Gap Analysis of Organizational Project Management Practices in Engineering Company

A Study of an Organization in Sweden, Finland and Abu-Dhabi

Master's thesis in International Project Management

HAFIZ FAIZAN JAVED
RUBÉN MARTÍNEZ GONZÁLEZ

Gap Analysis of Organizational Project Management Practices in Engineering Company

A Study of an Organization in Sweden, Finland and Abu-Dhabi

HAFIZ FAIZAN JAVED
RUBÉN MARTÍNEZ GONZÁLEZ

Gap Analysis of Organizational Project Management Practices in Engineering Company
A Study of an Organization in Sweden, Finland and Abu-Dhabi
HAFIZ FAIZAN JAVED
RUBÉN MARTÍNEZ GONZÁLEZ

Table of Contents

List of Figures and Tables

Acknowledgments

Gap Analysis of Organizational Project Management Practices in Engineering Company
A Study of an Organization in Sweden, Finland and Abu-Dhabi
HAFIZ FAIZAN JAVED
RUBÉN MARTÍNEZ GONZÁLEZ
Department of Civil and Environmental Engineering

Abstract

In an attempt to manage increasing cost and complexity of engineering projects, companies are emphasising on developing and applying good project management practices. Project management practices help organizations and practitioners to identify their priorities and develop related competencies to achieve their project targets. The main purpose of this study is to evaluate organizational project management practices at three different project offices, located in Sweden Finland and Abu-Dhabi, in an Engineering company to find out the best practices in order to deliver projects while focusing on the customer requirements and company's internal processes. Project management theory offers a number of maturity assessment and evaluation techniques to analyse the implemented project management practices and process within an organization and help improving these processes to consistently achieve the organizational objectives. This study consists of interviews conducted with the senior project management, questionnaire distributed among the project team and study of internal processes in the studied company. The analysis revealed number of gaps in standard documentation and different project management practices associated to project execution which shows lack of company provided standards and best practices. Company provided systems to allocate resources and manage lessons learned for projects are not effectively managed which results in excessive use of external resources and repetition of mistakes. Furthermore, recommendations are provided to develop and implement company provided standards, with flexibility of accommodating local requirements of each office, guidelines and templates with the responsibility of each project individual to practice and improve those standards. Additionally, a new role of supportive PMO is recommended to introduce, who would support project managers in creating and developing project standards and to ensure same standards are implemented and continuously monitored in all three offices.

Keywords: Project management, project management maturity, PMO, customer requirements, lessons learned

1. Introduction

Project management helps engineering companies to produce, develop and introduce new products smoothly and effectively in complex environment (Itegi, 2015). Project management practices are helping organization to manage and implement their projects effectively, but still there are challenges related to developing capabilities to deliver projects successfully (Weldemariam, 2013). Project Management Institute (PMI) states that only 9 percent of the organizations are able to execute initiatives to meet strategic goals (Mark, 2014) and about 60 percent of professionally handled projects are either unsuccessful or challenged (Manifesto, 2013), which clearly shows that project management needs more attention and understanding to produce consistent and successful results for the projects.

Hillson (2003) stated that in order to deliver effective and consistently successful project results, organizations are required to continuously improve implemented project management practices. Moreover, Besner & Hobbs (2006) state that organizations have important assets in form of project management practices which help in aligning strategic objectives of organization. These project management practices helps in creating value for the organization by creating and increasing success rate (ibid). Additionally, Organizational maturity models play an important role in assessing and defining the organizational best practices and capabilities of an implemented framework against certain defined criteria in an organization (Demir and Kocabaş, 2010). Another important aspect of maturity assessment is to compare and benchmark project capability within and outside organizations (Mittermaier & Steyn, 2009 cited in Demir and Kocabaş, 2010) in order to develop a sequential path for progressive development (Crawford, 2007).

This study conducted in an engineering company will help to analyse and determine gaps in project execution and practices to improve and standardize the project execution to handle the complexity and increase effectiveness of engineering projects. The study is performed by using different project management frameworks like PMBOK, Prince2 and ISO standards, organizational project management maturity model, organizational culture and organizational learning, but the main standards used for analysis of studied projects are Project Management Institute (PMI) standards. Although the study is carried out on individual projects at three different offices, but it helps in tracing the evolution of project management practices on stand-alone projects to the conceptualization of project management as an organizational capability to significantly improve project performance.

1.1.   Purpose of the study

The purpose of this study is to carry out a gap analysis in terms of project management practices between three different projects executed in three different countries. The second part of this study consists of carrying out a project management practices gap analysis between these projects and some of the most well-known and used project management standards and methodologies. Additionally, this study also focuses on finding out the reasons of the existence of these gaps and their potential impact on organizational and project performance. Finally, the goal is to give recommendations to the studied organization in order to improve project management practices and avoid future mistakes in the new project model implementation.

1.2   Research questions

In order to accomplish the purpose of the study and keep focus on what is relevant for this research, the following research questions were developed:

1) Are there any gaps in terms of project management practices between the different studied projects within organization? Which are those gaps? What are the possible reasons for their existence?

2) Are there any gaps in terms of project management practices between the studied projects and some of the most used project management standards? Which are those gaps? What are the possible reasons for their existence? What is their impact on the organizational and project performance?

3) How can those gaps (if any) be minimized? What recommendations could be useful in order to improve future project management practices and avoid mistakes during the new project model implementation in the studied organization?

1.3   Limitations

Although the study has reached its purpose, there were some unavoidable limitations. As it is mentioned further in this paper, the research methodology is based on both quantitative research and qualitative research. Although the questionnaire was sent to eighteen people, only fourteen answers were obtained. Therefore, the quantitative research is based on the questionnaire answers of fourteen individuals. This reduces the sample size and for that reason, the final outcome could have been slightly different. Moreover, the qualitative research is based on the results of eight different interviews. Each one of these interviews was

carried out under different circumstances and environments. Some of them were face to face interviews or videoconference interviews and the rest were over the phone. The lack of visual contact and analysis of body language might be limitations since it can lead to a different interpretation of the answers.

The interviewees had different nationalities. Some interviewees were from Sweden, some from Finland, some from Abu Dhabi and some others from India. Even the interviewers had one Spanish nationality and the other one Pakistani nationality. This mix of cultures could affect in the way of how people answer or react to answers, how questions or answers are interpreted and consequently, have an impact on the results of this study. We believe that although this fact can bring several limitations it might also enrich the quality of the study thanks to the different perspectives and backgrounds.

The time frame and interviewee's availability was also an issue. Since all of the interviewees had high job positions in the organization and certain responsibility, it made it more difficult to find a suitable moment to carry out the interviews as they were very busy. Since some of the interviews were rescheduled several times, this study's time schedule was delayed several times which reduced the time available to carry out the study. As mentioned before, the interviewee's busy schedule also affected in some cases the duration of the interview which might have also affected the quality of the answers.

The lack of knowledge of some of the interviewees in terms of project management terminology it can be considered as a limitation since some of the time of the interviews was used to explain that terminology in some cases. Furthermore, some of the interviewees claimed to have been only working for the organization for a short time which might influence the results due to their lack of knowledge about the organization.

Finally, the three projects were in some points different in size and type which might make it more difficult to compare, analyse and obtain relevant results.

1.4 Thesis Outline

This thesis report starts with an introduction of project management background and its evolution in the recent past, including the purpose of conducting this study and limitation associated to this research in first chapter. The second chapter comprises of methodology adapted to conduct this research which includes research strategy approach, research design and methods to collect data. The related theoretical framework to undergo this research study is presented in third chapter which includes the basics of project management, organizational project management maturity assessment, organizational culture and adaptability together with individual resistance and organizational learnings. The fourth chapter consists of a company's case study and collected data results by using research methodology. The collected results are analysed and discussed in chapter five where main gaps between studied projects are compared and discussed together with theoretical knowledge. The research is concluded in chapter six by presenting conclusions, providing recommendations to the company and suggestions for further studies in future.

2. Methodology

2.1 The research design

A research design is major plan to conduct a research while considering different factors including research topic, the target audience, time and resources, access and availability of people and information (Greener, 2008).

Designing the research in the earlier phases of the project is highly important which provides information about the sources and the information that is related to the research problem. It helps to identify and select approach for gathering and analysing the data from population. Research design also includes time and cost that is related to conducting a particular research (Kothari, 2004).

According to Kothari (2004), the research design needs to include a definition of the main research problem, procedures and techniques to collect data, sampling size and type; and the methods that are used for data analysis and processing of information.

The research design for this specific study is divided below into different sub-sections where different types of research associated to this particular study are discussed depending upon audience, type of data and approach to conduct the research. Additionally, the method to collect, compare and analyse the data and privacy concerns are presented in below section.

2.2 Type of research

There are different types of research available where different variables are compared and analysed, solution finding can be related to a particular society or generalized with the formulation of a theory (Kothari, 2004). This thesis can be categorized into following mentioned types of research.

I. Qualitative research is primarily concerned with the qualitative phenomenon that is particularly related to finding the motives and desires through interviews or story completion test (Kothari, 2004). This research work is primarily based on the interviews conducted with the project management at three different projects to collect the data about their motives and desires. This data is further analysed to find the project management gaps at different project sites in implementing project strategies.

II. *Quantitative research* is primarily based on the measurement of quantity of data collected irrespective of the quality, and generally applicable to where opinion or results can be expressed in terms of quantity (Kothari, 2004). The questionnaire was sent to several team members working on each project to gather quantitative data regarding organizational project management maturity and to increase reliability of empirical data. The purpose of the questionnaires was to assess the level of organizational project management maturity on a scale from 1 to 5. Being 1 the lowest level of maturity and 5 the highest.

III. *Applied research* is mainly focused towards finding a solution for a societal or an industrial organizational problem (Kothari, 2004). This particular study is done to measure the gaps among different projects sites in order to provide solution and recommendations to increase the standardization of project management practices within the organization and to give input to the new project model implementation.

IV. *Deductive research approach* focuses on testing theories which relates to the research topic and produces hypothesis or research questions to testify and validate the focused theory (Greener, 2008). This particular study would use the same deductive approach to validate the theories by answering different research questions.

2.3   The method

All the methods and techniques used during the research in order to collect compare and analyse data and at the same time, to help the researcher find a solution for the research problem, are the so called research methods (Kothari, 2004). The main purpose of defining a research method is to define or to develop a method which leads to solution for a given problem, or to relate different options to make a solution possible (Kothari, 2004).

2.4   Data collection

The data was divided into primary data and secondary data. According to Kothari (2004), primary data is collected for the first time and it is considered as original and unique whereas secondary data is data that is already available has been previously gathered and analysed by someone else.

In order to collect primary data, eight different interviews were carried out with key project members of each project and six questionnaires were distributed among random project team members of each of the three projects. The interview questions and the questionnaire were created by using the Organizational Project Management Maturity Model (OPM3). This model provides with the necessary information of all

the project management knowledge areas in order to find the gaps between project management practices in different projects.

In order to collect secondary data, different books, articles, reports and theses were selected, read through and analysed so that the final chosen data was reliable, suitable and adequate.

i. Sampling design

Sampling design is a process of making definite plan to acquire a sample from a given larger population. As elaborated by Kothari (2004) it is a technique which is used by the researchers to analyse the trend in larger population by selecting items for the sample. The size of the sample depends on the number of items included in the sample, which affects the accuracy of results as well. Kothari (2004) describes that size of sample is one of the major problems for the researchers and it should be optimum to produce efficient and reliable results for the researcher. While selecting the sample size, the cost of collecting the data and the cost of incorrect influence resulting from the collected data should be considered.

