



Universitetet
i Stavanger

DET TEKNISK-NATURVITENSKAPELIGE FAKULTET

MASTEROPPGAVE

Studieprogram/spesialisering:

Master: Industriell Økonomi
Spesialisering: Prosjektledelse og Risikostyring

Vårsemesteret, 2013

Åpen

Forfatter:

Børge Skjæveland

.....
(signatur forfatter)

Fagansvarlig: *Professor Petter Osmundsen, Universitetet i Stavanger*

Veileder(e): *Eivind Jåsund, Oceaneering Asset Integrity AS*

Tittel på masteroppgaven:

ANALYZING BUSINESS PROCESS MANAGEMENT

Norsk tittel:

ANALYSE AV ET STYRINGSSYSTEM FOR ARBEIDSPROSESSER

Studiepoeng: 30

Emneord:

Prosesstyring
Kvalitetsstyring
Prosjektledelse
Effektivisering

Sidetall: 81

+ vedlegg/annet: 4

Stavanger, 14. juni, 2013

I. Preface

This Master Thesis was completed in the spring of 2013 by Børge Skjæveland, while attending the fifth grade discipline of Industrial Economics at the Faculty of Science and Technology at the University of Stavanger. The thesis work took place in the months between February and June in collaboration with Oceaneering Asset Integrity AS. The topic of the paper fit well in with the course specialization Project Management and Risk Assessment and could also be a valuable study for Oceaneering Asset Integrity AS.

Before the spring semester even started, I knew I wanted to write my thesis in collaboration with my company, Oceaneering Asset Integrity AS. At the very start year, quite some time was spent trying to figure out a good topic that could both be academically relevant for my studies while at the same time being significant for the company. Together with the help of my academic supervisor, we came up with a great topic for the thesis. The time spent on this Master Thesis has been very educational and I've experienced how theoretical knowledge can be applied in various business situations. The road towards completions has been bumpy at times, where challenges have been met, but with great collaboration and help from colleagues, these have been overcome with perseverance and expertise.

I would personally like to thank everyone from work who was involved in some way or another during this thesis. Either if it was answering the questionnaire regarding the business process management system, discussing different issues concerning the topic, proof-reading my work, and/or general motivation to complete this thesis. A special thank goes to Ole Jørgen Årvik who has given me great pointers during this period and assisting me when I had further questions regarding the process management system. I would also like to thank the management at Oceaneering Asset Integrity who agreed to collaborate on this thesis, and also set aside some time during their busy schedule to be interviewed. Finally I would like to thank my academic supervisor Professor Petter Osmundsen from the University of Stavanger for giving me great guidelines and helpful advice along the way.

II. Summary

Within the Oil & Gas Industry, the market is constantly growing more competitive, forcing companies to continually adapt to changes. Companies need to cut costs and improve the business efficiency. One way of successfully managing these challenges is to implement business process management in the organization. This thesis will analyze how Oceaneering Asset Integrity AS handled the implementation of a Business Process Management System and the effects it had on the employees.

The main goals of this thesis are to examine the following issues:

- What effects a newly implemented Business Process Management System would have on the employees working within project management, at Oceaneering Asset Integrity.
- How these effects corresponded with the managements' expectations and assumptions.
- Determine the consequences of business process management and which corresponding factors are important to govern.
- Conclude if implementing such a system was the right decision.

Through interviews and questionnaires, personal opinions could be obtained from the management and employees, regarding the Business Process Management System. The acquired results were used to analyze and discuss the issues based on the theoretical literature.

It became clear that the employees working within project management were pleased with the Business Process Management System, understanding the purpose and benefits. The visualization of the processes and procedures will secure the company in delivering high quality services to their clients in an efficient manner, just like the management predicted.

It can be concluded that the implementation of the Business Process Management System has had a positive impact on the company and the employees. If the management is willing to use the necessary resources to maintain, update and develop the system in the future, there is no doubt quality cost will decrease and business efficiency increase. It was therefore a wise decision to implement the Business Process Management System.

III. Table of Contents

I. Preface.....	2
II. Summary	3
III. Table of Contents	4
IV. Figure List	7
V. Definitions and Abbreviations	7
1. INTRODUCTION.....	8
1.1. Field of Study	8
1.1.1. Topic.....	8
1.2. Framework for Topic.....	9
1.3. Thesis Structure	10
1.4. Main Goals	10
2. THE COMPANY	12
2.1. Oceaneering International Inc.	12
2.2. Oceaneering Asset Integrity AS	12
2.2.1. Maintenance Management	13
3. PROCESS MANAGEMENT.....	14
3.1. Development.....	14
3.1.1. Historical Development.....	14
3.1.2. Todays Practice	15
3.1.3. ISO 9001:2008	16
3.1.4. Business Process-Orientation.....	17
3.1.5. Future Goals and Success Factors	19

3.2.	Business Process Management	21
3.2.1.	Business Process	21
3.2.2.	Process Architecture	23
3.2.3.	Business Process Design	24
3.2.4.	Initiating Factors	27
3.3.	Tools and Strategies.....	27
3.3.1.	Kaizen.....	28
3.3.2.	Lean.....	29
3.3.3.	Six Sigma	30
3.3.4.	Lean Six Sigma	31
3.4.	Business Management Systems.....	31
3.4.1.	Business Process Management Systems	32
3.4.2.	QLM	33
3.4.3.	APOS.....	34
3.4.4.	ARIS Express	35
4.	METHODOLOGY	36
4.1.	Qualitative Approach.....	36
4.1.1.	Theoretical Basis	37
4.2.	Semi-Structured Interviews	37
4.3.	Structured Questionnaire	39
4.4.	Key Personnel.....	40
4.4.1.	The Management.....	40
4.4.2.	Project Managers and Project Engineers.....	41
4.5.	Practical involvement	42

5.	RESULTS AND ANALYSIS	44
5.1.	The Management	45
5.1.1.	Initiating Factors	46
5.1.2.	Implementation and Maintenance	49
5.1.3.	Future Improvements	54
5.2.	The Project Engineers and Managers	55
5.2.1.	Old vs. New Business Project Management System.....	56
5.2.2.	Improved Performance	58
5.2.3.	Future Improvements	61
5.3.	Closing Remarks on Results and Analysis	63
6.	DISCUSSION	64
6.1.	Implications and Interpreting of the Results.....	64
6.1.1.	Initiating Factors	64
6.1.2.	Implementation and Maintenance	68
6.1.3.	Future Improvements	70
6.2.	Evaluation of the Methodology Approach	72
6.2.1.	Interviews	72
6.2.2.	Questionnaire	74
6.2.3.	Closing Remarks on the Methodological Approach	75
7.	CONCLUSION	77
8.	LITTERATUR	79
9.	APPENDIX	81

IV. Figure List

<u>Figure</u>	<u>Source</u>
Figure 2.1-1 Oceaneering's Magnum ROV	www.oceaneering.no
Figure 3.1-1 ISO 9001:2008 Certification Stamp	http://dsdial.com
Figure 3.2-1 BPM Life-Cycle	http://www.tarponline.net
Figure 3.3-1 PDCA Cycles	Taking the first step with PDCA, 2009
Figure 3.3 2 Six Sigma Sign	http://Issacademy.com
Figure 1.1-1 Ready for Work	http://www.bnp-chronicle.com
Figure 5.1-1 thru 5.2-10	Response from Appendix II

V. Definitions and Abbreviations

OAI – Oceaneering Asset Integrity

AGR FO – A.G.R. Field Operation

TQM – Total Quality Management

HSEQ – Health, Safety, Environment and Quality

HR – Human Resources

BPM – Business Process Management

BPMS – Business Process Management System/Software

BPR – Business Process Re-engineering

QLM – Qualiware Lifecycle Management

CIM – Corrosion and Insulation Management

1. INTRODUCTION

1.1. FIELD OF STUDY

The field of study in this Master Thesis is a process management system to effectively improve project management at Oceaneering Asset Integrity (OAI). Since the company is dependent on their clients and the ability to deliver competitive services, it crucial to manage the efficiency, quality and productivity of their deliverables. In the line of work at OAI's Maintenance Management department, the customers demand a product of high quality, delivered at a reasonable price and at a fashionable time. In order to achieve this without losing contracts to competitors, the company was in need of a tool to effectively improve their business. Implementing a process management system, was consider one step in the right direction, in order to successfully manage these factors while also strengthening the organizational structure within.

After the implementation of the process management system, OAI wishes to monitor and measure the quality costs, the effectiveness of projects and cover risk factors within project activities. While using a tool to visualize the work flow processes, roles, support functions, requirements etc. OAI will be able to better manage their work and strive for constant improvements. By finding advancements and better solutions on how to work, the company hopes to become more efficient while quality costs decrease.

1.1.1. Topic

What effects does a newly implemented process management system have on the employees at Oceaneering Asset Integrity? How will this affect the quality and efficiency of the project management executed in the deliverables to clients? Do these effects correspond with what the management predicted and assumed, when deciding to implement such a process management system? Was implementing this system a bad decision?

1.2. FRAMEWORK FOR TOPIC

The services that Oceaneering Asset Integrity offers derive from many years of experience and they can boast at being one of the leading suppliers within Maintenance Management services. With a solid understanding of the business anchored in each employee, the company has and receives a lot of contracts within the oil & gas industry. However, over the years the company and its business have expanded, leading to a greater distance between colleagues and departments, and slowly the unison understanding of how the organization holistically work is fading. Also the gas & oil industry is constantly changing with new competitors enter the markets daily, offering competitive services at an ambitious price. This has led the management into implementing a process management system in order to counter these increasing problems.

Before the process management system was implemented, the documents explaining OAI's work procedures and governing processes were located in a so called Share Point, which could be accessed through an intranet link. This site was confusing to use, it was difficult to find the necessary procedures/ processes, and most of the documents were outdated. As a result, employees would not use these documents by spend valuable time searching for necessary procedures and processes, due to the systems complexity. The result was that each employee would rather work using their own techniques, acquired through practice and experience, instead of the governing documents in Share Point. Inevitably, this created a deviance between each employees' working methods and deliverable standards. This inconsistency between the employees naturally creates an end product for the clients, where the quality can be quite variable from project to project. The management has seen this progress over the last two years and has now set aside the necessary resources to implement a process management system to stop this negative evolvment. By trying to create a complete understanding of the processes and procedures within the company, allowing each employee to have a unison comprehension, the management aims for high quality en products, executed effectively by each individual involved.

1.3. THESIS STRUCTURE

This paper is divided into nine chapters and structured to maintain a good progressive flow of the thesis. This first chapter gives a short introduction of what the topic is about, the background of choosing these issues and the main goals of this thesis. Chapter two gives a brief view of the company Oceaneering International Inc., the department Asset Integrity and explaining the importance of a process management system in such a business. The third chapter will go into the depths of the theory covering process management and the ideology behind it. The third chapter will be the basis of chapter five and six and be the foundation of the questions asked in the interviews and questionnaire. The fourth chapter will present the methodology used during the study and explain why these methods were chosen. Chapter five will present the results found in the interviews and questionnaire, and analyze according to the presented theory. Next, chapter six will discuss the accumulated results from the previous chapter and try to interpret the full meaning of the outcome. Also the methodological approach will be evaluated by looking at the advantages and disadvantages of the methods used in the thesis. The seventh chapter will draw a conclusion of what was discovered in the thesis and seek a plausible answer to the topic, through a silver lining. Chapter eight and nine will display a list of literature used in the thesis and the appendix.

1.4. MAIN GOALS

One of the main goals of this thesis is to analyze the effects of implementing a process management system within project management in Oceaneering Asset Integrity. This involves looking at how the employees working as project engineers or project managers react to the system and receive the information displayed. Their opinions are relevant to see if they will adopt their work in the future in according to the system, or rather neglect it as another irrelevant intranet site with administrative bogus. The feedback and suggestions from the employees is important to analyze in order to understand what they have previously missed, what they thought of the newly implemented system, or what they think needs further

improvement. By analyzing the reaction to this system, the underlying effects can be concluded.

Another goal of this thesis is to analyze what the management thought a process management system would contribute with and measured their anticipations up against the actual effects. The idea, behind the managements' decision on implement a process management system, needs to be fully understood in order to draw proper conclusions. If the effects are corresponding to what the management believed the system would bring, the decision for implementing can be priced for being a step in the right direction to secure a more quality based product and better efficiency within project management.

The thesis will also look at the different perspectives from both the project engineers/managers and the management, and try and draw similarities and differences between the groups. By doing so, a holistic view of the situation can be analyzed to further understand the correlations of a process management system between organizational levels, responsible and employees. This might be one of the most important goals, because if the studies show that OAI manages to reach a unison understanding of its processes, then a process oriented organization culture can evolve, bringing forth continuous development and improvement suggestions of the business.

This Master Thesis will document how these goals were met based on theoretical literature and study. Evidently the thesis goals will contribute to how OAI can benefit from such a process management system resulting in reduced costs, higher efficiency, and a better control over its activities.

2. THE COMPANY

2.1. OCEANEERING INTERNATIONAL INC.

Oceaneering International Inc. is an American *subsea engineering* and *applied technology* company, founded in 1964. With their headquarters in Houston, Texas, USA, Oceaneering International Inc. offer a variety of services, mainly within the oil and gas industry, but also have clients such as government agencies, aerospace companies, marine engineers, and within the construction industry. Their main business products are:

- Remotely operated vehicle (ROV)
- Subsea oilfield hardware
- Deep-water intervention
- Manned diving services
- Non-destructive testing/inspection
- Engineering/project management

Their mission statement: “Oceaneering’s mission is to increase the net wealth of its shareholders by providing safe, cost-effective, and quality technical solutions satisfying customer needs worldwide.”



Figure 2.1-1 Oceaneering's Magnum ROV

During the last 50 years, Oceaneering has grown from an air and gas diving company in the Mexican gulf, to become a diversified and technologically advanced organization with business affiliations around the world. This growth can be explained by their strategic plan of executing internal research and development through acquisitions. During the last three years Oceaneering International Inc. has bought up smaller companies in Norway to augment their business.

2.2. OCEANEERING ASSET INTEGRITY AS

In December 2011, the Norwegian company AGR Field Operations was bought by Oceaneering International Inc. in order to strengthen their competence and role within the

inspection and maintenance field of the oil and gas industry. At that time, AGR Field Operations was the largest asset integrity management service provider in Norway, on pipelines, offshore production platforms and onshore facilities. In addition, a new subsea technology had been developed, that enabled internal and external inspections of flexible and rigid flow lines and risers. This ultrasonic piping inspection tool is used on ROVs, and was therefore a great asset for Oceaneering International Inc. Besides Norway, AGR Field Operations had offices around the world including America, Australia, United Kingdom, Abu Dhabi and Dubai, providing an established business and a great reputation abroad.

After the acquisition, AGR Field Operation became an subsidiary company receiving the name Oceaneering Asset Integrity (OAI). The line of expertise range within the following business areas: Asset Condition Evaluation Tool (ACET), Conductor Stabilization Solution (CSS), In-service pipeline inspection, Inspection and Integrity Management, Maintenance Management, Maintenance Services, Non-Destructive Testing (NDT) and Rope Access. Even though OAI is now a part of Oceaneering International Int., the company has its own management, HR, finance and IT department.

2.2.1. Maintenance Management

Within Oceaneering Asset Integrity, resides the Maintenance Management department, providing clients with an integrated maintenance management package. This is a holistic cost efficient solution to grant clients a professional maintenance plan of their assets, in a according to governing requirements. This service gives the client more time to focus on their core business and reduced down time through better availability of their assets. The lifecycle of Maintenance Management include maintenance engineering, corrosion management, advisory services and integrity engineering. Even though this department doesn't consist of production lines and a strict form of processes, the daily work does revolve around a set of processes and procedures and is therefore important to manage and improve these. The implementation of the Business Process Management System in thesis was done in this department, and the analysis is based on the key employees from Maintenance Management.

