to challenges in later project stages. The operator had an on-site supervisory team on the construction site. This team in conjunction with the contractor critically and thoroughly assessed construction changes that were submitted. A good dialogue between these parties resulted in final costs being kept at a lower level (NPD, 2013).

2.5.4 Valhall RDP

Located in the southern parts of the North Sea, Valhall RDP was commenced to facilitate future production and extended field operation, see Figure 2-13 (Oljefakta, n.d.) and Figure 2-14 (BP, 2013b).

Figure 2-13 Map indicating the location of Valhall (Oljefakta, n.d.).

Figure 2-14 Photograph of the Valhall field center (BP, 2013b).

The project was complex and included among others modification work, new constructions and new technology. A prerequisite for the project was not to shut down existing operations while the work was carried out. Valhall RDP was subject to significant cost overruns, the project was

delayed by 25 months, and the field was shut down three months longer than what terms in the PDO stated. Key components of the project were:

- Transition to landbased electric power
- Project work in different areas:
  - Project engineering – performed in the United States
  - Living quarters – constructed in the United Kingdom
  - Platform substructure – constructed in Norway
  - Facility – constructed in Holland

2.5.4.1 Project experiences

In 2006, a large wave struck Valhall's field center damaging the production installation and living quarters. In this context, the operator made a decision to accelerate the redevelopment plans for Valhall. The pressure to get started caused the project to be schedule-driven from the very beginning (NPD, 2013).

A new review of the Valhall reservoir was presented in early stages of the project, indicating a future production potential far lower than expected. It was decided that there was no time to revise the design and plans stayed unchanged. Valhall RDP was designed for a 40 year lifespan instead of a 25 year lifespan. The project therefore used more costly materials and needed more special expertise within some construction phases. Correct expertise and competence was hard to acquire due to an exhausted labor market, thus creating challenges for contractors on meeting quality requirements in their deliveries. Special design requirements and shortage of competent personnel led to cost overrun, delays and quality problems (NPD, 2013).

Insufficient time and resources was spent in the early phases of the project. This was reflected by; (1) several change orders during the project lifespan, and (2) underestimated platform dimensions and weight, which was detected late into the detail engineering phase (NPD, 2013).

Shortages were uncovered in delivered equipment and were attributed to the contractor having poor quality follow-up, leading to deficiencies being detected too late. This hindered mechanical completion and ultimately contributed to a delay in commissioning and production startup (NPD, 2013).

2.5.4.2 Lessons learned

There was not enough time dedicated to early project phases. New reservoir information should have been taken into account and initiated a review of the design. This could have reduced topside weight, simplified design and quality requirements, reduced dimensions and size, and ultimately reduced the need for changes. The fact that the project was schedule-driven from the start was not beneficial and made it difficult when delays started to stack up (NPD, 2013).

Furthermore, the operator should have monitored subcontractor fabrication more closely, which could have alleviated some of the issues with equipment quality. Also, an immense number of activities and dependencies had to line up. Challenges were underrated in respect to the size and complexity of upholding existing operations in parallel with project interventions (NPD, 2013).

2.5.5 Yme development project

Situated in the southern parts of the North Sea, Yme was the first field in Norway to be reopened after production ended in 2001, see Figure 2-15 (Oljefakta, n.d.) and Figure 2-16 (Holm and Don, 201X).

The Yme project was deconstructed into three elements: drilling and completion of wells, subsea facilities with piping, and construction of a mobile production unit. Estimated time window for the project was 28 months, but the project was shut down by the licensees when it reached 75 months. At that point it had overrun both cost and time estimates by a tremendous amount.

Figure 2-15 Map indicating the location of Yme (Oljefakta, n.d.).

Figure 2-16 Photograph of the Yme platform – a mobile production unit (Holm and Don, 201X).

2.5.5.1 Project experiences

SBM Offshore, a Dutch company reputable for HSE and FPSO construction, was awarded the contract for constructing the mobile production unit. Its concept was based upon proven technology that was expected to work on the NCS. Though SBM lacked experience with large construction projects adhering to Norwegian standards, a great amount of confidence was put towards company. Platform construction took place in Abu Dhabi (NPD, 2013).

The contract itself had a rental concept were SBM owned the rig and the operator was to lease it. Hence, the contractor could not collect rental fees until the platform was operating on the field. This set in motion incentives to complete the rig as soon as possible. The project became schedule-driven from the very beginning, where insufficient time was devoted to both Front End Engineering Design (FEED) and detail engineering prior to fabrication. Detail engineering started before the FEED was completed, and fabrication and procurement started too early relative to detail engineering. A major consequence of these events were among other increased platform weight (NPD, 2013).

A recurring problem in the project was failure to understand and comply with Norwegian requirements and standards. As construction of the mobile production unit progressed, more and more deficiencies and quality deviations were discovered. The operator therefore dedicated more personnel to realize the build, increasing the follow-up costs. As SBM was rig owner, the

contract restricted the operator to inspect, intervene and supervise the build. This was made it difficult to uncover the extent of deviations and limited the operator's potential to influence solutions (NPD, 2013).

When the mobile production unit left Abu Dhabi heading for Norway, it had numerous deviations. The work was to be completed in Norway, even though Norwegian rates were higher. After a period of time decisions were made to tow the unit out on the field, making further rectifications even more costly as offshore rates are higher than onshore rates. The Yme rig was eventually scrapped by SBM in December 2012 after uncovering significant structural errors and cracks in the unit's foundation (NPD, 2013).

2.5.5.2 Lessons learned

Focus and work in the early phases of a project is critical to create a good foundation for further effort. It is especially important that an internal system is in place to ensure quality and maturity towards project sanctioning. Enough time has to be devoted to complete the FEED prior to detail engineering. And the competence, quality and experience level of contractors have to be assessed thoroughly (NPD, 2013).

Moreover, contracts that take basis in renting should be avoided. An operator should own the rig under construction, thus giving the opportunity to better influence solutions and monitor progress. An option is to sell the rig after completion and rent it back in the operational phase (NPD, 2013).

Additionally, the bar should be raised early in the project with respect to obtaining deliveries that meet requirements. Project follow-up is critical throughout the project to reduce the risk for cost overrun and delays. Competence within project follow-up and Norwegian requirements is also key to successfully realize a project on the NCS (NPD, 2013).

3 COMPETITIVE EDGE – A MODERN NECESSITY

This chapter starts by presenting prominent changes that have occurred in the competitive business environment. It proceeds by looking closer into definitions of competitive advantage and qualities for future competitiveness on the NCS. Thereafter, specific theory related to competitive advantages is presented, which converges towards to a set of principal features for modern organizations in the 21st century.

3.1 General changes in the competitive business environment

Companies conduct their business in a holistic *market environment* that consist of a micro and a macro environment, see Figure 3-1 (Activated Logic, 2010). The *micro environment* includes the internal company and immediate parties close to it that influence its decision-making, performance and ability to serve customers. Normally, major influencers here are seen as suppliers, customers and competitors. The *macro environment* holds greater external forces that affect the micro environment. For example, political forces imposing government-issued safety regulations that companies must abide by, and technological forces bringing advances that induce modernization of companies' operating methods. Strength of macro influences correlate with a company's dependency on the various forces. For example, to what extent a company depends on the health of the overall economy (Kotler and Armstrong, 2011).

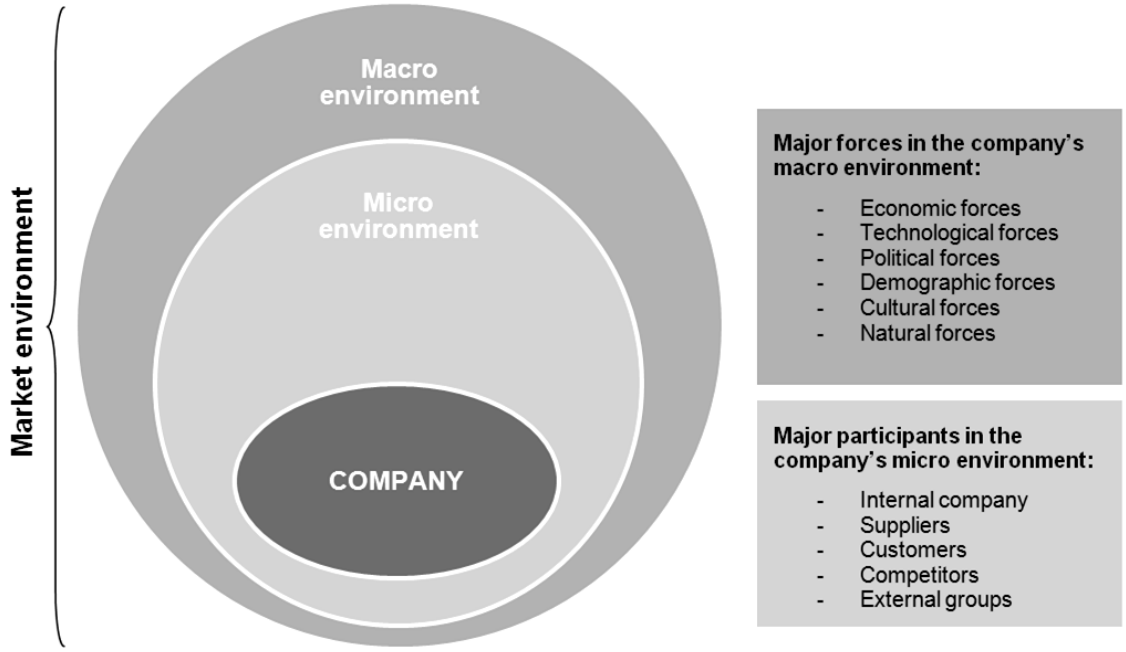


Figure 3-1 Illustrative overview of the relationships between market, macro and micro environment (Activated Logic, 2010)

3.1.1 Change drivers

By studying the works of Albrecht and Sack (2000), Botes (2005), Brooks et al. (2010) and Bang (2012) it becomes evident that there are several drivers imposing change to the competitive business environment. The following change drivers are frequently referred to and discussed:

- Technology
- Globalization
- Knowledge economy

A high pace in technology development has made information easier to collect, prepare and distribute. Quality hardware such as servers, computers and communication devices are easily acquired at low costs. And high-speed internet connections facilitate quick and easy distribution of information regardless of geographical location. Advanced software and databases create potentials to collect, analyze, manipulate and edit information (Albrecht and Sack, 2000; Brooks et al., 2010).

Complementing the aforementioned, Botes (2005) explained that IT has had an enabling role and directly influenced other two change drivers. Through utilization of IT, companies have established setups for new work practices and distribution of real-time information. An important factor in the development of technology is mankind's eagerness to innovate, continuously explore and improve. Brooks et al. (2010) stated that innovative efforts with respect to technology, for example development of search engines, have made information available to a massive number of people and thus facilitated fast research and development.

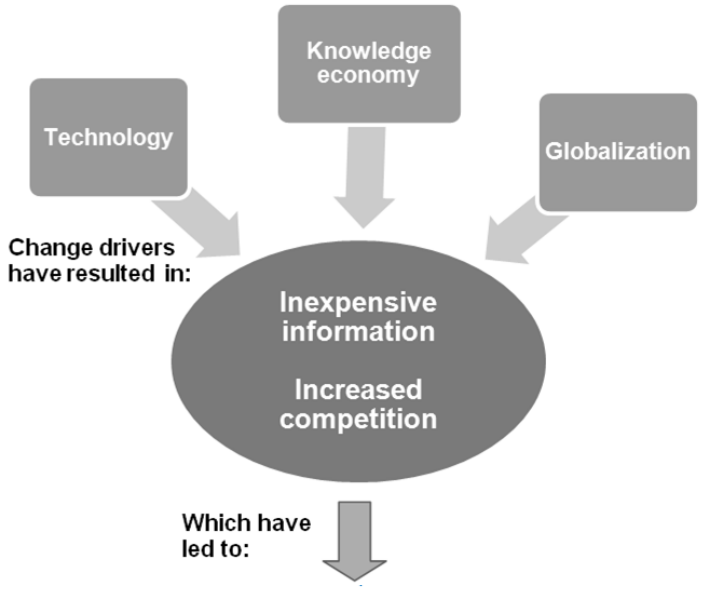
Rapid distribution of information and quicker methods of transportation has made it easier to overcome geographical boundaries and tap into other markets on a global scale. Customers can now, almost invariably, select services and products from companies in other countries or continents. Organizations have not only local competitors to worry about, but also actors from different parts of the world. Instead of having a few key competitors to be concerned about, companies have to manage competitive pressures from the global market. Furthermore, as information has become easier to collect, edit and distribute, companies on a worldly basis know more about each other than ever before. If a particular company has weaknesses in a product, rivals supplying the same product obtain the ability to act on those deficiencies immediately (Albrecht and Sack, 2000).

Bang (2012) identified several drivers and effects in his study called: "Globalization and changes to companies' competitive environment". He stated that the competitive situation is becoming more dynamic and less static. The *drivers of globalization* (i.e. lower trade barriers, lower transportation and communication costs, ICT development & spread of technology) have made boundaries less clear, bound markets closer together and made it more difficult for companies to be unique. Bang (2012) also identified *size effects* (i.e. larger market potential, larger number of potential clients, larger number of potential competitors, and larger number of potential suppliers and partners) that increase companies' potentials and size, but these effects also enhance direct competition to the same companies. Moreover, he explained that *pressure effects* (i.e. cost and price pressure, higher rate of change, more diverse markets, lower start-up barriers and lower visibility) intensify changes, creating a higher pressure on the companies. In light of aforementioned factors, players in the industry have become harder to identify and boundaries are more unclear.

Application of knowledge to generate tangible and intangible values is branded 'knowledge economy'. The term is often used in context with knowledge technology, integrating human knowledge into systems and machines, but it can also be used outside the technology domain. (Amidon et al., 2005). Knowledge and know-how are valuable resources in knowledge industries such as the oil and gas industry. Botes (2005) explained that the appearance of the knowledge economy has increased pressures in the competitive environment, creating a need for quick and rapid response to changing demands. Furthermore, he stated that business success often correlates with the ability to convert information into knowledge – tailoring knowledge from relevant information to make it useful to non-specialists.

3.1.2 Outcome of change drivers

Aforementioned change drivers have had evident impacts on companies' business environment. Mostly in the form of increasing the level of competition between players, but also in the shape of facilitating easily accessible and inexpensive information. An overview of the major change drivers and their results can be seen in Figure 3-2 (Albrecht and Sack, 2000).



Recognition of risk	More uncertainty	More complexity
Shorter product life	Restructuring of rewards	Focus on customer satisfaction
Shorter duration of competitive advantage	Increased regulatory activity	More outsourcing of non-core competencies
Emergence of new players	Complicated short-term and long-term planning	Exposed companies in terms of information
Increased pace of change	Changes in market environment	Revaluation of business models
Information overload	Stressful working environment	Increased rate of virtuality
Increased focus on adaptability and flexibility	Restructuring of organizations	Need for quicker and more decisive actions by management

Figure 3-2 Illustrative overview of change drivers, their results and examples of effects on the competitive business environment. Figure is based on that of Albrecht and Sack (2000) with added elements mentioned by Botes (2005) and Brooks et al. (2010).

Major advances in technology have made systems and equipment increasingly complex. System components are ever more interrelated and numerous, making it difficult to get a clear overview of system extent and consequences of unexpected events. Albrecht and Sack (2000) explained that complexity, uncertainties and a need to make fast decisions contribute to higher risks. As organizations search for a competitive edge, they extend their reach into new areas of the value chain, stretching capacities and increasing complexity even more. Heightened awareness of risk has formed the basis of expert services that solely deal with understanding risk.

More complexity, regulations and information require more experience and knowledge. In modern times, a company's workforce often has to be skilled and highly educated in order to carry out their daily activities and responsibilities, which has resulted in a rapid decline in number of unskilled jobs (Botes, 2005). Skilled jobs are frequently connected to activities that to greater extents subject workers to information overloads, mental strains and other stresses.

Good performance is a prerequisite in the eyes of investors and customers, but traditional business models are being challenged by competitors that have different cost structures. Furthermore, the easily accessible nature of information exposes organizations, uncovering weaknesses that rivaling companies can act upon. As companies have become more exposed, power and influence has shifted from service/product providers to service/product receivers. Customers and investors can now make assessments of contractors and suppliers, and to a wider extent dictate specifications, delivery time and prices (Albrecht and Sack, 2000).

3.2 Competitive advantage and competitiveness

Competitive advantages can be construed as intangible assets, but due to an increasingly fast industry pace these advantages lose their usefulness faster (Albrecht and Sack, 2000). Many authors and institutions have tried to define and capture the essence and meaning of a competitive advantage:

> …advantage that a firm has over its competitors, allowing it to generate greater sales or margins and/or retain more customers than its competition (Investopedia, n.d.).
>
> …superiority gained by an organization when it can provide the same value as its competitors but at a lower price, or can charge higher prices by providing greater value through differentiation. Competitive advantage results from matching core competencies to the opportunities (BusinessDictionary, n.d.).
>
> … achieving a bigger gap than your competitors between the value your customers see in your product and the costs you incur in providing that product (Pietersen, 2010, p. 17).
>
> … what enables a business organization to thrive. It is the objective of strategy. It is the combination of elements in the business model which enables a business to better satisfy the needs in its environment, earning economic rents in the process (Create Advantage, n.d.).

Though variations in these definitions are evident, commonalities can be observed as having an upper hand on the competition, a characteristic that makes the company unique, and beneficial cost/profit aspects.

KonKraft, a collaborative venue for the Norwegian petroleum industry, published a report assessing the competitive position of construction yards in the Norway oil and gas industry. They argued that sustained competitiveness requires reorganization, continuous improvement, productivity and competence throughout the value chain. A premise in the report was that future competitiveness on the NCS hinges on continuous improvement with respect to costs, capacity, competence and quality (Stubholt et al., 2013). These factors have several underlying components as shown in Figure 3-3 on the next page.

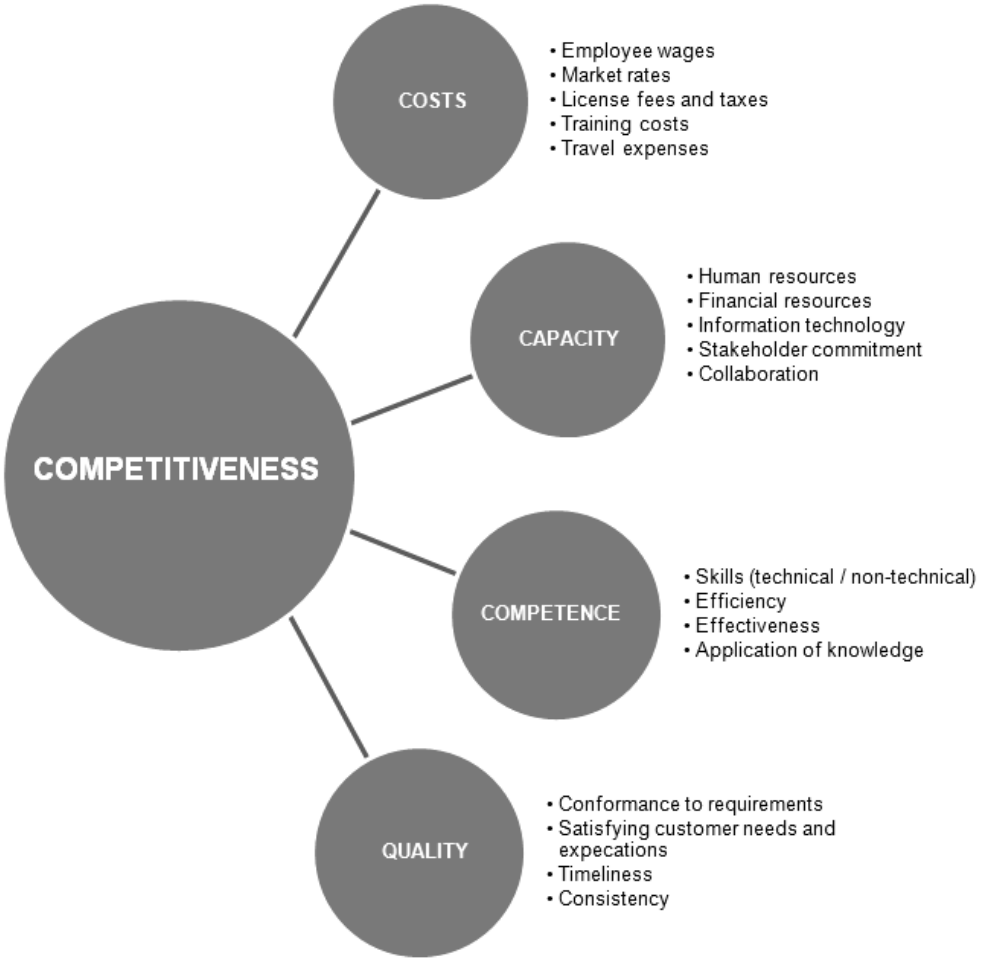


Figure 3-3 Illustration showing KonKraft's constituents of future competitiveness on the NCS. These are linked to a variety of exemplified underlying components to demonstrate its comprehensiveness.

3.3 Competitive forces and generic strategies

In the 1980s, Porter (2008) developed the model of five competitive forces. This model takes basis in the deduction that threats in a company's external environment should be met by the company's strategy.