In the thesis study, a sample size of three people from each project at different location for the qualitative collection of data was selected to carry out the qualitative approach. These people were selected particularly based upon their roles and involvement during the project execution. Furthermore, for quantitative data collection a questionnaire was sent to three random team members of each project as well. The final research will be based on the results from six people of each project in three different countries.

ii. Data analysis

The analysis of data was divided into three parts. The first part consisted of processing, analysing and selecting the useful and relevant information for the research that was obtained from the eight interviews. The analysis of the interviews not only includes the spoken information obtained from the interviewees but their body language, silent answers and gestures. The second part consisted of processing, analysing and selecting the useful and relevant information for the research that was obtained from the fourteen questionnaires. Finally, the data obtained from the interviews and questionnaires was analysed and compared with the theoretical framework and literature review.

2.5   Ethics

The five principles for research ethics (Smith, 2003) are considered when conducting the research. These five principles are; the purpose of the research was stated frankly beforehand since contacting the organization. The subjects and the participants' intellectual property rights were clarified again before starting the interviews. Moreover, the confidentiality and privacy of the interviewees and organization were carefully respected. The identification of each interviewee in this research was concealed. The interviewees were also informed their rights to decline answering any questions they wish not to.

3. Theoretical Framework

3.1 Project and Project Management

Project management has been developed and practised for as long as humanity has settled on the face of earth. It has been essentially involved in almost all the organizations including product or service development, technology advancement or construction of mega structures (Seymour and Hussein, 2014).

In 1987, PMI published first PMBOK in an attempt to document all the standards procedures, tools and techniques related to the project management knowledge (Seymour and Hussein, 2014). Project Management Body of Knowledge (PMBOK) is a guideline to successfully apply the project management concepts and manage individual projects according to the defined project life cycle model (Project Management Institute, 2013).

According to PMBOK "*Project management is the application of knowledge, skills, tools and techniques to project activities to meet the project requirements*" (Project Management Institute 2013, p. 5)

Project is defined as "*A project is a temporary endeavour undertaken to create a unique product, service, or results*" (Project Management Institute 2013, p. 3).

Project management is considered as a practical application of the project management guidelines, learnings and integration of all the tools and techniques to achieve the end results of a project. A project is usually concluded once it has achieved the end results or the defined goals of the project. Project activities are usually repetitive during different phases of the project, but the end results should be novel i.e. unique for every project (Project Management Institute, 2013).

According to Kwak (2003) the fourth and the current era of project management belongs to the technological advancements. Technology is driving force for the change and introduction of several new methodologies in the field of project management which impacts the project manager's role. In 1996 and 1997 Prince2 and the critical chain Project management (CCPM) was introduced which generally based the calculation on the resources available rather focusing on the task to be performed (Seymour and Hussein, 2014).

Prince2 defines standard project as "*a temporary organization that is created for the purpose of delivering one or more business products according to an agreed business case*" (Hinde 2012, p. 2).

According to Prince2 definition and terminologies, a group of people usually work together to achieve the agreed business objectives of the organization and then disperse after achieving those targets. There are certain characteristics which differentiate a project from daily business of an organization such as; it brings change, it must have a definite ending point, human resources are acquired from cross-functional department, uniqueness to certain extend and certain degree of uncertainty which turns to clarity as project progresses (Hinde, 2012).

3.2   Project Life Cycle

A project passes through various phases right from the point of inception till the completion and handover of the final project outcome to the customer. These different phases combined together define the lifecycle of a project. Maylor (2010) has described the generic project life cycle as different interactive phases through which the work performed changes with respect to time. The generic behaviour of the project in early phases is relatively less work performed which increases to maximum during the doing phase and decreases through the development phase (Maylor, 2010). The generic project life cycle of a typical project as explained by Maylor (2010) is shown in the figure below.
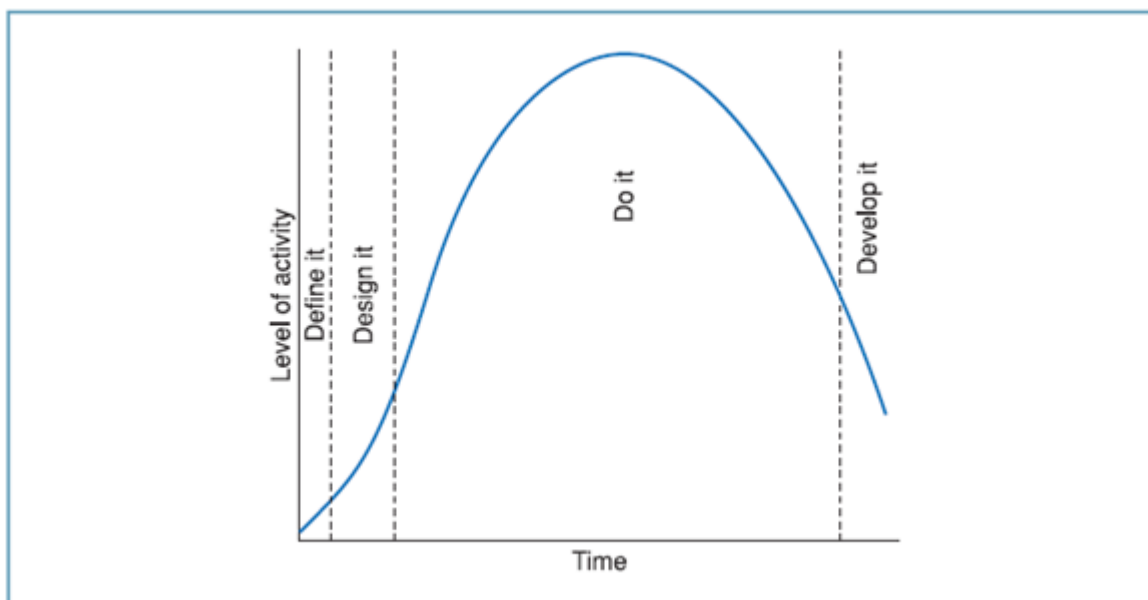
Figure 3.2.1: Generic Project Lifecycle and how level of activity varies with time
(Maylor, 2010, p.33)

Similarly PMBOK defines project lifecycle as ''A project life cycle is the series of phases that a project passes through from its initiation to its closure'' (Project Management Institute, 2013, p. 38). These phases are usually in a sequence to each other whereas their determinants are dependent on the nature of project and

organization in control of these projects. As explained by PMBOK earlier, a project is a temporary effort which usually has a definite beginning and ending, the same time bounding implies to the phases of projects as well with definite starting, ending and controlling points (Project Management Institute, 2013).

According to Prince2 standards, the project life cycle is the time span consumed from the start of the project till the acceptance of the final outcome or closing of the project. Therefore, the activities performed after the acceptance of the closure of the project such as follow-up maintenance and project support are not generally considered during the lifecycle of the project (Turley, 2010).

3.3 Organizational Project Management

Organizations produce their own working environment which is broader than project and project management environment. Every project and project management needs to abide by the organizational environment, practices and standards to achieve the organizational strategic objectives (Project Management Institute, 2013). Project management institute (PMI) defines organizational project management as sequential process of managing projects, programs and portfolios to achieve the final strategic objectives of the organization (Project Management, 2008).

Figure 3.3.1: Organizational Project Management. (Adapted from Levin, 2011)

When the project involves external organizations and entities, these external organizations have their own culture and practices which influence the project management and project implementation. In the light of globalization and managing projects at different locations, understanding and considering the impact of organizational culture is becoming more and more important (Project Management Institute, 2013).

3.4   Project Management Maturity Models

In the recent past, the term 'maturity' was rarely used as a tool to access the organizational performance in doing different functions. But recently several organisations are undergoing this maturity concept and assessment to find different ways to enhance and standardize the organizational services. The first maturity model ''Capability Maturity Model'' is an outcome developed by software Engineering Institute to measure and evolve the organizational effectiveness in developing software with repeatable results (Crawford, 2007).

Capability maturity model was introduced to focus on every level of software project management comprises of people, process and product (Kumta & Shah, 2002). It requires a complete change of project manager's approach towards software management. The initial level 1 is unpredictable and the variables are poorly controlled. In level 2, project managers exhibit their own models and existing practices to achieve success. Level 3 require project managers to accept and follow organizational standard processes. Level 4 & 5 comprising of controlling the existing organizational standards and focus on process improvements respectively (Kumta & Shah, 2002).
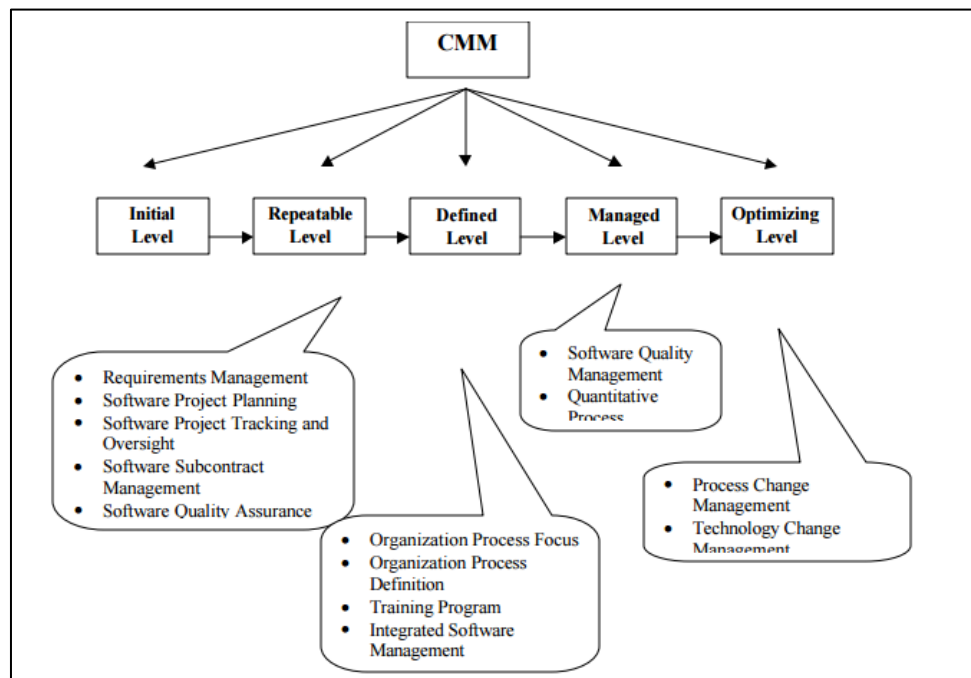
Figure 3.4.1: Capability Maturity Model Framework (Kumta & Shah, 2002, p.3)

There are several different kinds of project management maturity assessment models available, mostly inspired and based upon the Capability Management Model developed for the software project management (Backlund et al., 2014). Khoshgoftar & Osman (2009) conducted a research between different maturity models (OPM3,

CMMI, P3M3, PRINCE, BPMM & Kerzner's Project management maturity model) based upon different benefits and characteristics associated to these maturity model to find out a detailed and useful model. The results of the study shows that among all the studied maturity models, OPM3 is most useful maturity model based upon several factors including multi-dimensional framework which cover projects, programs and portfolios and reduce the gaps between executed projects and organizational strategies (Khoshgoftar & Osman, 2009). The study also presented that OPM3 provides most continuous and detailed approach to analyse and find gaps in the maturity of an organization and is applicable to all industries (Khoshgoftar & Osman, 2009). Similarly Yazici (2009) presented that OPM3 is mostly commonly used maturity model to identify, manage and improve the project management practices in an organization. This study is conducted to find gaps and improve the project management best practices within an organization, so the arguments clearly show that OPM3 is quite useful in conducting this study.