3. PROCESS MANAGEMENT

In this modern technological age that companies have come to face during the last decade, the significance of improving the effectiveness of a business has become crucial. To maintain a strong position in the ever growing competitive market, all companies must be able to manage their processes in the best possible way, in order to survive. Most of the businesses in the world today consist of procedures that cannot simply be explained by process diagrams and models. The complexity of a company's line of work can be so vast and confusing that the employees themselves are unaware of what processes are being done and which piece of the puzzle their work covers. Nowadays, few companies operate with a traditional production line where the work executed deviates from the official processes in the business. Nonetheless, it is still important to manage all processes to their full extent allowing the business to prevail through continuous improvement.

3.1. DEVELOPMENT

3.1.1. Historical Development

The idea of measurement and quantification of production is not a new phenomenon. It was described as early as 1911 by Frederick Winslow Taylor in his well-known monograph "The Principles of Scientific Management" (Taylor, 1911). His famous monograph laid down the principles of scientific management and included fundamental literature describing the modern organizations and decision theory. It was not before the 1950s the quality theory of Total Quality Management arrived, based on William Edwards Deming's work. His studies shone light upon the importance of improving the product and process quality, implying that every employee involved with the product/process were responsible for their involvement of management (Ahire, 1997). His work helped improve the production rates in the United States during the Cold War and later helping Japan merge into an innovative and industrialized nation.

Various strategy literature including Michael Porter's view of the creation of companies, were introduced in the 1980s. This served as a revolutionary mindset of creating value chains that went across functional and hierarchical divisions, connecting together the whole organization (Porter, 1985). Not late after came the inspiration Just-in-Time principle from Japan and Toyota Production System's Lean manufacturing. The common denominator of these strategies is the focus on removing non-value-adding activities from the workflow of the entire company.

In the early 1990s, Michael Hammer published his article "Do not Automate, Obliterate" (Hammer, 1990), presenting Business Process Re-engineering, where the idea of completely restructuring of all the work processes in an organization was introduced. His strategy received much criticism due to the lack of view on short-term improvement, and rather focuses on life-time improvement. From this evolved the term Business Process Management, introducing a unified and continuous management of a process-oriented organization, which dominates the practice of business improvement in the modern world today. Companies are using more resources to optimize their supply chain by implementing and executing Business Process Management. Companies that specialize within BPM sell software and services as specialists and help clients build the necessary tools within their company.

3.1.2. Today's Practice

Businesses today are living in a time of mandatory compliance to laws and regulations. When these requirements, either conducted by the government, stakeholder or customer, become too vast, companies tend to spend a lot of resources to ensure compliance (Carri, 2011). In the oil and gas industry, especially on the Norwegian Continental Shelf, the requirements are high and there are regulations within different areas such as safety, quality and documentation. To comply with the strict requirements and to guarantee the industry a continuous service, most companies have established departments like Health, Safety, Environment and Quality, Human Resources and Document Control to deal with the regulations within their field. Still,

a lot of resources are being used on compliance and companies are therefore looking for better ways to solve these problems and to reduce the increasing costs.

Most companies are traditionally structured based on functions and the organization is divided accordingly. By the use of technology and organizational development, these functions have become well-adjusted to their business area and produce positive results. On the other hand collaboration across functions and coherence between activities are often forgotten and the increased self-management features have led to higher coordination costs. Through globalization and the increasing need to be flexible, new ideas emerge within organizations. In today's practice the relatively modern thought of organizing a company by its processes is taking place for good. The structure of an organization follows the strategy which reflects the processes in a company (Spanyi, 2003). This way of organizing a company has its roots in the Total Quality Management ideology, which emerged from the Japanese concepts Kaizen, Lean and Six Sigma (concepts explained in chapter 3.3). The main components in a modern TQM which contribute to the overall management of quality are *Quality Management* -:

- *Core values*: processes orientation, customer focus and continuous improvement methods
- *Methods*: processes management and customer focused planning
- *Tools*: process maps and the ISO:9000 series

3.1.3. ISO 9001:2008

The ISO 9000 series is a set of standards of quality management. ISO 9001:2008 describes the requirements and importance of designing, implementing and improving a quality management system based on the processes within a company. Furthermore it explains what is meant by a process and keeping the process-oriented thoughts in mind. General requirements of the standard states that the organization shall establish, implement, document and maintain a system for quality control and continuously enhance its effects accordingly (ISO 9001:2008). If a company is certified with these requirements they are obligated to comply with all the specified requirements. By governing an overall system for process

management a company will benefit by the easy access and maintenance of the organization's governing documents.



Figure 3.1-1 ISO 9001:2008 Certification Stamp

ISO 9001:2008 is considered the most popular formal policy, regarding quality, and many companies around the world have certification stating that they comply with the requirements specified in the standard. However, inadequate monitoring of quality management between revisions often takes place, mostly due to the

company's lack of resources for the continuous compliance. Many project-based companies have adapted procedures for each project which result in an increasing amount of documents needed to update according to changes in the certified requirements. A solution to make sure that all the documents are quality checked could be to visually link these to process maps and workflow diagrams. The stakeholders and quality controllers can easily see which documents required control. On the other hand, this makes it more difficult to get an overview of the total process line and see the work flow as a whole. Duplications or missing coordination between individual projects can occur without being discovered if the quality control is brought down on an individual process scale, which leads to a negative effect and the business becomes less efficient. To avoid these situations a company is recommended by the ISO 9001:2008 to maintain a process-oriented state of mind while implementing and executing a quality management system.

3.1.4. Business Process-Oriented

Business processes are a central aspect in the process-oriented organization and can be explained in three ways (Ko, 2009):

1. A collection of related and structured activities/tasks that produce a specific service or product for a particular customer(s).

2. A collection of activities/tasks that transforms any input into output which contains value for a particular customer(s).

3. A series or network of value added activities, performed by relevant roles or contributors to help achieve the targeted goal of the company.

The difference between a feature-oriented and process-oriented organization, is that the first usually divide its process into departments or divisions, while the latter looks at the overall picture and end product, seen from the perspective of the customer. A business process, in a process-oriented organization, can be divided into three different levels:

- *Management processes*: corporate governance and strategy management
- *Operational processes*: the core business workflow and the primary value stream. (e.g. production, advertisement, marketing and sales..)
- *Supporting processes*: non value added processes, but still necessary and supplementary to the operational processes. Examples for these are procurement, logistics, accounting, personnel administration, recruitment, customer support and technical assistance.

By having this clear distinction between the processes, gives a clearer picture of the total business strategy and structure, making it easier to communicate, adjust and adapt to changes.

Recent research show that companies that have adopted process-oriented management in their daily workplace feel that the organization has become more transparent, easier to understand, clearer boundaries of responsibilities and a transparent structure (Kohlbach, 2009). With a process based business, employees are empowered on a lower organizational level with decision making authorities creating positive result and efficiency (Tomasko, 1993). Further studies show that organizations are quicker to improve, have increased customer satisfaction, better quality, reduced costs and increased financial performance (Kohlbach, 2010). Studies of failed projects using process-oriented management show that the reason for failure is the lack of support and understanding from the management, who expect immediate improvements, only focus on long/short term gains and too much focus on details rather than the overall picture (Ramias & Wilkins, 2011). It is therefore important to see the advantages

of analyzing and modeling the processes in an organization thoroughly. By successfully doing so, a company can see progression like (Ko, 2009):

- Increased visibility and knowledge of the organizations activities
- Increased ability to detect bottlenecks and become more efficient
- Increased ability to identify potential improvements
- Reduced lead time/delay
- Better definition of tasks, roles and responsibilities in the organization
- Greater auditing and assessment of compliance with regulatory requirements
- Good tools for counteracting corruption

3.1.5. Future Goals and Success Factors

The way forward within BPM and its systems will be to integrate three fundamental functions: *compliance to regulations, quality control and management of business processes* in a professional and successful manner. The trend for developing comprehensive programs and systems for managing business processes is gradually growing where relevant requirements and guidelines associated with the processes in the organizations are being maintained. This is a positive evolvement and the importance need to be understood when implementing such systems. While integrating these functions, the challenge for companies will be to successfully identify the regulations and conditions connected to the problems where improvement is desirable. The next step will be to establish a solution approach, map up the main and overall business processes, before the organization can go further into details. It is crucial at this stage to correctly link the processes to the required quality controls, improvement projects and governing requirements (Carri, 2011). If, in the future, companies manage to integrate these factors in a successful manner, using this approach, the advantages will result in reduced cost and risk, faster implementation of changes, exchange of best practice between departments, reduced duplication and a clear, holistic view of the organization.

For a process-oriented organization to be successful four prerequisites must be in place (Ramias & Wilkins, 2011):

- *A holistic view of the main processes:* A clear and logical overview of how the organization executed its main work. It is difficult to manage something that cannot be viewed.
- *Process management systems must be a part of the daily operations:* The system/tool must be provided to every employee in the organization and be displayed in an understandable fashion. Employees can use this tool to manage their work on a daily basis and bring the decision making down to a lower level. The system must be constantly maintained and updated to make sure that the processes are continuously improved.
- *Management must be process-oriented:* Process management must be integrated into the management and the main processes must be evaluated while planning both long and short terms of the organization. The processes must have appropriate owners and roles must be defined and linked to relevant activities.
- *Ability to change and transform:* One of the main reasons why an organization should be process-oriented is to increase the flexibility and ability to change. To understand how the organization works is important for planning new changes and improvement of projects. Maintaining a continuous improvement within the processes contributes to the organizations ability to adapt to the evolving business world.

When it comes to the software for management of processes, the vendors are increasing. The technological they bring is advanced, comprehensive and highly integrated with various BPM platforms, support practitioners in a wide variety of projects and business areas. The problem is that most companies do not understand their organization well enough to implement and use a BPMS correctly or to its full potential. Attaining software that is complex and advanced can have a negative effect on organizations that should be using a less elaborate tool. The effects can result in poor organization, bad process management, insufficient quality control and lack of a holistic view. It is therefore important when choosing a BPMS to understand the organization and implement a tool/system that reflects the companies' process orientation.

3.2. BUSINESS PROCESS MANAGEMENT

Business Process Management is a systematic approach to manage the organizations processes. This is done by observing all the activities that lead to the end product or service and analyze the path of the workflow. In other words, look at the processes that are used in the execution of the product. One can then start to manage the current processes to become more cost effective, more efficient and more robust to changes in the market. The main goal behind the BPM is to reduce human error and miscommunications between colleagues/departments on which requirements are expected from their particular role.

3.2.1. Business Process

The most traditional definition of a process is that it consists of activities that transform input to outputs. Also, according to the “International Organization for Standardization”, a process is characterized by a set of interrelated resources, such as personnel, finance, IT facilities, equipment and methods (Laguna & Marklund, 2005). A process can therefore be viewed as a system or subsystem that consists of related components which share a common purpose and goal. On the backhand of this conceptual definition, any organizational unit can be characterized as a single or a network of processes. Understanding this leads to the realization of the importance of business processes.

Dependent of the organizations scale and complexity, a process can be divided into three types:

- *Individual process*: performed by separate individuals, independent of other groups
- *Vertical/functional process*: performed by several individuals, but within a certain team/unit/department.
- *Horizontal/cross-functional process*: performed by multiple teams/units/departments

There exists a hierarchical relationship between these three types of processes because the horizontal process can be broken down into vertical processes, which again can be broken down into individual processes (Laguna & Marklund, 2005). Another definition of the three process types distinguishes them by different levels: organizational, department, and

individual level (Ostroff, 1999), but for this thesis they will go by types mentioned above. Furthermore, a process can be broken down into:

Sub process → Activity → Task → Step.

Though every process type is important and has potential for improvements, the horizontal processes are the most significant. These organizational processes contain mostly non-production related activities and therefore suffer from sub-optimization. Put in other words, since the horizontal processes are difficult to coordinate, sub systems are optimized within its local opportunities and constraints, leading to a worse solution for the whole system and organization. Sub-optimization occurs when there is a lack of communication and consistency between departments and usually happens in larger companies where several business areas/departments collaborate on projects. By preventing sub-optimization, companies use tools to systematically display their system and manage the processes accordingly, a so called Business Process Management System (BPMS).

There are several explanations for why the horizontal processes have the greatest potential for improvement (Roberts, 1994):

- The improvements in the horizontal business process have failed to keep up with the advancement in manufacturing processes and contain therefore greater margins for improvement.
- It is difficult to detect non-value activities (also called *waste*, explained in chapter 3.3.2) and inefficiency in a non-production horizontal process, than for instance a vertical process. This is mainly because the horizontal process is way more complex. There are therefore more *waste* to find, if one looks closely, than vertical/individual processes.
- Compared to the individual and vertical processes, a horizontal process result “only” in a 5% or less value for the customer, measured in activity hours. Although this is not an exact figure, improvement measures of horizontal processes are shifted aside because of its insignificant rate. This does not mean that it is unimportant, but this

percentage results in the horizontal processes to be neglected, where large improvements can be found.

- Customers and clients are five times more willing to switch to a competitor due to better service related business processes, than a better product. By improving horizontal processes, the business service will improve and customers will become more satisfied.

According to Roberts, it is interesting to see how little resources are used to improve the horizontal processes. As most business process management strategies, as Lean and other theories, focuses on getting rid of *waste*, these measures are a bit extreme in a non-production line business. Since most of the activities in a horizontal process are non-valuable, they are still necessary to maintain in order to execute the value based activities in the vertical processes. Instead of removing these non-value activities in the horizontal processes, one must rather find opportunities to make them more effective in accordance with the whole organization. When implementing these improvements, one must be aware of the complexity and the scope of the information, materials and employees involved in the processes. A change to horizontal processes involves a certain risk of misunderstanding, lack of communication and loss of information between the interfaces. So called “*white spaces*” can enhance this risk and will be introduced in the next chapter 3.2.2.

3.2.2. Process Architecture

The concept “*white spaces*” (Rummler & Brache, 1995) is the result of the lack of mutual adaptation between the structure and processes of the organization. *White spaces* must be effectively managed in order to maximize the performance of the company, from the customers’ perspective (Spanyi, 2003). Ideally and logically a company should always design the organizational structure according to the design/re-design of the processes. There is no point organizing a company based on ineffective processes and it is therefore important to have these updated and synchronized. However, a lot of companies do not manage to design the processes and organizational structure correspondingly, but rather separately based on different scopes (Oden, 1999). This lack of collaboration can cause large *white spaces*.

When designing/re-designing processes, the overall goal of the person responsible is to streamline the processes, by eliminating slack, latency and non-value adding activities (explained further in chapter 3.2.3). Philosophies like Lean and Six Sigma are common to include while executing process architecture, because the main focus is to find how things can be done in a more efficient manner. While doing process architecture or designing the process structure, one must base it on five main components: input and output, flow units, networks of activities and buffers, resources, and information structure (Laguna & Marklund, 2005). Understanding the constraints and opportunities between these elements in any given situation, is the key to a great Business Process Design.