Porter (2008, p. 4) explained that profitability and attractiveness is influenced by the intensity of competition, which in turn in is determined by the five competitive forces that are characteristic in every industry and market: "the entry of new competitors, the threat of substitutes, the bargaining power of buyers, the bargaining power of suppliers, and the rivalry among the existing competitors". These are depicted in Figure 3-4 (Porter, 2008, p. 5) on the next page. He also stated that as an industry changes, companies can influence the five forces through their strategies, whereas the five-forces framework allow firms to identify factors that are critical to industry competition.

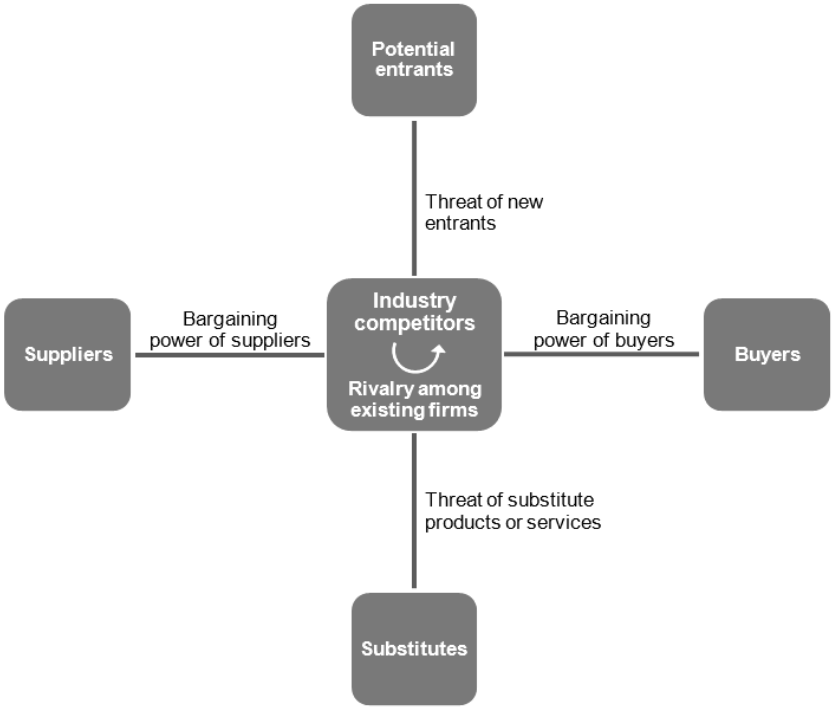


Figure 3-4 Illustrative structure showing the five competitive forces that determine industry profitability (Porter, 2008)

Porter (2008) identified three generic strategies for competitive advantage:

- Cost leadership strategy
- Differentiation strategy
- Focus strategy

Companies employing a cost leadership strategy seek to provide deliveries at lower cost compared to the competitors, i.e. provide sensible value at lower price. Such companies often have a wide market segment and provide many offerings, which is important for the cost advantage (Porter, 2008). This is supported by Amadeo (2012), who argued that companies with a cost leadership strategy often achieve value at lower price by improving the operational efficiency on a continuous basis. Also, the firms tend to employ unskilled labor or use incentives such as promotions to drive down salary costs. Another cost reducing measure is the option to decrease unit cost through buying in bulk.

A differentiation strategy requires companies to hold distinguishing features that separate them from the crowd. A company must have one or more features that are in demand, where efforts are rewarded with a higher price or compensation (Porter, 2008). In this context, Amadeo (2012) argued that companies can distinguish themselves by "providing a unique or high-quality product, by delivering it faster, or by marketing it in a way that truly reaches customers better". Here, influential effects towards differentiation are singled out as innovative abilities, product quality and customer service.

Companies utilizing a focus strategy target narrow product lines or buyer segments. The focus approach is either cost focused or differentiation focused, depending on whether advantages are associated with exploiting cost behaviors or buyer needs in the industry segments. A company would in this case optimize and tailor the strategy for specific target segments (Porter, 2008). Complementing the aforementioned, Amadeo (2012) stated that focused companies should

comprehend and service their targeted industry segments better than anyone else, thus becoming sovereign in their respective niches. Characteristics of the three different strategies are summarized in Figure 3-5.

Figure 3-5 Graphic showing a coarse summary of Porter's three generic strategies and how they create competitive advantages

3.4 Resources and capabilities

Create Advantage (n.d.) argued that competitive advantages are established through; (1) a company's position in the industry, or (2) utilization of company resources and capabilities. Building on the latter, Hackwood (2012) explained resources as company assets that help to create an advantage that is intricate for competitors to acquire. For example, qualities such as company reputation, customer base, proprietary knowledge, etc. Furthermore, he stated that capabilities refer to company's aptitude to use its resources effectively, e.g. through provision of logistics or well-timed deliveries. Together, resources and capabilities shape the core competencies that enable innovation, efficiency and improved customer service. From this advantages and value creation arise as shown in Figure 3-6 (Hackwood, 2012).

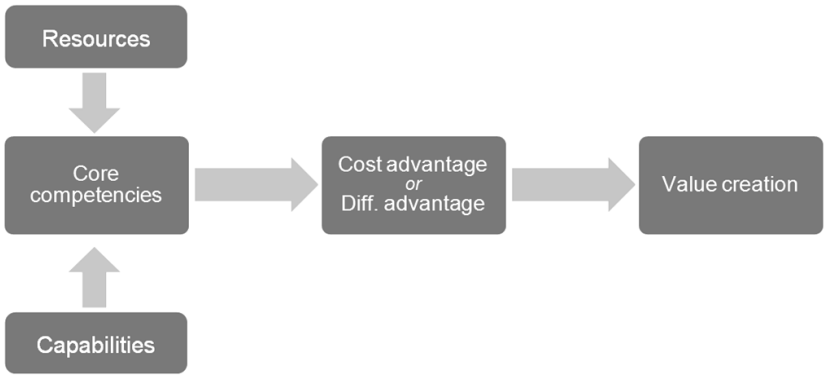


Figure 3-6 Illustration showing the link between resources, capabilities, competencies, advantages and value creation (Hackwood, 2012)

3.5 Organizational capability

Ulrich and Lake (1991) argued that competitive advantage can be achieved through three traditional sources:

- Financial capability – offer products/services at lower cost than competitors
- Strategic capability – provide products/services that differentiate from competitors'
- Technological capability – offer products/services that are innovative or state-of-the-art

Yet, the current dynamic environment makes it difficult for these traditional sources to create an advantage on their own. Therefore, a fourth source of competitive advantage is introduced – organizational capability (Ulrich and Lake, 1991). In its essentials, organizational capability is a company's aptitude to manage its human resources in order to attain an advantage vis-à-vis other companies. Organizational capability focus on using internal processes and systems when adapting to varying market requirements and meeting customer needs. It creates unique and advantageous competencies specific to the organization. Consequently, competent staff is a crucial in the quest to establish sustainable competitive advantages (Potapova, 2012). The importance of company staff is underlined by Brainbench (2003), which stated that employee skills account for 85 percent of a firm's assets.

> Organizational capability is an intangible asset and a source of company's competitive advantage that adds value to its product, makes the organization unique, and includes organization's ability to develop such internal structures and processes that lead to creating competencies unique to this organization and allow for a better adaptation to changing strategies and customer needs (Potapova, 2012, p. 2).

A relationship exists between competitive strength and effective use of human resources by means organizational capability, see Figure 3-7 (Potapova, 2012, pp. 2-5). For a company, changes in the competitive environment induce competitive pressures. But reactions from the company also have retroactive effects on the competitive environment. Competitive pressures aggravate a need for competitive advantages, where sources of such are found in financial/economic, strategic/marketing and technological capabilities. Organizational capability has a strengthening and liberating effect on these sources.

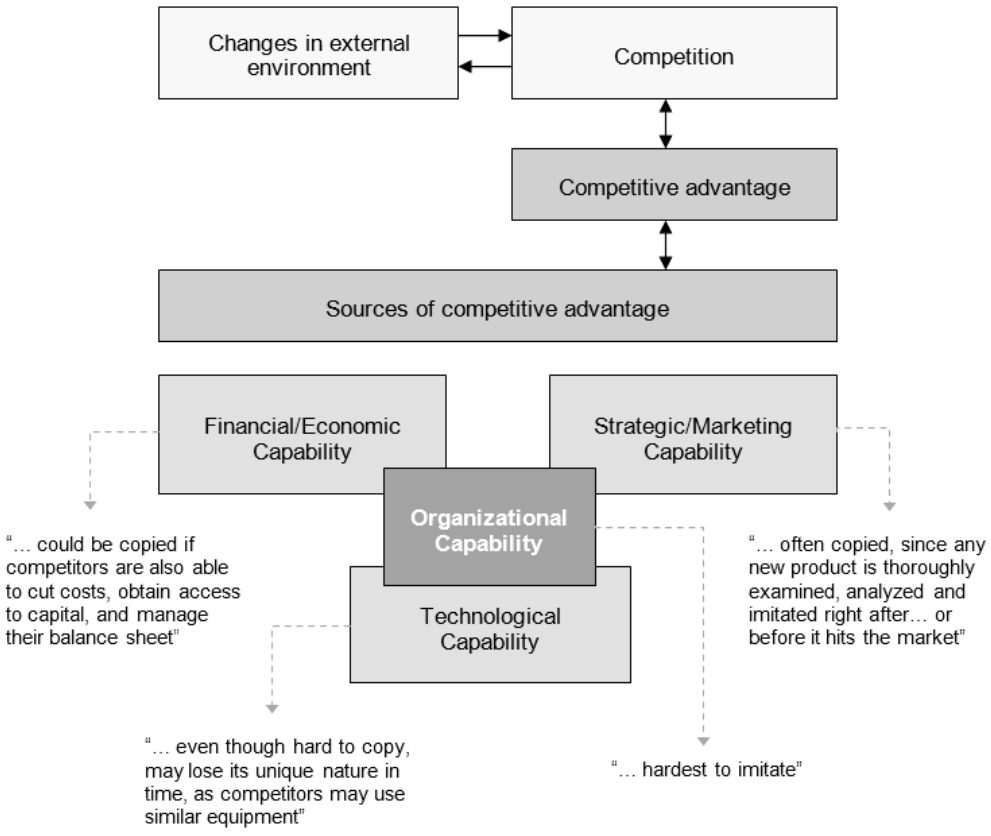


Figure 3-7 Overview showing linkage between competitive strength and efficient management of human resources through employing the organizational capability component (Potapova, 2012)

Trough a reflection on the concept of organizational capability, Schienstock (2009) concluded that there is an absence of consensus in the academic milieu on which core capabilities that are needed to counteract competitive pressures. Meaning that the concept of organizational capability is still somewhat vague. However, Ulrich and Lake (1991) and Potapova (2012) rated the following four elements as critical for capable organizations.

Shared mindset: Organizational capability relies on a common vision or understanding, both internally and externally relative to the organization. Uniformity is desired in attitudes, thinking, evaluation and valuation. Shared mindset is a common understanding of objectives and how to get there. It facilitates alignmnent of customer and employee expectations, shifts focus towards goal achievement, allows for better change response, and increases commitment of employees, customers and suppliers (Potapova, 2012; Ulrich and Lake, 1991).

Management practices: Management practices are essentially processes and approaches used to influence people's performance, thinking and actions. They change employee behaviors in order to generate consistency in interactions with external parties. They create customer satisfaction and match expectations, behaviors and goals organization-wide (Potapova, 2012; Ulrich and Lake, 1991).

Change capacity: Being capable of rapidly changing and adapting as a response to the needs and requirements of suppliers and customers is important to maintain a competitive edge. Hence, organizations must be able to adjust according to changes in the market environment. The ability of an organization to change relies on the employees' ability to change. An organization's capacity for change hinges on: aptitude to bridge between internal action and external conditions to deal with external change (symbioses), ability to make self-assessments and continuously learn from past experiences (reflexiveness), aptitude to integrate processes, tasks, systems and structures that underpin changing aspects of the company (alignment), and ability to change over time when needed (self-renewal) (Potapova, 2012; Ulrich and Lake, 1991).

Leadership: Achieving better internal and external leadership than competitors relies on internal leaders' ability and readiness to direct others and support them in achieving targets. It also includes installment of self-leadership – empowering employees to manage challenges, make decisions, and solve problems within their own domain (Potapova, 2012; Ulrich and Lake, 1991). Role models are more important than formal and strict policies in times of economic unrest and growing complexity in the industry environment. Top management has to consciously model adaptability so that it cascades through all levels of the organization (Roghé et al., 2012).

Abovementioned elements enhance two criteria for competitive advantage as seen in Figure 3-8 on the next page.

Perceived customer value is improved in three ways: *Responsiveness* – the ability to understand and change according to customer needs and demands more rapidly than competitors. *Relationships* – aptitude to develop sustainable relationship with the customer and other entities to ensure continued growth and competitiveness. This can affect reputation, loyalty and future sales. *Service quality* – organization's ability to develop and provide services that meet expectations of the customer (Ulrich and Lake, 1991).

Uniqueness is enhanced through *social engineering* and *behavior influences*, which create qualities that are hard to replicate through manipulation of intricate mechanisms such as teamwork, leadership and culture (Ulrich and Lake, 1991).

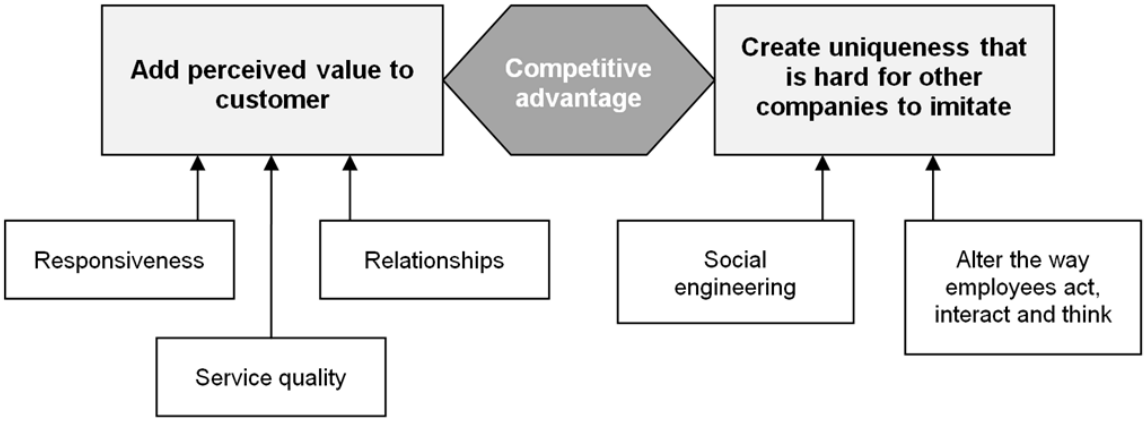


Figure 3-8 Illustration showing two criteria for competitive advantage and their core qualities which are liberated through organizational capability

3.6 Shared value

There is an ever-growing and heightened awareness of societal, environmental and economical challenges in the broad community. Simultaneously, companies are often perceived to prosper at the expense of its surroundings. Shared value takes basis in a premise that mutual dependency exist between a company's competitiveness and its nearby community. Acknowledging and expanding on links between economic and societal aspects make growth possible. Porter and Kramer (2011, p. 6) defined the shared value concept as "…policies and operating practices that enhance the competitiveness of a company while simultaneously advancing the economic and social conditions in the communities in which it operates".

The general intention of shared value is to 'blur' boundaries between capitalism and society by tying business success and societal improvements closer together. Competitive benefits include among other market expansion, enhanced differentiation, new ways to serve needs and improved efficiency. Companies can create shared value in three ways as described below. Developing value in one area generate openings in the others (Porter and Kramer, 2011).

The first form of shared value is called "reconceiving products and markets". Companies can meet social needs through their products and services, whilst simultaneously reaching underserved and un-served customers. Contextually, unmet needs and social challenges must be identified in order to create products that change or influence them. For example, low-cost personal computers have developed a new marked area and new services for the unprivileged and poor. Such effort give a renewed sense of company purpose and drives growth and innovation (Porter and Kramer, 2011).

The second form of shared value is called "redefining productivity in the value chain". Companies can improve factors such as cost and quality whilst simultaneously focusing on utilizing resources and consuming goods in the most productive and efficient manner possible. This may include building supplier capabilities, fostering human talent or improved use of natural resources. For example, cost and negative environmental influence can be reduced by removing excess packaging in product distribution. Reconfiguring value chains can fundamentally improve productivity and can generate both long-term and short-term benefits (Porter and Kramer, 2011).

The third form of shared value is called "building supportive industry clusters at the company's locations". Companies operate in a micro environment with many immediate actors, i.e. they are not isolated from their surroundings. This shared value targets investment in factors external to the company in order to overcome challenges that are linked to productivity and growth. Assets

such as infrastructure, academic institutions and industrial relationships influence companies' ability to prosper, and efforts to build these helps a company thrive. For example, supporting universities in the region and improving skills of suppliers. Companies compete better when they are associated with reliable suppliers, and have solid relationships and access to competence (Porter and Kramer, 2011).

4 INDUSTRISTIAL CASE

This chapter presents key information about the selected contractor – Aibel AS. Familiarity is also established with one of its framework agreements. Main objective of this chapter is to create a knowledge base so that reader can better understand issues identified in the contractor's project environment and arguments that are made in later discussion.

4.1 Introduction to Aibel AS

Aibel AS, hereinafter referred to as Aibel, is a oil service company that plans, builds, upgrades and maintains platforms, vessels and production facilities in the Norwegian oil and gas sector. The company has four main segments of operation: field development, international, renewable, and maintenance and modifications (Aibel, 2014a).

Maintenance, modifications and operations is the company's largest business area. It covers the majority of Aibel's long-term contracts on the NCS. A full range of engineering, procurement and construction services are provided: concept studies, FEEDs, engineering, procurement, fabrication, installation, system completion, maintenance, operational support and decommissioning (Aibel, 2014a).

Aibel has approximately 6 000 employees in six countries, whereas the majority of the workforce is distributed over the eight offices in Norway. The headquarter is situated on Forus near Stavanger, frequently referred to as the oil capitol of Norway. Aibel has construction yards in Haugesund (Norway) and Laem Chabang (Thailand) that supply topsides and modules. The company has employees distributed over the majority of the NCS, being present on more than 20 oil and gas fields and on four onshore facilities (Aibel, 2014a).

4.2 Greater Ekofisk Modification Contract (GEMC)

ConocoPhillips Norway awarded the GEMC framework agreement to Aibel in 2011. It is valid for five years with an option to extend by three plus three years. The long-term agreement encompasses modification work in the Greater Ekofisk Area (Aibel, 2011).

ConocoPhillips Norway is hereinafter referred to as ConocoPhillips.

In order to avoid compromising the confidential nature of GEMC, this thesis will refrain from going deeply into contractual design or content details. Relevant information needed to understand forthcoming views are described below.

GEMC includes the following project work (Aibel, 2011):

- Provide resources to operator in concept and feasibility studies
- Pre-engineering studies
- Engineering
- Procurement
- Onshore fabrication
- Offshore construction
- Commissioning

Relevant characteristics:

- GEMC requires Aibel to use third-party suppliers that ConocoPhillips has framework agreements with. Responsibility rests on Aibel to follow-up these.

- GEMC takes basis in weight, meaning that Aibel is granted project hours on the background of installed project weight offshore. A set of contract norms determine how many hours Aibel should receive per ton.
- GEMC projects adhere to a 'target philosophy', meaning that ConocoPhillips and Aibel agree on a fixed price, and then Aibel attempts to execute projects at or below that price.

In the period 2002-2012, Aibel had a similar long-term framework agreement with ConocoPhillips for maintenance and modifications work in the same area. That agreement was called Greater Ekofisk Modifications (GEM) and was one of the largest contracts of its kind on the NCS at that point (Aibel, 2011). Aibel has via GEM and GEMC accumulated extensive knowledge about the Greater Ekofisk Area and created a well-established relationship with ConocoPhillips.

4.3 Greater Ekofisk Area

The Greater Ekofisk Area is located in southern parts of the North Sea, some 300 kilometers southwest of Stavanger, see Figure 4-1 (Oljefakta, n.d.). The area includes the Ekofisk, Eldfisk, Embla and Tor fields as shown in Appendix B, Figure B-1 (Moe and CIAAS, 2013). Note that GEMC projects primarily execute modification work on existing platforms connected to the Eldfisk and Ekofisk fields (Aibel, 2011).

There is a lot of history linked to the Greater Ekofisk Area. Ekofisk itself was the world's largest, and Norway's first, offshore oil field when discovered late 1969. Close to 30 unmanned and manned installations have been operational in the area, the oldest being roughly 30 years old. Several installations have over time been decommissioned and either removed or prepared for removal, e.g. oil storage tank in the background of Figure 4-2. The area is currently undergoing refurbishment for another 40 years of operations. ConocoPhillips Skandinavia operates all four fields on behalf of the license co-venturers (ConocoPhillips, 2014).

Figure 4-1 Map indicating the location of the Greater Ekofisk Area (Oljefakta, n.d.)