4.5   Organizational Project Management Maturity Model (OPM3):

The rapid change in technology, business and economic conditions provide several opportunities and challenges to the organizations to survive and grow in changing environment. Among other challenges for organizations, one of the key challenges is to remain focused and achieve strategic objectives while considering external factors (Project Management, 2008). Executing projects and practising project management enable organizations to remain goal-focused and undertake changing environment (Project Management, 2008). In order to successfully implement project management practices and support the organizational strategies, PMI (Project Management Institute) introduced Organizational Project Management Maturity Model (OPM3) to create a framework to implement and control project management best practices in order to deliver organizational strategic objectives (Project Management, 2008).

It is defined as "The OPM3 is a framework that provides an organization-wide view of portfolio management, program management, and project management to support achieving Best Practices within each of these domains. This holistic perspective is a powerful tool enabling successful execution of organizational strategies" (Project Management, 2008, p. 1)

Enhancing organizational maturity is a progressive process which is achieved by undergoing several distinguished improvements at different stages of development and adapting project management culture. There are several short term benefits which can be associated to the organizational project management maturity such as improved project timelines, monitoring and controlling of project cost and schedule along with improved strategic decision makings. Long term benefits as a result of

project management maturity are sustainable growth and increased profitability over the period of time (Crawford, 2007).

3.5.1 OPM3- Model Description

The basis for Organizational project management maturity assessment is Project Management Body of Knowledge, which is an excellent point of reference considering the wide acceptance of this standard and range of knowledge available for ten knowledge areas (Crawford, 2007). The model developed to assess the Project maturity is dependent upon ten knowledge areas explained in PMBOK and presented across five different stages of maturity as explained by Capability Maturity model. Furthermore, OPM3 has given special attention to Project Management Office (PMO), management oversight and professional development of project managers in addition to knowledge areas (Crawford, 2007).

3.5.2 Project Management Knowledge Areas

The maturity assessment comprises of the below mentioned 10 knowledge areas, which are further divided into key component in order to measure and assess the maturity of an organization. These key components are examined independently without affecting the other components.

Project Integration Management
This knowledge area is used to gather key outputs from different other knowledge areas, helps in coordinating to produce a unified and integrated output for undergoing project (Project Management Institute, 2013). The key components examined under this knowledge area are Project charter, project management plan and availability of formal change control board.

Project Scope Management
Plan scope management deals with all the mandatory processes to ensure a well-documented and complete scope management in a project. It includes all the work required to successfully finish the project together with validating and controlling the scope during different phases (Project Management Institute, 2013). The key components of this knowledge area examined are Scope management, requirement collection, Work breakdown (WBS) creation and Scope validation process.

Project Time Management
Project Time Management deals with all the processes required to establish a schedule for an undergoing project. It uses the outputs from other knowledge areas to develop schedule plan and schedule baseline (Project Management Institute, 2013). The key components evaluated for maturity assessment are Schedule plan,

sequence of activities, estimations for resources and duration, control and analysis of schedule in different phases.

Project Cost Management

This knowledge area is involved to figure out the cost required to complete project activities and the whole project. It also provides baseline to manage and control the cost during different phases of project execution. Resource cost estimations is one of the main objective of project cost management to finish within budget (Project Management Institute, 2013). The key components examined are Cost plan, cost estimations, project budget and budget control.

Project Quality Management

Project quality management deals with the processes to ensure the final quality of the product being produced and assure the processes selected are sufficient to produce the final product. It also emphasise on the process quality standards to approve and ensure quality and operational standards (Project Management Institute, 2013). The key components examined are quality management plan and quality control documentation.

Project Human Resource Management

Project Human resource management deals with processes related to human resources in order to successful produce the project results. It deals with acquiring resources, developing the project team and tracking their performance throughout life cycle (Project Management Institute, 2013). The key components analysed are Human resource plan, acquisition, management and development of project team.

Project Communication Management

This knowledge area deals with communication processes needed for effective communication internally and externally with stakeholders. Plan communication management enables the project team to take timely and appropriate decision along with identifying the stakeholders and their impact (Project Management Institute, 2013). The key components examined in this knowledge area are planning, managing and controlling communications.

Project Risk Management

Project risk management deals with the processes of ensuring a proper risk identification, analysis and control during different phases of project. It enables the project team to take proactive responses and control the impact of risk events (Project Management Institute, 2013). The key components examined are risk management, risk identification, analyses and risk response plan.

Project Procurement Management

This knowledge area deals with the processes involved in purchasing and acquiring the required resources from external suppliers. Procurement decisions depend upon the make or buy analyses in the initial phases of the project life cycle (Project Management Institute, 2013). The key components analysed in this knowledge area are procurement management plan, procurement contract, controlling and closing procedures and documents.

Project Stakeholder Management

Project stakeholder management deals with the processes of identifying and managing different stakeholders during different phases of project lifecycle. Stakeholders may have an impact on the project or the project may impact their concerns. These stakeholders are further used to create an effective communication plan as well (Project Management Institute, 2013). The key components analysed are identifying stakeholders, management and engagement of stakeholders during different phases.

3.5.3 Levels of Project Management Maturity

The basis of Organizational Project Management Maturity Model (OPM3) is created by benchmarking already existed Capability Maturity Model (CMM) by Software Engineering Institute. CMM provides model for assessing the organizational maturity in several areas and structure is widely acceptable (Crawford, 2007). The key components from ten knowledge areas are presented against the five levels of maturity assessment as shown in the figure 3.5.3.1 following page.
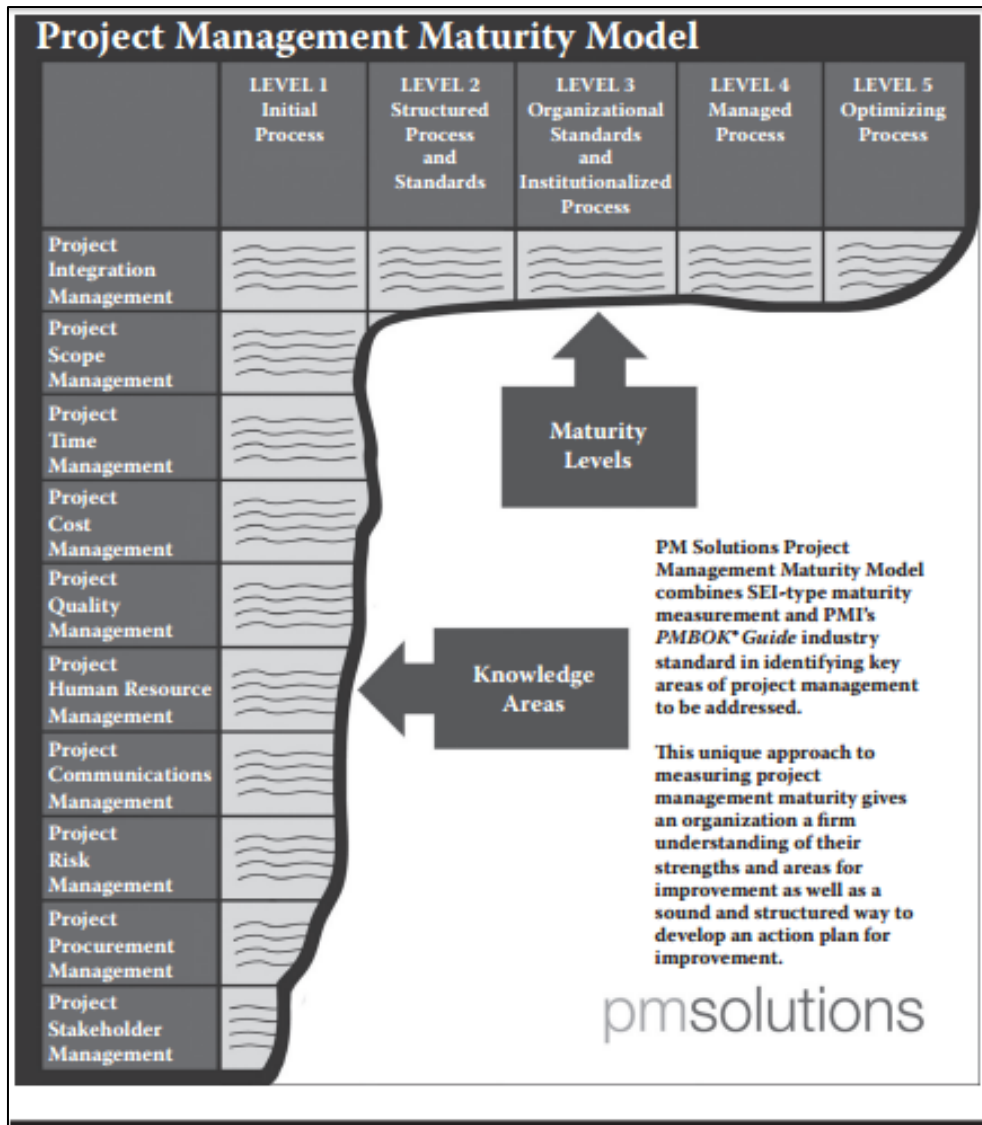
Figure 3.5.3.1: OPM3 – Basic Framework (Crawford, 2007, p. 5)

There are five levels of Organizational Project Management Maturity Model define by Project Management Institute. All these level are defined below:

Level 1 – Initial Process:

In the first level of project management maturity, the process standards and practices are unavailable and project managers are not required to follow any process or standard to deliver project objectives. Project definition is known and accepted within the organization but documentation and metrics are informal and ad hoc based (Pennypacker, 2001).

Level 2 – Structured Process and Standards:

In this level several project management practices and processes are available within organization but they are not considered as organizational standards. Due to lack of involvement and inconsistency the standards are not always followed and documentation exists only on basic processes (Pennypacker, 2001).

Level 3 – Organizational Standards and Institutionalized Process:

In this level, the organization provides all the necessary standards and practices for project management. All the key stakeholders are considered integral part. All these standard practices are procedures are implemented on almost all the project with at least minimal requirements (Pennypacker, 2001).

Level 4 – Managed Process:

Managed process includes the project management considering the past project performance and lessons learned which can be implied for related projects. The standard procedures and practices are implemented on all projects, decision are made based upon the efficiency and effectiveness metrics. Project information is an integral part of central system which helps in making strategic decisions (Pennypacker, 2001).

Level 5 – Optimising Process:

All the standard procedure and practices are implemented within organization to improve project management activities. Lessons learned are recorded and examined to improve the project management standards and processes. The main focus of organization is to improve continuously and foresee the future challenges along with managing the projects successfully. Earned value metrics are used to measure the project performance and for making organizational management decisions (Pennypacker, 2001).