3.2.3. Business Process Design

Business Process Management should never be a one-time exercise, but rather a continuous evaluation and analysis of the processes, where actions for improvement are constantly implemented. The activities executed while doing BPM are created based on the company’s strategic visions and goals and can be visualized in a Life Cycle (Fig. 3-1). The 5 activities that make up the BPM Life-Cycle can be broken up into processes that different functional personnel in the company have responsibility to maintain. The activities that are included and tasks attached to these are:

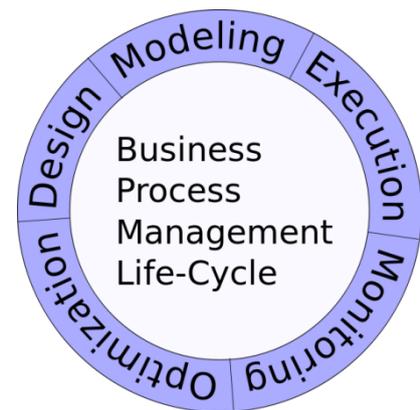


Figure 3.2-1 BPM Life-Cycle

1. Design: In this activity a theoretical identification of existing processes are found and the design of “soon to be” processes are prepared. It is important to focus on the process flow, both horizontally and vertically while doing this design phase. In other words, one must consider the processes that are done by a group/department (vertically) up against the effects it has on the processes between different groups/departments (horizontally). When designing the processes, one must see the company as a whole and clearly distinguish the correlations between processes.

Alerts and notifications are important and necessary to map as well, in order to maintain the quality the company pursues and will also contribute to achieve compliance with government/contractual agreements. If a good design is accomplished, the number of problems occurred over the lifetime of the process are reduced, and therefore the graphical design of the processes is the first step to a more effective business.

2. Modeling: The theoretical design gets created into a quantifiable model which can be visually displayed. This is usually done in a Business Process Management System/Software, which is a process management tool (explained in chapter 3.4). While modeling the processes, it is wise to be aware of what happened in the design phase and why the theoretical design turned out the way it did. Then the person modeling could spot logical errors or careless mistakes that otherwise would pass unseen (SINTEF, 2005). Keeping in mind the thoughts behind the design while modeling, can produce improvement to the design itself and furthermore make the process better. Another way to strengthen the design in the modeling phase is to run several “what-if analysis” on the processes, identifying loopholes and mistakes in the design.

3. Execution: The main tasks for this activity are to transfer the finished modeled processes to a readable format for the rest of the company, so that all the necessary employees can access and benefit from the tool. The BPM Software’s usually contain this application to make it visually accessible for the organization, usually through the intranet site. Before one executes the processes for the whole company to view, one must quality check that the processes are correct and the display reflect the model/design. The processes and procedures will need to be quality checked by competent personnel with the field of business/operation, before it is published (Petroleum Safety Authority Framework HSE, 2010).

4. Monitoring: This activity includes tasks where one must track and interpret the performance of each process by looking at the cost of the end product vs. the customer’s

satisfaction. Also one must monitor the flow of the processes and understand where problems occur in the operation. With a well-developed monitoring system, the organization will be able to benefit a lot by analyzing the state of each process and gather a basis for the optimization activity of the Life-Cycle. All employees working within the processes should have the ability to report findings of faults or improvements.

5. Optimization: The process performance information gathered in the monitoring phase will now be analyzed and discussed for further improvement. Potential bottlenecks or actual bottlenecks must be identified and preventive measurements applied to the design. The main and most common tasks for the optimization phase are to minimize costs, maximizing throughput and/or efficiency. When adjusting a process for optimization, it is important that it does not interfere with constraints of other processes in the organization. If this activity is done correctly, the result will be greater business value.

Re-engineering, also called Business Process Re-engineering (BPR), can be an activity in the Business Process Management Life-Cycle, but will not be used in most cases. This activity will be performed if the processes become too noisy/no room for positive improvement and the optimization will not result in a beneficial output. In these cases, a completely new process is designed and integrated into the organization, being more effective and productive than the previous design. For this BPR activity to be beneficial for the company, it is important to know when the re-engineering should take part. If a BPR is executed when the need for a new design was actually not present, the time and resources used to re-engineer will be cost ineffective and can also have a negative impact on the process cycle as a whole, by making it less efficient than the previous design. So carrying out a BPR demand that the processes are correctly understood on a holistic level and the person responsible is certain that a re-engineering will actually be an improvement.

3.2.4. Initiating Factors

There are many good reasons why a company would decide to manage their business processes. Some of the main factors are:

1. The need for a more cost effective business: by reducing the companies costs and/or improve the productivity.
2. The need to improve the management coordination and/or the organizational responsibility.
3. The need for improvement of the client/customers satisfaction, which result in maintaining their position as a strong competitor in the market.
4. The need for improving existing or new products/services or becoming ready to enter a new business area.
5. The need to improve the management of IT resources. Also called Enterprise Resource Planning.
6. Monitoring and risk management, either by the company themselves or governing supervision.
7. Other “one time” events, such as fusion/acquisition of companies.

The most common reasons why companies preform BPM, is to save money, followed by a better management coordination and more satisfied customers (point 1,2 and 3).

3.3. TOOLS AND STRATEGIES

In the recent years, the business world has experienced an enhanced upbeat of competition, with a corresponding marginal pressure. Before, the seller would dominate the market, where the customer would have to make do with what was offered. Now we face markets where the buyer’s demand is the controlling factor. Globalization, the internet and e-commerce forces sellers to compete on a larger scale, increasing the competition and the need for a continuous improvement of their supply chain. The challenge is to achieve this within the framework of the traditional hierarchical organization model. There are many popular tools for quality control and management of a business, known as business management system. In these

systems, continuous improvement is a primary focus in order to optimize processes, improve product and correct the causes of current problems. A holistic approach is needed to manage the business in an efficient manner where a process-orientation of the organization is needed (Mathis & Jackson, 2007). Customer focus, increased product quality, continuous improvement, streamlining of work, and developing a culture that supports this are the main values in Business Process Management.

3.3.1. Kaizen

Kaizen is a philosophy originated from Japan after WWII, which means “improvement” or “change for the better”, and is now known and used world-wide. The practice of Kaizen focuses on continuous improvement of processes, typically in engineering, manufacturing or business management (Imai, Masaaki, 1986). The philosophy states that continuous improvement everywhere, on all levels, at all times, always, are necessary (Goetsch & Davis, 2009). This includes all functions in the entire organization. That means that everyone, from the CEO to the workers on the platform, on a daily basis, must be on a lookout for improvements and advancement of the business.

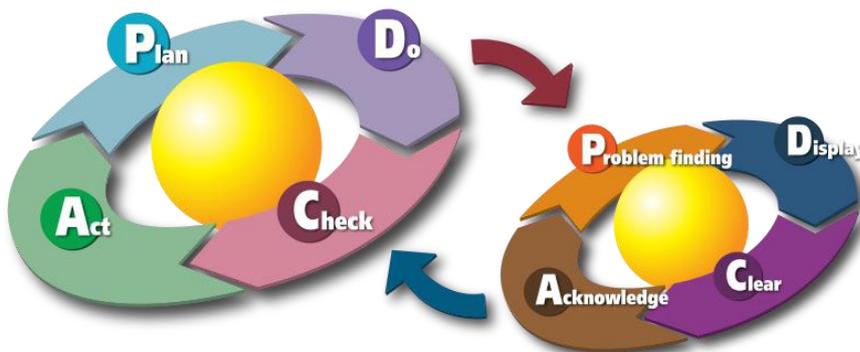


Figure 3.3-1 PDCA Cycles

A systematic approach to uphold the continuous improvement in a company would be to implement a PDCA technique (Fig. 3-2). The activities included are:

- To standardize the operation and activities in a business process.
- Take measurements of the operation (time and quantity).
- Check the found measurements against requirements.

- Innovate new operation/activities to meet the requirements and increase productivity
- Standardize the new and improved operations and activities
- Keep a continuous cycle on the activities above.

Other approaches to keep a continuous improvement in an organization would be Kaizen checklists, the 5-Step Plan and/or the 5-M Checklist.

3.3.2. Lean

“Brilliant process management is our strategy. We get brilliant results from average people managing brilliant processes. We observe that our competitors often get average (or worse) results from brilliant people managing broken processes”. This is a quote taken from Toyota’s Lean strategy derived from the Toyota Production Systems in the 1990s (Holweg, 2007). The main goal of Lean is to identify and extinguish all “slack”. That means activities that produce no meaningful results and therefore is “waste”. The seven *wastes* definition used in Toyota are:

- *Transporting* of products that are not required to perform the process.
- *Inventory* of components not being processed.
- *Motion* of equipment or people walking more than required for the process.
- *Waiting* for the next production step.
- *Over-processing*: too many activities due to poor process design
- *Over-production*: production ahead of demand.
- *Defects*: the resources used to inspect and fix production problems

By analyzing the activities closely and identifying where *waste* occurs, a business can financially benefit, by simplifying processes and its efficiency.

The main goal behind Lean strategy is to create better results for the clients, by removing all form of slack, continuous improvement and work towards 100% quality. Businesses that have implemented Lean in their organization have not only increased their revenue, but also reduced costs, more satisfied customers and a better workplace for the employees. To successfully achieve these results, it is important to establish and develop a culture for

continuous improvement within the company. Without the basic understanding of the strategy and its effect, the employees will not be able to contribute to the Lean strategy. Implementing the Lean mentality must not only happen on an organizational level, but within each and every employee (Stratcog, 2010).

3.3.3. Six Sigma

The concept Six Sigma was developed by the Japanese company Motorola around 1985. While Lean tries to eliminate *waste*, Six Sigma is a tool that is used to identify and eliminate the source of the unwanted defect or variation. The main goal is to improve the quality of the business product by finding mistakes and fixing processes. By doing this, the amount of defect product goes down and quality up, while the end customers receive satisfying results. Six Sigma focuses on ways to measure quality and thereafter being able to see improving adjustments. The goal is to have less than 3,4 defect product per million. This mean that the customers' requirements are satisfactory 99,99966% of the times (hence the name Six Sigma).

The Six Sigma methodology can be defined by four major steps:

- Clear goal: set by the company's management
- Mobilization of the improvement team
- Implementation of suggested improvement
- Management of permanent improvements



Figure 3.3-2 Six Sigma Sign

Like the Lean strategy, the Six Sigma methodology will not be successful until the culture within the company is open minded about and understand the underlying effects of Six Sigma. Usually there is a need for a cultural change before Six Sigma is implemented, to make sure that the tool is being executed properly. Also, there is a need for big amounts of data collecting to be able to analyze the process qualities which can often be a challenge. Since Six Sigma is a rigid methodology, companies often recruit a so called "black belt", who is a specialist within the field that is being analyzed and can lead the work of improving the process.

3.3.4. Lean Six Sigma

This strategy combines both the Lean and Six Sigma methodology. Combining the Lean goal of eliminating *waste* and the Six Sigma focus on reducing variation and eliminating defects, makes Lean Six Sigma a powerful tool. If used correctly, this combination will allow companies to remove any unnecessary elements in the process which does not produce value, for the customer. The most common tool used in this strategy is called DMAIC, which claims to be the future within management of business processes (Hill, 2008). The steps are as followed:

- *Define*: Articulate the business problem, goal, project scope, potential resources and high level project timeline.
- *Measure*: Collect data within the processes. To set clear parameters on how and what to measure is important to establish good data.
- *Analyze*: Identify, validate and select root cause for elimination of the data collected.
- *Improve*: Identify, test and implement a solution to the problems found in the analysis.
- *Control*: Monitoring the implemented improvements to ensure a continuous and sustainable success.

Though this might seem like a straight forward methodology and many companies claim they are using Lean Six Sigma, very few actually use it properly, on a day to day basis, following it every step of the way.

3.4. BUSINESS MANAGEMENT SYSTEMS

The ever changing complexity of the modern business world has an effect on the corporate organizational design. To maintain a strong competitive position, companies must constantly adapt to the surrounding environment and are prone to make quick and important decisions on a daily basis. To be able to preserve the competitiveness of the organization's efficiency one must continuously search for an optimal solution for the operations within the business. Investing in Business Process Management System is a great solution to limit the need for constant improvements of the organization and its processes.

3.4.1. Business Process Management Systems

A Business Process Management Systems or Suites can be defined as software that enables a company to design and model the automation of interrelated activities, processes within or across departments, collaboration and integration with other systems, and including external partners, customers and suppliers as performers in the value chain. With the proper use of BPMS, the company enlightens all the stakeholders' understanding of the organization as a whole and its strategy mapped in process structure, communicated by a visual display. One can say that a BPMS is a bridge between information technology and business (Silveira & Rodriguez, 2012). By digitally modeling complex tasks and activities a company facilitates mechanisms for business problem solving. Also business processes become easier to assist by monitoring and controlling, resulting in quality improvement.

We can divide a BPMS into four components and can be described as:

- *Process Engine*: a platform for designing, modeling and execution of process-based applications, where requirements, rules and regulations are included.
- *Business Analytics*: through reports and dashboards, the managers are able to identify and analyze the business' progressing strengths, weaknesses, opportunities and threats (SWOT analyzes), and can react accordingly.
- *Content Management*: a secure and digital storing system for documents, files, images etc. needed in the processes display.
- *Collaboration Tools*: provides a cross-functional communication platform between different departments using forums, workspaces and message boards.

Another important factor which should not be underestimated is the validation of the BPMS, especially if regulatory compliance is mandatory. Usually an authorized third party will be validating the BPMS or even the users themselves. Anyhow, there must be some kind of approval documents generated and made public or retainable by the users.

Most companies do not have a formal BPM group in their organization but usually hire an external consultant company to establish a Business Process Management System. When

BPMS consultants are appointed, a company would often prioritize the following tasks to be done:

1. Develop a system for measuring, monitoring and controlling processes at a corporate level.
2. Define and map the relationship between strategy and process.
3. Design and implement architecture for the process at a corporate level.
4. Coordinate, lead and train the BPM projects and programs within the company.

Using consultants can also help a company re-design projects, execute process analysis, design training and training in process management. There has been a significant increase in the use of BPMS consultants in the latest years, where the most commonly used tools are the graphically modeling kind. Also there has been an increase in the repository based modeling tools, which allows the users to accumulate process models.

3.4.2. QLM

Qualiware Lifecycle Management is repository based BPMS developed by Qualisoft AS. The company itself was established in 1994 and have since then been working with process architecture and model-based quality systems. In the Norwegian business industry, Qualisoft AS is a leading company within its field and has many customers in both private and public sectors (Qualisoft, 2010). Oceaneering International Inc. has been using QLM for several years and Oceaneering Asset Integrity is now in the phase of implementing this system to their intranet pages. The analysis of this thesis is based on the actual work done by OAI in QLM.

QLM is a system designed for process and quality improvement which supporting a holistic enterprise architecture, consisting of goals, requirements, processes, applications, information and technology. QLM has also adapted solutions for enterprise risk management, compliance and being able to handle improvement and variance suggestions. The software is a process-oriented and visual management system for the development and documentation of the organization's work processes and procedures. In other words, it is designed in a way where

the relevant business processes can be visually understood and effective management of the processes can be done accordingly. Also QLM provides quick and easy access or links to important information and documentation.

Qualiware Lifecycle Management is built on an electronic process-oriented structured platform with links to portals and documents. With this tool, one can model the whole or desired levels of the business and also include the visualization of external actors. The finished modeled BPM include both symbols and text descriptions and can be distributed by the company's intranet pages to all employees. Links to requirements, laws, regulations, procedures, job descriptions, safety instructions, templates, forms, checklist, guidelines etc. can be added to tasks, activities, processes, people or roles. By modeling the QLM to be easily understood the company improves the quality of the work done by the employees, who can easily navigate through the processes and the links connected. It is also easy to develop and maintain the system, while facilitating continuous improvement.

3.4.3. APOS

Another Business Process Management System is APOS which is used by for instance Statoil. The system is made for best practices and management of documentation. Workflows are attached to activities that are linked to requirement and methods of executing the tasks, much like QLM. These workflows will help the employees to uncover defects or error in the delivery. Much like QLM, APOS can show in the graphical display that specified activities must be granted by authorities or an internal control element, before one can continue. The main goal of APOS is to make sure that all the involved stakeholders can at any given time access and view the processes and the requirements attached to it. Since Statoil use a large amount of suppliers, having a visually displayed business process system is important to uphold the quality of work from all parts.