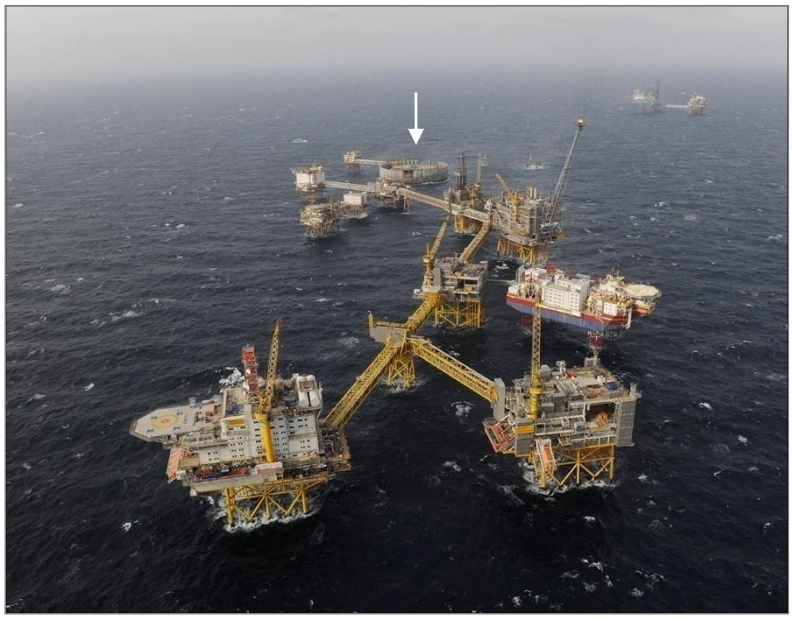


Figure 4-2 Photograph of the Ekofisk complex (Alsvik, 2013). Notice decommissioned oil storage tank in the background.

4.4 Contractor's project environment

4.4.1 Execution method and workload

Figure 4-3 (Aibel, 2012) shows a coarse overview of Aibel's project execution method. Project management activities for GEMC are executed from the Forus, Singapore and Petersfield offices. The Forus location functions as an anchor point for interaction with ConocoPhillips and the offshore segment. Furthermore, fabrication needs are accommodated by the yard in Haugesund.

Project studies are done to ensure that projects are viable, i.e. that they are economical, low risk, technically feasible, timely and have low impact on the environment. Several concepts are initially developed. These move through decision gates, whereas concepts that are unsafe of unfeasible are eliminated. Feasible concepts are further screened with respect to factors such as costs and time estimates. Concepts that show best potential are short-listed for further evaluation.

For GEMC, a project will normally move through several Front End Loading (FEL) phases and decision gates before reaching the execution phase. The first study phase is called FEL 0, which is initiated by a project proposal from ConocoPhillips. Thereafter the project will move to FEL 1, where Aibel employees leased by ConocoPhillips conduct a feasibility study assessing if the project can be done. Subsequently the project reaches FEL 2, where leased Aibel employees develop a rough outline or draft of the project. Afterwards the project enters FEL 3, where the objective is to define project scope. Thereafter the project moves into the execution phase.

Engineering activities for GEMC projects are executed from Forus, Singapore and Petersfield. Engineering and procurement are essentially integrated processes, whereas engineering teams inform procurement teams on what equipment and which materials to acquire. Project engineering involves a wide array of activities, e.g. solution validation, risk assessments, identification of needed materials, creation/revision of project documents, etc. Work packages are fundamental elements in realizing a project. These contain detailed work descriptions and necessary documents to perform specific jobs offshore. A project is often deconstructed into different elements that are carried out in diverse work packages.

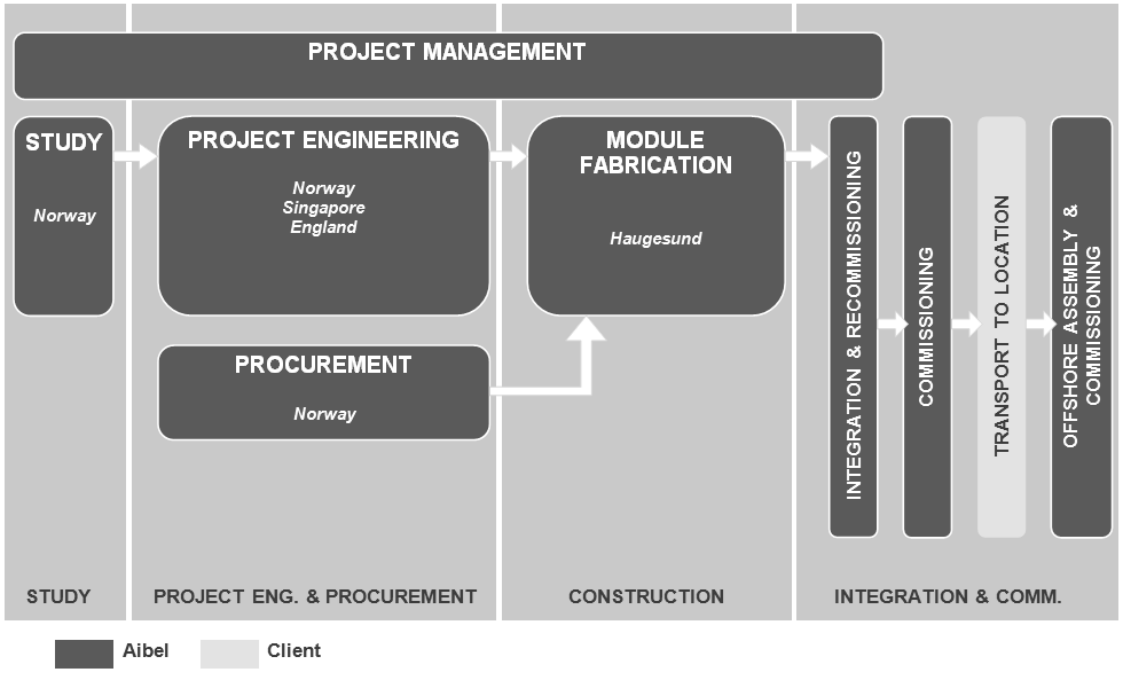


Figure 4-3 General overview of Aibel's project execution model (Aibel, 2012).

ConocoPhillips conducts periodic shutdowns in the Greater Ekofisk Area in summertime every four years. The contractor, ConocoPhillips and other actors carry out intricate project work in such periods, e.g. work that require production to seize or essential systems to be out of service.

Workload and activity level generally vary in the oil and gas industry. Some periods have high activity and some have lower, which is why it is often referred to as a cyclic industry. Similarly, workload in the GEMC environment increases towards a shutdown, and when it is over the load is somewhat reduced, see figurative example in Figure 4-4.

Size of workload peaks, and growth of workload relative to time, vary depending on extent of work the company has to perform during a shutdown. Note that all projects do not depend on shutdowns. Many projects carry out work that do not require production to seize or critical systems to be out of service.

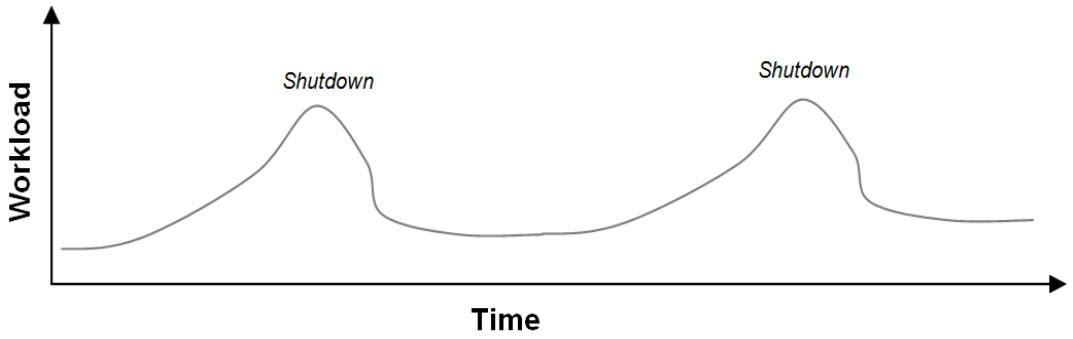


Figure 4-4 Figurative example of workload variations in time relative to shutdowns in the Greater Ekofisk Area. Notice that workload grows as new projects are issued and preparations are made towards shutdowns offshore.

4.4.2 Management system

Project work is rooted in processes and instructions disclosed by the company management system called “Way We Work”, frequently referred to as “W3”. This system is implemented at all Aibel-locations and describes superior principles for systematic and methodical execution of tasks in all projects (Aibel, 2014b).

In a holistic perspective, W3 intends to facilitate best practice work in order to avoid deviations in quality and performance from location to location, i.e. a principle purpose is to ensure consistency. Additional purposes include; integration of company values organization-wide, that work conforms with customer and company requirements, and continuous improvement through knowledge sharing and best-practice work processes (Aibel, 2014b).

An illustration of the management system as displayed to employees via the company’s intranet is presented in Figure 4-5 (Aibel, 2014b) on the next page. Here, brief explanations of each element are included to the right.

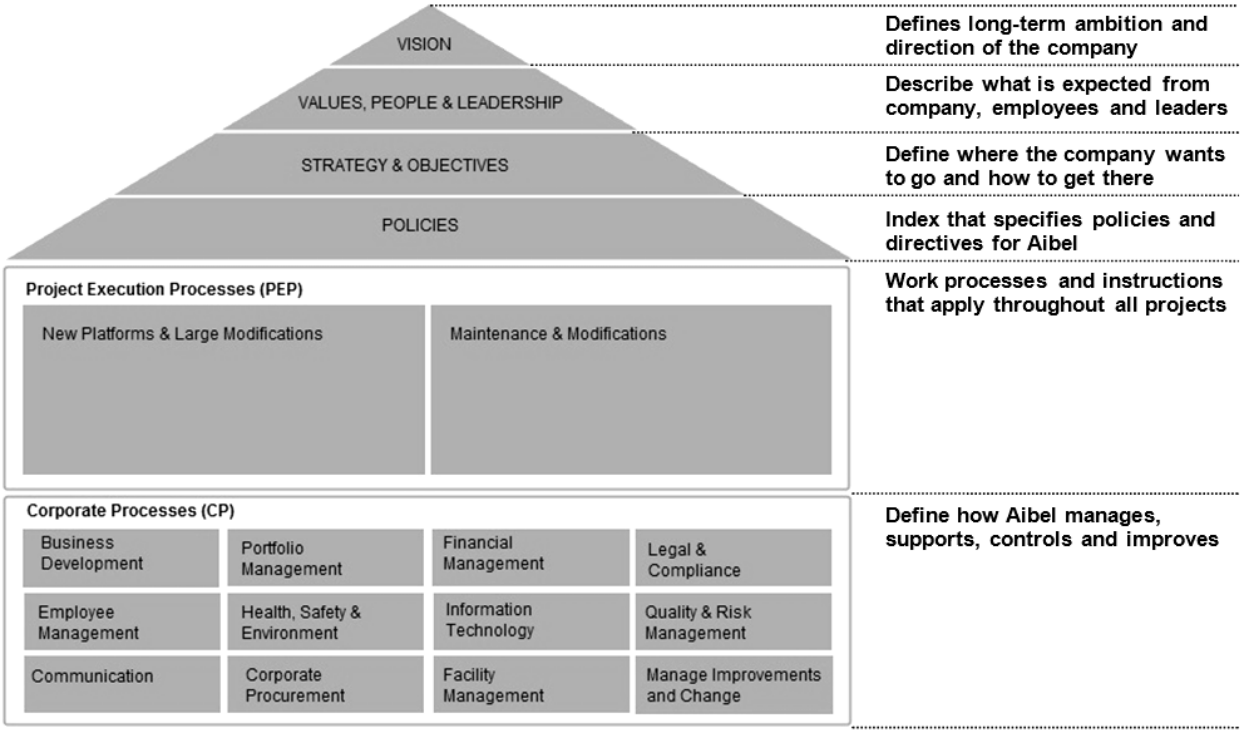


Figure 4-5 Graphical interface showing Aibel's management system, "Way We Work", as seen through the company's intranet (Aibel, 2014b)

Under "Project Execution Processes" a box called "Maintenance & Modifications" is apparent. This area of the management system contains work processes and instructions applicable for GEMC projects. Clicking this will lead users to an interface as shown in Figure 4-6 (Aibel, 2014b). From here, employees can move further into the areas they need guidance on. Larger processes are broken into smaller and smaller processes. And as an employee moves deeper into a process, specific activities and tasks appear in flow charts.

Figure 4-6 Graphical interface that appears if a user clicks on "Maintenance & Modifications box" (Aibel, 2014b)

4.4.3 Roles, responsibilities and reporting

Aibel operates with positions and project roles. This basically means that an individual is hired in a position, whereas this position may be connected to several project roles. For example, an employee is hired as 'Mechanical Engineer', but his/her project role may be both 'Discipline Engineer' and 'Work Package Responsible'.

Figure 4-7 (Aibel, 2014c) illustrates interconnections between various project roles in a general GEMC project environment. Note that this figure does not cover all project roles, as it is only used to establish a general overview in the context of this thesis. Brief explanations of the different roles are described below.

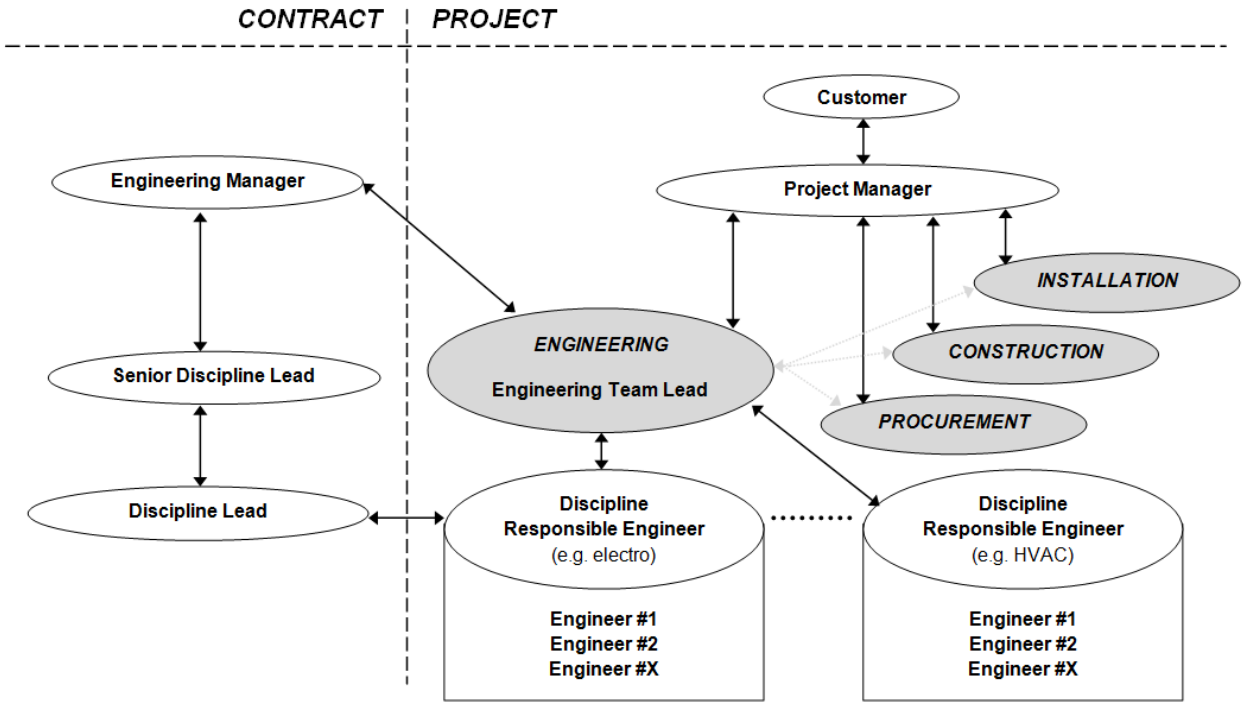


Figure 4-7 Illustrative overview of general reporting and communication structure in the GEMC project environment (Aibel, 2014c). Note that this is an example presented for explanatory purposes. Projects may include more roles and interconnections than what is seen her.

Discipline Engineers are responsible for carrying out job tasks in line with W3, client's governing documentation and government rules and regulations. They also give input on project status and progress, contribute to training and experience transfer to other engineers, and engage actively in the process of continuous improvement and experience transfer (Aibel, 2014c).

Discipline Responsible Engineers verify discipline input to estimation tools and are responsible for their own discipline's scope of work. Holders of this role also ensure that work within the discipline is carried out according to plan and that progress is reported. They ensure that schedule and man-hours budgets are understood and followed within the discipline, and report potential changes or deviations identified in own discipline (Aibel, 2014c).

Engineering Team Leads are responsible for the complete engineering scope of work on maintenance and modification assignments, all aspects of design verification and validation, ownership of engineering plan and for progress and productivity of all engineering activities (Aibel, 2014b).

Project Managers communicate with customer representatives and administer projects between Aibel and ConocoPhillips. Their responsibilities include fulfillment of contract commitments and relevant project requirements. Holders of this role carry out corrective actions to ensure optimal project execution, and secure optimal information flow in the projects. They are responsible for project change management, work delegation to project personnel, encouragement of individual responsibility, and feedback from the customer with respect to cost, quality and project execution (Aibel, 2014b).

Discipline Leads accumulate knowledge of governing documentation from W3 that is relevant for the discipline. Role holders establish project/contract specific guidelines and work instructions for his/her own engineering section. Other responsibilities fall under categories of quality verification of discipline project work, training management and experience transfer in discipline and at contractual level (Aibel, 2014c).

Senior Discipline Leads are responsible for engineering processes and the section's resources in the contract. Holders of this role verify and ensure that correct competence is in place within the resources and that correct methods and tools are used. This person must be familiar with applicable requirements, laws, procedures, norms, standards, rules and regulations, and is responsible for the implementation of these (Aibel, 2014c).

Engineering Managers are responsible for covering the framework agreement's need for engineering governing documentation via generic W3 and contract specific work instructions. Responsibilities also include resourcing of the engineering organization, that the engineering execution method is employed, and that the population of the engineering IT applications are included (Aibel, 2014b).

4.4.4 Multi-disciplinary and cross-departmental work

Project types in GEMC are grouped together and assigned specific product groups, see examples in Table 4-1. This allows for better project management and enable deeper understanding of project related challenges and risks.

Table 4-1 Examples of product groups and related project types

Group:	Project grouping:
P01	Flow line & gas lift projects
P03	Process and utility projects
P04	Structure and accommodation projects
P05	Control systems
P06	Crane projects
P07	3D model services

Each product group is multi-disciplinary in the sense of including necessary competence, meaning that a group is connected to a selection of technical and commercial disciplines, see examples in Table 4-2 on the next page. Structuring teams and groups in such a manner also enables the delivery of more complete solutions.

In a project environment, technical disciplines are often segregated into what is commonly referred to as 'black disciplines' and 'white disciplines'. Black disciplines are disciplines that work with heavier physical weights, e.g. steel beams in Structure discipline and heavy machinery within Mechanical discipline. White disciplines refer to disciplines that normally do not carry much physical weight, i.e. Electro, Instrument, Automation and Telecom. These disciplines often use components or materials that are smaller and lighter. Also, work is often done on elements that may not carry any physical weight at all, e.g. information systems and signal transfer.

Table 4-2 Examples on different disciplines that can be in a product group

Technical disciplines:	Commercial disciplines:
Piping & Layout	Procurement
Quality & Risk Management	Planning
Technical Safety	Estimation
Structure, Architect, Marine	Cost control
Maintenance	
Mechanical	
Process	
HVAC	
Material	
Engineering Management	
Electro, Instrumentation, Telecom and Automation	

Through employment of technology, the company has connected its offices in daily work operations. Meetings and dialogues are frequently held via videoconference and systems are in place for information sharing. Split-location work shows its presence as the three offices collaborate on project input and employees interact cross departments. For example, engineers at the Forus office can get remote support from engineers at the Singapore office.

A noteworthy feature is the Onshore Project Centre (OPC) that Aibel and ConocoPhillips have built in collaboration. It basically links the onshore management segment tighter together with the offshore segment via video communication and system sharing, making support and competence more accessible (Aibel AS, 2012).

5 FINDINGS

This chapter starts by presenting current issues experienced in the industry. Thereafter, specific issues identified in the GEMC project environment are disclosed, which is followed by an overview of findings from the SWOT analysis. Lastly, sources of errors and uncertainties are described.

5.1 Trending industry issues

With basis in articles, reports and a review of historical projects, trending industry issues were identified as presented in Table 5-1 through Table 5-10.

Table 5-1 Industry issue: Exhausted labor market

Exhausted labor market
Description: A high industry activity level has enhanced competition between companies with respect to obtaining qualified personnel. As numerous companies compete for the same human resources, competent personnel has become a scarce commodity. The industry is also facing mass retirement of experienced personnel, which has forced companies to gaze outside the Norwegian labor market, increasing the employment rate of international manpower.

Table 5-2 Industry issue: Heavy regulation

Heavy regulation
Description: Project work in the oil and gas industry is subject to large amount of standards, regulations and policies. Companies often have to consider and satisfy international requirements, (e.g. ISO standards), requirements specific to Norway (e.g. NORSOK standards) and customer requirements (e.g. technical control documents). This heavily contributes to industry complexity. Understanding of and conformance to the extensive amount of requirements have proven to be difficult.

Table 5-3 Industry issue: Reduced profitability

Reduced profitability
Description: Despite high investment and activity level on the NCS, companies operating in the Norwegian oil and gas industry are currently facing fundamental challenges with respect to profitability. As mentioned earlier in chapter 2.3, analyses performed by Inventura indicated that as much as 50 percent of oil service companies are experiencing reduced profitability.