The figure 3.5.3.2 showed below shows how the maturity increases along the continuum while considering project, program and portfolio management on vertical axis. In this research our main focus is on Project organization, so we are not considering and discussing the program and portfolio management.
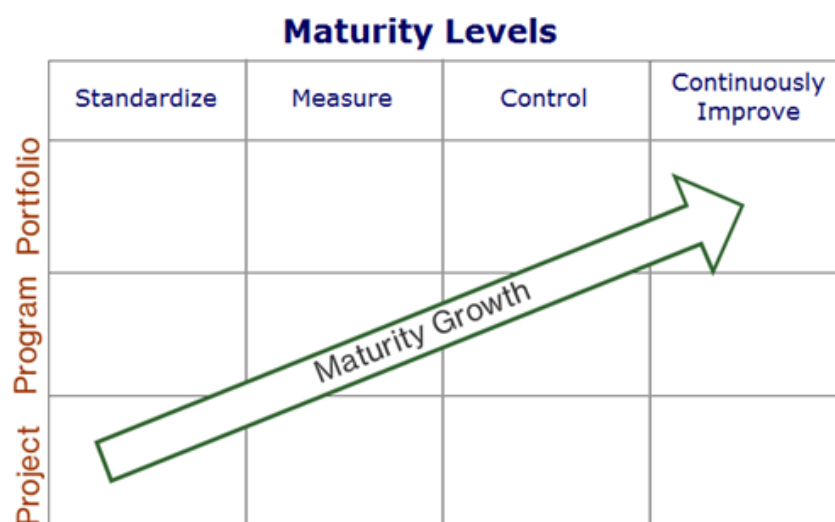
Figure 3.5.3.2: Maturity Growth (Adapted from Project Management, 2008)

3.5.4 Business Impact of Improved Maturity

Yazici (2009) revealed in his study that the project management maturity is mainly related to the overall business performance of the organization instead of project performance. Crawford (2007) explained that project management maturity is a continuous process which results in several improvements during different stages of analysing and implementation process. Project management maturity is an improvement tool which shows development in controlling cost and schedule, improved strategic business decision and profitability of the organization (Crawford, 2007).

Crawford (2007) has explained the results of conducted survey and found out that improving the level of project management maturity enhances the customer satisfaction by 25% results in better project delivery. Similarly Kevin Chui (2013) presented in his study of organization project management maturity model (OPM3) that companies with more mature project management practices and standards deliver their projects within cost and budget baselines. Whereas less mature companies have probability of missing their schedule targets by 40 percent and cost targets by 20 percent. Kevin Chui (2013) also explained that project management maturity is highly relatable with increasing predictability of project schedule index and cost performance index by 0.08 and 0.11 respectively.

3.6 Project Management Office (PMO)

In todays' fast paced technological advancements and its associated challenges, there is a need for a greater project management discipline which can handle on-going challenges of successfully managing the projects and defining the skills and tools to confront. For several organizations the implications of practicing project management skills, processes and governance structure can be handled by implementing a Project Management Office (Singh et al., 2009). The use of PMO can be traced back to 1930 and has been used in different industries including aerospace, telecom and defence sector to improve project performance and similarly reducing the project failure incidences (Dai, 2002 cited in Singh et al., 2009). Furthermore, this concept of PMO was accepted as industrial practise during 1990s with introduction of internationally accepted project management certifications and standards like Prince2, Project Management Institute and International Project Management Association (IPMA) (Giraudo & Monaldi, 2015).

According to PMI "A Project Management Office (PMO) is a management structure that standardizes project related governance processes and facilitates the sharing of resources, methodologies, tools and techniques" (Project Management Institute, 2013, p. 11)

Project Management Institute has defined the role of a PMO in different scenarios where the degree of control varies from high to low. PMO may directly manage and control some projects or provide support to other project managers during different phases of the project by making recommendations and keeping track of business objectives (Project Management Institute, 2013).

Project Manager	PMO
Project Manager focuses on the specific project objectives	PMO manages scope changes to achieve the business targets and align the project outcomes
Project Manager controls the assigned project resources	PMO take decision to optimally utilized the organizational resources among all the active projects
Project Manager manages constraints (scope, cost, schedule and quality) of the individual projects	PMO manages and implement methodologies, standards, policies, risk among projects across organization

Table 3.6.1: Difference between PMO and Project Manager. (Adapted from (Project Management Institute, 2013)

Introduction of Project Management Office (PMO) in an organization does not always run as planned. One of the major challenges in the implementations is to define the key benefits for the organization and later realizing those benefits for the organization (Singh et al., 2009). Many studies have revealed that the failure rate of introducing PMO in an organization is very high, and these PMOs are quite unstable entities within organizations which they reconfigure after every few years (Hobbs et al., 2008 cited in Singh et al., 2009). Therefore, it is particularly important to establish the type of PMO suited for the organization culture and key benefits which fulfils the objectives of senior management in the longer run (Christie, 2006). Similar to many change management activities within the organization, introduction of PMO in a newer environment must consider the existing culture of the organization and the resistance to implementation of newer practises within the organization. PMO will introduce a new culture with changes in approaching different problems and their solution (Christie, 2006). The table 3.6.2 shows the target culture after introduction of a PMO in an organization.

Without PMO	With PMO (Target Culture)
Projects are handled as fire-fighters	Project team should control projects
Unstandardized practices	Standard best practices utilization
Lessons learned not utilized efficiently	Lessons learned fully recorded and utilized for future projects
No basis for cost and schedule estimations	Estimations are made using existing basis and references
Lack of standard process to follow and monitor	All practices should follow standard procedure
Decision making is random/ad hoc	Structured and fact based decision making

Table 3.6.2: Comparison of Organizational Culture before and after PMO Introduction (Adapted from Christie, 2006)

Mariusz (2014) explained the key features of PMO in an engineering industry, where the projects take more time in completion along with large number of resources involved and higher budget. Mariusz (2014) explained that the function of PMO is taken care by the department responsible for strategy implementation. This department takes responsibility to implement the traditional functions of PMO like methodological standards, administrative support for the project managers and strategic projects (Mariusz, 2014).

	The role played in the company	Implemented functions
PMO (Strategic Programs Office)	Projects should be selected depending upon their contribution towards strategic objectives of organization while supporting the programs aligned with organizational strategies	- Creation of standard procedures and methods - Supporting project and program managers for strategic projects - Communication management - Management of lessons learned and knowledge sharing

Table 3.6.3: The idea of functioning PMO in an engineering industry (Adapted from Mariusz, 2014)

3.7   Organizational Culture

In addition to national culture, organizational culture captures the unconscious and the beliefs with assumptions and convictions shared by the group members in its environment in order to learn coping with the external environment and managing internal integration of the organization (Bhaskaran and Gligorovska, 2009). Anantamula (2010) claims that these beliefs normally have an impact and influence people's and group's behaviour in the organization. According to Anantamula (2010), a work culture is defined by shared values, beliefs and behavioural norms when it comes to individuals and shared job practices, job ethics, processes and norms in terms of organizational matters. Organizational and national cultures are closely connected. As Hofstede stated, "the subculture of an organization reflects national culture, professional subculture, and the organization's own history". (Hofstede, 1980, p. 27)

3.7.1   Organizational culture and change

Something important to consider when carrying out a change, it is whether the change involves values, ideas and beliefs or changes in structure that will end up affecting people's behavior (Alvesson and Sveningsson, 2015) In order for a change to become real, we need to modify and change people's ideas and values and consider cultural matters (ibid). It is important to understand the organizational culture before considering a change. The change of the organizational culture seems to be very complicated and it can be seen that openness and receptiveness to new ideas, beliefs and values are crucial to successfully achieve cultural change (ibid).

3.8   National Culture

Leung et. al (2005, p.357) define national culture as "values, beliefs, norms, and behavioural patterns of a national group". Bhaskaran and Gligorovska (2009) states that national culture is work-related values and behaviours of individuals within a country in which each country has its populations with shared history and experiences, as a result, each country has a homogeneous culture. However, there are several countries in which their population is a mix of several ethnises and religions and with a different historical, social, economic and political background. This suggests that there might several national cultures in the same country and for that reason, attempting to study national cultures might produce an inaccurate and unrealistic outcome. (ibid)

3.8.1 National culture and Project Management

It is very complicated to pinpoint the extent of how much national culture affects project management and project performance. It is believed that in addition to national cultures, there are organizational cultures, project cultures and individual differences within an organization. This suggests that there are several cultures and factors affecting the outcome of the project. (Rees-Caldwell and Pinnington, 2013). However, different national cultures might affect the project manager's performance and project management practices (ibid). For instance, in some cases, stakeholders with different cultures might have a different understanding or interpretation of project management and project management practices and for that reason project managers and organizations need to be aware in order to minimize the impact on performance (ibid). Moreover, when it comes to using WBS in project management, some cultures like Western Europe tend to use quite detailed work packages whereas some other cultures tend to use very few details or not use WBS at all (ibid). Furthermore, in terms of scheduling it can be found that some cultures are prone to schedule with high level of detail whereas some other cultures might not believe in scheduling since they believe that no one can know what it will happen in the future (ibid).

Different national cultures might lead to different expectations, reactions, behaviour and in some cases can lead to frustration. This suggests that cultural differences might have an impact on working relationships, communication and collaboration and consequently might have an impact on project and organizational performance if not managed efficiently (Rees-Caldwell and Pinnington, 2013).

3.9   Resistance to change

Thomas and Hardy (2011) claim that in order for a change to be successful, employees' cooperation is needed since any form of resistance might obstruct the change and consequently lead to unwanted outcomes. According to Pardo del Val and Martinez (2003), resistance to change is any event that obstructs the process of change at the beginning or the development of it with the objective of retaining the current situation.

Resistance to change is usually seen as something negative in most of the literature on organizational change and as a problem that organizations need to identify, face and overcome. However, Thomas and Hardy (2011) claim that resistance to change can be considered as a problem for organizations that needs to be overcome but also as something needed in order for a change to be successful. According to Thomas and Hardy (2011), the negative way of looking at resistance to change has not provided efficient ways of handling change but on the contrary, it might hinder successful change. The reason of seeing resistance to change as something that

can benefit the outcome of the change might be because the negative reactions after a change proposal, might be motivated by a positive intention and also because questioning that change might lead to interesting discussions that might improve the final change as Thomas and Hardy (2011) claim.

People's personalities influence resistance in different ways (Erwin and Garman, 2010). Some people tend to show resistance to change as an act of inertia whilst some other people tend to be more open to changes with optimism and willingness to face the challenge (ibid). The reactions to changes might differ from person to person and the concerns behind those reactions might be lack of confidence to perform after the change, job security, value of the change, lack of trust, difficulties seeing the change as an improvement, etc (ibid). Some of the issues that affect resistance are how the change is communicated, how well people understand the change, inconsistencies in change messaging delivered and the participation or involvement of people in the change (ibid). Pardo del Val and Martinez (2003) coincide with the latter and also mention the presence of different interests among employees and the change of values as also factors to influence resistance.

In order to manage resistance and overcome it, organizations should follow some routines and procedures. The organization should have a plan and be able to foresee resistance. People that are more prone to show negative reactions and resistance should be identified and gain their trust by explaining the importance of the change, making them understand properly, involve them in the change so that they feel part of it and support and train them in order to improve their capabilities towards the change. Employee feedback, resistance and opposition should be taken as an opportunity for improvement instead of a threat that might jeopardize the change. Communication is a vital part when trying to avoid resistance. The organization should deliver quality, detailed and clear information about the change and make sure that employees properly understand the need for change. In order to avoid inconsistencies, organizational policies, objectives and behaviours should be aligned with the change proposal. In order to create confidence and trust, the organization should encourage employee engagement and participation in the change and take everyone's opinions into consideration. Finally, the organization should make sure that the relationship between managers and employees are good and that the employee development possibilities are well defined and respected. (Erwin and Garman, 2010)

3.10 Organizational Learning

"A learning organization is an organization skilled at creating, acquiring, and transferring knowledge, and at modifying its behaviour to reflect new knowledge and insights" (Garvin, 1993, pp.3)

According to Hong and Easterby-Smith (2002), claim that organizational learning is a process of active interaction between knowledge and knowing and that the access of employees to previous knowledge acquired is vital in order for them to obtain the skills, knowledge and understanding to be a part of the active knowledge process. As Schindler and Eppler (2003) claim, the knowledge or key project experiences obtained from previous projects and that are remarkable for future project benefits are also called lessons learned.