3.4.4. ARIS Express

A third BPMS which is worth mentioning is ARIS Express, a freeware modeling tool for business process analysis and management. Much like QLM and APOS, ARIS Express is built on an electronic platform, which can model processes, activities, workflows, organization charts, etc. ARIS is divided in a home screen for employees to view the modeled processes and a modeling environment where the designers can create the system. Besides the standard BPMS tools that most software have, ARIS Express have some unique features not found in similar software. For instance ARIS Express has a smart design which allows the modeler to type in data in a “live” spreadsheet that will automatically be generated in the viewing site.

4. METHODOLOGY

This chapter will explain the chosen approach to the topic and describe the different methods used. The sources and interview objects will be presented and how the studies were performed.

4.1. QUALITATIVE APPROACH

The studies were performed using a qualitative methodological approach. This involved the use of literature, observations and interviews of relevant personnel took place, based on the theory and practical work around the implementation of the business process management system. The qualitative method is considered suitable for this type of research, where one wishes to access personal experience and opinions around known problems (Tjora, 2004). One wishes to explore the *how* and *why* instead of the *what* and *where*. By using structured questionnaires and semi-structured interviews of key personnel, in depth information was able to be obtained. The method is based on few respondents and many variables. This reflects the decision of using a qualitative approach and not a quantitative method. A quantitative method requires a clear hypothesis, holistic view of the phenomenon, control of the variables and values that could affect the results. In this case, such information does not exist or cannot be acquired.

The qualitative method is useful when one wants to study something that cannot be observed but understood through communication, like in this case. By using qualitative research through interviews and questionnaires, firsthand information can be communicated through the participants. With the use of the questionnaires and interviews, access to information become available which otherwise would have been almost inaccessible (Holme & Solvang, 1996). The time and cost factor that qualitative methods bring usually result in relatively few observational samples. In this case, few participants were interviewed and questioned, which leads to rich descriptive data of a specified issue. Sixteen key personnel within project management were the object of the questionnaire and two key persons from the management

were interview objects. The collected data was separately examined and then compared with each other. Because of the small size of samples one will seldom attain a representative model where the results can be generalized when using a qualitative method. The samples are not a representative of the whole population but rather of a category and are therefore a representative for the area where one expects to find information (Sander, 2004). However, when looking at other studies or practices of the same art, one may still conclude that the samples can be generalized to a certain extent.

4.1.1. Theoretical Basis

The theoretical basis for process-oriented management should be investigated, both in comparison to the existing research and development, and the corporate basis for choosing this topic. By interviewing the management personnel who stand behind the implementation of the BPMS, deeper insight of this comparison can be analyzed. The development of the BPMS must reflect the decisions made by the management and what effects it will have on the company. When comparing the theoretical basis up against the research, one must remember that the theory is generalized and applicable to a standard business model, while OAI is a unique company with its very own organization, strategy and structure.

4.2. SEMI-STRUCTURED INTERVIEWS

A qualitative research interview session collects data through conversations between oneself and the object. The unique properties of this type of conversations is the fact there is a methodological conscious of the query form, a dynamic awareness of the interaction between the interviewer and participant, a critical awareness of what is being conversed, and the personal interpretation of what is being said (Kvale, Brinkmann, Anderssen, & Rygge, 2009).

The interview used in this thesis had a characteristic semi-structured form with 10 questions regarding the topic. Two key personnel within the management were interviewed due to their ambitions towards implementing the business process management system and their involvement in the startup of the BPMS project. The respondents could answer freely on the

open questions asked, because there were no premade answers presented. While conducting the interview, it's essential to steer the conversation within the boundaries of the topic. Also adding follow-up questions where the respondent was unclear or a deeper meaning was sought. The questions asked were based on the theoretical literature and the practical work experienced at OAI.

While designing the questions it was important to structure these in such a way that most data could be captured from the respondent in a timely and consistent manner. Since qualitative case oriented method require in depth interviews and detailed responses, interviews of this fashion tend to become extensive and time consuming. To effectively reduce the time used on the interview, the questions were sent per mail to the respondent beforehand along with a short description of the upcoming interview, explained over the telephone. By doing this, the respondent got a quick brief of what would happen and how the interview would take place. Also it gave them time to prepare their answers to the questions and reflect on any issues they wish to discuss. At the end of the session, the participants were asked to add any additional comments, giving them room to elaborate on any points they wanted.

By using a semi-structured interview one must control the discussion to some extent but also allow the respondent to emphasize their areas of expertise and personal opinions. A closer contact between the interviewer and respondent is then easier to achieve, while also having a more flexible dialog. The respondents become more relaxed and open to express themselves deeper and more thorough, and the interviewer can easily add follow-up questions during the session. On the other hand, the disadvantages of a semi-structured interview and few samples would be that the method may be limited in range. Put in other words, it may be difficult for the interviewer to draw conclusions from the answers due to them being unrepresentative or the sample rate is from a subjective perspective. Also, when there are few samples, like in this case, some responses may have to be neglected and the data becomes less viable when deliberating. While few, the respondents can be dishonest or inadequate in their response either by trying to protecting themselves, promoting a self-interested strategy, or misinterpreting the questions (Tjora, 2010). Keeping this in mind when doing the interview is

important, while trying to avoid such situations, keeping each respondent on the same trail of thoughts and questions. However, when receiving a wide variety of answers with contrary information based on different perspective, the interviewer can see the issue from different angles.

4.3. STRUCTURED QUESTIONNAIRE

Like the semi-structured interviews, the main goal using a questionnaire is to extract the personal opinions of the participants. The questions were based on theoretical literature in relevance to the thesis topic and also the practical work experience attained while implementing the BPMS. While the interviews were semi-structured the questionnaire was structured with multiple choices for each question except the last question opening for any further comments. This narrows the spectrum of the replies and retains the participant to have limited alternatives, which can be both an advantage and disadvantage. The positive effects of having a structured questionnaire are that the responses are easier to analyze when the multiple choice answers are the same for each participant. It is considered a qualitative method when the answers reflect a personal opinion, however by using this form of survey the method becomes somewhat quantifiable. Meaning the personal answers given can be weighed against one another, since the replies are in a scale. The disadvantages of using a structured questionnaire are that the respondent is limited to the premade questions, maybe preventing the true thoughts and opinions to be expressed. The questions can be misunderstood by the respondents or the answer scale can be misinterpreted, giving an ambiguous understanding of the questions.

The survey was designed to be easy and quick to complete, allowing the respondent to answer in a timely manner. This was done by asking 15 questions, with six multiple choices and a free text field at the end. By using this questionnaire form, the respondents could use their time to evaluate each question and easily submit their response with a click of the mouse button. Compared to other surveys where each question is answered with a sentence/paragraph, the participants tend to lose interest when their time goes to waste typing, retyping, checking spelling etc. Having a multiple choice gives the participant time to think

on the question and evaluate their answers rather than spending time correcting their spelling. This can seem as bad research when the participant are forced to choose from premade choices and conducted to limited alternatives, but the questions and multiple answers are formulated to reflect the issues of the topic based on the theoretical literature. This questionnaire would ask about how project managers and project engineers experience the newly implemented business process management system and their personal views.

4.4. KEY PERSONNEL

To determine the current situation it is necessary to investigate the experiences of the formal procedures that exist in the company, how they are presented and how available are they. By interviewing key people who have project work experience, one may acquire personal experiences and knowledge of the challenges with the current system and receive guidelines for improvement. Trying to identify the common denominators in the difficulties that have been experienced, personal opinions and attained knowledge were the main focus while interacting with the key personnel. Since the participants ranged from a variety of expertise and knowledge, it helped broaden the basis for further analysis of the topic and evaluation of the effects of the BPM project (Punch, 2005).

The participants were selected from the roles they had and can be divided into two groups. All the respondents are employed in OAI since this will be an internal site aimed to improve the effectiveness within the company. The participants include disciplines from top management, to middle management and project engineers, assuring experience horizontally across the organization. There has been shown great understanding of the topic and the participants have been enthusiastic to convey their experiences and challenges around the issue.

4.4.1. The Management

The first group consisted of two key personnel from the management who were two of the main people behind the realization of the business process management system. These two individuals had a positive view of process management and understood the importance of it.

They are aware of the fact that any large and serious company is bound to have some form of process management of their work in order to survive the increase in demand from their customers. The main goals when interviewing the key personnel were to investigate why they initially wanted to implement a BPMS, how they would manage the designing, modeling and implementation phases, how they plan to uphold the continuous improvement of the system and what effect they believe it will have on the company. During the whole interview, one had to remember that the respondents were key members involved in the decision making of implementing the BPMS and would therefore probably exaggerate and misrepresent the matters being discussed to their favor. It was then important to try and guide the interview in a manner that the respondents would have to answer in a most honest and factual way.

4.4.2. Project Managers and Project Engineers

The second group consisted of sixteen project managers and project engineers from the company who on a daily basis is influenced by project management. The reason for choosing these participants was because the questionnaire asked specifically about the processes within Project Planning, Execution and Closure. This would secure a realistic response because the participants had experience working with these processes. This group had a variety of participants from different projects, background, locations and experience, giving a broad perspective on the issue. Using a questionnaire was suitable with this group because the variety of participants would otherwise generate large variety of responses which could be impossible to compare. Since the size of this group was quite large, an interview session with each recipient would take too long. The recipients were first introduced to the BPMS at a staff meeting at their location and at the end being explained shortly about this master thesis. Afterwards they were contacted by phone, explaining the thesis in detail and the purpose of the questionnaires, and finally sending the questionnaires to the participants per mail. The questionnaire was made in an online survey called Google Form, allowing the recipients to submit their answers electronically.

4.5. PRACTICAL INVOLVEMENT

In order to gain a proper insight in the strategic plans made by the management concerning the implementation of the business process management system, one must acquire information around the work that has previously been done. Being involved so early in this project, when this was no more than an idea, the whole development of the project was experienced, from startup to launch. This has given me an understanding of the system on a holistic level and has helped me understand the theoretical purpose behind such a tool. This might seem like a bias position where I am in favor of the business process management and its implementation, but keeping exactly this involvement in mind while doing the thesis, a completely objective perspective will be present.

By being a part of the development, design, modeling and implementation phases of the Business Process Management System, I learned the basic aspects of how the system will work technically, its purpose and potential within the company. During the modeling phase of this project, one comes to understand the processes, procedures and work flows more fully and how it is relevant for the employees on a day to day basis. By obtaining this insight, the communication between the key personnel and me became much smoother, seeing clearer what to ask and how explain complicated problems. Having worked on the implementation of the BPMS combined with the theoretical literature, the preparation of the interview and questionnaire could be designed on a suitable level so that it challenged the system and thesis topic. Also, by the practical work experienced while implementing, the analysis of the responses could be fully interpreted based on the fundamental understanding of the system.

One might think that being an OAI employee will result in a bias perspective of the issue and favoring the company and its values. Yes, I have a personal affection towards OAI and wish the BPMS will succeed, but I understood that in order to help my company in the best possible way I had to be totally objective and find the true results when doing this thesis. Having said that being an employee of OAI gave me a wider perspective of how the different work areas, systems, software, personnel and organization work. It also gave me a holistic

view of the current situation within the company. By knowing the main work processes through previous projects, the preliminary work before the analysis of the respondents' results went smoothly. The activities, roles, requirements, documentations and responsibilities were well known and therefore easy to formulate questions to challenge these objects. Knowing the employees at OAI has helped me communicate better during the interviews and questionnaires. Choosing the right people to attend the questionnaire and contacting the management was therefore not a problem, and the respondents could feel more relaxed when dealing with a familiar face/voice. Nonetheless, while executing the interviews and questionnaire, all my personal relations between myself and work were put aside to assure an unbiased result.



Figure 4.5-1 Ready for Work

5. RESULTS AND ANALYSIS

Since the data in the studies are only qualitative, there will not be used and statistical analysis. There are a lot of different methods of analyzing when working with qualitative data and can vary widely (Qualitative Methods, 2010). There are no set templates or requirements while analyzing, but rather a hermeneutic process. This means that the analysis tries to find meaning in the data while organized in a sensible way, analyzing each response individually. In order to find meaning full patterns, one must reduce the irrelevant data, set up dimensions/categories in order to summarize and compare, and find similarities, differences and relationships (Lüders, 2004). One can sometimes reveal an underlying structure of the material by grouping observations into classes and present them in for instance tables or graphs.

The questions asked in the interviews and questionnaire was designed on the basis of the theory, and will therefore be analyzed from the theory's point of view, adapted to this specific organization. As the theory is only a generalization of companies worldwide, in this thesis the circumstances are different and therefore light must be shone upon this fact while analyzing. Some of the questions asked in the questionnaire were formulated also on the basis of the knowledge gained while designing and implementing the process management system. While working on the implementation process, one gets a clearer insight of otherwise unknown challenges, seeing a new perspective and finding interesting disputes. These issues will be tried analyze up against the managements point of views.

One must also match the respondents' opinions and interpretations correspondently, and keep in mind when reviewing the data that the questions in some cases appear to be perceived in different ways. The participants will react differently to some questions and emphasize differently on other questions. This cannot be avoided, because people are different and perceive and interpret situations differently, seeing different contexts and connections. However, it is important to be aware of this when analyzing and comparing data. It's about

painting the larger picture and finding the total meaning of all the responses to find the real results of the study.

Before continuing, the terminology of *analysis* in this thesis must be clarified, since there are many definitions and understanding of the word. To remove any uncertainty of what is meant by *analysis* in this thesis, a common description explains:

Analysis – To separate into constituent parts or elements; determine the elements or essential features of a material or abstract entity (dictionary.com).

5.1. THE MANAGEMENT

The interviews with two of the key personnel were conducted over the phone, were the questions beforehand had been sent to the participants. The ten questions can be divided into three sub-topics, based on the theory presented in chapter 3. The two interviewees did not have any contradicting comments, so when it refers to “one of the respondents” it does not mean that the other respondents disagree; there were just no comments on the matter. When referring to “the management” it means both the participants had the same reply/opinion on the particular issue. The questions asked in the actual interview deviates from the semi-structured questions made beforehand. That is because while doing an interview, correct presentation and follow-up of questions are important, in order to maintain a natural dialogue and flow of the interview.

The following three chapters will first present the theory on which the issue at hand is based on. Next, the actual question asked in the interview will be appointed (in italic font) and afterwards the responses from the participants will be presented. The symbol ~~~ indicated that a new question or a follow up question have been asked. All questions concern the newly implemented Business Process Management System at the company.

5.1.1. Initiating Factors

The three most common reasons why companies decide to perform Business Process Management are:

1. In order to save money
2. Better management coordination
3. Secure more satisfied customers

To achieve a successful Business Process Management and its systems, a company needs to integrate three fundamental functions: compliance to regulations, quality control and management of business processes. If these factors are correctly integrated in a company using a strong approach, the results will be reduced cost and risk, faster implementation of changes, exchange of best practice between departments, reduced duplication and a clear, holistic view of the organization.

Why did the management decide to start the Business Process Management project and what are the main goals behind the implementation of such a Business Process Management System?

The essential reason why the management started the implementation of the Business Process Management System was to assure Oceaneering Asset Integrity AS better quality control over their projects and to visualize the processes/procedures, in order to enhance the performance of each employee.

Quality Management: The management states that every year 1 or 2 larger projects are reported for containing mistakes and being unfulfilling. This was explained due to a lack of correct project management because of bad or no consistent processes and procedures to follow. The management says that delivering a product that does not meet their clients' requirements due to poor quality is very bad business. The company is dependent on their clients and the contracts they bring, as OAI is a service providing organization. Therefore delivering a product with high quality and value to their customers is the most important

value for the management. A satisfied customer results in further collaboration, more contracts and an improved reputation, which inevitably helps OAI's financial growth. In order to maintain a good quality, the management is aware that it must be measured, controlled and managed. By implementing a BPMS, the management believes these elements can be ensured.