Table 5-4 Industry issue: High cost level

High cost level
Description: Costs on the NCS have seen strong growth as a result of circumstantial effects such as high oil price and high level of investments. In this context NPD (2013) stated that the current cost level is hardly justified by the productivity level. In other words, work outputs do not correlate with related costs. High employee salaries, service rates and material/equipment prices are examples on costs that are under dispute on the NCS. Some of the larger actors in the industry are currently taking measures to reduce costs. Statoil, for example, has per March 2014 decided to reduce costs by downsizing the company's workforce, outsourcing work abroad, reducing investment costs by roughly NOK 30 billion, and establishing an extensive improvement program (Vågen and Økland, 2014).

Table 5-5 Industry issue: Delays and cost overruns

Delays and cost overruns
Description: It should be noted that delays and cost overruns often go hand-in-hand. For example, change orders during project execution can cause; (1) cost increase due to weight budget overrun and extra work, and (2) project delays as said extra work postpones subsequent activities that are dependent on work in earlier phases. Greater circumstantial factors linked to project delays and cost overruns were identified as; high activity and cost level, stretched company capacity, longer supplier lead times, scarcity of competent personnel, poor project follow-up, a sense of urgency resulting in unfortunate planning, non-conformance to Norwegian standards and regulations, quality deviations, and changes during project execution (NPD, 2013; Stubholt et al., 2013).

Table 5-6 Industry issue: Inefficiency

Inefficiency
Description: The industry has embraced automation, digital tools and technological advances to support project processes, but this is has not explicitly enhanced the efficiency. An internal review conducted by Statoil indicated that there currently is a need for 20-50 percent more engineering hours per ton compared to 10 years ago. Reasons for this were explained by among other major industry growth and retirement of experience personnel, where the efficiency is clearly affected when new and less experienced employees join the workforce. Furthermore, it is a fact that more engineering hours are currently used in early project phases to ensure concept viability. Another reason for reduced efficiency is attributed to intricacy of systems, tasks and activities that have contributed to complex projects and more demanding engineering work (Helgesen, 2013b).

Table 5-7 Industry issue: Shortcomings in early project phases

Shortcomings in early project phases
Description: Shortages in the early project phases specifically relate to project engineering before procurement and construction. Errors and deficiencies made here propagate through subsequent project phases. Insufficient focus on early project phases often result in change orders and work having to be redone in the execution phase, thereby contributing to cost and time overruns. Projects become more vulnerable to take up unbeneficial practices if a proper project foundation is absent. Optimistic and ambitious project plans impose a fast project pace, thus leading to adverse decisions such as starting procurement before necessary engineering work is completed. Schedule-driven projects also have a propensity to dismiss relevant conditions as seen with the reservoir analyses connected to Valhall RDP (NPD, 2013).

Table 5-8 Industry issue: Inadequacy in pre-qualification of suppliers

Inadequacy in pre-qualification of suppliers
Description: Pre-qualification of suppliers engaged in a project is essentially a risk reducing measure. Some of the reviewed historical projects show signs that this was lacking, e.g. the Skarv and Yme developments. Project risk grow in the presence of uncertainties on whether or not suppliers can provide deliveries on time and at expected cost and quality, thus jeopardizing project success (NPD, 2013).

Table 5-9 Industry issue: Lack of project follow-up

Lack of project follow-up
Description: Project follow-up heavily relates to the extent contractors and suppliers conform to Norwegian standards and regulations and provide quality products, deliveries and documentation. Foreign companies find it more challenging to understand NORSOK standards and Norwegian legislations. Lack of such knowledge widely increases the probability of deviations and deficiencies in fabrication. Moreover, project delays and cost overruns are highly attributed to incomplete deliveries relative to project quality requirements and Norwegian standards. A recurring situation is that customer, contractor and suppliers lack personnel with in-depth knowledge about relevant standards and requirements (NPD, 2013).

Table 5-10 Industry issue: Shortcomings in contract strategy

Shortcomings in contract strategy
Description: Contractual terms in reviewed projects showed shortcomings to various degrees. Risk elements were not sufficiently reflected in terms of factors such as supplier pre-qualification, modification complexity and preconditions towards upholding field production. The construction contract for Yme's production unit underpins the shortcoming in risk assessment. It restricted transparency and the operator's insight into employed construction practices, making it difficult to ensure progress, quality, follow-up and control. In other cases, contracts reflected unfavorable distribution of liability as responsibilities weighed on contractors for large and important project deliveries (NPD, 2013).

5.2 Specific GEMC issues

Reference is made to the interview questions in Appendix A, Table A-1. A total of six interviews were conducted with key personnel – four with employees from Aibel (contractor) and two with employees from ConocoPhillips (customer). Table 5-11 reflects their roles, employing company and seniority.

Table 5-11 Interview sample

Participant's role in GEMC:	Employer:	Been with company:
Discipline Lead	Aibel	4 years
Engineering Manager	Aibel	10+ years
Engineering Team Lead	Aibel	3 years
Program Manager	Aibel	7 years
Director Offshore Activities	ConocoPhillips	10+ years
Project Manager	ConocoPhillips	10+ years

First, a few words are laid forth on factors that were not perceived as major issues. Talks with interview participants gave evidence that a positive trust culture exist in the project environment, and that the customer has good insight into work conducted. ConocoPhillips has employees permanently stationed at Aibel's Forus office to oversee and coordinate projects. However, two employees from the contractor stated that customer employees had better insight during the GEM contract, and that they were better integrated in projects at that point. A potential reason was mentioned as internal restructuring of the office environment, whereas customer employees now sit more clustered and segregated from Aibel employees. Remarks were also made towards the fact that Aibel's Project Managers are somewhat open to choose how much they wish to involve the customer.

Furthermore, participants did not see deviations according to requirements (e.g. ISO or NORSOK) as any major issue. Such knowledge is heavily rooted in the work contractor conducts. However, one Aibel employee stated that more effort was needed towards employee training at the international offices, as they do not have the same amount of experience with the Norwegian oil and gas industry.

Interview participants had varying explanations to the questions that were asked. Evidence from the depth analysis suggests that 22 issues are predominant in Aibel's GEMC project environment. These were recurring topics that participants to different extent brought up.

Titles of the following five subchapters reflect grouping of issues as performed in the transcript analysis process: 'Capacities and resources', 'Restructuring of method', 'Project specifics', 'Communication and interactions' and 'Contractual'. Each issue is presented by a title, brief description and a few examples of warning signs related to its presence.

5.2.1 Capacities and resources

Table 5-12 through Table 5-15 present the following issues:

- Continuity in project personnel
- Competency gaps
- Varying supplier capacity
- Shortages in early project phases

Table 5-12 GEMC issue: Continuity in project personnel

Continuity in project personnel
Description: There are occurrences where projects have lengthy execution phases and project personnel have been replaced several times. In such cases, project history and relevant information can get distorted as messages are conveyed from old to new project participants. For example, on what has been clarified and what has been documented. Turnover and a varying project portfolio are factors that heavily influence rate of personnel replacement. Workload varies and consequently makes predictions on needs for human resources more difficult. Demobilization of employees with GEMC experience can turn out to be unbeneficial if the workload increases within a matter of months. Getting back the 'written and unwritten' GEMC competencies have proven to be difficult. Also, capacities of engineers are often spread over multiple projects. An individual may, for example, be engaged at 10 percent in project X, 60 percent in project Y, and 30 percent in project Z.
Symptoms: ▪ Derailment of projects ▪ Employee inefficiency and reduced productivity ▪ Work overload and confusion ▪ Ignorance with respect to customer specific requirements, leading to quality deviations in deliverables

Table 5-13 GEMC issue: Competency gaps

Competency gaps
Description: In recent years Aibel has, like most companies in the industry, experienced major workforce growth. An exhausted labor market led to scarcity of competent personnel, thus increasing the employment rate of untrained personnel, young engineers and costly consultants*. Shortage of professional expertise on a market level has also increased the turnover. Aibel had to release heavy amounts of its internal competencies as competition for human resources has been fierce. The company still has employees with experience, but some may have insufficient or incorrect professional experience within the important areas of GEMC, i.e. maintenance, modification and offshore familiarity. *Note that the workforce has recently been reduced due to cost reducing measures. Consultants have been phased out and some employments have been terminated.
Symptoms: ▪ Poor knowledge about internal procedures and method ▪ Insufficient knowledge about customer specific requirements ▪ Inadequate understanding of project management ▪ More quality deviations ▪ Increased need for training and follow-up ▪ Employee inefficiency and reduced productivity

Table 5-14 GEMC issue: Varying supplier capacity

Varying supplier capacity
Description: There have been instances where Aibel had to assist suppliers in their design processes as they also experienced stretched capacity caused by market pressures, scarcity in competencies and high turnover. For example, customization of standard products can result in a supplier design that does not conform to customer specific requirements. In such situations, Aibel has to make comments and mark-ups on how a delivery in fact should be and send it back to the supplier for revision. Sporadically, a supplier may even forward unrevised standard documentation for a product if the company is lagging on a delivery, leaving Aibel to make all revisions.
Symptoms: ▪ More Aibel-resources put towards work outside of scope ▪ Doubts towards supplier capabilities ▪ Shifts in responsibilities ▪ Project delays

Table 5-15 GEMC issue: Shortages in early project phases

Shortages in early project phases
Description: Some projects enter the execution phase with vague project boundaries, or with a scope of work that is unclear. Quality of a project scope is reduced as important matters are not fully appraised and resolved. For example, end-users may have been insufficiently involved in concept development, FEL 2 has not assessed HSE and safety aspects sufficiently, and the FEL 3 report may contain ambiguities that need reassessment in subsequent phases. In some cases, elements of a job have not been identified, and have consequently not been estimated and implemented in plans. Shortages in early phases have heavy repercussions for project progress. For example, engineers may discover that a concept cannot be implemented some time into execution, and the project has to move back to preceding phases.
Symptoms: ▪ Cost overruns and project delays ▪ Increased rate of change orders in execution phase ▪ Distrust to work done in early phases ▪ Project derailment

5.2.2 Restructuring of method

Table 5-16 through Table 5-21 present the following issues:

- Insecurities regarding positions and roles
- Knowledge gaps with respect to W3
- Incomplete or flawed engineering systems and tools
- Rigidness of management system
- Users question validity of reformed practices
- Distorted representation of productivity

Table 5-16 GEMC issue: Insecurities regarding positions and roles

Insecurities regarding positions and roles
Description: Some employees fail to recognize the difference between positions and roles, and the fact that one employee can have several project roles. For example, an Electrical Engineer (position) can be both a Discipline Engineer (role) and Work Package Responsible (role).
Symptoms: ▪ Uncertainties on whom to forward inquiries ▪ Beliefs that organization is immense, while it in fact is not

Table 5-17 GEMC issue: Knowledge gaps with respect to W3

Knowledge gaps with respect to W3
Description: There is a general sense that Aibel's employees have insufficient knowledge about the work practices put in motion by the management system W3. This particularly applies to the engineering population. Rapid and numerous changes, high turnover, a fair amount of junior personnel and insufficient/improper training are factors that have contributed to this shortage.
Symptoms: ▪ Employee inefficiency and reduced productivity ▪ Breach of internal procedures, routines and requirements ▪ Disloyalty to management system ▪ Internal delays and project delays ▪ Reduced employee motivation

Table 5-18 GEMC issue: Incomplete or flawed engineering systems and tools

Incomplete or flawed engineering systems and tools
Description: Necessary engineering systems and tools are in principle available, but several show signs of deficiencies or flaws. A few examples are presented below. *Discrepancies:* An internal estimation tool is employed where needed hours to carry out a job are approximated via weight inputs. Estimated hours seldom match amount of hours granted by the contract norms. The tool can for example indicate a need for 1000 engineering hours, but the norms specify 500 hours. Estimates may also be grossly unfavorable for white disciplines as they do not carry much weight. *Functional gaps:* A planning tool used for project follow-up. In this tool, progress percentage on an activity might instantly leap from, for example, 10 percent at 'stage A' to 60 percent at 'stage B'. Here, an interval of 50 percent exists where the ability to conduct project follow-up has disappeared. *Incompleteness:* Data for several offshore platforms are missing in the engineering information system, hence it cannot be properly employed in all projects. Projects are told that they have to implement these data themselves. *Automation shortage:* Some systems and tools are not compatible or do not communicate very well. For example, difficulties exist in the interaction between planning networks, which creates a necessity for planners to use more effort and time on updating plans instead of directly assisting the projects.
Symptoms: ▪ More effort spent on actions indirectly related to projects ▪ Undermined trust to systems ▪ Demoralized employees

Table 5-19 GEMC issue: Rigidness of management system

Rigidness of management system
Description: The management system has over time become more comprehensive and determinant, and a general impression exist that the system controls users more than users control the system. While a rigid system may in theory be good for ensuring consistency and control, it can also reduce flexibility and creativity of the employees, or in other words, weakening them instead of building them up.
Symptoms: ▪ Inhibited creativity and flexibility ▪ Demoralized employees ▪ Reduced ownership to systems, plans and tools

Table 5-20 GEMC issue: Users question validity of reformed practices

Users question validity of reformed practices
Description: Some employees question the validity of changed practices in the W3 method. An example of such is the procedure and labor division for creating work packages as described below. In the past, Engineering has designed, planned and assessed project solutions. They have also created the content and description of work packages that are to be sent offshore. This practice has been changed. Engineering still performs solution design, planning and assessment, but they no longer create the work packages, Construction does. This basically means that a project engineer, i.e. the individual that over time has accumulated extensive knowledge about a solution and its underlying conditions, is phased out from the practical implementation phase. Project engineers no longer manage and oversee the work packages and their descriptions before they leave for offshore implementation, thus hindering identification and rectification of mistakes and errors. This specific change in practice diminishes an engineer's ability to ensure realization of quality projects.
Symptoms: ▪ More difficult to deliver quality projects ▪ Enlarged gap between the engineering segment and offshore implementation segment ▪ Questions arise on how well thought out reformed practices are ▪ Increase in safety-related risks

Table 5-21 GEMC issue: Distorted representation of productivity

Distorted representation of productivity
Description: Aibel has a philosophy that employees engaged in projects should have 94 percent billable work. Non-billable work such as training, e-learning, courses and various travel expenses should be recorded as project costs. This basically means that hours spent on things that do not directly concern projects are directly attributed to project activities. Such an approach drives down apparent project productivity and can be unbeneficial as many projects already have tight budgets.
Symptoms: ▪ Projects reflect incorrect productivity ▪ Undermined credibility to plans ▪ Schedule, plan and budget overruns ▪ Employees more frequently need to defend use of time

5.2.3 Project specifics

Table 5-22 through Table 5-25 present the following issues:

- Lack of commitment to project venture
- Weaknesses in project change management
- Poor or faulty documentation for older platforms
- Reluctance to change standard deliveries at supplier-end

Table 5-22 GEMC issue: Lack of commitment to project venture

Lack of commitment to project venture
Description: Dedication and commitment to a project's undertaking and objectives show shortcomings to various degrees. This can occur in all cooperative bodies working alongside in a project, i.e. at customer-end, contractor-end and supplier-end. Inadequacies are revealed when individuals push away responsibilities, when people are reluctant to move forward or get involved, and when it is difficult to get clear and decisive answers.
Symptoms: ▪ Project delays ▪ Key roles are reluctant to make decisions ▪ Higher rate of concept criticism ▪ Reduced keenness to realize project and collaborate

Table 5-23 GEMC issue: Weaknesses in project change management

Weaknesses in project change management
Description: Internal and external forces induce change orders during the lifespan of projects. Design alterations, adjusted scope of work and additional scope of work are examples on factors that frequently contribute to such. During the execution phase a project may have apparent overruns in costs and time, but ultimately it does not look so bad when the project is closed out. In other words, while the project is on-going there are no proper indications that a project actually has, e.g. twice as much work as initially. Furthermore, Aibel occasionally does more than the initial scope of work for various reasons, but this may not be properly reflected by variation orders*. In other words, Aibel does the extra work, but it has not been systematically documented. *Projects write variation orders in order to document why project costs have increased to the customer, and these may also be used as substantiation to request payment for extra work.
Symptoms: ▪ Project elements are forgotten during project close-out ▪ Apparent budget and time overruns during execution phase ▪ Increased difficulty with respect to resource management ▪ Reduced ability to generate income

Table 5-24 GEMC issue: Poor or faulty documentation for older platforms

Poor or faulty documentation for older platforms
Description: GEMC projects often conduct work on installations that are very old. Digitized documentation can be poor or faulty, and in some cases the documentation is so weak that engineering cannot be performed properly onshore. Such situations induce a need for costly offshore surveys in order for projects to be successful. In other cases documentation may exist, but it is in non-editable formats in the form of images or pictorial formats. For a project, it is something entirely different to revise existing documentation than to make it from scratch. White disciplines generally find it more difficult than black disciplines, as they have very extensive and complex documentation.
Symptoms: ▪ Increased need for offshore surveys ▪ Employee inefficiency ▪ More uncertainties and higher project risk

Table 5-25 GEMC issue: Reluctance to change standard deliveries at supplier-end

Reluctance to change standard deliveries at supplier-end
Description: Some suppliers demonstrate reluctance when a request for customization is submitted. Normally, they have standard products they want to deliver. Changing products and related documents in order to satisfy customer specific requirements involves a fair deal of time and effort, hence suppliers can be difficult to deal with when Aibel attempts to acquire non-standard products.
Symptoms: ▪ Project delays and lack of dedication towards fulfilling customer needs ▪ Need for more follow-up of suppliers

5.2.4 Communication and interactions

Table 5-26 through Table 5-31 present the following issues:

- Troubled relationships with suppliers
- Cases of silo mentality
- Cultural differences between offices
- Internal clarifications at customer-end
- Communication and language barriers
- Unclear collaboration towards the offshore segment

Table 5-26 GEMC issue: Troubled relationships with suppliers

Troubled relationships with suppliers
Description: The framework agreement requires Aibel to use suppliers that ConocoPhillips has agreements with. Suppliers normally provide upon Aibel's request, but some are not as committed once products have been delivered. Follow-up and completion of end-documentation often suffer as a consequence, prolonging the time it takes to finish projects. Some suppliers included in the GEMC network have very large customers, and Aibel does not have the same 'weight' to push through and get closure on a delivery. The company can potentially withhold 10 percent on a delivery payment, but 10 percent on Aibel's payments is nothing vis-à-vis large deliveries these suppliers have to other companies. Furthermore, suppliers sometimes choose to contact ConocoPhillips instead of Aibel, meaning that the contractor is kept out of the loop, but still has principle project responsibility. Consequently, a sense of being down-prioritized emerges within the project environment. The fact that larger companies have stricter contracts with their suppliers in terms of penalty fines may be considered as an influencing factor in this context.
Symptoms: ▪ Project delays and prolonged time to finish projects ▪ Reduced employee motivation as a result of priorities being misplaced ▪ Project participants perceive suppliers as 'arrogant'

Table 5-27 GEMC issue: Cases of silo mentality

Cases of silo mentality
Description: Some project participants have a mindset that hamper information sharing between departments and individuals. Insufficiencies exist in understanding that individual actions and withheld information can have repercussions for other project participants, or an entire project population. Some individuals have their own tasks and responsibilities in their own secluded 'boxes' and fail to communicate with people outside their own domain. For example, 'that is not my responsibility, it is yours' or 'I will not do anything before you give me what I need'.
Symptoms: ▪ Inefficiency in overall operation ▪ Demise of productive company culture ▪ Reduced morale and friction between individuals or departments

Table 5-28 GEMC issue: Cultural differences between offices

Cultural differences between offices
Description: Cultural differences exist between the Forus, Petersfield and Singapore offices. The most prominent differences experienced in the GEMC project environment are described below. Differences in how offices relate to the basis, contract and local organizations. For example, Petersfield and Singapore offices may perceive the Forus office as more of a 'person in charge' rather than a cooperative entity. In other words, someone to deliver to instead of collaborate with. Differences in perception of organizational hierarchy and employee position, and consequently communication style internally in projects. For example, management on Forus may not uphold their authority at the same level as the Singapore office. Differences in sharing of information. Individuals at the international offices may shield their work more and do not distribute relevant information among themselves unless told to. Differences in the way offices work towards and approach the interface with ConocoPhillips. For example, a requirement of single point of contact has been enforced to reduce amount of inquiries from international offices directly to the customer. International offices have therefore been restricted from direct communication with ConocoPhillips to some extent.
Symptoms: ▪ Inefficient cooperation and weakened sense of teamwork ▪ Weakened relationships between offices ▪ Indecisiveness and lack of willingness to make decisions ▪ Impressions of skewed distribution of power contribute to a 'fear culture'

Table 5-29 GEMC issue: Internal clarifications at customer-end

Internal clarifications at customer-end
Description: Progress is occasionally hindered as projects have to wait for clarifications from the customer. A typical example would be a situation where Aibel requests approval to deviate from a customer specific requirement. Such submission often concern supplier deliveries, and Aibel must inform the supplier if ConocoPhillips gives consent to deviate. Late responses or mixed messages from customer-end may result in Aibel not daring to move forward, therefore choosing to fulfill the stringent customer specific requirement. Consequently, the design can become grossly over-dimensioned and more expensive than necessary.
Symptoms: ▪ Project delays due to untimely response ▪ Project costs greater than necessary

Table 5-30 GEMC issue: Communication and language barriers

Communication and language barriers
Description: Employees with different nationalities and languages work together in the GEMC project environment. Communication and language barriers can make it difficult to know if the receiving parties have fully understood and appreciated the information that has been conveyed. For example, if matters related to safety are not thoroughly understood, severe consequences can follow later down the road. How to let an individual know that he/she is difficult to understand in a professional and courteous manner can be somewhat intricate.
Symptoms: ▪ Increased uncertainties and project risk depending on importance of conveyed information ▪ Weakened bonds among individuals in a team ▪ Diminished sense of belonging to a project

Table 5-31 GEMC issue: Unclear collaboration towards the offshore segment

Unclear collaboration towards the offshore segment
Description: There is a lack of clear collaboration between Engineering and OPC. Employees from ConocoPhillips are frequently contacted by the OPC environment on matters that could have been conversed with Engineering directly. This can, for example, be on practical matters related to offshore project installation. Furthermore, there is an unclear interface between Project Managers and OPC. Challenging situations are not embraced, but rather pushed away. Some Project Managers are perceived as passive towards the implementation offshore, even though they are responsible from project start to finish.
Symptoms: ▪ Inefficiency in overall operation ▪ Uncertainties and insecurities at offshore-end

5.2.5 Contractual

Table 5-32 and Table 5-33 present the following issues:

- Ambiguities in contract content
- Tough contract norms

Table 5-32 GEMC issue: Ambiguities in contract content

Ambiguities in contract content
Description: Aibel and ConocoPhillips have not reached full consensus on the contract content that is open for interpretation. Projects suffer as time is devoted to clarification of contractual matters. Some principle examples are described below. *Clarification on requirements*. Contractual terms require certain technical systems to be used, but some of these are not employed upon request from the customer's operational organization, e.g. system concerning spare parts. Aibel has been informed that this particular system only applies for capital projects, i.e. new constructions. *Clarification on responsibilities:* Aibel is regulated in terms of which suppliers to use, but the company is not allowed insight into the framework agreements ConocoPhillips has with these firms. Consequently, contract responsibilities are now and then subject of discussion. *Uncertainties regarding target model:* Projects are subject to a target philosophy, and discussions arise between Aibel and ConocoPhillips on the amount of hours granted for project studies.
Symptoms: ▪ Misinterpretations of contract content and consequently breach of requirements ▪ Focus shifts from projects and execution to contractual content ▪ Delays in the startup of projects

Table 5-33 GEMC issue: Though contract norms

Tough contract norms
Description: Hours granted to carry out a job is regulated by norms that take basis in physical weight. These norms are perceived to be very tough and leave little room for profit generation. White disciplines struggle more than black disciplines since their materials/equipment weigh less, but also because weight estimates do not account for complex intangible elements such as signals and information transfer.
Symptoms: ▪ Lower profit margins ▪ Insufficient hours granted to carry project work ▪ Cost and time budget overruns

5.3 SWOT analysis – GEMC project environment

Collective responses from the interview process have been condensed into the strengths, weaknesses, opportunities and threats as shown in Figure 5-1. These elements will be brought up in the discussion chapter.