By having a systematic record of project experiences, organizations are able to compare their different projects regularly and document their problem solving techniques. Moreover, the systematic record of project experiences such as mistakes, fails, etc., makes it easier in order to avoid future project risks and at the same time, looking in the long term, helps developing project competencies that will turn the organization into a more competitive one. Organizations see as a key issue the loss of knowledge by the termination of the project. By keeping record of knowledge in an effective way and using that knowledge in future projects, organizations could avoid redundant work and repetition of mistakes which is translated into important cost savings. (Schindler and Eppler, 2003)

3.10.1 Barriers to knowledge transfer

According to Schindler and Eppler (2003), normally, the gathering and documentation of lessons learned is not done systematically and it is normally carried out in an informal way or at the end of the project or not carried out at all. There are several reasons for not carrying out lessons learned best practices.

Time and budget are the most important elements for project success and are constraints that put lessons learned process in a secondary position since there is a tendency to focus on short-term results. Moreover, the lack of resources makes it more difficult to carry out lessons learned best practices since resources are moving from one project to another as their workload is reduced in the previous project. In addition, insufficient willingness to learn from mistakes of individuals and the lack of transparency in terms of admitting and sharing mistakes makes bring more barriers to knowledge transfer. Moreover, in most cases, individuals are not enough motivated since they do not see any personal benefit on documenting lessons learned. Additionally, in most organizations, documentation of lessons learned is not considered as important and therefore, is not included as mandatory steps

throughout project phases. In this case, employees do not give it the needed importance since they can see that the organization itself does not see it as an important step. (Schindler and Eppler, 2003) and (Disterer, 2002)

In addition, Disterer (2002) claims that is necessary to have a good environment with generosity, freedom and safety where the employees can take part of knowledge transferring in order to manage knowledge in an effective and transparent way.

According to Schindler and Eppler (2003), in most of the cases, when knowledge sharing and lessons learned are performed is not done in an effective way from which future projects can benefit from. In most cases, lessons learned are not well documented and recorded, are too general and lacking specific content and not categorized by type so that it is difficult to find the relevant ones for each project or even though they are well documented, they are not accepted. (ibid)

3.10.2 Lessons learned gathering methods

Schindler and Eppler (2003) divide into two groups the different methods of gathering project experiences and lessons learned: *process-based methods* which focus on highlighting the important steps and their sequence of the project life cycle and *documentation-based methods* which focus on how project experiences are documented and stored. (ibid)

i.   Process-based methods

- Post-Project Appraisal: Consists of carrying out an evaluation of a completed big project by an external unit. The purpose of this evaluation is to be able to identify mistakes and successes and share them worldwide. The post evaluation needs to be carried out by an external team so that it increases the level of objectivity. It is needed around six months to carry out the evaluation. Once is done, a report is created and distributed among team members and a review to be approved. (Schindler and Eppler, 2003)

- After Action review: This consists of confronting the team during sessions of a certain time. During these sessions the team is asked "*what was supposed to happen?", "what actually happened?", "Why were there differences?"* and *"What can you learn from this experience?"* (Schindler and Eppler, 2003.p.223) In this method, team learning, trust and team integrity are vital objectives for it to be successful. All the relevant information is transferred to a flip chart that will be used every time a similar event occurs. (ibid)

ii.   Documentation-based methods

- Micro Articles: They consist of writing a maximum of half a page in an informal way explaining the experience after completion. It is of a great importance for the article to make sense that the author explains the context of that experience in order for future readers to be able to understand. It is recommended to use illustrations and authentic language in order to make them easier to read and more entertaining. They should be recorded in a database and distributed in the intranet. (Schindler and Eppler, 2003)

- Learning Histories: It consists of creating a twenty to one-hundred pages document in which the main and most relevant happenings of a project are told in a chronological way so that it makes it more interesting to read. After this, the document is distributed via workshops or group discussions. (Schindler and Eppler, 2003)

- RECALL: It is a system in which lessons learned are recorded as they happen in a data base. When they occur, they can be submitted via Internet browser which facilitates the process of recording lessons learned. Individuals are provided with a check list in order to identify lessons learned and find out whether they are relevant or not. (Schindler and Eppler, 2003)

3.10.3   Key success factors

Even though the record of lessons learned is normally located at the end of the project according to most of the literature, in practice it is necessary and very important the regular and constant gathering of lessons learned throughout the project since the information obtained is more relevant and of a greater quality and enhances team members' motivation. The continuous and regular record of lessons learned improves the quality of the information gathered specially in long projects and it ensures the availability of resources since it is performed during the project. Furthermore, it is recommendable to carry out workshops where lessons learned are represented graphically (ex. Time line) so that all errors and successes can be easily identified. These workshops should be moderated by an external and neutral moderator.   In addition to this, in order for lessons learned to be successfully recorded and implemented, new project roles and tasks should be defined so that different individuals have different responsibilities in terms of lessons learned gathering, record and classification and implementation. Moreover, it is of a great importance to integrate learning and knowledge goals in the project model and at the same time, integrate learning and knowledge goals in the final project objectives. (Schindler and Eppler, 2003)

3.11 Key concepts

In order to be able to formulate key questions, that provide quality answers for the empirical research of this study, the following key concepts have been considered: Organizational Project Management, Organizational Project Management Maturity Model (OPM3), Project Management Knowledge Areas, Project Management Office (PMO), National Culture, and Resistance to change, Organizational Culture, and Organizational Learning.

4.   Empirical Data and Results

4.1   Company's Case Study

The company studied is an engineering consulting company with more than sixty years of experience in technology development, industrial investment projects, maintenance and performance improvement in oil and gas, bio refining, petrochemicals and chemicals industries. The company´s headquarters are located in Finland and has offices in several countries such as Sweden, Abu-Dhabi, Norway, Singapore, Netherlands and Azerbaijan. The company employs more than 1300 professionals around the world. It is a matrix organization where the project managers and functional managers have the same power and authority. The main functional departments are sales, marketing, human resources, ICT, engineering disciplines (electrical, automation, mechanical, civil, etc.), project management, finances and top management among others. The three projects studied in this research were:

Project Location	Project Budget	Number of people involved	Project Duration
Sweden	15.000.000 SEK	11-20	+18months
Finland	12.000.000 SEK	11-20	+18months
Abu Dhabi	10.000.000 SEK	11-20	+18months

Table 4.1.1: The three studied projects in this research

4.2   Results

The first part of this chapter shows the empirical data collected and compiled from the eight different interviews. The second part of the chapter presents the results obtained from fourteen questionnaires.

4.2.1   Interview results

Interviews Finland

Two employees were interviewed from Finland Headquarters who are currently working as a portfolio manager and project manager for studied projects with an experience of minimum two years.

The interviewees mentioned that in terms of integration project management, they are using the company's provided standards, guidelines and templates but the processes are not smooth and structured in order to combine all the plans at one

place. While discussing the appointment of project manager and assigning responsibilities, interviewees mentioned that there is a documented process to appoint a project manager but these practices are not always used and usually the appointment of project manager is informal. The interviewees explained that the project stakeholder management is not structured and no separate documents are available for identifying the project stakeholders and managing their engagement level, however, as key stakeholders are identified in presented in organizational chart for each project. When it comes to scope, time and cost management, the interviewees claimed that they collect the requirements and create WBS to assign and monitor tasks according to company's provided procedures and templates. However, the procedures to calculate earned value of project, the procedures are not well defined and informal. The interviewees explained the procedure of collected the cost and time related information from functional managers who are responsible for resources and later project engineer is required to collect and integrate all these time and cost related information to create cost and time baselines.

While inquiring about the quality standards of the company, the interviewees were not quite sure if they are using all the quality standards of the company or the processes involved to ensure the quality standards. The interviewees explained that the resource acquiring and identifying system used within the company is not efficient which leads to more utilization of external consultants. The interviewees showed interest in having a better system where availability of resources along with their skill level and recent experiences are available. While discussing risk management plan, interviewees claimed that there are certain main risk which are mentioned in the execution plan of the project but separate plan to identify, manage and respond is not created for the project. The communication plan and communication channels are informal within the project with no definite plan create to manage the communication among stakeholders. Although, company provide some general guidelines for the communication which are not fully exercised in projects. Project procurement is following company's standard templates and procedures together with signed closing documents and performed by procurement managers.

The interviewees claimed that the project roles are clearly identified in the beginning of project by creating an organizational chart for each project and different phases of the project lifecycle are identified. The interviewees raised their concerns about the ineffective system of recording, sharing and categorizing the lessons learned from pervious projects and they claimed that usually they are performing same mistakes again and again. There is no person responsible for managing the lesson learned and there is no PMO role in organization.

Interviews Abu-Dhabi

There were three individuals interviewed from Abu-Dhabi office of the company, who are working on different roles including project manager, quality control manager and Engineering manager. They have vast experience of managing project up to 30 years in the field of project management.

The interviewees mentioned that in terms of integration management, there are standard documents and templates being used with little changes for all the projects in Abu-Dhabi. They mentioned that unfortunately these standard templates, guidelines and documents are not provided by the company rather they have created these documents for their use in Abu-Dhabi office for all the projects. Furthermore, there is a standard documented procedure and template available for appointing project manager in the beginning of each project. Another interviewee mentioned that he was not aware about the documentation of project charter because he was not involved in this process. While inquiring about the stakeholder management, the interviewees mentioned that company provides some of standards, templates and guidelines such as stakeholder management plan which is strongly influenced by customers in Abu-Dhabi. When it comes to scope, time and cost management, interviewees claimed that there are scope, schedule and cost management plans provided by the company. However, in Abu-Dhabi they have created some of their own standards, templates and guidelines such as requirement collections document which is not provided by the company. The interviewees claimed that they are following step by step procedures define and breakdown scope into further activities and creating WBS. The time and cost estimations are provided by functional managers for each activity by using their previous experience which are used to create budget for the project and schedule baseline.

While inquiring about the quality management in organization, not all the interviewees were confident about the availability of quality standards, however the quality manager explained the available processes and standards for quality control like audits for random projects. There are standard checklists available for the quality management. While discussing human resource management, the interviewees explained that functional managers are responsible for the appointment of resources by using an internal system. The specific plans related to work sharing among the employees are missing but the organizational instructions related to percentage utilization and cost control are available. According to interviewees, risk management plans have been developed by Abu-Dhabi office due to lack of company standards. The standard process followed in Abu-Dhabi consists of identifying risk, register them and create response plan for each identified risk and continuous follow-up. There was not risk response plan for this project but a risk matrix was available. While inquiring about communication management, the interviewees claimed that they have strict communication control and mostly the communication with customer is formal and documented. There are no standard

company documents and standards available for communication management and mostly the standard templates and procedures are created by Abu-Dhabi. Interviewees claimed that strict and formal communications helps in avoiding the risk of unidentified changes in the project due to communication issues. Interviewees explained that procurement is responsibility of procurement managers, which is conducted by using company's standards, guidelines and templates. All the documentation are signed from customer and suppliers.

The interviewees further explained that all the project roles are clearly identified in the beginning of project whereas the project lifecycle is somehow unclear. The interviewees claimed that they are creating and sharing lessons learned among each other but the process is sometimes informal which makes it difficult to find lesson learned. The interviewees raised concerns about the structure of project management system in organization which is not regularly updated and it is difficult to find relevant documentation because of complex structure. There is no PMO in the organization.

Interviews Sweden

There were three individuals interviewed from company's office in Gothenburg. These interviewed individuals were working in different roles including project manager, site manager and functional manager. The interviewees were quite new in studied organization however they had a lot of working experience in different roles of project management.