One of the respondents says that through the process management system, OAI must establish clear measuring parameters of the project processes in order to effectively measure the quality costs. By systematically quantifying the quality costs, the company can simply locate where in the process of project management bad quality is produced, and can then do improvement changes. The management, together with the Health, Safety, Environment & Quality department, are in the developing stage of creating processes on how to measure and document quality costs in projects in a sufficient way. The next step will be how the procedures can be implemented in the BPMS and used in practice.

The management states that if the quality can successfully be measured and documented, the company will be able to better control the conditions of the deliverables and manage improvement factors accordingly. Changes to counterwork negative quality costs will be implemented in the governing processes and procedures, which can be reflected in the BPMS. By continuously measuring, controlling and managing the quality, the processes on a holistic level will become more robust due to a regular improvement and awareness of mistakes and problems: states one of the respondents. Further, the improved changes applied to a specific process will be communicated through the BPMS on all the different levels of the project, giving each project participant a unified understanding of the quality cost constraints.

Visualization: The management was not satisfied with the previous attainability of the processes and procedures documents in SharePoint. They were difficult to locate and therefore not frequently used. The work processes of the project management participants were fragmented due to undefined processes. One of the interviewees said that the main goal for the BPMS is to establish a holistic visualization system in order to elucidate the processes,

documents, responsibilities, requirements and information. By creating well defined processes in the system within project management the informational communication between employees across departments and locations would be strength. Eventually this improved collaboration and common understanding of the processes between participants will result in a more precise product and assure better quality for the customers.

One of the respondents says that if the processes and procedures in the company are visualized prominently and clearly it is more likely that the employees will use the Business Process Management System more frequently. Further the respondent comments: compared to the previous system, a BPMS like this will have a positive impact due to the improved availability of information regarding work processes and procedures. The management also mentioned that a clear visualization of the project management processes will lift the competence level of the average employee and result in a better deliverable to the clients. When new employees are appointed an unfamiliar project, the BPMS will be a great aid in the training and practice. The management believes this will give the person responsible for the employees' training, a great tool to communicate and teach the work flow of projects, using visual display of processes, procedures, requirements, responsibilities, supporting functions, etc. Also, the training will become more efficient, allowing the person responsible for training a quicker return to his/her work and the new employee can sooner be ready for independent work.

~~~

The theory states that in order to successfully achieve increased quality, continuous improvement and reduced costs through a business process management system, it's important to establish and develop an organizational culture that understand the core values behind BPM. Every employee must be aware of the BPMS, understand the purpose of it and actively use the tool. Lacking the correct culture at the work place results in no one giving improvement suggestion, no proper use of the BPMS and the system will therefore be useless.

*Do you believe the Business Process Management System will affect the organizational culture, if so, how? What will the management do to enforce the employees to have a Business Process Management mindset?*

The management believes that the BPMS will definitely have a positive effect on the culture within the company. Visually displaying the processes and procedures will give a harmonic understanding of the governing documentation and will therefore strengthen the organizational culture. One of the interviewees points out that if an employee gives a suggestion for improvement and the changes are done accordingly in the BPMS, the employee will see that actions have been taken from his/her suggestion. This will create a feeling of achievement and boost the cultural mindset towards continuous improvement. When employees see that their comments and feedbacks are being heard and listened to, the organizational culture regarding BPM will flourish.

Both the participants responded that the management has an important role in achieving this culture development. They implied that they must promote good ideas from the employee and have clear procedures on how improvement suggestions will be handled. Failing to do this was not an option. When the BPMS was implemented and launched internally in the company, the management arranged the project leader to introduce the system at OAI's four locations in Norway. The project manager travel from the Fredrikstad office, to Stavanger, to Bergen and the Trondheim, giving a 30 minute introduction to the BPMS and explaining what purpose the system will serve. In doing so, the management believe the employees will get a clear understanding of systems, promoting them to use it on a regular basis. One of the interviewees said that this was the first step towards securing a good BPM culture.

### **5.1.2. Implementation and Maintenance**

When implementing a Business Process Management System one has a lot to remember while populating processes and procedures. Outdated processes or missing procedures, due to lack of information available, inconsistent process design or no knowledge of the work flow will

result in a poor implemented system. Bad process design can perhaps confuse employees while utilizing the BPMS, leading to projects mistakes, and ultimately dissatisfying the employees resulting in stopped usage of the system.

*Considering the newly implemented Business Process Management System and the processes that have been designed so far, how satisfied is the management with the overall design?*

Both the respondents from the management were satisfied with the process system so far and one was even surprised at how well the system was designed. The interviewee said that it is good to see that processes with its support functions give detailed visualization of each area of work and its activities. The other interviewee states that the management had, a couple of weeks ago, started a project that would re-design all the processes and procedures in the Corrosion and Insulation Maintenance (CIM) department, in order to have the processes updated and ready for implementation to the BPMS. The company is aware of that the system is under development, and incomplete, missing processes and procedures for some departments. However, the management is satisfied with the framework of the system so far, and says it looks very promising.

~~~

The ISO 9000 series is a set of standards of quality management. ISO 9001:2008 describes the requirements and importance of designing, implementing and improving a quality management system based on the processes within a company. Furthermore it explains what is meant by a process and keeping the process-oriented thoughts in mind. General requirements of the standard states that the organization shall establish, implement, document and maintain a system for quality control and continuously enhance its effects accordingly. ISO 9001:2008 is considered the most popular formal policy, regarding quality, and many companies around the world have certification stating that they comply with the requirements specified in the standard. However, inadequate monitoring of quality management between revisions often takes place, mostly due to the company's lack of resources for the continuous compliance (ISO 9001:2008).

Is Oceaneering Asset Integrity ISO 9001:2008 certified? If so, how will the management assure the Business Process Management System will be in compliance?

The management confirmed that the company is certified by the ISO 9001:2008 standard. They were both well aware of what this standard states, and what it means to be in compliance. The interviewees explained that the certification implied the requirement of having a process-oriented mindset while developing and executing quality control. Further they described the importance of having a Business Process Management System could reflect these requirements. One of the respondent states that having a process-oriented mindset while developing the process system and the corresponding quality control is very important. Also, the respondent says that besides the ISO 9001:2008 requisites, there are other requirements that should also be visualized in a BPMS.

The management assures that the processes are being revised regularly, according to requirements, and they will make sure this will be done in the future. The management has procedures on how to maintain the revision of the processes on a regular basis and is aware that these revisions must be updated in the BPMS. One of the interviewee says the project management processes have been revised four times since 2007, with the help of the HSE&Q department. These changes are documented according to the requirements and it is important for the clients to see that the company is in compliance with the ISO 9001:2008. The other respondent continues from the previous question and states that another reason why the CIM department re-designed their processes was due to following the ISO 9001:2008 standard and ensures compliance.

~~~

The theory states while doing process architecture or designing the process structure, one must base it on five main components: input & output, flow units, networks of activities & buffers, resources and information structure (Laguna & Marklund, 2005). Understanding the constraints and opportunities between these elements in any given situation, is the key to a great Business Process Design.

*The Business Process Management System is far from finished. How will the management administer the further business process design? What resources are set aside to assure the best possible outcome?*

One of the respondents from the management started answering the question by first explaining the history of the decisions behind implementing a Business Process Management System. The respondent explains that for over two years ago, the management, of then AGR Field Operation, agreed upon the necessity of having a BPMS. During these couple of years, the management had considered different systems and programs from various suppliers, but none came close to what they desired. After Oceaneering International Inc.s' acquisition of AGR FO, the management was introduced to the BPMS Oceaneering was using and were convinced that this was the right system. The interviewee explained that the reason for waiting so long was to find the best possible system suited for OAI. Having found a great BPMS meant that the process design would go much smoother and know the resources would be safely used on reliable software. Further the interviewee states that there are resources set aside every year for the Quality Control and Improvement account, and this is where the resources for development, design, implementation and maintenance of a BPMS are obtained from.

The management says that there will be appointed personnel to be in charge of the further implementation and maintenance of the BPMS, but the exact amount of resources that will be spent on this has not yet been decided. They explain the importance of finding a good procedure for the further implementation using personnel with profound understanding of process management and knowledge of the business on a holistic level. These procedures are under development together with the HSE&Q department, to make sure the processes are implemented and maintained properly. One of the respondents describes that the management is willing to spend the necessary resources needed in order to correctly implement a new set of processes in the system. This includes for instance if the responsible process engineer have little or no knowledge of the processes and procedures at hand, he/she can set up a workshop with an employee that has more comprehension. The company must then pay an extra

employee by internal hours in order to complete the process design. However, the respondent says these kinds of measures are necessary to assure the best possible implementation of the processes in the BPMS.

~~~

Studies of failed projects using process-oriented management show that the reason for failure is the lack of support and understanding from the management, who expect immediate improvements, only focus on long/short term gains and too much focus on details rather than the overall picture (Ramias & Wilkins, 2011).

How will the management support and contribute to the implementation, maintenance and further development of the Business Process Management System project?

The management states that they have a responsibility to ascertain that the Business Process Management project is done properly and make sure that it will be used on every level of the organization to its full potential. One of the respondents says that the management will have to involve all the different departments in OAI and assure that each responsible is aware of the goals of the BPMS, and everyone has a unison understanding of the process system. Further the interviewee states that if some departments are not satisfied with the current framework of the system, the management is responsible for finding a suitable solution that can be implemented for every business area.

One of the respondents says that currently the processes and procedures implemented in the BPMS are on an organizational level that is too low. These needs to be lifted to a higher level and thereby be used on a bigger scale in order to get a holistic overview of the organization and can be used for everyone at OAI, including the management. The management will use the current BPMS to show and influence future top level decision regarding further implementation and development of the system.

5.1.3. Future Improvements

For a process-oriented organization to be successful four prerequisites must be in place: A holistic view of the main processes, process management systems must be a part of the daily operations, management must be process-oriented, and the ability to change and transform (Ramias & Wilkins, 2011). For the last prerequisites, the theory says: one of the main reasons why an organization should be process-oriented is to increase the flexibility and ability to change. To understand how the organization works is important for development and improvement of projects. Maintaining a continuous improvement within the processes contributes to the organizations ability to adapt to the evolving business world.

What will the management do to maintain a continuous improvement of the Business Process Management System and how will improvement suggestions from the employees be fulfilled?

Both of the respondents from the management explained that a Plan Do Check Act (PDCA) cycle will be used to secure a safe and continuous improvement of the processes within the organization. Certified personnel will have the responsibility to make improvement changes within their discipline, according to governing procedures. There are still some uncertainties regarding the how to handled improvement suggestions, in the Act part of the cycle. One of the respondents states that the HSE&Q department together with the management is developing clear procedures on how to manage just this. The respondent also says that when these guidelines are established, actions for improvement will be fulfilled, and that the Business Process Management System will be an important tool to communicate the improvement suggestions to and fro the employees. The management does not wish that comments and feedbacks regarding the BPMS will be sent for instance via email or verbally, but rather have a tool within the system that can manage and communicate these suggestions. In that way, the suggestions for improvements will be correctly recorded and can easily be managed by the person responsible, being usually the process owner.

The management concludes that in order to secure a continuous improvement, the employees themselves need to be active in the feedback loop. Without the employees' suggestions,

nothing will be changed and therefore no development. The management explains that in order to achieve a positive feedback loop, the system needs to be promoted to be used on a regular basis by all employees in their daily work. By doing so the processes and procedures will be used actively, improvement suggestions will be prominent and a culture for continuous improvement will develop. One of the respondents states that the Business Process Management System must not become a comfortable cushion for the company. Meaning it shouldn't be used just to boast to their customers that OAI has a systematic display of its processes, but rather become a system which is frequently used during daily work and be an active part of the organizations' mindset.

5.2. THE PROJECT ENGINEERS AND MANAGERS

The questionnaire was sent to sixteen voluntary project managers and project engineers from four different locations in Norway, where twelve of these had the time and opportunity to reply. After the Business Process Management System was introduced at their office, they were contacted over the phone and thereafter the questionnaire was sent to their private email. The questionnaire gave the opportunity to answer each question from a scale from 1 to 5 (where 1 was the least positive answer and 5 was the most) or a N/A option if the question was unclear or the respondents didn't wish to answer. Question 14 had multiple choice answers with an additional free text field, and question 15 gave the participant a chance to freely comment on anything. Since the responses are quantified as a scale, no deeper analysis of the answers can be done, and therefore only a systematic display of the survey results will be presented. Comments from the participants will be displayed with “ ” and will be the exact words from the questionnaire. Ex: “this is a valid comment”.

The following three sub-chapters are divided into three issues, where the first chapter will present the opinions regarding the old versus the new systems' way of displaying processes and procedures. There is no fundamental theory behind the questions asked in the first chapter, but the issue is still interesting and essential to the master topic. Seeing the contrast between the old and the new system will help in the further deliberation of the Business Process Management System and its effect on the company. The second and third sub-

chapters will first present the underlying theory behind the questions asked and thereafter display the response from the participants. The symbol ~~~ indicated that a new question based on different theory have been asked. All issues regard the newly implemented Business Process Management System.

NB! The graphs only display the choices of the scales that had responds. The numbers of the scale that are not on the graph had therefore no respondents who had that opinion. Ex: If a graph shows that 8% answered 3-Neutral, 33% answered 4-Yes, but could be better, and 58% answered 5-Yes, definitely; it means 0% answered 1- No, not at all and 2- No, not quite and therefore the number 1- and 2- are not displayed (refers to figure 5.2-5).

5.2.1. Old vs. New Business Project Management System

When looking back on the old system for viewing processes and procedures for project management compared to the newly implemented Business Project Management System, there are drastic changes. The following questions will try and extract the personal opinions regarding the new BPMS in contracts to the previous system used.

- *Were you aware that OAI was implementing such a Process Management System?*

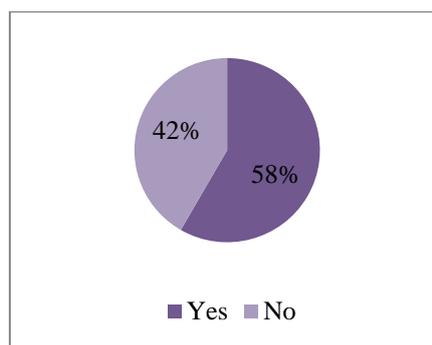


Figure 5.2-1 (Ref. Appendix II, Question 1)

- Do you know where these processes/procedures could be obtained before this system?