	Positives (Aibel in GEMC)	**Negatives** (Aibel in GEMC)
Internal origin (attributes of the organization)	*Strengths:* ▪ Flexible and dynamic organization ▪ Strong customer relationship ▪ Experience with the Greater Ekofisk Area ▪ Good HSE statistics	*Weaknesses:* ▪ Knowledge gaps with respect to method ▪ Gaps in professional expertise ▪ Lack of general philosophy for engineering aids and utilities
External origin (attributes of the environment)	*Opportunities:* ▪ Flexibility towards choice of suppliers ▪ Broadening reach in the value chain ▪ Utilization of technological advances	*Threats:* ▪ Power and control of customer ▪ Exhausted labor market ▪ Other companies in direct competition ▪ Growing bargaining power of suppliers

Figure 5-1 Overview of findings from the SWOT analysis on contractor's work with GEMC

5.4 Sources of errors and uncertainties

First, uncertainties exist regarding the validity of developed interview questions. These may not have uncovered all current issues that Aibel experiences in work with the framework agreement. However, it is argued that relevant issues have been uncovered as questions took basis in current industry issues, and also that they were designed to be fairly easily relatable and understandable to the participants. The fact that unstructured interviews were conducted gave room to pursue and follow-up statements, remarks and leads.

Second, the interview sample consisted of six people, which may have been too small a quantity. Yet, the sample consisted of personnel from both customer and contractor companies, thus more likely contributed to a wider specter of issues. Also, the fact that the sample included experienced key personnel with central roles is likely to have contributed to identification of relevant and current issues.

Third, the interview sample was skewed as $^{2}/_{3}$ of the sample consisted of contractor employees and $^{1}/_{3}$ consisted of customer employees. This is reasoned by the intuition that Aibel employees arguably have deeper knowledge about the contractor's execution method and work directly related to GEMC projects.

Fourth, uncertainties arise on the validity of the identified issues. It is important to understand that information obtained through interviews reflect personal experiences and individual opinions, and may not mirror beliefs of the entire GEMC organization. More interviews could surely have been conducted, but this would have required more time from the companies. An evaluation on this was made, and benefits of increasing the interview sample size were outweighed by the costs of pulling more participants from their work activities.

Fifth, no interviews were conducted with suppliers. This could have helped to broaden the specter of issues even more, and possibly enlightened their stance on certain issues. However, it is mentioned that problems regarding suppliers did not become evident until the interview sessions had started, and it would have been very time consuming to start a second interview process.

Sixth, it is acknowledged that a quantitative survey could have been created and distributed within the GEMC project environment in order to verify and possibly strengthen validity of identified issues. And thereby perhaps help to establish a better perspective of which issues are perceived greater than the others. This was not done due time limitations, as the interview process and subsequent transcript analysis took a significant amount of time.

Seventh, generalization of the results can only be of speculative nature. The objective of this thesis is not to generalize, but rather offer insight and views on what current issues are. Blindly extrapolating findings from this research to other industries or companies may prove precarious.

6 DISCUSSION

This chapter starts with reflections on relevant forces, pressures and influences that affect the GEMC project environment, and how the contractor adjusts accordingly. It proceeds by assessing needs for competitiveness and related challenges towards attaining an enhanced competitive state. Thereafter, specific recommendations are presented, followed by considerations that must be made in an eventual transitional phase. Lastly, a holistic overview is presented to tie the different key elements of the thesis together.

6.1 Forces, pressures and influences

Economic forces heavily influence the capital-intensive oil and gas industry. A high cost level and reduced abilities to generate profits make oil companies increasingly prudent in terms of investing in new projects. Consequently, focus shifts more towards margins and cost control. Oil service companies ultimately experience reduced order inflow as their customers' threshold for issuing work increases.

Parallels can be drawn to cost-benefit-analyses. At the current cost level, oil companies may not consider a project expenditure of NOK 100 million to give appropriate beneficial outputs, resulting in abandonment of marginal projects. However, at a lower cost level the project expenditure might have been NOK 70 million. Costs would consequently carry less weight and perhaps become outweighed by the benefits.

Aibel has long-term contracts with major oil companies beyond ConocoPhillips, e.g. Statoil, Shell and BP. Decisions made by these contracting entities directly affect work in the GEMC project environment. For example, Aibel's future order inflow has been reduced as a result of Statoil's investment cuts and prudency in terms of issuing project work.

Aibel relies on its long-term contracts to see steady inflow of new projects. A surplus in capacity occurs when the company's workload level is exceeded by employees' capacity. Partly because of Statoil's actions, Aibel put in place counteractive measures such as staff reduction, employment freeze and reorganization of human resources. In GEMC's project environment, the spare capacity has particularly contributed to organizational restructuring. More project activities have been transferred from Forus to Singapore in the attempt to drive down costs and effectively utilize company resources.

Political forces have arguably had heavy influence on the evolution on the NCS. As it is now, the industry is subject to strict government-issued safety requirements, but these requirements also impose difficulties in the project environment. Normally, a loosely formulated ISO requirement is in place, which is made more stringent by a NORSOK requirement. On top of this there is an even more stringent customer specific requirement. Exceedingly stringent requirements lead to conservative and over-dimensioned designs that require more costly materials and special services. Similar to the reviewed case of Valhall RDP, it is arguably inappropriate for Aibel to design according to a platform lifetime of 20 years if the unit is to be removed or decommissioned in 2-3 years. Now and then, GEMC projects request permission to deviate from strict customer specific requirements. On one hand, knowing that a less conservative design is good enough still elicits uncertainties. In light of high risks and dire consequences, it is somewhat understandable that individuals responsible for system integrity avoid decisions that have compromising potentials. On the other hand, if a customer requirement is twice as conservative as a NORSOK requirement, and it is never approved, cost expenditures are not likely to drop drastically.

Technological forces do not solely relate to research and development of modernized, physical products in order to stay ahead of the curve. It also relates to how technology is introduced to the system of daily work operations. Through automation, companies in the 21st century often attempt to boost efficiency, reduce costs and decrease the rate of human errors by phasing out the human component in activities and systems. However, this does not necessarily exclude human errors in the automotive design itself.

The argument made above is supported by Redmill and Rajan (1997). They underlined that personnel often interact with automated systems that are very complex. Such systems impede understanding and may 'dull' the skills of a person that is expected to take counteractive measures to mitigate dangerous situations. An example can be illustrated by the event where an American missile carrier shot down an Iranian passenger plane in 1988. The carrier had advanced technological equipment that warned if hostile aircrafts were in near vicinity. Even if the captain of the carrier was notified by other sources that the target could be an ordinary airplane, he gave orders to shoot it down. Time pressure and high confidence in the advanced equipment were major influential factors for this decision. Had the equipment been less advanced, the captain would likely have done a thorough evaluation before giving the orders. Technological aids may arguably increase efficiency and reduce the rate of human errors, but too much faith and reliance on them may also prove to be counterproductive.

The *technology change driver* is most visible as commutative and information sharing functions in Aibel. OPC is perhaps the best example, facilitating direct, virtual interaction between onshore and offshore. The SWOT analysis uncovered opportunities worthy of pursuit within the technology aspect. Firstly, further utilization of ICT could be used to create an even more 'paperless organization', as many project processes still very much rely on physical drawings and documents. Such efforts can help to drive down costs, improve speed of internal document flow, and further simplify the information exchange between onshore and offshore. Secondly, though it is valuable for projects to have project engineers physically on-site offshore, this is not always necessary. Technological advances exist where cameras are mounted onto an individual's helmet offshore, and the video feed can be transferred wherever desired. This is already available to some extent, but it is not properly integrated in Aibel's project environment. A principle benefit of such technology includes reducing the need for costly offshore surveys.

Another opportunity identified in the SWOT analysis was putting more efforts towards broadening the value chain. Following examples present two ways of extending the company's reach, the first being very technology oriented:

1. Several million NOK are currently spent on electro-technical calculations in the GEMC project environment. Aibel can procure and implement a calculation program in the existing software platform in order to eliminate use of external suppliers of such services. Ability to rapidly perform complex calculations can make the customer more dependent on Aibel, secure a larger part of the value chain and make work more efficient.
2. Aibel has solid experience with Ekofisk and the company could readily take over more of the operational tasks currently performed by the customer. This has been done in some of the other long-term contracts.

The examples above prove that Aibel has options to explore. An investment-will is of course needed, which can be difficult to acquire as companies seek to reduce costs. However, it is argued that short-term investments can secure long-term benefits, and may be determinant for a company's ability to gain future competitive advantages.

The *globalization change driver* has become very visible as many new builds and contracts have gone to Asia. When Aibel is not awarded contracts for new builds, offices that conduct work within this area have less to do, thus driving the need for counteractive measures as previously

explained. Observing GEMC as an isolated case, globalization is more evident via utilization of foreign labor and the offices abroad. Future long-term contracts such as GEMC are arguably less likely to be awarded to companies that are heavily rooted abroad. Modification work on new and old platforms requires substantial knowledge about Norwegian requirements, customer specific requirements and the area in question. As seen in the review of historical projects, contractors situated abroad tend to have insufficiencies within this area. Nevertheless, suppose ConocoPhillips chooses to avoid international contractors for future maintenance and modification work in the Greater Ekofisk Area. This does not explicitly imply that Aibel is guaranteed to win future contracts similar to GEMC. Other Norwegian oil service companies in must also be accounted for. This will brought up later in the discussion.

The *knowledge economy* is an important change driver in terms of knowledge industries such as the oil and gas industry. In its rudiments, Aibel is as an institution that sells transformation through its core capabilities, see Figure 6-1. Each and every project takes basis in a concept solution, whether it be a crane upgrade or control system modification. The concept manifests through a combination of information, technical tools and the crucial asset of proprietary competence. Therefore, it is argued that competitiveness very much relies on the overall knowledge and competency level of the workforce. Information and tools on their own become worthless without employee know-how and skills to manipulate them.

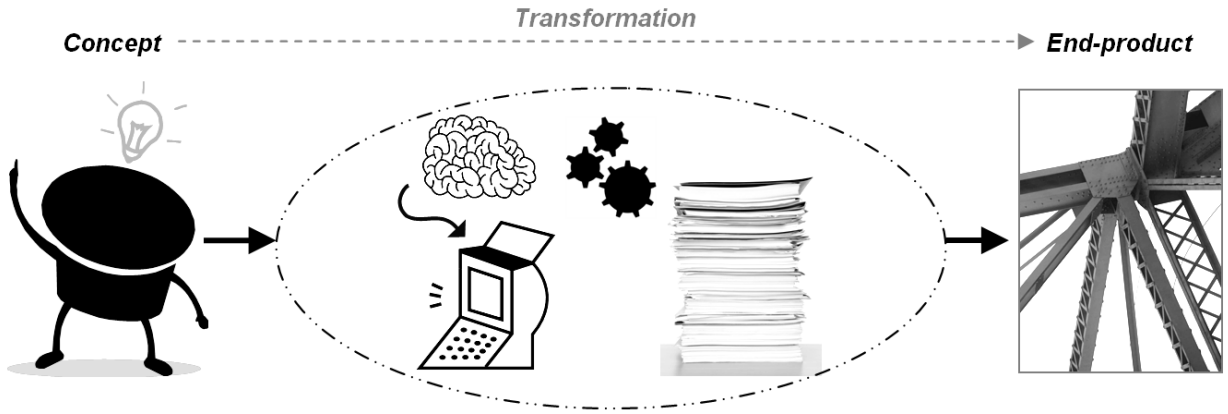


Figure 6-1 Figurative illustration showing that concept solution is linked to end-product via an arrangement of information, technical tools and employee know-how

Two of the five competitive forces mentioned in subchapter 3.3 are rated as less relevant relative to Aibel's future work with GEMC. *Entry of new competitors* may occur, but new players need, as mentioned earlier, deep familiarity with complex modification work and relevant requirements. Unless the new competitors have strong basis in the mentioned requirements it is unlikely that ConocoPhillips will select them. *Threat of substitutes* is on its own fairly unachievable as solutions in modification projects are more or less custom made according to customer needs. This threat is likely to be more relevant for suppliers that are in competition, where a supplier might, e.g. mass produce a pressure gauge component that exceeds quality or performance vis-à-vis competitors' products.

Three of the five competitive forces are rated as more relevant with respect to GEMC. The following forces were reflected by external threats uncovered in the SWOT analysis.

Bargaining power of buyers translates as bargaining power of ConocoPhillips as the customer. The framework agreement does not specify amount of work the customer has to provide, whereas ConocoPhillips can chose to freeze projects or put them on hold as suited.

Consequently, this can influence Aibel's workload and ability to generate profits. Additionally, short workload fluctuations result in internal transfer of GEMC staff to other contracts, which is arguably unbeneficial in the long-run as it is difficult to get back personnel with GEMC experience.

Bargaining power of suppliers is perceived as a threat as some suppliers are in a power position. They have, or are close to having, a monopoly on their respective services, i.e. they are sole providers of the products in demand. Other companies are overworked and have a stretched capacity. Both of these situations can lead suppliers to become somewhat 'non-service oriented' in the way they deal with customers. They can for example become absent when needed, choose whether to respond to a correspondence or not and differentiate between prioritizing customers. Furthermore, conflicts of interest arise as some suppliers have different contractual mechanisms than Aibel. They might charge hour by hour, and the further a project extends in time the better it is for them. Aibel on the other hand has a driver to keep hours down in order to increase profits in light of the target philosophy enforced by the framework agreement.

Rivalry among existing competitors is a reality, but as far as GEMC goes the framework agreement is currently locked to Aibel. However, a threat will appear once the company has to fight for an extension, or when the contract period ultimately runs out and Aibel has to bid on new contracts issued by ConocoPhillips. Given the contract expiration date and the customer's option to extend, Aibel is continuously weighted against its competitors. Competitive sovereignty in rivaling companies may eventually lead ConocoPhillips to sever its ties with the contractor.

6.2 Need for competitiveness

Aibel does not adhere to a *cost leadership strategy* as the company does not provide services at lowest price. Such a strategy can be difficult to pursue for Norwegian companies in light of the high national and industry cost level, and the fact that international players have different cost structures that may be more beneficial. Aibel has the ability to improve the cost perspective by carrying out more work at the international offices, but this is arguably not effective enough to establish a leading position as the one company that provides services at lowest cost. Also, although cost is one factor to consider, customers in the Norwegian oil and gas industry require a certain level of quality, which they in turn might be more inclined to pay for.

Neither is Aibel a 'niche company' that adheres to a *focus strategy*, targeting a very narrow market segment. An example of such a company is Interwell Norway, a firm that specializes in field recovery and barrier technologies, e.g. well plugs and setting tools. Aibel on the other hand provides a wider segment of services as mentioned in subchapter 4.1.

Evidence indicates that Aibel adheres to a *differentiation strategy*, where the intention is to have a characteristic that separates the company from rivals in direct competition, e.g. Aker Solutions. However, at this point it is not explicitly clear what this characteristic is. Clarity is improved by assessing internal strengths uncovered in the SWOT analysis.

Aibel has…

> …a well-established organization with dedicated and present engineers. The GEMC organization has the ability to adjust relative to changes. Particularly with respect to costs by utilizing the international offices, and resources by dynamically increasing and decreasing the manpower in projects according to needs.

> …built a strong relationship with ConocoPhillips in terms of trust and transparency. The contractor has experience with the customer on all levels of the framework agreement, i.e. in management, the disciplines and offshore.
>
> … solid experience with the customer's requirements and is well-familiarized with facilities in the Greater Ekofisk Area. Experience also relates to the fact that Aibel has been involved in most types of projects, where something completely new and unknown seldom occur.
>
> …shown very good HSE results and has strong management of the HSE element in projects.

Abovementioned strengths indicate that Aibel's characteristic in fact is a form of intangible asset that adds value to the company's products and services. Familiarity and experience with the industry, networks and relationships, and the rooting in HSE. In conjunction, they shape meaningful and identifiable strong points in the contractor's service style. However, the SWOT analysis also indicated internal weaknesses that restrict the organization from reaching its full potential.

Aibel has…

> … an employee population with knowledge gaps relative to the company's work practices.
>
> …some disciplines with gaps in professional expertise as a result of turnover, reshuffling of project personnel and a fair amount of relatively inexperienced employees.
>
> … been unclear with respect to employing a holistic philosophy for engineering aids and utilities. Rapid and numerous changes in method have been introduced, incomplete engineering tools have been implemented, and employees' ownership to systems has been diminished.

As mentioned earlier, a company heavily invested in the knowledge economy relies on its asset of employee knowledge and competencies to function well. It is therefore argued that Aibel's greatest weakness is perhaps employees' knowledge and competency gaps.

Similar to companies in the review of historical projects in subchapter 2.5, GEMC is influenced by the final threat uncovered in the SWOT analysis – an exhausted labor market. A depleted labor market creates difficulties in attaining competent employees. And in parallel, companies have to release some of their internal competencies as rivals expand and scout for skilled workers.

Attractiveness is a good indicator of a company's aptitude to draw competence. In a collaborative survey, KarriereStart and Evidente asked approximately 9 000 students to rate how attractive they perceived different companies. Table 6-1 on the next page shows the twenty most attractive companies for engineering students. Aibel's greatest competitor, Aker Solutions, was rated as the most attractive oil service company for engineering students – followed by Schlumberger, FMC technologies, Subsea7 and National Oilwell Varco.

Statoil ranked as the most attractive employer when including companies that were not oil service companies. Statoil's recruitment and promotional director explained that the company focuses on being a attractive employer by being visible and commutative at universities, and by offering summer jobs and internships (Søreide, 2014). Such marketing is perhaps why engineering students ranked Statoil highest in terms of attractiveness.

Aibel was ranked number 18 with a six percent decline in attractiveness compared to the preceding year. And roughly three in every five engineering students knew about the company.

Table 6-1 List of the twenty most attractive companies for engineering students. Score column reflects average score given by students, change column shows changes relative to the survey carried out in 2013, and familiarity column indicates percentage of students that were familiar with the respective companies. This table is derived from that of Søreide (2014).