The interviewees mentioned that in terms of integration management, the project is using some of the company provided standards, guidelines and templates. However, the processes are not enough structured and the system is complex to find relevant guidelines. The interviewees explained that there is no documented process for project manager appointment which is usually informal process. Change management is not always documented at the time of approval because it is informal process agreed with customers. The interviewees mentioned that in terms of stakeholder management, there is no separate documentation available for stakeholder identification and usually key stakeholder are identified in the project organizational chart. When it comes to scope, time and cost management, the interviewees claimed that they collect the requirements in a document according to company's procedures. The time and cost estimations for these activities are provided by functional managers but some of company standards, guidelines and templates are missing or difficult to find.

While inquiring about quality management, they interviewees were not aware about the availability of quality control and assurance documentation and were not sure if they can find them in company's project system. Quality management is exercised as per the customer requirements and standards are created by using their own past

working experiences. Because of lack of standards, sometimes there may be issues of exchanging different standards for same documentation with customer. Human resource management is the responsibility of functional managers and project manager is not involved in identifying and acquiring the resources. Functional mangers claimed that the company's project system provides instructions for resource utilization but lacks in providing documentation and templates. Risk management is performed as per the instructions provided by the company, but the standards and templates are missing to manage and control risks. The interviewees explained that there is no communication management plan for this studied project because of informal relationship with customer and no defined guidelines for communication channels. Procurement management is following company's standards, guidelines and templates.

The interviewees claimed that project roles are clearly identified; however there is lack of formal documentation in terms of change management. There is a process in company to gather lesson learned but the use of lesson learned for the future projects is difficult due to lack of sharing system and responsible person. The interviewees considered that they need standards, guidelines and templates structured and easily available in project system. There is no PMO in the organization.

4.2.2 Questionnaire results

The following tables (tables 4.2.2.1, 4.2.2.2 and 4.2.2.3) show the results from the questionnaires divided by country where all the scores from project management process, project governance and organizational support are presented. The questionnaire can be found in the appendix section. (See appendix B)

	INTERVIEW	MATURITY LEVEL-SWEDEN					
		1	2	3	4	5	AVERAGE
PROJECT MANAGEMENT PROCESS	Integration Managment	2	2	2	4	2	2
	Stakeholder Management	2	2	0	3	2	2
	Scope Management	2	2	2	2	2	2
	Time Management	2	2	2	3	1	2
	Cost Management	2	2	2	4	1	2
	Quality Management	1	0	2	2	2	1
	Human Resource Management	0	0	2	0	1	1
	Risk Management	3	2	2	4	2	3
	Communication Management	1	0	1	0	1	1
	Procurement Management	1	0	1	1	1	1
PROJECT GOVERN-ANCE	Roles and Responsibilities	2	1	2	4	1	2
	Project Governance Process	1	0	1	4	1	1
ORG. SUPPORT	Project Life-cycle model	2	0	5	0	2	2
	Support for Knowledge sharing between PMs	0	0	0	0	0	0
	Project Management Office	0	0	0	0	0	0

Table 4.2.2.1: Org. Project Mgmt. Maturity Assessment in Sweden

PROJECT MANAGEMENT PROCESS		MATURITY LEVEL-ABU DHABI					
	INTERVIEW	6	7	8	9	10	AVERAGE
PROJECT MANAGEMENT PROCESS	Integration Managment	5	0	0	3	5	3
	Stakeholder Management	4	4	3	2	3	3
	Scope Management	2	5	5	2	3	3
	Time Management	3	4	3	4	3	3
	Cost Management	2	5	5	0	2	3
	Quality Management	5	5	5	5	5	5
	Human Resource Management	0	4	4	0	3	2
	Risk Management	0	4	4	3	2	3
	Communication Management	3	5	5	3	2	4
	Procurement Management	5	5	5	1	3	4
PROJECT GOVERNANCE	Roles and Responsibilities	0	2	2	0	5	2
	Project Governance Process	3	3	3	0	2	2
ORG. SUPPORT	Project Life-cycle model	0	5	5	0	4	3
	Support for Knowledge sharing between PMs	2	4	4	0	5	3
	Project Management Office	0	0	0	0	0	0

Table 4.2.2.2: Org. Project Mgmt. Maturity Assessment in Abu-Dhabi

PROJECT MANAGEMENT PROCESS		MATURITY LEVEL-FINLAND				
	INTERVIEW	11	12	13	14	AVERAGE
PROJECT MANAGEMENT PROCESS	Integration Managment	1	1	1	1	1
	Stakeholder Management	0	0	0	0	0
	Scope Management	2	2	2	2	2
	Time Management	2	2	2	3	2
	Cost Management	3	2	2	3	2
	Quality Management	1	1	1	2	1
	Human Resource Management	1	1	1	1	1
	Risk Management	2	3	3	2	2
	Communication Management	2	2	2	0	1
	Procurement Management	2	2	2	2	2
PROJECT GOVERNANCE	Roles and Responsibilities	2	2	2	1	1
	Project Governance Process	2	2	2	3	2
ORG. SUPPORT	Project Life-cycle model	0	0	0	0	0
	Support for Knowledge sharing between PMs	2	2	2	1	1
	Project Management Office	0	0	0	0	0

Table 4.2.2.3: Org. Project Mgmt. Maturity Assessment in Finland

The following figure (Figure 4.2.2.1) graphically represents the level of organizational project management maturity for Sweden, Abu-Dhabi and Finland offices based on the results from the questionnaires.
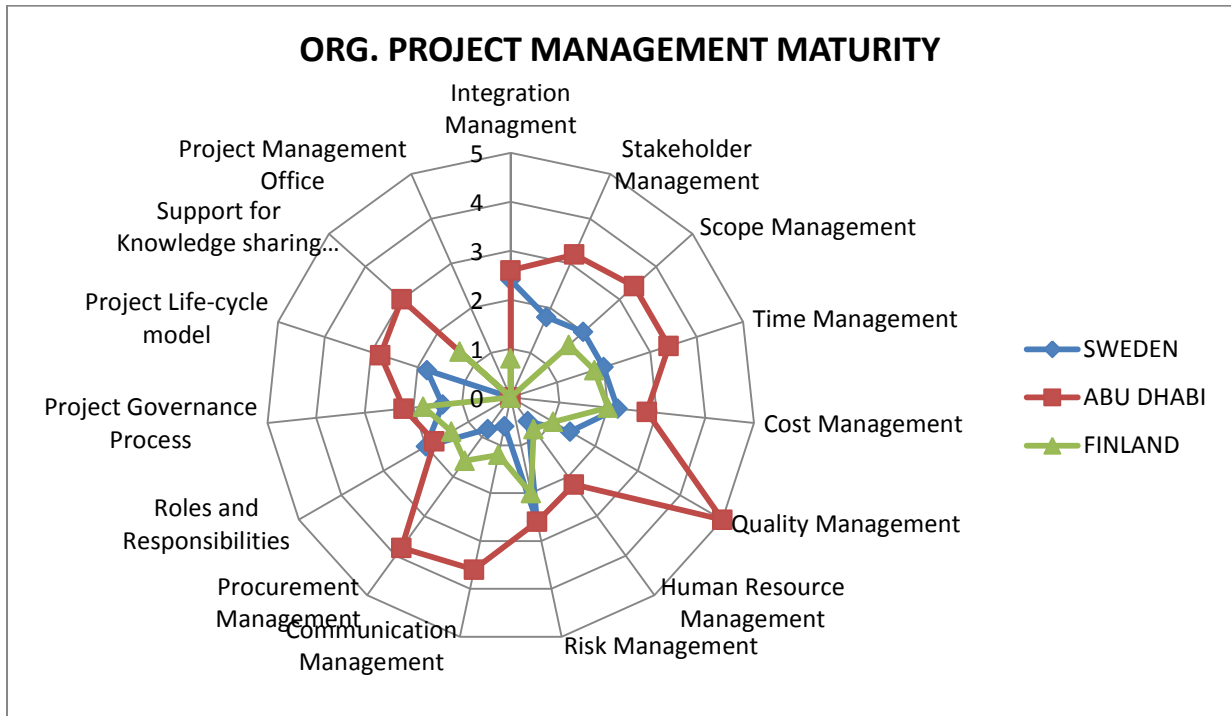

Figure 4.2.2.1: Org. Project Mgmt. Maturity Assessment in Sweden, Abu-Dhabi and Finland

5. Analysis and discussion

The following table (table 5.1) shows the project management practices of the three projects studied in the three different offices within the organization. The table is divided into ten knowledge areas as well as project governance, project life-cycle and general comments. It shows an analysis of the results obtained from the interviews and the questionnaires presenting the most relevant information for this research:

	SWEDEN	FINLAND	ABU DHABI
INTEGRATION MANAGEMENT	- Project charter missing - Informal project handover - Changes not documented, informal change management and customer relationship	- Project charter missing - There is PM plan - No document for change control board - Informal and unstructured change management	- Project charter available but created by them - PM plan created by them after not being able to find in the organization - There is change control board - Structured change management
STAKEHOLDER MANAGEMENT	- Not formal stakeholder identification doc or stakeholder management plan. Project organization chart used as such.	- There is a stakeholder management plan and stakeholder identification integrated in the PM plan available in the management system.	- There are company standards for stakeholder identification and stakeholder management plan.
SCOPE MANAGEMENT	- There is no scope management plan - Scope validation documents are missing. Created own doc., checklists, permits based on customer require. - Difficulties finding templates	- There is no scope management plan nor requirement collection doc. -WBS template provided by company - There is scope validation template or deliverables list	-There is requirement collection doc but created by them - Scope validation doc. Provided by company - The company provide some guidelines but not all templates
TIME MANAGEMENT	- There is no schedule management plan provided by company - Engineering leads and functional managers create time estimates and resource - No company standard for earned value analysis	- Schedule management plan created by experience without guidelines - Engineering leads and functional managers create time estimates and resource - No company standard for earned value analysis - Need of templates	- Software Silver Bucket used for schedule and resource and Primavera for project control as required by customer - Earned value analysis templated provided by company

COST MANAGEMENT	- Cost estimations done by functional managers and engineering leads. Company standards - There is no company cost management plan standard	- There are some documents and templates available in the company management system but some of them are missing	- Cost control using software Cognos. Input provided by functional managers and following company standards -Analogous calculations
QUALITY MANAGEMENT	- No using company quality management standards. Lack of knowledge of their existence or availability. They create own check lists, work permits, etc. No customer standard either.	- There are quality management standards provided by company. - No company standards for HSE	- All documents, standards and templates available from the company with audits, reviews and improvements -Interdisciplinary checklist not available in the management system
HR MANAGEMENT	- Resource acquisition provided by line managers and customer. External consultants also from line managers	- Software silver bucket used for resource acquisition. Not possible to see neither competences nor availability. - Overuse of external consultants - Lack of communication	- Software silver bucket used for resource acquisition. - Prioritizing the use of local resources. - There are workshare instructions available in the management system - HR plan missing
RISK MANAGEMENT	- Risk management plan provided by company - HSE company plan missing. They created their own	- Risk management plan and risk identification plan provided by company - Missing action plan	- No risk management plan used for this project. - They created their own risk matrix to identify and mitigate risks
COMMUNICATION MANAGEMENT	- Communication management plan available in the management system but not formally used in this project. -Organization chart with contact details - Informal communication channels with customer	- There is a communication management plan provided by company - There is no control communication document	- There is a communication management plan and control communication doc. provided by company - There is control project administrator and document controller - There is formal communication. No possible to directly talk with customer

PROCUREMENT MANAGEMENT	- All templates, documents and guidelines provided by company	- All templates, documents and guidelines provided by company	- All templates, documents and guidelines provided by company
PROJECT GOVERNANCE	- No formal change control board document or procedure - No access to business case - Most of project roles are well defined	- No formal change control board document or procedure - All projects roles are well defined - Company templates for business case, budget baseline, scope baseline and schedule baseline.	- All projects roles are well defined. RACI matrix - Availability of business case but not accessible to everyone
PROJECT LIFE CYCLE	- There is a clear project life cycle that follows company standard	- There is a clear project life cycle that follows company standard	- There is a clear project life cycle that follows company standard. Use of milestones
KNOWLEDGE SHARING	- There are some company standards but there is a lack of knowledge where they are stored. - Not previous lessons learned checked for this project - Informal knowledge sharing (meetings and phone calls)	- Following similar projects experiences - Lessons learned are not well documented, not categorized by type and difficult to find them. - No one is responsible for lessons learned	- Informal communication and transfer of lessons learned - lessons learned should be available to everyone but they are difficult to find.
PMO	- There is no PMO in the organization	- There is no PMO in the organization. There is a need for a PMO.	- There is no PMO in the organization. There is a need for a PMO.