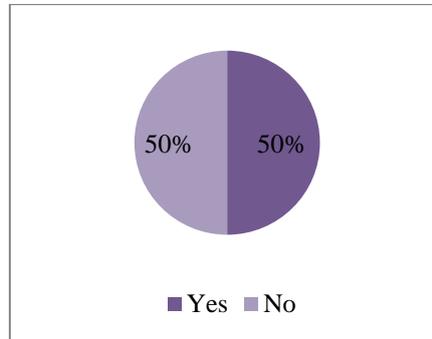


Figure 5.2-2 (Ref. Appendix II, Question 11)

- If Yes, were you satisfied with the previous accessibility?(Follow-up from previous question)

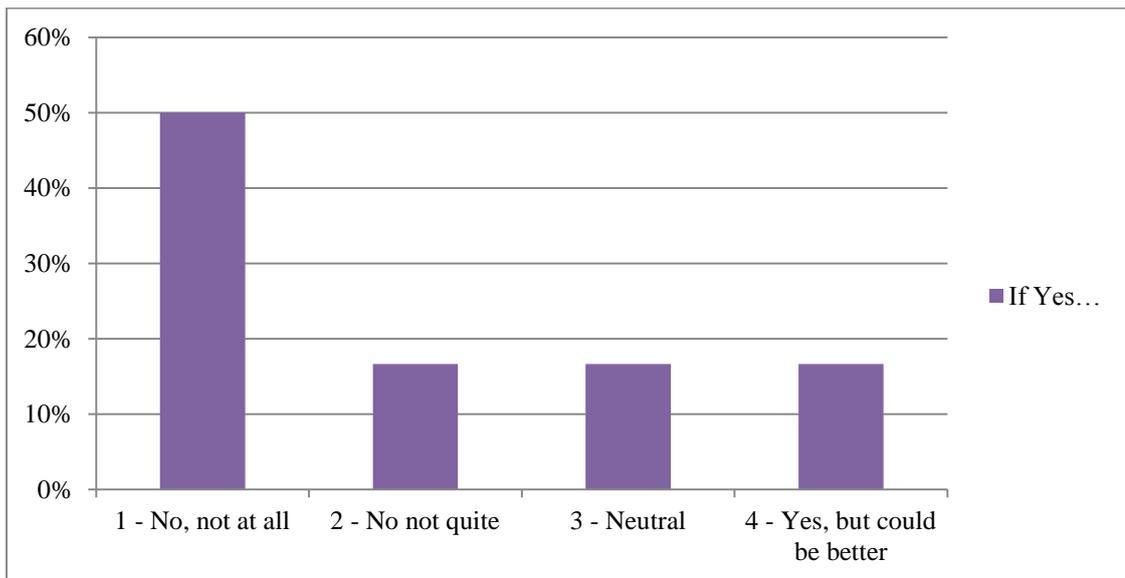


Figure 5.2-3 (Ref. Appendix II, Question 12)

The next three questions were asked in order to get a closer insight on how the employees experienced the new Business Process Management System and if the system was easy to use. The results are displayed in one graph showing the results of each question, respectively.

- I. - When exploring this site, what was your first impression?
- II. - Did the site seem clear and easy to navigate?
- III. - Did you find the site user-friendly?

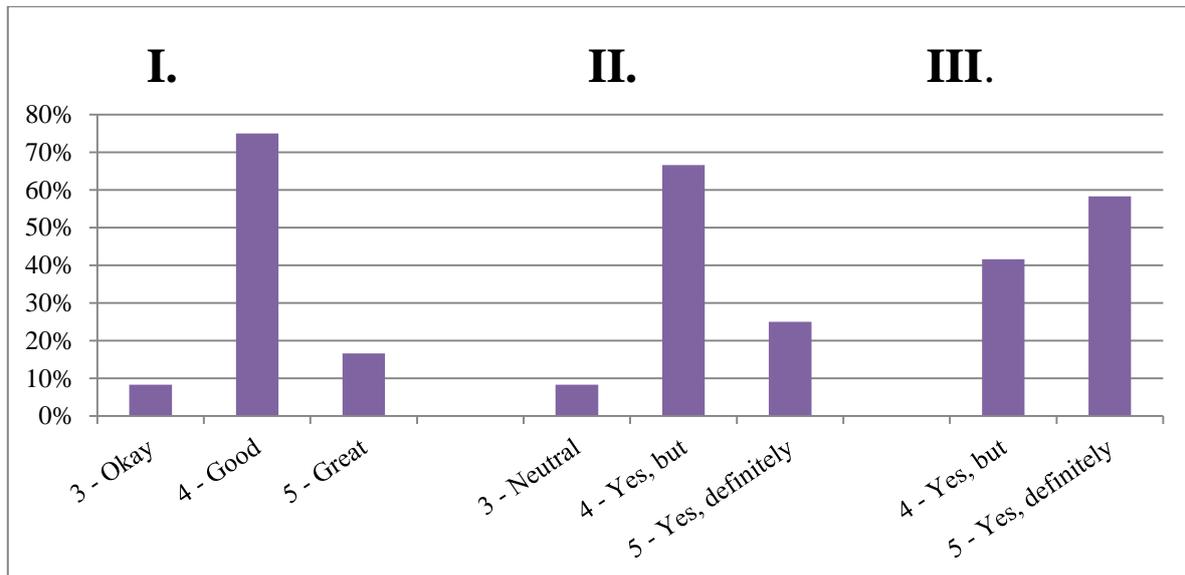


Figure 5.2-4 (Ref. Appendix II, Question 2, 3 & 4)

Question 15 in the questionnaire gave the respondents the ability to comment freely on any issues or opinions. For this sub-chapter the only relevant comment received would be from one of the participant who commented: “Perfect website. The best one I have seen in any company so far”. More comments will be presented in the next sub-chapters.

5.2.2. Improved Performance

It is important to see the advantages of analyzing and modeling the processes in an organization thoroughly. By successfully doing so, a company can see progression like (Ko, 2009):

- Increased visibility and knowledge of the organizations activities
- Increased ability to detect bottlenecks and become more efficient
- Increased ability to identify potential improvements
- Reduced lead time/delay
- Better definition of tasks, roles and responsibilities in the organization
- Greater auditing and assessment of compliance with regulatory requirements
- Good tools for counteracting corruption

- I. *Did this site give you a clearer understanding of project activities, roles and responsibilities within OAI?*
- II. *Did you find the necessary requirements were shown properly and clearly?*

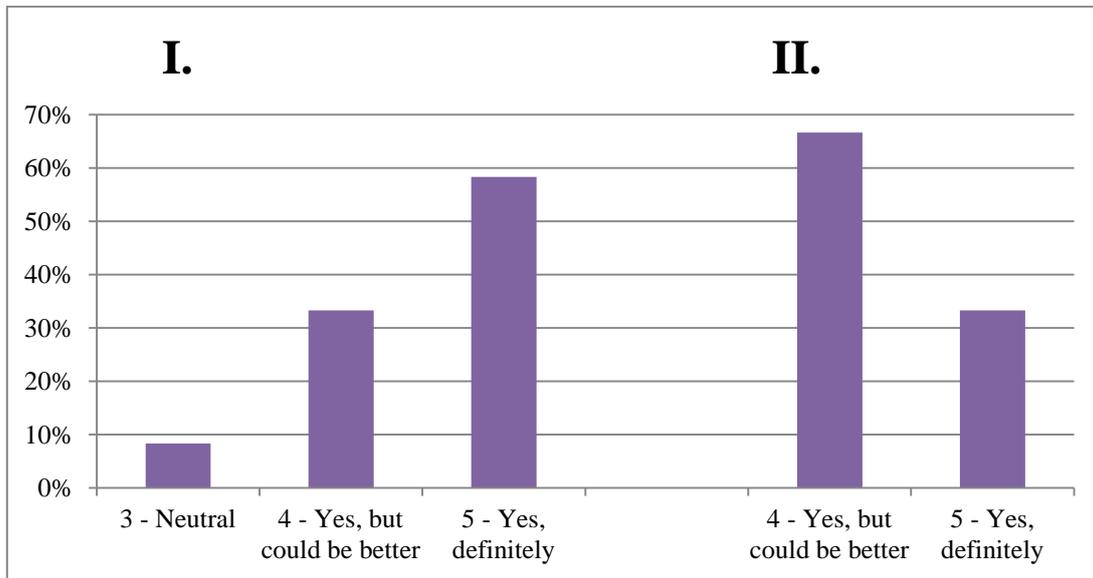


Figure 5.2-5 (Ref. Appendix II, Question 6 & 7)

There were a couple of comments on how a Business Process Management System increases the visibility and accessibility to activities, tasks, roles, responsibilities, requirements etc. Two participants comments: “It is very nice to have a tool such as this, so that most project management documents can be found easily, and in one specific place” and “Easy access to valuable documents and information. Easier to follow the "track" of a project”.

~~~

The initiating factors for why a company implements a Business Process Management System is:

1. The need for a more cost effective business.
2. The need to improve the management coordination and/or the organizational responsibility.
3. The need for improvement of the client/customers satisfaction.
4. The need for improving existing or new products/services.
5. The need to improve the management of IT resources.

- 6. Monitoring and risk management.
- 7. Other “one time” events, such as fusion/acquisition of companies.

The most common reasons out of the seven above is to save money, followed by better management coordination, and thirdly more satisfied customers. From a Project Manager and Project Engineer point of view, the most interesting points above is 1 and 2. The next questions tried to shine light upon these factors.

- *Do you think this system will help you meet project requirements in a more efficient manner?*

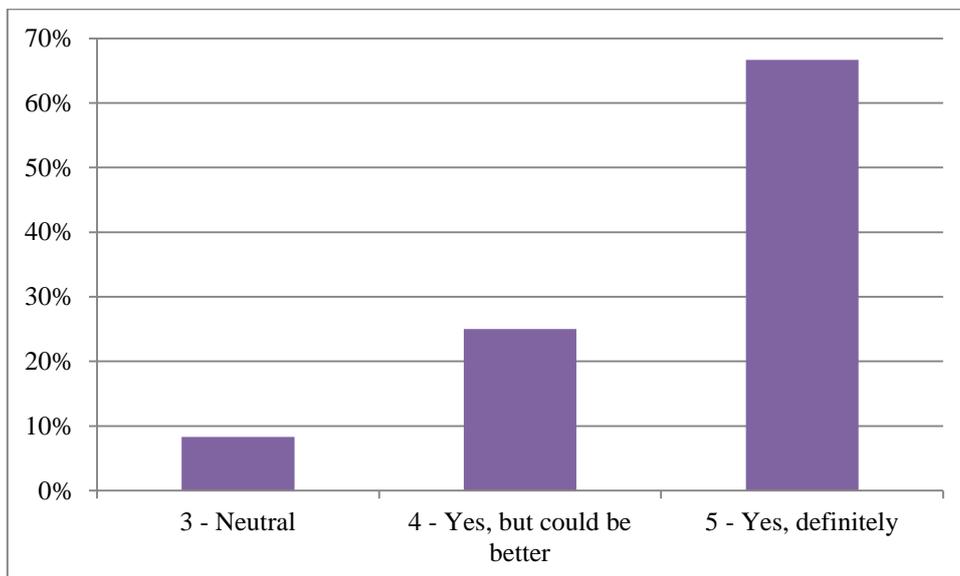


Figure 5.2-6 (Ref. Appendix II, Question 8)

- I. - *To what degree do you think this site will help with the organization of your projects?*
- II. - *How much do you think this site will minimize your time spent finding necessary documents and project requirements?*

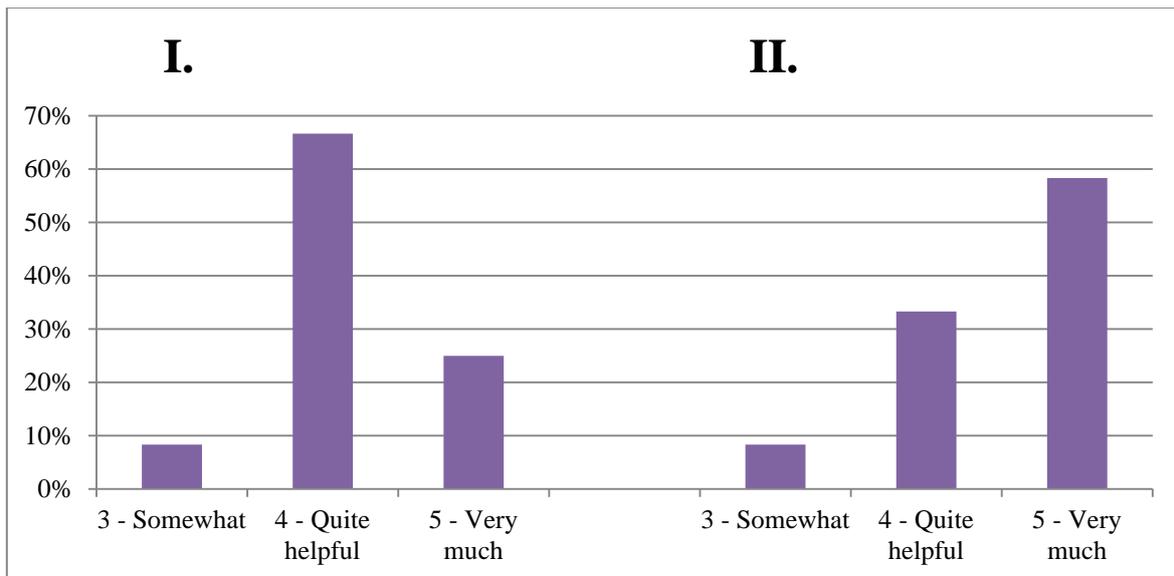
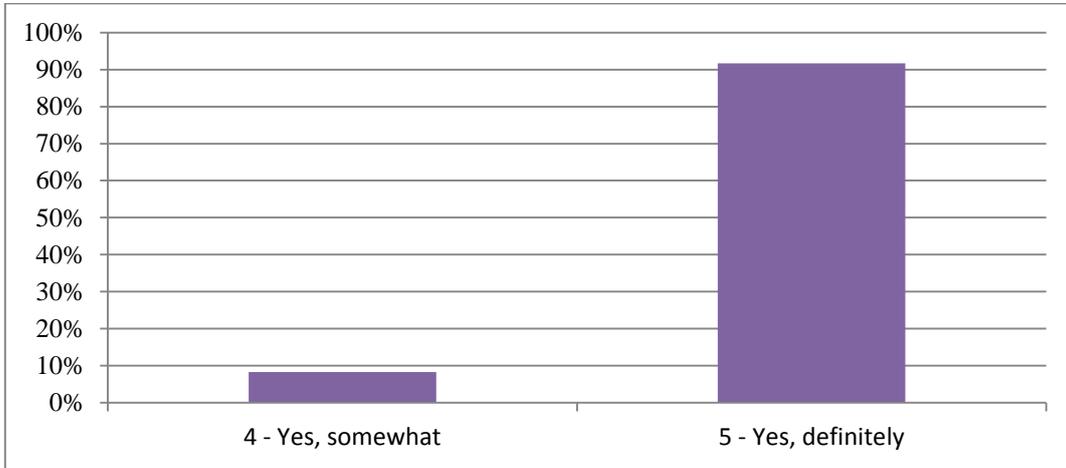


Figure 5.2-7 (Ref. Appendix II, Question 9&10)

### 5.2.3. Future Improvements

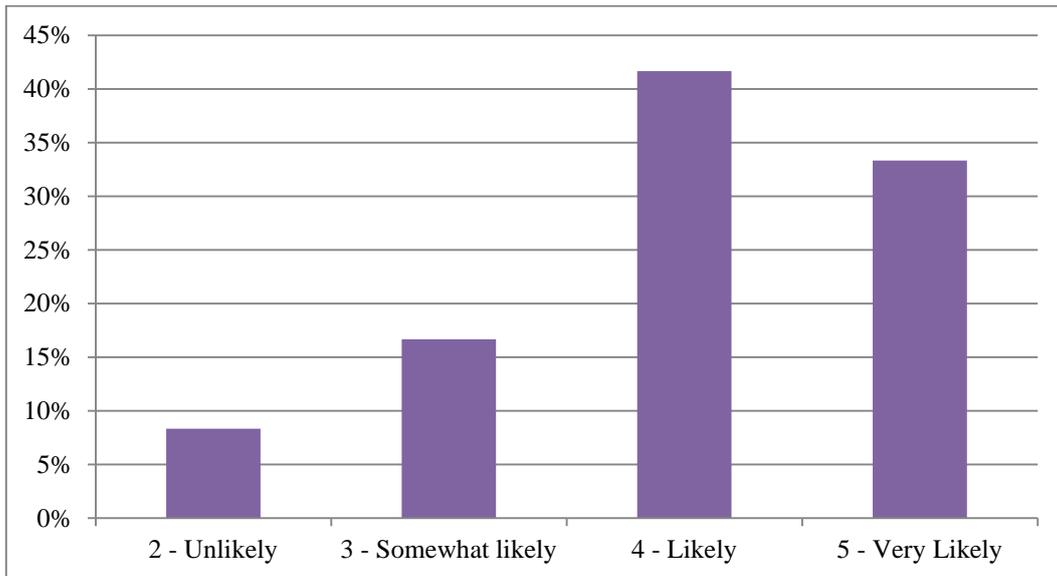
For a process-oriented organization to be successful four prerequisites must be in place (Ramias & Wilkins, 2011): A holistic view of the main processes, process management systems must be a part of the daily operations, management must be process-oriented, and the ability to change and transform. To achieve the third prerequisite, process management systems must be a part of the daily operations; the system/tool must be provided to every employee in the organization and be displayed in an understandable fashion. Employees can use this tool to manage their work on a daily basis and bring the decision making down to a lower level. The system must be constantly maintained and updated to make sure that the processes are continuously improved. In order to achieve this, the system must be regularly used, and suggestive improvements must come from the employees themselves. The next two questions were meant to discover if this could potentially happen.

- *Did you get the impression that you could use this site for your work in the future?*



**Figure 5.2-8 (Ref. Appendix II, Question 5)**

- *What is the likelihood that you will report faults and suggest improvements?*



**Figure 5.2-9 (Ref. Appendix II, Question 13)**

The next questions gave the recipients the possibility to check of multiple answers from the list. This was to see if there already were suggestions and an ambition among the employee to develop the system further. Altogether, 16 choices were selected, including the “Other” field.

- *What areas would you say need further improvement?*

The alternatives are as followed:

1. The layout of the site needs improvement
2. The site must become easier to navigate within
3. Make a clearer display of text, diagrams and windows
4. Change the design of the process(es) and/or work flow diagram(s)
5. None of the above
6. Other:

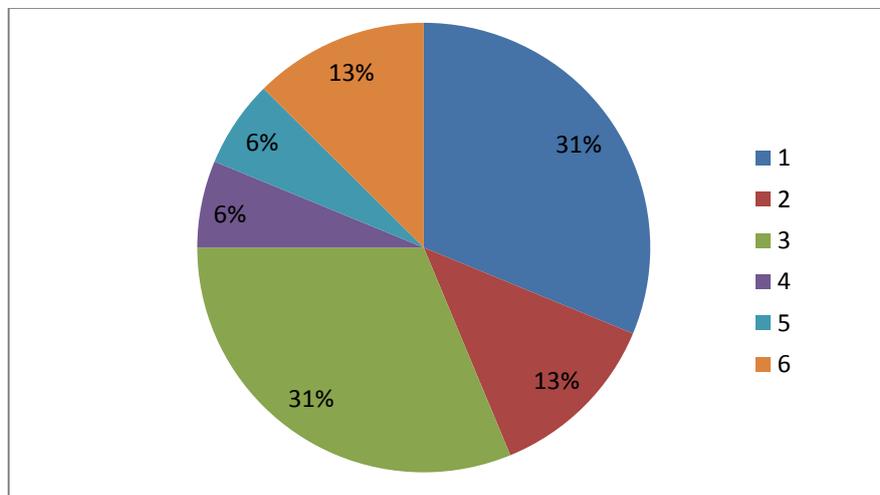


Figure 5.2-10 (Ref. Appendix II, Question 14)

Other comments regarding the future improvements: “There should be specified better what requirements that are absolute, and what requirements that are ""Best practice"" or only required for big/complex projects (ref. Project Management process)” and “With some small improvements this should be a very useful tool!”.

### 5.3. CLOSING REMARKS ON RESULTS AND ANALYSIS

Now that the results from the interviews and questionnaire have been systematically display, the data can be used in the next chapter in order to interpret what the results actually imply. The discussion chapter will bring together the results from both parties, analyzed up against the theory.

## 6. DISCUSSION

In this chapter the results from the analysis will be discussed on the basis of theory behind the issues. The results from the management and the project participants will be compared to see if there are corresponding or contradicting responses. When both sides have been discussed and interpreted, conclusive remarks will attempt a plausible justification of the topic.

Also, the methodological approach used in the studies will be evaluate, pointing out pros and cons with the chosen methods. The evaluation will manifest if the results are valid, reliable and/or can be generalized.

### 6.1. IMPLICATIONS AND INTERPRETING OF THE RESULTS

The results from the interviews with two participants from the Management will be brought up against the results received from the Project Managers and Project Engineers. The following three chapters will try and distinguish between what effects the Management **thought** a Business Process Management System would have on the company and the **actual** effects it had on the employee. Similarities and differences between the results will be interpreted and the underlying implications will try to be explained.

The three sub-chapters are divided into the same issues presented in the result chapter for the interviews. The reason for arranging in the same order is to keep the discussion as systematic and organized as possible. Each issue will be opened with a leading question from the interview, and thereby the results from both parties will be discussed. The symbol ~~~ indicated a new question. Remember, the scale of the questionnaire goes from 1-5, where 5 is the best possible answer.

#### 6.1.1. Initiating Factors

*Why did the management decide to start the BPM project and what are the main goals behind the implementation of such a Business Process Management System?*

According to the theory, the three most common initiating factors for starting a Business Process Management System is:

1. In order to save money
2. Better management coordination
3. Secure satisfied customers

The management clearly states in the interview that quality of the work is the most important aspect of the company. This is because the bottom line of their business is to satisfy the clients' need, by delivering high quality products and services. Without the clients, OAI would not exist, so it's easy to conclude that the results implicate that the managements' most important initiating factor is to secure satisfied customers.

In order to create high quality services for the clients, the employees themselves need to be informed of what the quality expected. This could be solved through checklists in a BPMS, but was not mentioned by the management. When asked in the questionnaire if the site gave a clear understanding of the project activities, roles and responsibilities within OAI, 58% of the respondents replied *5-Yes, definitely* and 33% answered *4-Yes, but could be better*. Also when they were asked if the necessary requirements were shown properly, 67% answered *4-Yes, but could be better* and 33% replied *5-Yes, definitely*. This shows that the employees benefit from the BPMS, allowing them to easier find requirements and a clearer understanding of the organization of a project, eventually leading to a more quality secure deliverable. However, there are currently no way to check what quality is required or expected in a project, which definitely should be present for the employees to see.

The theory states in order to achieve a successful Business Process Management, compliance to regulations, quality control and management of business processes must be fulfilled. One of the respondents says that together with HSE&Q, the management wishes to establish a tool to measure and control quality, in order to secure a best possible quality of the deliverables at OAI. This is a very good idea, because the management wishes to use the BPMS as a tool to communicate and manage quality. This allows everyone in the company to view the quality

measured, the constraints connected and the required quality of their work. By achieving this, OAI will have a stronger chance to securing satisfaction through quality assured deliverables.

If we go back to the initiating factors, the second most popular reason why a company would implement a Business Process Management System is in order to create better management coordination. The management mentioned that OAI was in need of a better system to display processes and procedures. The current system they had, SharePoint, was confusing, cumbersome and inconvenient, and therefore rarely used. When asked in the questionnaire if the employees knew where the process and procedures could be found (in SharePoint), 50% of the respondents answered “No”. Also of the other half who answered “Yes”, 50 % replied that they were “Not at all” satisfied with the previous system. It becomes very clear that the system OAI was currently using was rarely used by the employee, most probably because the system was not good. Therefore it was wise of the management to decide to create a new BPMS with much clearer visualization of the processes and procedures of the company, contributing to better management coordination.

One of the interviewees from the management states that if the system is visually displayed well, it will encourage employees to use the system more frequently and therefore follow requirements and procedures more closely, resulting in a better end product. This assumption can be verified by looking at the questions of whether the necessary requirements were shown properly and clearly: 67% answered *4-Yes, but could be better* and 33% replied *5-Yes, definitely*. It can therefore be concluded that by visualizing the processes in a fashionable manner, procedures and requirements are easily accessible, potentially resulting in employees delivering high quality products to the clients.