Ranking	Company	Score (1-100)	Change from 2013	Familiarity
1	Statoil	63.6	-18 %	98 %
2	SINTEF	60.8	3 %	82 %
3	Aker Solutions	60.6	-3 %	94 %
4	Norconsult	58.2	-1 %	73 %
5	Hydro	57.9	3 %	93 %
6	Multiconsult	56.7	-4 %	71 %
7	ConocoPhillips	56.4	5 %	62 %
8	Schlumberger	55.7	4 %	60 %
9	FMC Technologies	55.2	4 %	62 %
10	Rambøll	54.7	19 %	65 %
11	Subsea7	54.1	-6 %	73 %
12	Kongsberg Gruppen	53.6	0 %	76 %
13	National Oilwell Varco	52.4	-1 %	71 %
14	Kværner	51.9	-15 %	80 %
15	DOF Subsea	51.7	-2 %	52 %
16	Oceaneering	51.6	-1 %	65 %
17	GE Oil & Gas	51.4	6 %	76 %
18	Aibel	51.3	-6 %	58 %
19	Det Norske Oljeselskap	50.6	-4 %	89 %
20	Statkraft	50.4	8 %	92 %

Companies that plan for the long-term in difficult times are arguably better off when eventual up-periods arise. Nevertheless, many companies tend to take drastic short-term measures when facing, e.g. declining profitability or reduced order inflow. They often slim down and shed weight through staff reduction and hiring freeze.

Aibel made headlines in public media when cutbacks in staffing were announced. As explained in chapters 3.1.1 and 3.1.2, a major change in the competitive business environment is the fact that companies are more vulnerable since information has become more accessible to the general community. News and rumors spread like wildfire as people and institutions have become increasingly connected via the internet, social media and cellular devices. Drastic short-term actions can arguably create unbeneficial long-term effects. As a company's reputation degrades its attractiveness consequently degrades. And the ability to hire 'the best of the best' hinges on attractiveness in times where competencies are scarce. In light of media exposure and public perceptions, uncertainties are put towards Aibel's ability to acquire needed competencies in future up-periods.

Google has in recent time been ranked as the most attractive employer on a global scale (Welinder, 2012). That which is referred to as the 'Google philosophy' is often linked to qualities such as attractiveness, employee satisfaction and competitive advantage.

Dickerson (2004) condensed the philosophy into five general principles:

1. "Work on things that matter"
2. "Affect everyone in the world"
3. "Solve problems with algorithms if possible"
4. "Hire bright people and give them lots of freedom"
5. "Don't be afraid to try new things"

Principles one and two establish the importance of overcoming relevant issues experienced by employees and customers. Principle three relates to automation of repetitive processes and tasks to improve efficiency and enable employees to focus on more important matters. Principle four and five seek to ingrain a sense of innovation in the organization through employment of competent people, employee empowerment and giving workers freedom in their daily work environment (Dickerson, 2004).

Organizations must have the courage to step outside traditional methods and norms similar to what Google does. For example, the company requires engineers to spend a predetermined amount of time on personal projects, thus reducing barriers between work and leisure time. Contextually, Dickerson (2004) explained that an organization without slack will in due time defeat itself. Firms can beneficially learn from other industries, but prudency must be shown with respect to direct adaptation of strategies and methods. What works for Google in the IT industry is likely to need adjustment in order to work for companies in the oil service industry.

6.3 Key challenges in pursuit of competitiveness

Conditions in the framework agreement make it more difficult for Aibel to earn income as project profit margins become somewhat squeezed. However, dwelling over limiting effects in the contract is not the way forward – the agreement is set and it cannot be changed at this point. Efforts should rather be directed towards excelling under the preset contractual conditions. Therefore, it is argued that an improvement within any of the following three key elements is likely to boost Aibel's profitability potential:

1. Employee efficiency
2. Productive culture
3. Cost and revenue awareness

Furthermore, Aibel has improvement potentials with respect to shaping the characteristic that separates the company from its competitors. Here, organizational capability can help to create uniqueness and add perceived value to the customer through utilizing the company's human resources as presented in subchapter 3.5.

Moreover, Stubholt et al. (2013) stated that broad competency is the most important strategic advantage for the competitiveness of actors on the NCS. They explained that business clusters add value to the industry, because grouped companies bridge each others' shortages whilst simultaneously enhance individual development. Competence creates synergies internally and externally relative to organizations, especially if there is a culture for information flow and feedback present. Here, parallels can be drawn to the third form of shared value presented in subchapter 3.6 – building supportive industry clusters.
An opportunity identified in the SWOT analysis was contractor's ability to obtain a flexibility to choose suppliers beyond what is regulated in the framework agreement. This could potentially facilitate better and less costly work, and could also help smaller suppliers to prosper. However, this opportunity withers under firmly regulating contract terms. Nevertheless, Aibel can arguably become a stronger competitor by playing on the capabilities of companies included in the GEMC network. Networks are ideally tight, symbiotic connections or interfaces between companies.

Creating solid networks is basically a risk mitigation measure facilitated by shared understanding, collective know-how and shared expertise. It is not about sharing the people, but rather getting access to the knowledge and information, and then use the best available expertise at any point in time to compete in a very challenging market.

In light of what has been discussed up until now, four key challenges are established to enhance Aibel's current competitive state;

1. boost profitability under contract conditions,
2. add perceived value to customer,
3. create uniqueness that is hard to replicate, and
4. establish a sense of shared value internally and externally relative to organization

6.4 Recommendations

The following subchapters present a series of recommendations that intend to help overcome established challenges and ease some of the identified issues. Depth in with each recommendation is explained vary, and it should be acknowledged that other methods for realizing them may exist beyond what is described here.

6.4.1 Contract network

Companies are often connected to other companies in a network configuration as shown to the left in Figure 6-2. Such a structure often facilitate learning, knowledge sharing and flexibility (Campell and Faulkner, 2006).

GEMC's network configuration is more similar to the depiction in the center of Figure 6-2. Contract requirements state that Aibel shall oversee, follow-up and own most of the communication with suppliers. Bonds between customer and suppliers become somewhat weakened, leading to more of a 'chain of command' structure as seen to the right in Figure 6-2.

A chain of command structure may weaken ties between companies, but it also has is practical benefits. For example, the customer will not get overwhelmed with inquiries from all ends and confusions are less likely to occur on responsibilities and follow-up. GEMC has fairly rigid and inflexible contractual terms, and as it is now, changes cannot be done to firmly integrate a shared value philosophy. However, the fundamental nature of shared value thinking can still be appreciated.

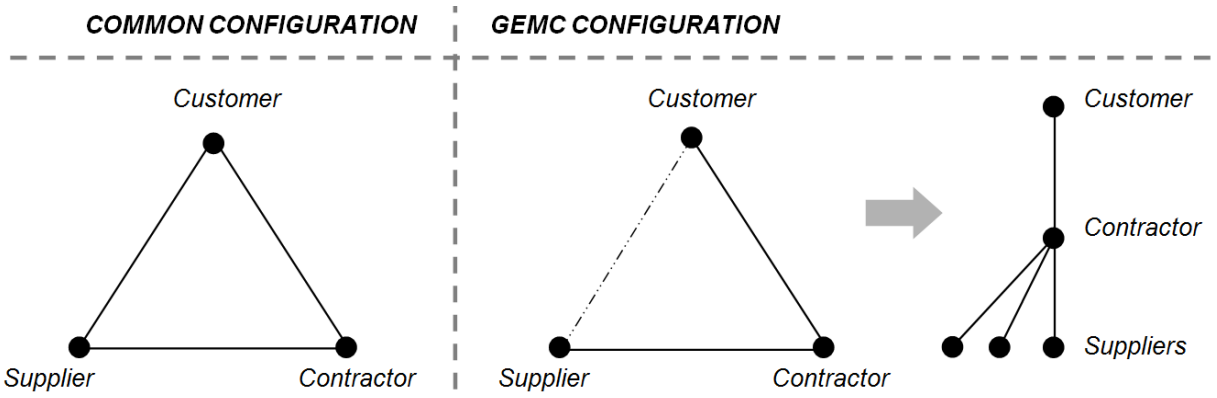


Figure 6-2 Illustration of network configurations. Companies are often networked as portrayed in the left structure. Network configurations seen in center and to the right are applicable for the GEMC project environment.

Recommendation #1: Demonstrate contractor's function as the contact node that bonds companies together

Companies engaged in a project may experience various difficulties or problems that influence deliveries, for example delays or clarification needs. Therefore, the contractor node must be able to balance flexibility and rigidness in order to 'consume' unforeseen situations. Aibel must aspire to become a reliable and solution-oriented junction node in the interface between companies. Key attributes to attain such qualities include:

- Understanding of network dynamics
- Strong leadership
- Encouragement of communication
- Clear division of responsibilities
- Cultivation of relationships

It is of essence to identify who the real stakeholders are among participants in the GEMC network. By performing a stakeholder analysis one can identify entities that are reliable, entities that bring negative influences, and entities that bring positive influences. Such analyses imply a full assessment of stakeholders in terms of strengths, weaknesses, capabilities, opportunities, etc. On the background of such information, Aibel can see if the current situation moves into more positive or negative dimensions, and consequently reorganize itself accordingly.

Strong leadership is realized through development of leadership skills for employees at all levels of the organization. The ability to manage and control own work domain is specifically important as employees at various levels interact with both customer and suppliers. Leadership of the contract node become visible via employees that are committed, empowered, motivated, loyal, proactive problem solvers and capable of making decisions. Empowerment is perhaps the most important quality an employee can get. Leaders must not micro-manage, but rather focus on balancing employees' freedom whilst still being accessible for advice.

Aibel's ability to effectively manage the different project inputs and deliveries hinges on encouragement of transparency and information flow towards the contractor node. Installing a principle philosophy that underpins trust in a collaborative venture can set this in motion. For example: 'Problems are merely solutions in disguise – together we conquer them'. Making the contractor node acquainted with important matters at hand improves the ability to adjust plans, schedules and designs accordingly. Communication goes two-ways and includes both listening and sharing. Open dialogues should be promoted, concerns and questions of employees must be considered and project goals must be conveyed.

All engaged parties must understand their own responsibilities. In this context, it is crucial that the contractor and customer reach a consensus on matters that may appear vague in the contract. Therefore, it is likely that more time must be set aside to clarify this. For example, meetings held between key personnel in all engaged companies prior to project initiation in order to assess responsibilities, consequences of breaking these, and whom to direct inquiries and questions to. Importance of documenting outcomes of such meetings is underlined. Agreed upon matters are difficult to disclaim when seen in 'black and white'.

E-mails and similar virtual communication reduce the sense of two-way communication. The contractor should seek to meet customer and supplier representatives more frequently in person, both inside and outside the work environment. Get-togethers in an informal environment, e.g. team buildings or casual events, can help bring employees closer together and thereby strengthen company relationships. Importance is also put on fostering relationships internally in the organization. Leaders must focus on getting to know employees as people with lives outside of the work environment, and make new project participants feel welcome to ease the transition.

An outline of recommendation number one is presented in Table 6-2.

Table 6-2 Recommendation number one, its relation to organizational capability and expected outcomes

Recommendation #1:	**Demonstrate contractor's function as the contact node that bonds companies together**
Rooted in org. cap. elements…	**change capacity** **leadership**
Expected to develop or improve…	**relationships** – as collaboration and trust towards the contractor node is strengthened **responsiveness** – as interests of engaged companies are catered for
Likely to ease or remedy issues…	▪ ambiguities in contract content ▪ cases of silo mentality ▪ troubled relationships with suppliers

Furthermore, some of the identified issues indicate that people sometimes are 'closed off' or do not categorically embrace their role in project realization. For example, at contractor-end unclear commitment and cases of siloing point toward the fact that some individuals may not have fully appreciated that their commitment towards a project is important to reach the goals set out to achieve. At supplier-end, principle issues regarded communication deficit and lack of priority from the point of product delivery until project completion. At the customer-end there were sometimes late or unclear messages. An important intangible asset for Aibel would be the explicit promise that suppliers and customer will aid when unexpected situations occur, which will thereby minimize some of the project risk.

Recommendation #2: Create a shared understanding among involved companies acknowledging mutual responsibility for project success

Employees may find it difficult to see the relationship between their individual tasks and the organizations objectives and mission. Establishment of mutual company goals is foundational in order to create an understanding of responsibility. These goals are thereafter translated into understanding through identification of what is needed to achieve them. Getting all participants to use the same 'playbook' and understand its rules is of essence.

One logic is to influence the behavior of individuals to achieve desired end-results, see Figure 6-3 (Performance Thinking Network, 2012). According to Performance Thinking Network (2012) the performance chain "…provides the tool to link what people do to what the organization wants to achieve".

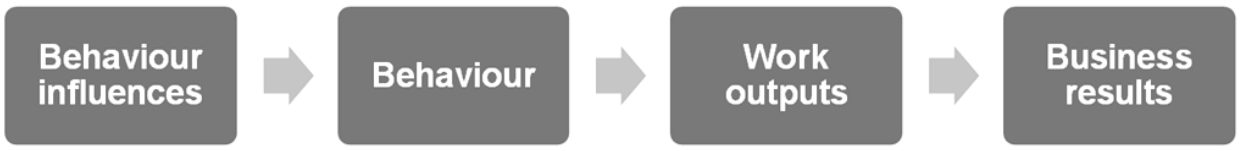


Figure 6-3 Illustration of the performance chain (Performance Thinking Network, 2012). Notice how behavior influences can steer individuals into achieving desired business results.

Understanding goals and making the link between work activities and results visible can help to bridge silos and improve other factors that reduce the performance of a collaborative venture. The most powerful behavior influences with respect to achieving a shared mindset in the context of GEMC are evaluated as:

- Goal setting (e.g. involve teams and employees in setting project vision and a set of goals and actions to drive down project costs)
- Feedback (e.g. specific and constructive update on a weekly, basis balancing negatives and positives as a project progresses)
- Coaching (e.g. managers communicate contributive value of each project team/member)
- Rewards and recognition (e.g. extra paid vacation days or subsidized personal exercise equipment if projects go well, or incentives directed towards suppliers to increase follow-up of end-documentation)

Furthermore, building on the fundamentals of shared value thinking, networked companies (i.e. customer, contractor and suppliers) could, for example, engage in a cooperative venture to assess reasons for reduced competitiveness. And thereupon establish a joint improvement agenda or efficiency improvement project. Such initiatives could target standardization and improvement of work processes, documentation, project interfaces between companies, administrative practices and allocation of resources (Stubholt et al., 2013).

An outline of recommendation number two is presented in Table 6-3.

Table 6-3 Recommendation number two, its relation to organizational capability and expected outcomes

Recommendation #2:	**Create a shared understanding among involved companies acknowledging mutual responsibility for project success**
Rooted in org. cap. elements…	**shared mindset** **management practices**
Expected to develop or improve…	**relationships** – as companies work towards the same goals **efficiency and productivity** – as project participants recognize liability and responsibility, and links between goals and activities are made visible **uniqueness** – as employee behavior is constructively modified or changed
Likely to ease or remedy issues…	▪ cases of silo mentality ▪ ambiguities in contract content ▪ internal clarifications at customer-end ▪ varying supplier capacity ▪ reluctance to change standard deliveries at supplier-end ▪ troubled relationships with suppliers ▪ unclear collaboration towards the offshore segment

6.4.2 Integrative efforts

Aibel and ConocoPhillips use different systems that are not well-integrated or may not interact with each other at all. Employees on contractor-end use two e-mail systems and phone lists, one for the mother company and one for the customer. Also, contractor's employees have access to some of ConocoPhillips' systems, but there are no easy solutions available with respect to information sharing. This makes it more difficult for employees to interact, and a person would often need to know which 'routes' to take in order to make sure that inquires are received by targeted parties.

Furthermore, Aibel and ConocoPhillips have different sets of Key Performance Indicators (KPIs). Aibel has a plan of action relating to what the company will work on regarding HSE in 2014, and similarly, ConocoPhillips has its own plan of action. This means that there are two different plans for HSE in play, but these are not necessarily compatible. Consequently, questions and ambiguities arise on what to pursue and how to reach objectives. Improved integration can reduce obstacles and make Aibel more valuable for the customer.

Recommendation #3: Strengthen contractor's integration with customer

Firstly, it is argued that integrative efforts should target solutions that make daily work operations of the employees easier, e.g. system integration with respect to e-mail, calendars, telephone lists and information sharing. Secondly, considerations should be put towards creating joint strategies for reaching common goals. For example, the companies can come to a consensus on a common set of KPIs applicable for the GEMC contract. This could for instance be six KPIs: two for safety, two for plan achievement and two for quality. Common goals help to establish focus and clarify direction on which areas the companies aim to excel.

At least two important elements have to be considered in an eventual integration process. Firstly, company rules have to be assessed in order to determine the potential for integration between the companies. One must not forget that ConocoPhillips and Aibel create revenues in the billions each year, whereas regulations on confidentiality and privacy are most certainly in place in one form or another. Secondly, an assessment on functions to integrate or merge must be conducted. IT experts and key personnel from both Aibel and ConocoPhillips have to be involved. It is underlined that input from employees and system users must not be underrated. The employee population is likely to be familiar with limitations and problems, and know what they need in order to work more efficiently.

An outline of recommendation number three is presented in Table 6-4.

Table 6-4 Recommendation number three, its relation to organizational capability and expected outcomes

Recommendation #3:	**Strengthen contractor's integration with customer**
Rooted in org. cap. element…	**change capacity**
Expected to develop or improve…	**efficiency** – as interaction is made easier between companies **attractiveness** – as contractor shows willingness to 'go the extra mile' for its customer **relationships** – as contractor and customer work together on achieving mutual goals and merged systems and functions bond them closer together

6.4.3 Project momentum

Decision makers at customer-end have a fair amount of influence on projects, especially in terms of progress and technical concept design. Ideally, project execution would follow a straight path towards the objective, but this is normally not the case as a project moves through its various phases. Project realization is made more difficult if the customer lacks commitment and willingness to get deeply involved. For example, late response to inquiries and higher rate of concept criticism. Projects will generally encounter more 'bumps and turns'.

Maxwell (1998, sec. 16) stated that "momentum is a leader's best friend", and that organizations with momentum are like a fast-moving trains where one could "…build a steel-reinforced concrete wall across the tracks, and the train would plow right through it". This also makes sense for projects.

Recommendation #4: Build project momentum through ownership to technical concept and end-product

Productivity in GEMC arguably hinges on getting the customer to feel an ownership projects and their technical concepts and end-products. As the concept gets gradually challenged from many directions, e.g. on HMS or from operational side, the customer will via ownership defend it and the project path becomes narrower and straighter. Building project momentum can reduce halts or stops on every issue or challenge that is encountered, and projects will in general be easier to realize as the execution phase becomes smoother, see Figure 6-4. For the illustration, assume that both projects have the same underlying conditions and resources. Now, imagine stretching the two lines for real execution and making a comparison of their lengths. The longest line, i.e. path without ownership, would point towards a prolonged execution phase, which in turn implies greater project costs.

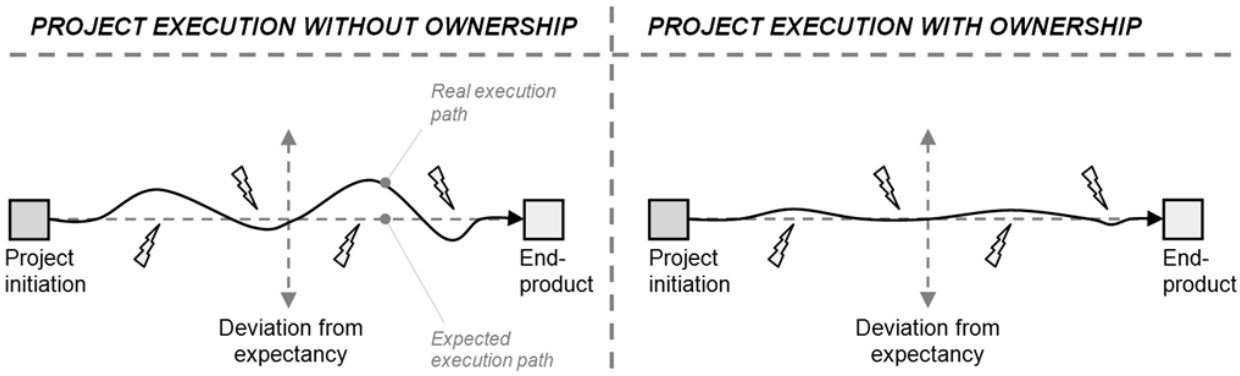


Figure 6-4 Figurative illustration of project execution with and without customer ownership to concept and end-product. Horizontal dotted line is the execution path a project is expected to follow. Lightning bolts symbolize instances where the concept is challenged. Solid swirling line is the real execution path a project takes. Notice deviation between real and expected execution path.

Individuals with leadership roles are crucial in getting the customer to experience ownership. However, they are not solely responsible in this undertaking. In general, all employees that interact with and work towards the customer in projects should consider the following:

- Clarify direction
- Involve customer in early project phases
- Show respect
- Express benefits beyond money

Clarifying direction intends to install an understanding of the complete project picture at the customer-end (Roy, 2013). Both good and bad news should be communicated as a project progresses. Have transparent dialogues in an open and plain manner that address issues and challenges that may be reasons for concern.

Getting the customer to make decisions in early project phases is perhaps the most effective psychological method of creating ownership, e.g. 'should we do it this way, or this way?'. Rate of concept criticism is reduced as the customer will defend own decisions. Also, it can help to improve cooperation from supplier-end as imminent weight over a supplier is greater when customer and contractor stand shoulder to shoulder.