GENERAL COMMENTS	- There is a lack of standards, documents, templates and procedures. - Not efficient introduction to new employees - Difficulties finding documents and templates - Lack of integrated system - Customer does not have own standards and ask us to produce	- There is a lack of standards, documents, templates and procedures. - Company's management system is not working well and relevant information and documents are difficult to find. - There is need of templates and guidelines to save time and cost and avoid mistakes - Inefficient lessons learned management	- There is a lack of standards, documents, templates and procedures. - Company's management system is not working well and relevant information and documents are difficult to find. (no latest revisions, not available in English, yellow marks, etc) - Necessity to adapt to cultural differences - Strict customer requirements, communication and contract. - Low adaptability of company standards to different projects and cultures

Table 5.1: Project management practices of the three different projects

Project management practices gaps between the studied projects

As it can be seen from the table 5.1 there are several gaps between the studied projects in Finland, Sweden and Abu Dhabi in terms of project management practices. The analysed data shows that project charter is not used in Finland and Sweden whereas in Abu Dhabi, project charter is created using their own standards. Moreover it can be seen that the change management process is unstructured in Finland and Sweden whereas in Abu Dhabi a standard structured process for change management is applied. In terms of stakeholder management Finland and Abu Dhabi are creating separate documents for stakeholder identification and management whilst in Sweden the process of stakeholder management is informal and lacking documentation. When it comes to scope management, in Abu Dhabi the project team are reviewing the scope and documenting the requirements collection whereas in Finland and Sweden these practices are not performed. In terms of cost and time management Abu Dhabi is using earned value analysis to calculate the current status of the project in comparison to project baselines whereas in Sweden and Finland there are no such practices of calculating the earned value of the project. Quality management practices are performed differently in the three projects. In Abu Dhabi all quality management standards are used, constantly reviewed and audited in order to keep updating and improving practices whereas in Finland some quality management standards are present and used but not constantly reviewed and improved. In Sweden, the company's quality management standards are not

used and for that reason, the process can be seen as informal and undocumented. Risk management is performed in a similar way in Sweden and Finland since they are following the company's risk management standard whereas in Abu Dhabi the risk management plan is not used and instead, a risk matrix is created by the project team. Moreover, in terms of communication there is a high degree of formality in Abu Dhabi where the communication channels are restricted and documented whilst in Sweden and Finland the communication channels are informal and there are no documentation nor communication restrictions. In terms of customer requirements, in Abu Dhabi the customer has strict and legal binding requirements related to project documentation. In Sweden the customer does not have own standards and for that reason company's standard are required.

What are the possible reasons for the existence of gaps between the studied projects?

There might be several possible reasons for the existence of the above mentioned project management practices gaps between the projects. All these gaps could be a consequence of a certain level of project management maturity, impact of internal factors and impact of external factors.

As it can be seen from the figure 5.1, Abu Dhabi seems to have a higher level of project management maturity in comparison to Sweden and Finland. Abu Dhabi scores higher in most of the assessed areas as obtained from the results of the questionnaires. The results of the interviews show that in the project studied in Abu Dhabi, most of the project management practices and documentation are created and used whereas in Finland and Sweden these processes are more informal and undocumented. This might be one of the reasons for the existence of gaps between projects executed in different offices.

Another reason for the existence of these gaps might the presence of internal factors within the different offices that favour the creation of differences in the execution of project management practices. These internal factors could be different employees' personalities and their resistance or willingness to accept changes. As Erwin and Garman (2010) mention, some people tend to show resistance to change as an act of inertia whilst some other people tend to be more open to change by showing optimism and willingness to collaborate. This was confirmed during the interviews by seeing the interviewees' reactions and answers to some questions. Some interviewees, especially in Finland and Sweden, showed a certain level of resistance to using company standards, procedures or templates whereas in Abu Dhabi it could be seen that team members were more willing to collaborate and create standards instead of complaining about what they do not have. Abu Dhabi showed a more positive and optimistic approach towards change. As Erwin and Garman (2010) claim, the concerns behind those reactions might be the lack of confidence to

perform after the change, job security, value of the change, lack of trust, difficulties seeing the change as an improvement, etc.

Furthermore, the presence of external factors might be another reason for the existence of the project management gaps between offices. National cultures and customer influence could be considered as external factors. As seen from the results of the interviews project management practices are, in some cases, carried out differently in the different projects and that might be the consequence of cultural differences as Rees-Caldwell and Pinnington (2013) supports by mentioning the impact of national cultures on project manager's performance and project management practices. Rees-Caldwell and Pinnington (2013) claim that different cultures have a different understanding or interpretation of project management and project management practices and at the same time might lead to different expectations, reactions, behaviour and in some cases lead to frustration. Therefore as it can be seen from the results of the interviews and as Rees-Caldwell and Pinnington (2013) claim, cultural differences might have an impact on working relationships, communication, collaboration and ways of working. Moreover, customer behaviour might also influence the way of carry out project management practices in different offices and projects as obtained from the results of the interviews. As mentioned before, in Abu Dhabi, legal bindings are present and customers tend to be more strict in terms of project management documentation requirements whereas in the studied projects in Finland and Sweden the relationship with customers are more informal and there are not strict legal bindings present. This suggests that the existence of gaps between the three different projects in terms of project management practices might be to some extent linked to the type of customer relationship and legal bindings that they are facing.

Project management practices gaps between studied projects and project management standards

The research shows that there are several differences between how the studied organization carries out project management practices and what some of the most used project management standards recommend.

From the results obtained from the interviews and questionnaires it can be seen that in general, there is a lack of project management standards, templates and guidelines within the studied organization. Therefore the project management best practices are in most cases not followed. In some cases, some standards are available but the results suggested that employees are not using them. Project Management Institute (2013) describes and provides the best known and recognized project management processes and practices which are usually applicable to the majority of projects and which values and usefulness are globally recognized. According to Project Management (2008), in order to achieve organizational project management maturity, to align projects with the company's strategy and achieve competitive economic advantage, the OPM3 best practices should be followed. The

results show that in most cases, the project management and organizational project management best practices are not created and followed by the studied organization.

Furthermore, the study shows that the procedure and documentation for project initiation, project handover among project managers is missing or in some cases too informal. In addition, the results show that project charter is missing in most occasions. According to Project Management Institute (2013) by having a project charter, project managers are officially authorized to initiate the project and allocate and utilize organizational resources. Additionally, Project Management Institute (2013) claims that the benefits of having a project charter are defining project boundaries, creation of formal project documentation and commitment of senior management towards project objectives.

Another difference between the studied organization and the project management theoretical framework is the way of managing changes. The results show that in general, change management is unstructured and lacks documentation and formality. On the other hand, Project Management Institute (2013) claims that in order to effectively maintain the project management plan, scope and deliverables, changes should be dynamically written and well recorded after approval of the responsible change control board so that time and cost impacts can be estimated. Even though changes might start in most of the cases verbally like the results from the interviews show, according to Project Management Institute (2013) they should always be formally written and recorded to validate and keep track of the scope baseline.

In terms of knowledge sharing and lessons learned, the study shows that generally, lessons learned are not well gathered, recorded, categorized and accessible to everyone within the organization. In the few cases in which lessons learned are recorded, they are recorded after project completion and they are not distributed and shared in an efficient way to the rest of the organization. Knowledge sharing and transfer among project managers is informally performed by phone calls or random meetings. This is an important point to consider, as Schindler and Eppler (2013) mentions, the key and remarkable project experiences obtained from previous projects will provide several benefits to future projects. Schindler and Eppler (2013) also claim that the record of relevant project experiences such as mistakes, fails, successes, etc. should be carried out systematically since by doing that, at the end of the project, it would increase the risk of forgetting important information. Furthermore, by effectively record and manage lessons learned the organization could avoid redundant work and repetition of mistakes which would provide important cost savings (Schindler and Eppler, 2013).

The results of the collected data from interviews pointed out the inefficient implementation and usage of some project management tools within the organization. The highlighted tools include company's project management system and resource planning and allocation system. The interviewees explained the

concerns related to project management system as a complex database where it is difficult to find the required project documents and templates. Moreover, the system does not give any notification related to updated documents and language issues in certain instances as well. The results from interviews raised concerns related to using resource planning system within the organization, as the system does not provide complete information like skills, certifications and past experience related to all resources. This inefficient use of resourcing system is resulted in more outsource resource utilization and results in high project cost.

In some cases, the interviewees mentioned that the company does not have a structured process to introduce new employees to the organization. According to some of the interviewees, this makes it more difficult for them to be fully aware of what documents, guidelines, standards, etc. are available in the organization, where to look for them or who to ask in order to obtain the needed information. This might have an impact on the project members' performance and efficiency as they might spend some of their time looking for information or directly using or creating their own documentation as the interviewees claimed.

What are the possible reasons for the existence of gaps between studied projects and project management standards?

The results from the interviews and questionnaires show that in general the studied organization is not creating and following the project management best practices and organizational project management best practices recognized by Project Management Institute (2013) and Project Management (2008) which suggests that the studied organization has low level of maturity in terms of organizational project management. This unstructured approach in the organization, results in a lack of standards, templates and guidelines that would facilitate project management and standardize processes. Furthermore, the results also show that the low level of organizational project management maturity affects the project change management, handover processes and organizational knowledge sharing. The level of organizational project management maturity divided by office can be seen in the figure 4.2.2.1.

The data collected from interviews and questionnaires shows that the studied organization does not have a Project Management Office (PMO). As mentioned in the theoretical framework section, Project Management Institute (2013) claims that a PMO is supposed to standardize project processes and help organizing and distributing resources, methodologies, tools and techniques that support project management. In addition, Mariusz (2014) explains that in engineering organizations PMOs are supposed to create project management standards and methodologies, give support to project managers and efficiently manage lessons learned, knowledge and communication among project organization. This suggests that the absence of a PMO like in the studied organization might be one of the reasons for the low level of organizational project management maturity, unstructured processes, lack of

standards and methodologies and at the same time the ineffective management of lessons learned and knowledge sharing as it can be seen from the results. Moreover, the absence of the PMO might also be one of the reasons for having an unstructured and inefficient project management system and resource allocation system.

As previously mentioned and as observed during the interview sessions, resistance to change might also be a reason for the existence of some of the gaps found. As Erwin and Garman (2010) mention, some people tend to show resistance to change as an act of inertia whilst some other people tend to be more open to change by showing optimism and willingness to collaborate. The results show that some employees tend to resist to change and adapt to new systems or standards or even to collaborate for the improvement. Some interviewees showed that they are not willing to change or follow company's standards instead; they are comfortable working the way they are used to. In some other cases the interviewees did not believe in the value of the change or had difficulties seeing changes as improvements which supports Erwin and Garman (2010) idea. This resistance could also be one of the reasons for the ineffective use, and improvement of project management tools, methodologies and standards and at the same time it could also be a barrier for effective knowledge sharing.