~~~

Do you believe the Business Process Management System will affect the organizational culture, if so, how? What will the management do to enforce the employees to have a BPM mindset?

It is clear that the BPMS will have an impact on the company when looking at all the positive responds from the questionnaire. Compared to the previous system, the employees are very satisfied with the new system and there are strong indications that it will be used at a regular basis. As predicted, the management knew the BPMS would affect the company in a positive way. Both the interviewees explained that through an easy attainable and well displayed system, the employees could get a holistic and unison understanding of the organization and the governing procedure of their work.

It can be assumed that if the employees are satisfied with the new system it will be more frequently used. The following questions can identify if the employees were happy with the BPMS. They were asked what their first impression of the system was, where 75% answered *4-Good*, 17% replied *5-Great* and 8% answered *3-Okay*. This indicated that overall, the employees were impressed with the new system and left with a positive impressions. When asked if the system seems clear and easy to navigate, 67% replied *4-Yes, but could be better*, 25% answered *5-Yes, definitely* and 8% were *3-Neutral*. Again, this is a very good response and it is clear that the employees are satisfied with the new system. A third question, relevant on the matter, was if the employees found the site user-friendly. 58% answered *5-Yes, definitely* and 42% replied *4-Yes, but could be better*. These responses all indicate that the BPMS had a positive effect on the employees when exploring the system.

In order keep this positive impression and keeping the organizational culture growing, regard continuous improvement of process management, the management have a responsibility to keep the system updated and promote all employees to use the BPMS actively. One of the interviewees from the management mentioned that this was important and the responsibility the management had to achieve this. However, the respondents had no specific plans of actions to make sure this was fulfilled and neither did the management have any specific personnel appointed to be in charge of the BPMS updates.

6.1.2. Implementation and Maintenance

Considering the newly implemented Business Process Management System and the processes that have been designed so far, how satisfied is the management with the overall design?

Even though the Business Process Management System was not finished and there are departments which have not started implementing their processes yet, the management decided to launch the system anyways. This was strategically done to spark an enthusiasm around the BPMS and encourage every employee and department of OAI to use the system. The processes within project management were complete, and when the project managers and project engineers were asked if they think the BPMS will help organize their project: 67% answered *4-Quite helpful*, 25% replied *5-Very Helpful* and 8% said *3-Somewhat helpful*. Considering that these processes were complete, there is still a good response that indicates the implementation of the system was successful. If the future implementation is done in a similar manner, other fields of work can benefit from helpful processes that could positively affect their organizational work within projects.

~~~

*Is Oceaneering Asset Integrity ISO 9001:2008 certified? If so, how will the management assure the Business Process Management System will be in compliance?*

A lot of companies claim to be certified with ISO 9001:2008 but do not actually comply in their daily work. The two respondents from the management were very comfortable when explaining ISO 9001:2008 and how OAI follows the guidelines in the standard. It is clear that the requirements in the ISO are corresponding to what/how the management wishes the BPMS to be. They both describe that the system must reflect the quality management executed in the company while also displaying a process-oriented organization.

When asking the employee if they thought the BPMS would help meet project requirements in a more efficient manner, 67% replied *5-Yes, definitely*, 25% answered *4-Quite helpful* and 8% replied *3-Somewhat*. Also, when asked how helpful they thought the BPMS would minimize the time spent finding necessary documents and project requirements, 58%

answered 5-*Very much*, 33% replied 4-*Quite helpful* and 8% said 3-*Somewhat*. This clearly implicates that the process system would be helpful for the project participants to find necessary requirements that need to be complied, in order to maintain a good project quality.

Even though one of the interviewees from the management states that there have been four revisions of the project management processes done according to ISO 9001:2008, the management is still unclear on how the BPMS will be updated and revised. This is often the problem for companies, that there are no specific procedures on how or who will revise the process system, and therefore a lack of resources set aside to keep the continuous compliance. The problem can often be that the management is unaware of that the BPMS is very complex and demand a lot of resources in order to be revised accordingly. Therefore the resources set aside for revision updates are often far less than required. It is possible that this can happen at OAI, since the management was not clear on how the revision updates will be maintained.

~~~

The Business Process Management System is far from finished. How will the management administer the further business process design? What resources are set aside to assure the best possible outcome?

The management explained that they had actively been searching for a Business Process Management System for a couple of years, before newly discovering the system that Oceaneering International Inc. use. This is interesting to see that the management has been yearly using resources to explore and investigate potential systems that could fit into OAI, and that other alternative they've tested had not been satisfying. It could be understood, that the management does not wish to invest in software that could end up negatively effecting the process management for the company. Instead, they waited a couple of years until they found a suitable system that covered what OAI needed.

The resources that have been used to implement the BPMS came from the organizational budget for Quality Control and Improvements. According to the management, there are no exact sums set aside to be used specifically for Business Process Design. As mentioned