Respect the customer and install a sense of equality (Roy, 2013). Treat the customer as one would do with any family member, and install a common notion among project teams that customer representatives make up important pieces in the project puzzle.

Communicate long-term benefits of the end-product (Roy, 2013). Project managers at customer-end may not always have a deep technical understanding, and in those cases project matters should be explained in simple terms. What benefits do different solutions give beyond monetary values? How do we get there most efficiently? Give the customer a chance to learn, develop and make suggestions.

An outline of recommendation number four is presented in Table 6-5.

Table 6-5 Recommendation number four, its relation to organizational capability and expected outcomes

Recommendation #4:	**Build project momentum through ownership to technical concept and end-product**
Rooted in org. cap. elements…	**management practices** **leadership**
Expected to develop or improve…	**uniqueness** – as contractor's teams target customer thinking **efficiency and productivity** – as customer assists in overcoming challenges **relationships** – as customer is more integrated with the contractor's teams and projects
Likely to ease or remedy issues…	▪ ambiguities in contract content ▪ lack of commitment to project venture ▪ internal clarifications at customer-end ▪ cases of silo mentality

6.4.4 Contractual awareness

A project is in principle a continuous sale process for the contractor. How the customer is approached and the way matters are presented play an important role for getting trust, more projects, understanding and extra work beyond the initial scope.

Furthermore, employees must understand that satisfaction of investors and other key stakeholders is equally important as fulfilling the interests of the customers. Individuals need to be familiar with what they can do in order to boost company value and profit creation.

Recommendation #5: Establish contractual awareness in employee thinking

In its fundamentals, GEMC projects are initiated, executed and closed out when finished. It is argued that Aibel employees need a better understanding of how to squeeze more value out of the execution phase under conditions set by the contract, see Figure 6-5.

Identification of minimum requirements relative to customer wants and needs should be a focal point in each project as margins in GEMC are tight. Meaning, minimum requirements are what should be delivered, whereas everything beyond this costs extra.

Furthermore, undertaking projects with an unclear scope of work indicates deficiencies in early assessments and decision-making. More effort can beneficially be devoted to early project phases in order to ensure that concepts are viable as they enter the execution phase. Aibel has to be more rigid in demanding a solid scope of work. Leaders, managers and decision makers must have the courage to decline or suggest reassessment of projects that have made it to the execution phase with poor or unclear boundaries. This is likely to lessen risks of encountering issues underway and will consequently reduce the rate of change orders.

Figure 6-5 Rudimentary model of GEMC projects illustrating that more profits can be squeezed out of the execution phase if employees are more aware of contractual mechanisms and know how to leverage them.

When conveying information, employees should be able to compress matters at hand into a paragraph instead of 'writing an essay'. Also, questions should be asked in clear and concise manner requiring 'yes/no' answers. Aforementioned is especially relevant in order to simplify decision-making for key personnel and boost inquiry response rates.

The most powerful influence towards establishing contractual awareness is perhaps through utilizing internal competencies. Experienced leaders or 'corporate champions' can transfer knowledge to employees via courses, workshops or one-on-one sessions. Principally, such efforts help to align the employees' mindset with needs of the company and contract organization. An agenda for a session could for example include the following key elements:

- Aibel's purpose and how the company makes revenue
- Aibel's strengths and weaknesses relative to the GEMC framework agreement
- GEMC profitability potentials (efficiency, productivity, cost/revenue aspects)
- How to think/act strategically according to company goals and objectives
- How to make right decisions and take calculated risks
- How to pursue project opportunities with respect to additional sources of revenue
- How to build project momentum through customer ownership
- When and how to write change orders

An outline of recommendation number five is presented in Table 6-6 on the next page.

Table 6-6 Recommendation number five, its relation to organizational capability and expected outcomes

Recommendation #5:	**Establish contractual awareness in employee thinking**
Rooted in org. cap. elements…	**shared mindset** **management practices** **leadership**
Expected to develop or improve…	**efficiency and productivity** – as employees can focus on company weaknesses under contract conditions **profitability** – as employees become aware of cost and revenue mechanisms in contract and projects **uniqueness** – as employees work united towards common business goals
Likely to ease or remedy issues…	▪ weaknesses in project change management ▪ shortages in early project phases

6.4.5 Adjustment of method, systems and tools

Too much focus on procedures and the road from 'point A' to 'point B' inhibits creativity, flexibility and the holistic overview of a project. It is important to understand that methods, systems and tools do not create the end-products, they merely coordinate the road to the desired results.

It is argued that current W3 practices are to some degree founded on principles for constructing something brand new. Yet, GEMC projects do not construct new platforms where 'steel X' comes before 'steel Y', or Electrical comes before HVAC. Orders range from simple and small projects, to large and complex modification projects. This requires plans and concepts that are tailor-made and customized according to customer needs and evaluations made by the engineers. Also, there is an issue with rigidness of the current method. On one hand, it is acknowledged that some employees are afraid to make mistakes and therefore need a rigid system that is very procedure and flow diagram oriented. On the other hand, a system that is too rigid may reduce creativity, flexibility and empowerment of employees and restrict an organization's capacity to change.

Ideally, a project should follow the most cost-efficient path to an end-product of highest quality. Even if an organization was to utilize the best possible methods, systems and tools currently available, knowledge about end-product and how things are done in practice cannot be dismissed. Such qualities are integrated in projects via the human component. Aibel may have the essential functions in place, but it is argued that they are insufficiently adjusted or 'tuned' relative to the real needs of the GEMC organization and its connected entities. In the remainder of this subchapter 'application' is used as a generic term for 'method, systems and tools'.

Recommendation #6: Tune applications relative to the needs of employees, customer and organization

Firstly, it is argued that the holistic configuration ought to reflect a set of key principles that underpin efficiency and productivity in day-to-day activities. For example, the holistic configuration should be…

… free of redundancies – do not use several applications when one can do the job
… user friendly and understandable – focus on simplifying complex processes
… built on cost efficiency principles – it is better to have one individual use a lot of time as opposed to having numerous people use a little time

Subsequent descriptions take basis in the principle Systems Development Life Cycle (SDLC) phases, see Figure 6-6 (Baltzan and Phillips, 2010, p. d-2). This systematic approach is often utilized when creating comprehensive applications aiming to meet or exceed customer expectations.

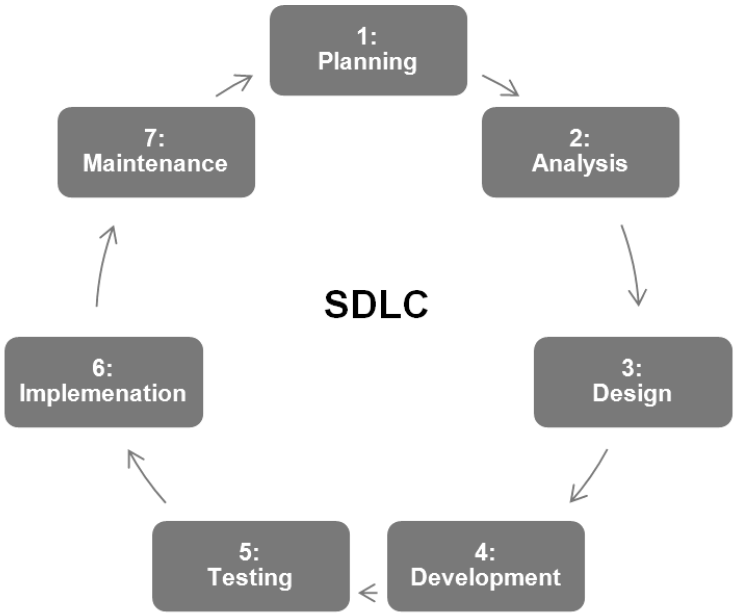


Figure 6-6 Graphic portraying the SDLC and its different phases (Baltzan and Phillips, 2010)

6.4.5.1 Planning

Tuning-success depends on solving the correct problems. Therefore, *identification and selection of applications* to adjust is important (Baltzan and Phillips, 2010). A good starting point is to gather information from parties internally (workforce) and externally (collaborators) on unbeneficial or restricting issues experienced in project environment. Such information can be uncovered via, e.g. interviews or surveys.

Feasibility studies uncover if alterations to an existing feature is feasible and achievable from a technical, organizational and financial standpoint (Baltzan and Phillips, 2010). Several solutions may be proposed, and the initiative has to weed out the ones that are unachievable relative to constraints such as legal, ethical, technological and economical factors.

Developing a plan for tuning is perhaps one of the most important activities (Baltzan and Phillips, 2010). This has the purpose to provide control, facilitate progress tracking, and guide the initiative so that a solution can be delivered successfully and on time.

6.4.5.2 Analysis, design and development

Requirement analyzes must be conducted in order to uncover the requirements an application should satisfy (Baltzan and Phillips, 2010). Various methods can be applied to gather such requirements: informal discussion meetings, interviews with employees from the project environment, questionnaires and surveys, observations and reviews of current policies and documents. Furthermore, to get applications tuned correctly knowledge about customer needs must be integrated. Contextually, minimum requirements must be identified through engaging with the customer.

Design and development intend to shape the operational features of an application (Baltzan and Phillips, 2010). It is argued that tuning efforts can beneficially be carried via a structured systems development approach, see Figure 6-7 (UiO, 2012, p. 6). Such an approach is user-driven, meaning it has greater user involvement in all phases (Cadle and Yeates, 2008). Basically, what the figure presents is a systematic way of integrating inputs from users into whatever application that is put under scrutiny. This is particularly important as Aibel is experiencing issues were user question existing practices. Input from users is likely to reduce rate of criticism as the employees will feel an increased ownership to reformed applications.

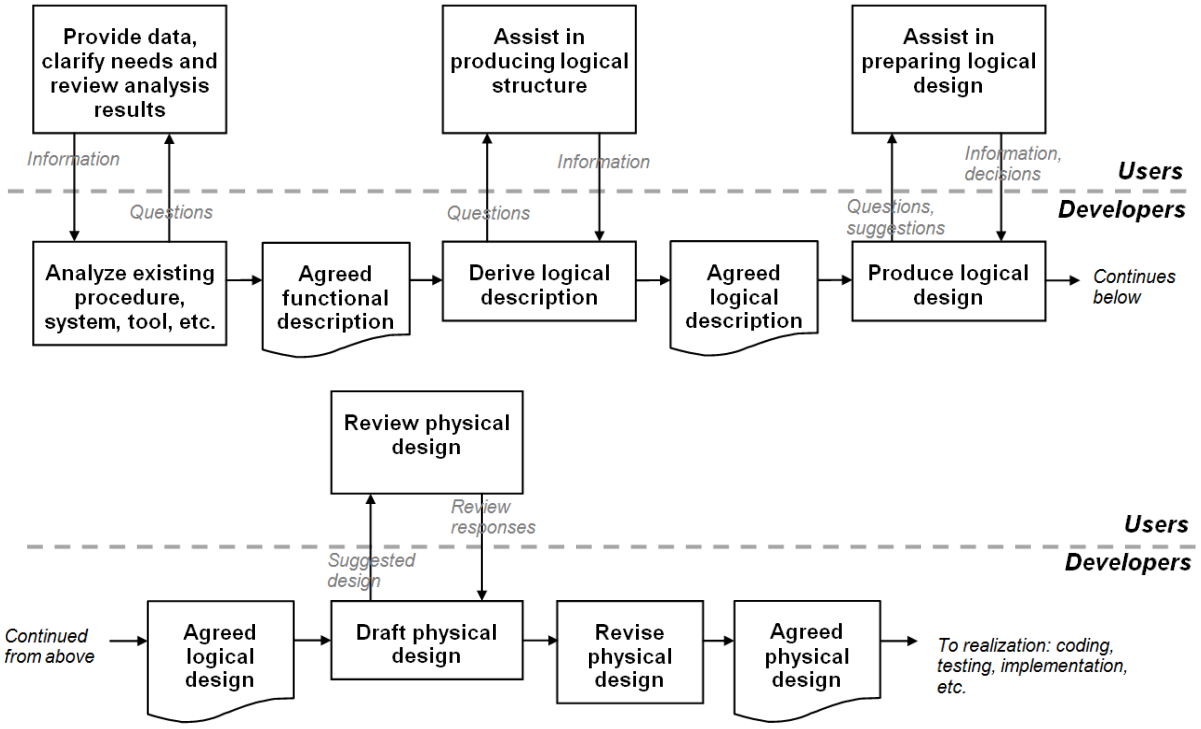


Figure 6-7 Illustration showing the user-driven method of structured systems development. Graphic is slightly modified from that of UiO (2012).

6.4.5.3 Testing and implementation

Testing can significantly reduce costs of an overall tuning initiative. Costs of remedying errors increase exponentially when moving into subsequent phases. It is important to verify that no bugs are present and ensure conformance with predetermined application requirements. Detailed test conditions and expected results must be written to assure functionality, whereas applications go back to development for rectification if deviations are uncovered (Baltzan and Phillips, 2010).

Implementation focus on introducing applications to the operational environment so that the end-users can employ them. Here, training is important as it drives user-efficiency, speeds up implementation and reduces costs. Online training provides the ability to schedule individual training at own pace. It is also deployed easily, cost efficient and easily accessible to the entire employee population. Baltzan and Phillips (2010) mention that online group training can be beneficial when employees are geographically dispersed, which is the case for GEMC where workers are sited in Norway, Singapore and Petersfield. In such training, individuals use their computers to follow a session held by a competent instructor, and two-way communication facilitates the ability to ask questions. It is mentioned that workshops are arguably more beneficial when dealing with complex applications that require more effort to understand. Sessions with individuals that have been active in application drafting and development

processes is perhaps most effective. They could explain the idea behind a developed application, thus shaping a better understanding at the employee-end.

The implementation phase also includes selection of a realistic deployment method for applications. Baltzan and Phillips (2010) explained that organizations have four implementation methods to choose from:

- Parallel conversion – both old and tuned application are available until new application performs as intended
- Phased conversion – tuned application is implemented gradually through phases
- Pilot conversion – tuned application is used by a group of individuals to ensure that it works before it is made available organization-wide
- Plunge conversion – old application is replaced by tuned application immediately

It is argued that the choice of conversion method depends on if an application is subject to light, medium or heavy tuning. Table 6-7 portrays suggestions on when to use the different conversion methods. Notice that parallel conversion has been avoided. It may reduce risk of downtime and give employees time to adjust, but it is also expensive to uphold two applications and it may create confusion. As it is now, trust towards project applications has to be re-built. Aibel employees need a morale boost and time to digest changes.

Table 6-7 Suggested conversion methods with respect to degree of application tuning

Degree of tuning:	Method:	Pros:	Cons:
Light	Plunge conversion	Lower costs, Less confusion, Higher conversion pace, Immediate benefits	Higher failure risk, Failure demoralizes
Medium	Phased conversion	Lower failure risk, Employees can adapt	Lengthened conversion phase, Delayed benefits
Heavy	Pilot conversion	Time to improve, Quality assurance, Maintains momentum	Delayed benefits, Employee differential treatment

6.4.5.4 Maintenance

This phase focuses on changes, rectifications, modifications, and upgrades that ensure continuous improvement towards the changing needs of a project environment and its connected entities. Establishment of an environment to support changes is perhaps the most important activity in the maintenance phase. Important aspects to incorporate are mentioned by Baltzan and Phillips (2010) as; having (1) a change management system that can assess change impacts and collect change requests from project stakeholders, and having (2) a change control board consisting of representatives from key business areas that make decisions with respect to impact analyzes, and approve whether or not to pursue a change request.

An outline of recommendation number six is presented in Table 6-8 on the next page.

Table 6-8 Recommendation number six, its relation to organizational capability and expected outcomes

Recommendation #6:	**Tune applications relative to the needs of employees, customer and organization**
Rooted in org. cap. elements…	**change capacity** **leadership**
Expected to develop or improve…	**responsiveness** – as tuned applications consider customer requirements, even though they are minimum requirements **service quality** – as focus is shifted more towards customer expectations and requirements **efficiency** – as tuning efforts are user-driven and therefore accommodate employee needs **productivity** – as tuned applications are coordinated with contract requirements **profitability** – as applications reflect minimum requirements and the customer will have to pay extra for beyond this
Likely to ease or remedy issues…	▪ rigidness of management system ▪ distorted representation of productivity ▪ incomplete or flawed engineering systems and tools ▪ users question validity of reformed practices

6.4.6 Knowledge, competencies and skills

Method, systems and tools become useless if there is an absence in knowledge on how to use them. As discussed earlier, the competitiveness of a company relies on a capable workforce that is at an optimal skill, knowledge and competency level. Reaching such a state requires continuous efforts as market and customer demands change.

Reasons for Aibel's knowledge and competency gaps can be traced back to the apparent organizational growing pains. The company is currently in an extensive training mode due to major workforce growth and rapid changes in method, systems and tools. It is arguably more difficult to uphold efficiency, productivity and value creation in a training and adjustment mode. Even if the intention is to use less hours and do to things faster via training, the opposite happens in the beginning.

In order to save time and manage costs, it is argued that individual knowledge and competency gaps must be bridged with precision. Meaning that each employee is trained categorically according to his/her individual gaps relative to the organization's needs.

Recommendation #7: Uncover exact competency/knowledge/skill gaps and train accordingly

Firstly, it is mentioned that supporting factors such as having experienced colleagues in near vicinity can help to bridge aforementioned gaps. A mix between experienced and inexperienced personnel and access to information can heavily influence rate of learning. Aibel has an open office environment that may cause more disturbances and noise, but on the other hand this solution arguably welds teams together and eases transfer of knowledge and experience. The following paragraphs present a somewhat general and basic step-by-step procedure to illustrate important elements to consider.

Step 1 – Conduct needs assessment to uncover gap between standard performance set by company and real staff performance. Evaluate all employees using the same methods and only

consider competencies relevant for the business. Results will help to decide which employees are short of specific competencies.

Industry validated competency models can help to map workforce gaps. According to Maher & Maher (n.d.) such models "…identify the knowledge, skills, and abilities necessary to successfully perform critical work functions in an industry or occupation". In its basics, competency models utilize what is referred to as "building blocks", see Figure 6-8 (Maher & Maher, n.d.). Each block addresses a set of competency tiers, where competencies get more specialized closer to the top of the pyramid. The exemplified figure has nine tiers in three categories: "occupation-related", "industry-related competencies", and "foundational competencies". With respect to GEMC, it is argued that such a competency model ought to reflect the important elements of maintenance, modifications, offshore familiarity, customer requirements and W3 practices.

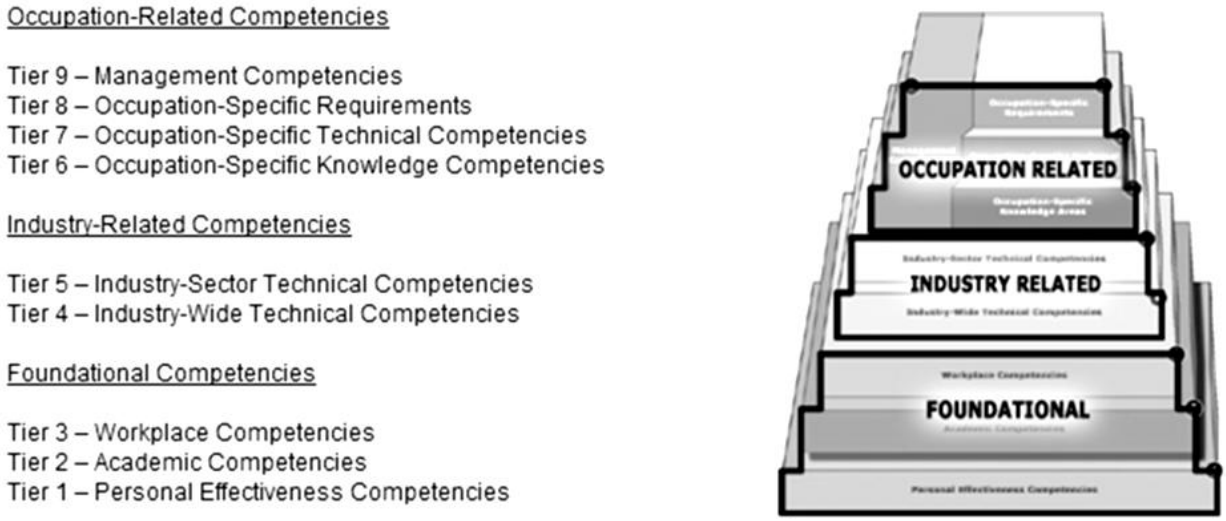


Figure 6-8 Graphic showing an example of a competency model and its different "building blocks" and tiers (Maher & Maher, n.d.). Notice that personal competencies are on the lowest level and management competencies are on the highest level.

Step 2 – Identify competencies that need further development as pointed out by the needs assessment. Write down competency requirements in a specific, reasonable, attainable and measurable manner. Written requirements should be based on company or organization needs. Examples could be: 'Ability to use W3 process for creating new technical drawing' or 'familiarity with customer's engineering numbering system'.

Step 3 – Ensure validity of written requirements and identify their criticality. Employee surveys are a good tool to identify how often a competency is used and its level of difficulty.

Step 4 – Training is imperative in order for employees to meet professional competencies. Approaches such as self-study and reading are good for development of knowledge-based competencies, and on-the-job training and simulation is better for development of skill-based competencies. A few examples that may facilitate and support training include: mentoring, computer-based training, self-study, distance learning, professional courses and individual plans for competency and career development.