before, this is not a comforting thought, as complex as the BPMS is in this company, there are bound to be large resources needed to administer and execute further process design. The management defends this by explaining that they are currently working on procedures with the HSE&Q department, on how to maintain the BPMS and who or what department will be responsible. Though there are no exact figures connected to the further development of the BPMS, the management has a positive attitude and states the necessary resources will be used.

~~~

*How will the management support and contribute to the implementation, maintenance and further development of the Business Process Management Process project?*

Studies of failed projects using process-oriented management show that the reason for failure is the lack of support and understanding from the management, who expect immediate improvements, only focus on long/short term gains and too much focus on details rather than the overall picture (Ramias & Wilkins, 2011). The results from the interviews with the management show positive response on how the management understands their role in the implementation of the BPMS and the importance of their support. Even though they have not completely figured out how they will support and with what resources, they know they have a responsibility. The management also mentions that the reason for implementing a process system is to give the employees a holistic view of the company. This is also a sign that the management understands and support the BPMS for the right reasons, and will therefore have a positive effect on the further development.

### **6.1.3. Future Improvements**

*What will the management do to maintain a continuous improvement of the Business Process Management System and how will improvement suggestions from the employees be fulfilled?*

In order to determine if the employees would report faults and suggest improvements, they were asked what the likelihood of them doing so were:

- 5 - *Very likely* = 33%
- 4 - *Likely* = 42%
- 3 - *Somewhat likely* = 17%
- 2 - *Unlikely* = 8%

It is clear that the majority will report in suggestions for improvements or faults in the system, in order to maintain a continuous improvement. However, if these suggestions are not properly maintained and updated in the BPMS, fewer and fewer employees will exercise the feedback opportunity and therefore the system will deteriorate. The management was aware of this problem and was clear about that the BPMS must obtain and establish a method to receive and communicate suggestive improvements from the employee in a professional manner. The management explained that emails and verbal suggestions can easily be forgotten and therefore potential improvements become lost. Even though the management is attentive about this issue, they should have established a proper feedback loop for suggestions for improvement before the BPMS was launched. That is because a lot of the employees reported faults and suggestions when exploring the newly launched site. Two disadvantages regarding this can be mentioned. First of all, this was a golden opportunity to take notes of what worked and didn't in the system, as first impressions are often the best. If the system is unclear and confusing for a first time user, it is probably not good enough and need to be improved. Secondly, when there were no proper procedures on how the employees could report suggestions, the comments were sent per email or verbally communicated, and most likely some employees didn't even bother to comment at all. As mentioned previously, emails and verbal communication lead to lost or ambiguous information transfer.

The management mentioned that an important part of making sure the BPMS receive continuous improvement suggestions is to promote an active use of the system among the employees. When the respondents of the questionnaire were asked if they were left with the impressions that the system would be used for future projects, 92% responded *5-Yes, definitely* and 8% *4-Yes, somewhat*. This is a very positive response that shows there is a common goodwill among the employee to use the BPMS on a regular basis. In order to maintain the enthusiastic drive to frequently use the system, it is important that the

improvement suggestions get properly taken care of and updated in the system. If employees send in numerous ideas for business development and their suggestions are never used/updated in the system, the employees will lose trust in the BPMS and will eventually stop using it. The end result will be that the whole BPMS will gradually forgotten and eventually never receive improvement suggestions from the employees.

## **6.2. EVALUATION OF THE METHODOLOGY APPROACH**

In this chapter the chosen methodological approach will be evaluated by discussing advantages and disadvantages with the interviews and questionnaire. The planning, execution, organization and analysis of the studies will be criticized in order to determine if the results of the studies are valid, reliable and/or generalizable.

The methodological approach was based on what the studies purposely wanted to find, what data would need to be collected and how obtainable this data was. Also, prior knowledge of the research field and the amount of information available were a contributing factor to the choosing of research design. After some deliberation, it became clear that a Qualitative Method was the most suitable research approach in the studies, using interviews and questionnaire as research methods.

### **6.2.1. Interviews**

The biggest advantage of conducting a semi-structured interview is the ability to extract complex opinions and deeper meanings from the recipients, on any specific subject. By asking open end questions, the interviewees were free to deliberate on the matter explaining their personal views. The information communicated between the participants is rich and the data is of first hand observation, being very reliable. Another positive thing about using interview as a research method is the ability to clarify any ambiguous information while communicating. This goes for both the interviewee and the interviewer. If one of the parties is unsure or unclear about an issue, the uncertainty can be resolved and discussed promptly. The interviewer has also the ability to ask follow-up questions on interesting and relevant

responds, which can be essential information for the thesis. While the questions of the interview were semi-structured, the leading nature of the questions helped steer the conversation in best possible direction, in relevance to the topic. However, this could prevent the interviewees to discuss other opinions which could have been interesting to analyze further. To try and counter this, the last question of the interview gave the participants the ability to elaborate or comment on anything they wish.

The questions asked in the interviews were based on the theory literature, and each question was of relevance for the thesis. The responses from the interviewees were therefore very valid for analysis of the different issues of the master topic. Knowing the company and management personally helped locate the correct people that could be interviewed. Usually researchers have a hard time tracking down the best suitable personnel that “have all the answers”. Also, personnel from the management have a tendency to use big and elaborate words to describe the smallest things, and have the habit of talking around the bush. Therefore, familiarization of the interviewees helped while communicating and analyzing the responses, in order to filter out the unreliable data. On the other hand, having a personal relationship to the interviewees can be viewed as bias researching leading to unreliable results. Therefore, the interviews were strictly executed in a professional manner, where no personal matters, beside the interviews, were discussed.

The disadvantages of using interviews as a research method is the fact that the information gathered from the participants can be hard to analyze and categorize. Misunderstanding of what the interviewee actually meant or an ambiguous respond can lead to uncertain results and can weaken the reliability of the information. Another disadvantage of conducting these interviews is the relative few respondents available. In this case, there were only two interview objects that were available and of relevance to the issues. Since the company is not that large and the management consists of few people, two respondents were the best outcome. However, these two were well connected to the Business Process Management System project and decision making behind the implementation, and therefore perfect candidates. The problem of only having two interview objects is the ability to verify the

results as generalizable. If both the management had the same response on an issue, it can be concluded that it was generalizable, because the similar responses were given independently. However, if one of the interviewees had a specific opinion, where the other had no comments, it would be hard to announce the result as reliable.

The interviews were operated over the phone, because of the different locations of the parties. The disadvantage of doing a phone interview is the inability to detect important body language throughout the conversation. By properly reading a persons' body language an unspoken communication can be captured, potentially leading to great follow-up questions or deeper understanding of personal opinion. Also, the problem of conducting the interview over the phone and the combination of no body language, misunderstanding between the parties could occur without any notice. This can happen especially when adlibbing follow-up questions that maybe have be poorly communicated and ambiguously formulated. One of the parties misinterprets the other part, and the misunderstanding goes unnoticed.

### **6.2.2. Questionnaire**

The questions asked in the structured-questionnaire were carefully formulated in order to receive answers on a specific issue. In order to make the result as generalizable as possible, the respondents could choose from a scale of 5 multiple choices. By using a scale, the results could be easily interpreted and quantified for further analysis. The questions and multiple choices were composed in the most general manner as possible, in order to eliminate any uncertainties about the questions asked and make the questions as valid as possible. This validity was accomplished by having the thesis supervisor check and approve the questions. Also the project manager of the Business Process Management System validated the questions. Two of the employees check the formulation and spelling of the questions, in order to correct any ambiguous implications in the questionnaire that might cause confusion.

Another advantage of using a questionnaire as a research method is the ability to treat a large number of participants and information at the same time. Since the questionnaire was

executed with Google Format, the responses were saved directly in a spreadsheet, ready to use for further analysis. This made the effort required by the respondents minimal, allowing them to answer the questionnaire in a timely manner. Finding a large amount of voluntary employees to participate on such surveys can be challenging, because of their hectic workdays. When using a questionnaire of this format, recruiting participants was quite easy when the simplicity and quickness of the survey was promoted.

The most disadvantage fact about using a questionnaire with multiple choices is the constraints the participants have on their response. They have only a scale of options to choose from, and cannot freely express their opinion on the matter. A part from the final question, there is no room for personal comments and opinions, which can possibly result in essential information being missed. The respondents ranged from project engineers to project managers with a wide spread of knowledge and experience. This spread can lead to different interpretation of the basis in which the questions/answers regard, and ultimately misunderstanding the question. However, this deviance between the employees' background and competence is a part of the thesis and is regarded in the topic, so the results are still reliable.

Although, a personal interview with each project participant could give more opinions and a broader perspective, the amount of time needed, would've been too vast. It would also be much harder to find voluntary participants to set of time for an interview. Instead, a questionnaire would try and extract the most essential and valid responses for a large amount of representative. A disadvantage with having results in a simple quantifiable scale is the inability to analyze the data further. The responses are what they are and cannot be interpreted to find a deeper meaning.

### **6.2.3. Closing Remarks on the Methodological Approach**

On the basis of the methodological approach discussed above, it can be concluded that there is genuine reliability present in the research. The reason for this conclusion is the fact that the

discussed issues, in this chapter, were upheld with integrity while executing the studies. Also, the results and analysis is based on literature, and the claims and conclusions have been reasoned in a logical way.

The analysis of the results, from the interviews and questionnaire, has been based on similarities and differences between the respondents. The results found can be verified as generalized for this particular company or other matching companies affected by the same type of internal and external factors. For companies that do not have the similar organization structure, work procedures and processes, the results cannot be prominent.

The reliability of the approach is good because the study can be attested. Other researches can use the same method of analysis as in this thesis and the probability is high that the same results will be found. It is also reasonable to believe that the same conclusion will be discovered if analyzing a different Business Process Management System in the organization.

Results from the study have a good validity because the respondents who attended the research were accurate representative of the topic. However, the interview result lacked a bit of validity because of the small population of the interview object, resulting in a weak basis of conclusion. On the other hand, the responses from the questionnaire can be confirmed valid.

## 7. CONCLUSION

The goals of this thesis were to see what effects a newly implemented Business Process Management System would have on the employees of OAI and if the effects corresponded with the managements' expectations and assumptions. The studies underlined the consequence of business process management and which factors are important to govern. In conclusion, the thesis can determine if implementing such a system was a correct decision.

The general responses from the employee were positive, giving valid proof to imply that the Business Process Management System has had a good effect on this particular company. There was a great enthusiasm among the employees regarding the newly implemented system, and the employees were eager to start using the processes and procedures on a regular basis. Suggestions for development of the system were definitely something the employees would submit, creating a great culture for continuous improvement.

By visualizing the processes and procedures through a Business Process Management System, the management made a great improvement from the previous system. The management expects the BPMS to contribute to increased quality, because elements such as requirements, support functions, and procedures are now much easier attainable and understandable. According to the employees, these assumptions were correct, stating project management will become easier to execute, while simultaneously complying with regulations, by the support of the Business Process Management System

In order to assume the positive effects will be prominent in the future, the management has a responsibility to maintain the system. The processes and procedures must be revised and updated in compliance to regulations, further implementation and development of the system must take place, and a feedback loop for improvement suggestions must be established. Even though the management has not completely figured out how these constraints will be managed, they are well aware of the consequences if these are not fulfilled. Also, the

management understands their responsibility and role in supporting the Business Process Management System.

In conclusion, implementing a Business Process Management System for Oceaneering Asset Integrity AS was a good decision, assuming the management will continue the development of the system and the employees use it frequently.

The thesis gives a good foundation for further studies, if one was to look at the effects of the Business Process Management System one year after the implementation. The effects of the system could be measured in quality cost and project completion time, and could thereby be quantitatively analyzed.

## 8. LITTERATUR

[www.oceaneering.com](http://www.oceaneering.com)

<http://www.ariscommunity.com/>

<http://www.qualisoft.no>

Ahire, S.L. (1997) - The Management Science - Total Quality Management Interfaces: An Integrative Framework.

Bulsuk, K.G. (2009) – Taking the First Step with the PDCA (Plan-Do-Check-Act) Cycle: Article

Carri, D. (2011) - Integrated Compliance, Quality and Process: Scholarly Article

Goetsch, D.L. & Davis, S. (2009) - Quality management for organizational excellence

Hammer, M. (1990) - Reengineering Works: Don't Automate, Obliterate - Article

Hennink, M., Hutter, I., & Bailey, A. (2010) - Qualitative Research Methods

Hill, G. (2008) - The Future of Business Process Management: Article

Holme, I.M. & Solvang, B.K. (1996) - Metodevalg og metodebruk

Holweg, M. (2007) - The Genealogy of Lean - Scholarly Article

Imai, M. (1986) - Kaizen: The Key to Japan's Competitive Success

International Standards Organization 9001 (2008) - Quality Management Systems: Requirements

Ko, R.K.L. (2009) - A Computer Scientist's Introductory Guide to Business Process Management (BPM)

Ko, R.K.L., Lee, S.S., & Lee, E.W. (2009) - Business Process Management (BPM) Standards: A Survey

Kohlbacher, M. (2009) - The Perceived Effects of Business Process Management: Scholarly Article

Kohlbacher, M. (2010) - The Effects of Process Orientation: Scholarly Article

- Kvale, S. & Brinkmann, S. (2009) - Det Kvalitative Forskningsintervju
- Laguna, M. & Marklund, J. (2005) - Business Process Modeling, Simulation, and Design
- Mathis, R.L. & Jackson, J.H. (2008) - Human Resource Management
- Oden, H.W. (1999) - Transforming the Organization: A Social Technical Approach
- Ostroff, F. (1999) - Horizontal Organization
- Petroleum Safety Authority Framework HSE (2010) - Regulations Relating To Health, Safety and the Environment in the Petroleum Activities and at Certain Onshore Facilities: The Framework Regulations
- Porter, M.E. (1985) - Competitive Advantage: Creating and Sustaining Superior Performance
- Punch, K.F. (2005) - Introduction to Social Research; Quantitative and Qualitative Approaches
- Ramias, A. & Wilkins, C. (2011) - The Process Centered Organization; Do You Know Where You're Going?: Article
- Roberts, L. (1994) - Process Reengineering: The Key to Achieving Breakthrough Success
- Rummler, G.A. & Brache, A.P. (1995) - Improving Performance: How to Manage the White Space on the Organization Chart
- Sander, K. (2004) - Kvalitative Metoder: Article
- Silveira, P. & Rodriguez, C. (2012) - Aiding Compliance Governance in Service-Based Business Processes
- SINTEF (2005) - Prosessmodellering
- Spanyi, A. (2003) - Business Process Management (BPM) is a Team Sport: Play it to Win!
- Stratcog (2010) - Verdikjedeoptimalisering: Article
- Susort, T.M. (2011) – Fra Prosedyre til Prosess: Scholarly Article
- Taylor, F.W. (1911) - The Principles of Scientific Management: Monograph
- Tjora, A. (2010) - Kvalitative Forskningsmetoder i Praksis
- Tomasko, R.M. (1993) - Rethinking the Corporation: The Architecture of Change

## 9. APPENDIX

Appendix I: Semi-Structured questions used as guidelines for the Interview with the Management.

Appendix II: Structured questions used in the Questionnaire for the Project Engineers and Project Managers.

## APPENDIX I: SEMI-STRUCTURED INTERVIEW

1. Why did the management decide to implement a Process Management System?
2. If you look at how the Process Management System turned out, does it correspond with what you had visualized in the planning phase of the implementation project?
3. Do you believe that the Process Management System will have an effect on the organization culture?
4. What plans does the management have in order to help finish the implementation of the system?
5. How will the management make sure to maintain a continuous improvement and updating of the system?
6. Has there been set aside any resources to achieve these posts (question 4 & 5)?
7. Who will be responsible for the future development and eventually re-design of the processes?
8. Is the Process Management System executed according to any specific official requirements?
9. Which area do you think we need to improve in the system, so far?
10. Other comments?

## APPENDIX II: STRUCTURED QUESTIONNAIRE

1. Were you aware that OAI was implementing such a Process Management System?

Yes

No

2. When exploring this site, what was your first impression?

Give a score based on your own opinion

1 - Bad

2 - Poor

3 - Okay

4 - Good

5 - Great

N/A

3. Did the site seem clear and easy to navigate?

Give a score based on your own opinion

1 - No, not at all

2 - No, not quite

3 - Neutral

4 - Yes, but could be better

5 - Yes, definitely

N/A

4. Did you find the site user-friendly?

Give a score based on your own opinion

1 - No, not at all

2 - No, not quite

3 - Somewhat

4 - Yes, but could be better

5 - Yes, definitely

N/A

5. Did you get the impression that you could use this site for your work in the future?

Give a score based on your own opinion

1 - No, not at all

2 - No, not quite

3 - Neutral

4 - Yes, somewhat

5 - Yes, definitely

N/A

6. Did this site give you a clearer understanding of project activities, roles and responsibilities within OAI?

Give a score based on your own opinion

- 1 - No, not at all
- 2 - No, not quite
- 3 - Neutral
- 4 - Yes, but could be better
- 5 - Yes, definitely
- N/A

7. Did you find the necessary requirements were shown properly and clearly?

Give a score based on your own opinion

- 1 - No, not at all
- 2 - No, not quite
- 3 - Neutral
- 4 - Yes, but could be better
- 5 - Yes, definitely
- N/A

8. Do you think this system will help you meet project requirements in a more efficient manner?

Give a score based on your own opinion

- 1 - No, not at all
- 2 - No, not quite
- 3 - Neutral
- 4 - Yes, but could be better
- 5 - Yes, definitely
- N/A

9. To what degree do you think this site will help with the organization of your projects?

Give a score based on your own opinion

- 1 - Not at all
- 2 - Very little
- 3 - Somewhat
- 4 - Quite helpful
- 5 - Very much
- N/A

10. How much do you think this site will minimize your time spent finding necessary documents and project requirements?

Give a score based on your own opinion

- 1 - Not at all
- 2 - Very little
- 3 - Somewhat
- 4 - Quite helpful
- 5 - Very much
- N/A

11. Do you know where these processes/procedures could be obtained before this system?

- Yes
- No

12. If Yes, were you satisfied with the previous accessibility?

Give a score based on your own opinion

- 1 - No, not at all
- 2 - No, not quite
- 3 - Neutral
- 4 - Yes, but could be better
- 5 - Yes, definitely
- N/A

13. What is the likelihood that you will report faults and suggest improvements?

Give a score based on your own opinion

- 1 - Not at all
- 2 - Unlikely
- 3 - Somewhat likely
- 4 - Likely
- 5 - Very likely
- N/A

14. What areas would you say need further improvement?

- More than one suggestion can be checked
- The layout of the site needs improvement
- The site must become easier to navigate within
- Make a clearer display of text, diagrams and windows
- Change the design of the process(es) and/or work flow diagram(s)
- None of the above
- Other:

15. Other comments?