Step 5 – Employees may need additional coaching to apply training in real life situations. In this context, active and supportive mentoring from supervisors has an enabling effect.

Step 6 – Employees' competency and performance must be assessed to verify if competency standards are met. Concrete measures can help to establish a better picture, e.g. customer feedback scores, timeliness of deliveries, supervisor feedback, etc.

An outline of recommendation number seven is presented in Table 6-9.

Table 6-9 Recommendation number seven, its relation to organizational capability and expected outcomes

Recommendation #7:	**Uncover exact competency/knowledge/skill gaps and train accordingly**
Rooted in org. cap. elements…	**management practices** **change capacity**
Expected to develop or improve…	**uniqueness** – as a capable employee base will emerge **efficiency** – as knowledge, competency and skill gaps with respect to daily work operations are bridged **productivity** – as training is done according to needs **service quality** – as employees attain a heightened ability to excel in their daily work tasks and activities **attractiveness** – as the customer will perceive contractor as capable and jobseekers recognize opportunities for professional growth **profitability** – as targeted training will avoid unnecessary training and therefore reduce overall costs of such efforts
Likely to ease or remedy issues…	▪ competency gaps ▪ knowledge gaps with respect to W3 ▪ insecurities regarding positions and roles

Furthermore, it is argued that a company can influence its employees' willingness and motivation to accumulate skills, but only to a certain degree. Ultimately, it is the employees who have control over individual preservation, development and improvement.

Recommendation #8: Establish employee accountability and ownership to skills

Making employees more accountable for individual development reduces the burden on managers and ensures a more dynamic response to changes in skill needs. Brainbench (2003, p. 1) explained that ownership of individual development is created when employees easily can see their own skill gaps and are provided with the resources to actively close those gaps. Three components are laid forth:

- Demonstrate ownership
- Establish accountability
- Foster continuous improvement

Effective measurement systems give control to employees. Ownership to skills is made possible through objective metrics and on-demand employee skill assessments. An individual would access the measurement system, choose and complete an assessment. Then, the system calculates quantities and present results instantaneously. Growth and improvement can thereby be tracked through a detailed view of critical skills (Brainbench, 2003).

Accountability is created via skill requirements and communication processes. Job roles are connected to a set of skill requirements, and role holders receive a plan on assessment due dates

and score objectives. The measurement system holds each employee accountable for progress as it contains various assessments, learning resources, and updated track-records relative to preset skill requirements. Communication processes actively engage the employees on a continuous basis, for example, via weekly e-mails that convey information on individual skill-level and progress. Reaching out to employees through such processes can radically improve their initiatives towards skills development (Brainbench, 2003).

Continuous learning and abridgment of individual needs are possible when workers have control over training the processes. The learning process starts directly after a skill assessment, and direct feedback keeps training on an as-needed level (Brainbench, 2003).

An outline of recommendation number seven is presented in Table 6-10.

Table 6-10 Recommendation number eight, its relation to organizational capability and expected outcomes

Recommendation #8:	**Establish employee accountability and ownership to skills**
Rooted in org. cap. elements…	**shared mindset** **management practices** **change capacity**
Expected to develop or improve…	**uniqueness** – as employees become actively committed to their own professional growth **efficiency** – as work load is reduced on managerial positions
Likely to ease or remedy issues…	▪ competency gaps ▪ knowledge gaps with respect to W3

6.5 Transition and holistic overview

There is no getting around the need for time and extensive efforts when making change to a project environment. Certain obstacles exist that can hinder change and a smooth transition from one state to another. According to Creasey et al. (2012) some common ones are:

- Inadequate resources, funds, time – extra pressure on the existing resources, more focus on daily responsibilities than changes, and optimistic program for change implementation.
- Insufficient executive support – lack of visibility and commitment when the organization is in a transition phase
- Company sluggishness – organization is heavily rooted in existing approaches and the culture pushes back and waive change initiatives
- Poor communication – Inconsistent or untimely messages, or information does not address correct issues
- Middle-management resistance – fear of reduced power to influence project inputs
- Employee resistance – fear of moving outside comfort zone

Employees that experience change in their daily work environment normally go through a cycle of emotions. The cycle encompasses four principle emotional states: denial, resistance, exploration and commitment. Figure 6-9 (Howe and Neal, 2009) on the next page illustrates a transition grid showing this. It is important that change managers are familiar with these emotions. Ignorance and insufficient arrangements can lead employees to feel disempowered, and may eventually lead to the demise of a good company culture (Howe and Neal, 2009).

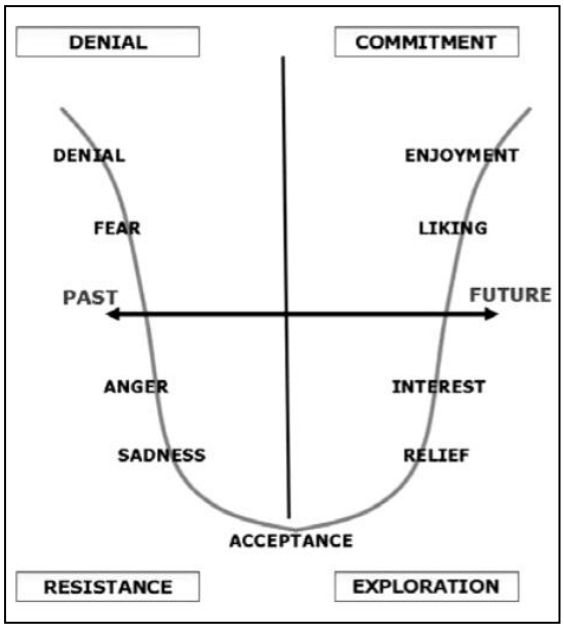


Figure 6-9 Illustration showing the transition grid and the range of emotions employees experience once changes are evident (Howe and Neal, 2009)

A set of Key Success Factors (KSFs) have been identified in order to ease the transition from current state to future competitive state:

- Active, committed leadership
- Communicate motive for change
- Embedded change
- Employee involvement

Leaders have key roles in the transition phase as employees look to their leaders when changes occur. They must be available and communicate change. They must actively engage with employees and focus on getting each worker onboard as the organization moves forward (Townsend, n.d.).

Change motives, vision and consequences should the company not change must be clearly communicated by leaders and the change implementation team. Employees are more likely to support change when they comprehend underlying reasons for it, and what stakes the organization has put towards the venture. Individuals must also understand what they can do to help realize the vision (Townsend, n.d.).

For change to work better, it should be embedded into the organization and the staff's daily activities. Goals are ideally connected to company strategy at the highest level, and then broken into department and individual goals. Such an approach helps employees to see the link between change and what they can do to facilitate it. Embedded change is better than programmatic change as it implements change little by little, whilst constantly considering employees' current level of adjustment (Townsend, n.d.).

Involving employees in change planning and implementation processes creates ownership. Employee participation foster creativity that help to overcome unexpected challenges in the adjustment process. Concrete measures that support employees in embracing change include among other; surveys to measure employee perception over time, open discussion forums to address successes and challenges, and establishment of advisory groups that give feedback on change efforts (Townsend, n.d.).

Figure 6-10 on the next page presents a holistic overview of main elements presented in this thesis. It portrays the contractor's current competitive state, measures and factors to consider in an eventual transition phase, and expectancies towards a shift in the status quo.

Firstly, developed recommendations are heavily invested in the human resources as they account for the majority of the company's assets. But also because they are crucially important for liberating benefits through organizational capability.

Secondly, it is argued that the recommendations incorporate KonKraft's constituents of future competitiveness on the NCS. Methods for realizing the recommendations address cost, capacity, competence and quality aspects in varying degrees.

Thirdly, Figure 6-10 is not purely about where the company is now, how it can move forward and which state is sought-after. A central question is – can we do it together as a special cluster or group? That is where shared value thinking emerges. It means that we value the diversity between companies in the group and respect that we have to work together. Differences are seen as positive inputs that contribute to all parties in a group reaching an increased competitive state.

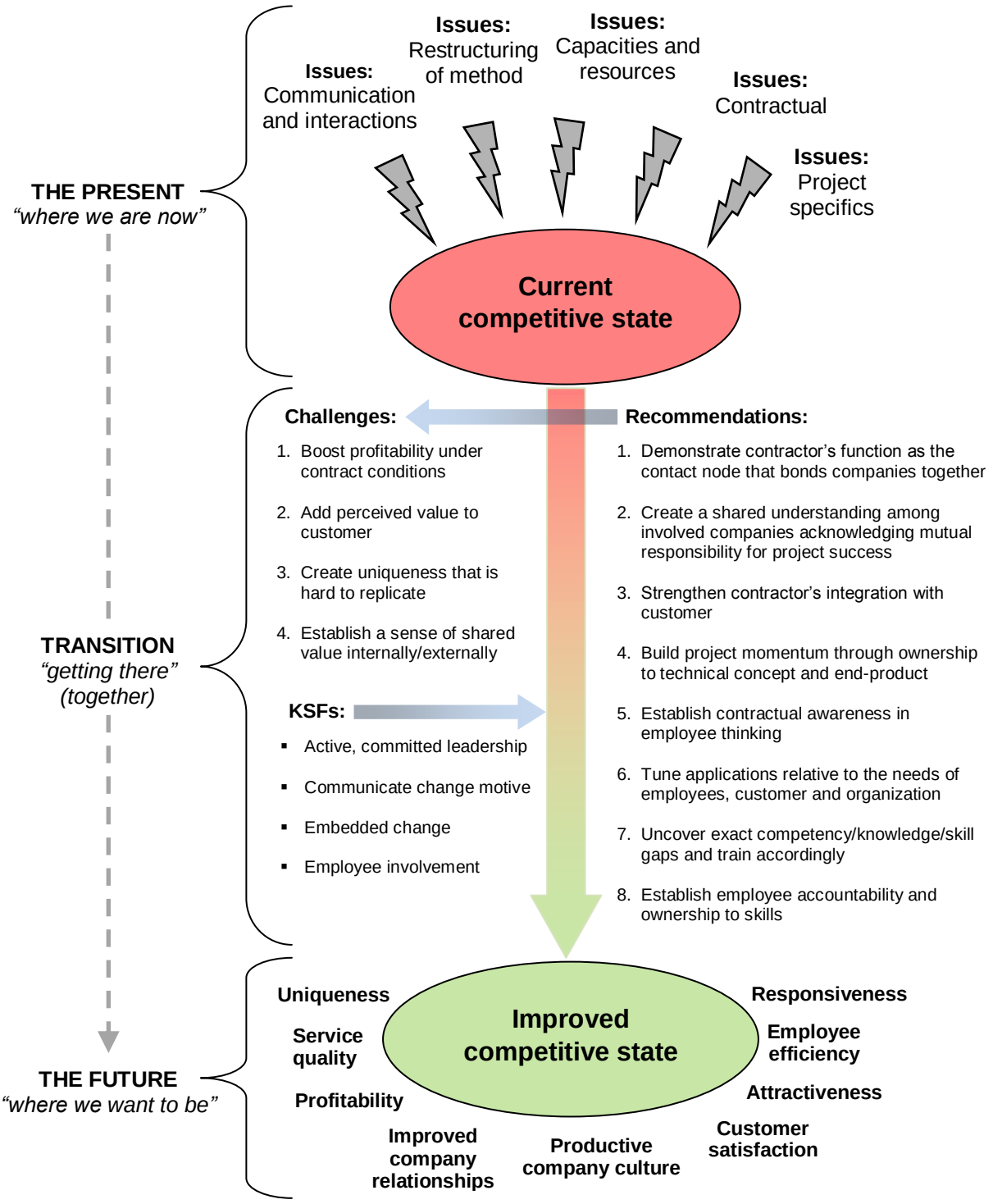


Figure 6-10 Holistic overview showing; (1) that contractor's current competitive state is limited by a series of issues, (2) measures, actions and factors to consider to attain improved competitiveness, and (3) expectancies towards contractor's future competitive state.

7 CONCLUSIONS

First objective: Identify and describe factors and qualities that create competitive advantages for 21st century organizations

Future competitiveness on the NCS is heavily linked to improvements within the aspects of cost, capacity, competence and quality

Organizational capability creates two major advantages: added value to customer and development of uniqueness that is hard to imitate for competitors. Its potential is released through four founding elements: a *shared mindset* internally and externally relative to the organization, *management practices* to modify employee behaviors, *change capacity* that underpins rapid adjustment and *leadership* to set direction and provide support.

Shared value takes basis in building competitiveness by meeting the needs of stakeholders in the surrounding community. A strategic advantage on the NCS is having broad competence. In this context, the shared value of building supportive industry clusters is very relevant as it bridges competence gaps and facilitate pursuit of common company goals and objectives.

Second objective: Pinpoint relevant issues a selected contractor experiences in the work with one of its framework agreements

22 greater issues were identified in the GEMC project environment. In a greater perspective, these issues limit potentials in work and impede competitiveness. Predominant effects were seen as reduced efficiency and productivity, and increased difficulties with respect to project realization and value creation. Sources of issues were found both internally and externally relative to the contract organization.

Third objective: With basis in findings, establish a set of challenges that aim to improve the contractor's competitiveness

Four challenges were established that should help set direction in terms of attaining better profitability, embellishing the characteristic that separates the company from its rivals and ingraining a sense of shared value thinking among players in the GEMC network.

Fourth objective: Develop a set of recommendations designed to help overcome identified issues and established challenges

Eight recommendations were developed in order to conquer the challenges and help ease or remedy issues experienced in work with the framework agreement. Expectancies of realizing these include qualities such as improved efficiency, productivity, responsiveness, uniqueness, service quality, profitability and company relationships.

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APPENDICES

APPENDIX A – QUESTION TEMPLATE FOR INTERVIEWS

Table A-1 Template used to conduct interviews. Notice that questions are highly related to trending issues experienced in the industry.

Name:

#	INTERVIEW QUESTIONS
	General information
1.	Who is your employer?
	☐ Aibel ☐ ConocoPhillips
2.	How long have you been with the company?
	☐ One year or less ☐ 1 to 4 years ☐ 4 to 10 years ☐ 10+ years
3.	What is your current role towards the contract? Have you had any other roles in the past?
	SWOT: Aibel's approach to GEMC
4.	Can you mention any internal strengths possessed by Aibel that are favorable for the realization of projects in GEMC?
5.	Can you identify any internal weaknesses in Aibel that might cause disadvantageous effects in respect to realization of projects in GEMC?
6.	Can you think of any external opportunities, not controlled by Aibel, which the company can utilize to excel in GEMC?
7.	Can you identify any external threats, not controlled by Aibel, which may cause unwanted effects or put projects at risk in GEMC?
	Quality, efficiency and productivity
8.	To your knowledge, do deviations in the quality of products, deliveries and documentation occur in the projects? Please explain.
9.	Can you identify any issues with Aibel's approach to GEMC that may hinder projects reaching the desired quality?
10.	In your experience, what reduces the efficiency and productivity of work performed in GEMC

projects?

11. Aibel has undergone major growth in the workforce over the last couple of years. To your knowledge, has this affected work in GEMC in any way? Please explain.

Costs and delays

12. Have you encountered occurrences where projects have exceeded their respective cost budgets? If so, what were reasons for these overruns?

13. Actors on the Norwegian shelf are currently battling a high cost level. Have you experienced any problems in GEMC as a result of the high cost level? Please explain.

14. In your experience, what would you say are the main issues that inhibit Aibel's ability to create profits through GEMC?

15. Have you encountered occurrences where GEMC projects have been delayed? If so, what contributed to these delays?

Contractual, managerial and regulatory

16. Can you identify any restrictions or limitations in the GEMC framework agreement that induce problems or create issues for projects?

17. How would you evaluate ConocoPhillips' insight into how Aibel conducts work in GEMC? Have you encountered instances where ConocoPhillips has made interventions in any way?

18. W3 contains work processes and instructions that apply throughout the projects. Have you experienced any issues related to the management system in projects?

19. Are Aibel's project roles in respect to GEMC clear, or do you find it difficult understand who is responsible for what? Please explain.

20. Companies in the oil and gas industry have to satisfy international requirements, requirements specific to Norway and customer requirements. To your knowledge, do GEMC projects encounter problems related to conforming to such standards? What would you deem as major challenges in this context?

Project risks

21. Can you mention any typical situations or issues that cause GEMC projects to derail?

22. To your knowledge, can you identify any factors that have put projects at risk in GEMC?

23. How would you rate the consistency, qualification and competency of external project suppliers? Please explain.

Communication and interactions

24. To your knowledge, is it difficult to deal with the suppliers? What are common issues in such interactions?

25. In GEMC, Aibel's Norwegian offices collaborate in a cross-departmental manner with offices in Singapore and Petersfield. Do you have any knowledge of problems that have arisen in this context? What would you say are the main challenges with such work in GEMC?

26. GEMC utilize an overlapping multidisciplinary work approach that adds complexity to projects. Can you point out any issues that GEMC projects have experienced in respect to this approach?

Project Resources

27. Have you experienced any issues related to Aibel's resources in GEMC?

28. To your knowledge, are the essential systems/tools in place in order for the employees to perform the necessary tasks? Are these systems/tools functional and do they give outputs as expected?

Supplementary

29. Can you think of any other major issues and challenges that have not been covered in this interview?

APPENDIX B – OVERVIEW OF THE GREATER EKOFISK AREA

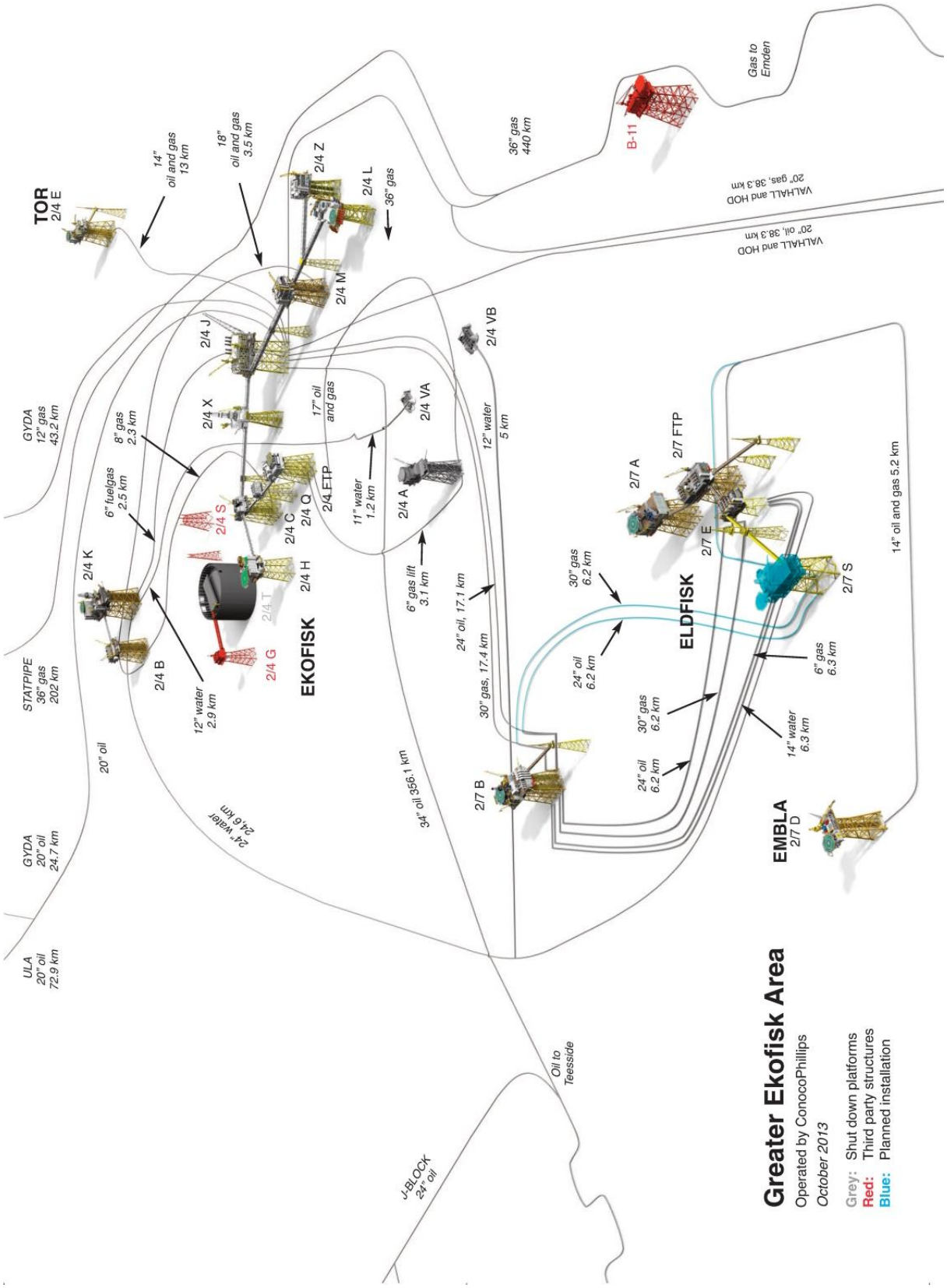

Figure B-1 Graphical overview of the Greater Ekofisk Area (Moe and CIAAS, 2013). Note that GEMC projects primarily do work on existing platforms connected to Eldfisk and Ekofisk.