Another reason for the existence of gaps between project management practices within the organization and some of the best known project management standards might be the existence of different national cultures across the organization as mentioned before. As seen from the results of the interviews, project management practices are, in some cases, carried out differently in the different projects and that might be the consequence of cultural differences as Rees-Caldwell and Pinnington (2013) supports by mentioning the impact of national cultures on project manager's performance and project management practices. This suggests that cultural differences might be also one of the reasons why project management practices are different across the organization since they might be understood in a different way or given different levels of importance. Moreover, customer requirements might also have a big impact on organizational project management practices as it can be seen by looking at different customer behaviours in Abu Dhabi, Sweden and Finland projects.

As mentioned before, in terms of knowledge sharing and lessons learned management, the organization is not effective and generally, lessons learned are not well gathered, recorded, categorized and accessible to everyone within the studied organization. The main reasons for not being effective collecting and transferring lessons learned and knowledge might be lack of time and budget, lack of resources, insufficient willingness to learn from mistakes, lack of transparency in terms of admitting mistakes, lack of motivation due to difficulties to see the individual benefit of recording lessons learned, lessons learned not considered as important by the

organization and lack of safe work environment where employees can freely express and share their thoughts as (Schindler and Eppler, 2003) and (Disterer, 2002) claim.

What is the impact of the gaps between the studied projects and project management standards on the organizational and project performance?

The consequences of low level of organizational project management maturity as mentioned by Kevin Chui (2013) could be a probability of missing schedule and cost targets by 40 and 20% respectively compared to a more mature organization where project schedule and cost performance index would increase by 0.08 and 0.11 respectively. A higher level of organizational project management maturity would result in a better project delivery and consequently would increase customer satisfaction in a 25% according to Crawford (2007). PM Solutions (2014) conducted a survey to analyse the benefits of project management maturity that shows that organizations with higher level of maturity improve project alignment with business objectives by 37%, reduce the percentage of project failure by 29%, improve customer satisfaction by 26%, increase the probability of delivering projects below budget by 23%, provides cost saving per project by a 16% and increase overall productivity by 21%.

As previously mentioned, there is no PMO in the studied organization. According to Christie (2006) the absence of PMO would result in unstandardized and unstructured practices, projects are executed in an unplanned way, lack of cost and schedule estimates due to ineffective knowledge sharing and lessons learned and random decision making. Additionally Mark (2014) based on a study conducted to analyse the benefits of effective project management claims that by having a PMO, the process maturity of an organization would increase by 10%.

The impact of employees' resistance towards change on project and organizational performance might be somehow uncertain. As obtained from the result, in the studied organization might exist resistance to follow standards or procedures and resistance to change in general. Even though it might sound as something negative that needs to be identified, faced and solved as most of the literature claim, Thomas and Hardy (2011) also mentions that resistance is needed in order to create interesting discussion that might end up improving the change proposal and consequently obtaining a more successful outcome.

The study has shown that cultural differences might have a big impact on how project management practices are carried out. As Caldwell and Pinnington (2013) claim, different cultures have different expectations, reactions and behaviour within the organization and project environment. As Caldwell and Pinnington (2013) mention and based on the results of this study, those differences might have an impact on working relationships, communication and collaboration within the organization and lead to issues at project and organizational level. However, while in

terms of standardizing project management practices, national cultures might seem as an issue, the answers from the interviewees suggested that the presence of several national cultures in an organization might bring several benefits.

Knowledge is not efficiently shared and lessons learned are not well gathered, recorded, categorized and accessible to everyone within the organization. In the few cases in which lessons learned are recorded, they are recorded after project completion and they are not distributed and shared in an efficient way to the rest of the organization. The impact of inexistent or unstructured practices in terms of lessons learned and knowledge management on project and organizational performance could be of a great importance for the organization and its employees. Even though lessons learned and knowledge sharing do not give benefits right away and it some cases are seen as a waste of time and costly, in fact, the literature suggests that it is a long term investment. As Schindler and Eppler (2003) suggest, bad or unstructured bad practices in terms of lessons learned and knowledge sharing might lead to future redundant work, repetition of mistakes which consequently would lead to higher costs.

How can the gaps *(if any)* between the studied projects and project management standards ***be minimized? What recommendations could be useful in order to improve future project management practices and avoid mistakes during the new project model implementation in the studied organization?***

In order to minimize or eliminate the gaps found in this research, several recommendations could be proposed. As previously mentioned, the studied organization wants to improve processes, increase standardization and find out the key success factors for the future project model implementation.

The introduction of a supportive PMO would help improving the standardization of the processes and procedures, by creating tools and templates and providing project management best practices. Moreover, the supportive PMO would also help recording, categorizing and distributing lessons learned efficiently within the organization (Project Management Institute, 2013). At the same time, organizational project management maturity focuses on the extent to which an organization carries out organizational project management best practices as Project Management (2008) claims. Consequently, in order to increase organizational project management maturity, a three-step process should be followed by the organization. In the first step, the organization should have an understanding on what organizational project management best practices are. In the second step, and assessment on the organization's current status should be carried out by comparing it to standard and finally some action plans should be proposed and implemented in order improve organizational project management maturity (Project Management,

2008). In order to improve organizational project management maturity, PMO would play an important role by creating, assessing and implementing organizational project management best practices and consequently improving processes and standardization as mentioned. Furthermore, achieving organizational project management maturity is a continuous and dynamic process that requires constant commitment. For this reason, it would be recommendable to link practicing organizational project management best practices to the Key Performance Indicators (KPIs) of the PMO or responsible individuals.

The introduction of effective lessons learned and knowledge sharing system and procedures would help avoiding repetitive mistakes, redundant work and high costs. It would be recommended to continuously gather lessons learned as they happen in order to do it at project completion. This would improve the quality of the information collected and it would ensure the availability of resources. Finally, it would be of a great importance to integrate learning and knowledge goals in the project model and at the same time, integrate learning and knowledge goals in the final project objectives (Schindler and Eppler, 2003). For all this to be implemented and effective, some methodology should be introduced. A Schindler and Eppler (2003) claim, "RECALL" is methodology to record and categorize lessons learned in a database as they occur. Individuals would be provided with a checklist to identify whether or not the event is relevant and considered as a lesson learned and proceed to submit it via internet browser (ibid). Therefore, a similar methodology would be recommended in order improve project management practices and effectively learned from experiences.

As a new project model is going to be implemented in the organization and a higher level of standardization is desirable, some individuals might show resistance to change as obtained from the results. For this to be overcome, employee feedback, resistance and opposition should be taken as an opportunity for improvement (Erwin and Garman, 2010). The organization should deliver quality, detailed and clear information about the change and make sure that employees properly understand the need for change. In order to avoid inconsistencies, organizational policies, objectives and behaviours should be aligned with the change proposal. In order to create confidence and trust, the organization should encourage employee engagement and participation in the change and take everyone's opinions into consideration. (Erwin and Garman, 2010)

The results showed that the organization's project management system or project model is complex, unstructured and difficult to understand. It would be recommended to improve the interface by creating a user friendly system in which all documentation can be easily found in a single interface, documentation should be continuously updated and reviewed, all project phases should be clearly identified along with the required deliverables of each phase. This project model should also be adaptable for different project types, sizes and consider customer preferences.

Finally, as shown from the interview results, the resource planning and allocation system is inefficient and the use of external resources is high. In order to overcome this, the system would need a functionality improvement that would help identifying resource availability across the whole organization. This functionality would also categorize employees by skills, experience and competences.

6. Conclusions

This study started due to a company's concerns regarding alleged differences in terms of organizational project management practices in three different projects located in three different countries. The company suspected that project management was being carried out differently within the different offices and for that reason this study would help them find those gaps. The goal after identifying the gaps between offices was to compare them with the project management standards in order to also identify the gaps. The gaps found in this study would lead to some recommendations in order to improve future project management practices, increase the level of organizational project management standardization and give input for a successful implementation of the company's new project model. In order to collect the needed data, face-to-face and videoconference interviews with different key members of every project were conducted and questionnaires were distributed. The interviews provided information about the differences in terms of project management practices in every project and also gave extra information about potential reasons for their existence. The questionnaires provided information about the level of organizational project management maturity of the different offices. The Project Management Institute's Knowledge Areas and Organizational Project Management Assessment Model OPM3 were used in order to pinpoint the gaps. Moreover, the results from the interviews showed that in order to understand the findings and the gaps, more theoretical knowledge was needed. Therefore, a deeper research on national and organizational culture, resistance to change, organizational learning and project management office (PMO) was carried out.

The first research question of this study is answered by looking at the results which showed that there are several gaps in terms of project management practices between the three projects. The two studied Scandinavian projects are more similar to each other when it comes to project management practices whereas the Abu Dhabi project shows bigger differences when compared to the Scandinavian projects. In general, in the Abu Dhabi project, practices and process have a higher degree of formality and structure whereas in the Swedish and Finish projects the level of formality and structure is lower. The possible reasons for the existence of those gaps could be various. As shown, Abu Dhabi seems to have a higher level of project management maturity in comparison to Sweden and Finland. Another reason for the existence of those gaps could be the level of resistance to changes and using company's standards, procedures or templates. Finland and Sweden showed a certain level of resistance towards the later whereas Abu Dhabi showed more predisposition and optimism towards it. Moreover, national cultures and customer influence seemed to be another reason for the presence of gaps between the offices. Different cultures seem to have a different understanding on project management practices and for that reason, reactions, attitude and performance may vary. Customer influence also seems to have a great impact on how a project is managed. The second research question of this study deals with finding out whether there are

gaps between the organizational project management practices and the project management standards. The results showed that there are several gaps. In general it can be seen that there is a lack of project management standards, templates and guidelines within the studied organization. Generally, documentation for project initiation, project handover and change management is inexistent or too informal. Moreover, lessons learned are not well gathered, recorded, categorized and accessible to everyone within the organization and organizational learning process is informal and unstructured. Furthermore, the study showed that some of projects management tools and resource planning and allocation system are not use effectively. As the results suggested, the possible reasons for the existence of these gaps between the company's project management practices and the project management standards might be the company's low level of maturity in terms of organizational project management practices, the nonexistence of a PMO, the resistance to change and to adapt to company standards of several individuals and the existence of different national cultures across the organization. Moreover, in terms of lessons learned and knowledge transfer gaps, the main reasons for their existence might be a lack of time and budget, lack of resources, insufficient willingness to learn from mistakes, lack of transparency in terms of admitting mistakes, lack of motivation due to difficulties to see the individual benefit of recording lessons learned, lessons learned not considered as important by the organization. Generally, based on the results obtained and the literature research, the impact of these gaps on project and organizational performance might be schedule delays, project overruns, decrease of customer satisfaction, ineffective project delivery, and misalignment of project with business objectives, project failure, unstandardized and unstructured project management processes and frequent repetition of mistakes. Finally, the third research question of this study intends to find out the way to minimized the found gaps and provide recommendations in order to improve future project management practices and avoid mistakes during the new project model implementation in the studied organization. The introduction of a supportive PMO would help improving the standardization of the processes and procedures, by creating tools and templates and providing project management best practices and at the same time would improve the lessons learned and knowledge sharing system. The introduction of effective lessons learned and knowledge sharing system and procedures would help avoiding repetitive mistakes, redundant work and high costs. In order to overcome employee resistance to change, the organization should deliver quality, detailed and clear information about the change and make sure that employees properly understand the need for change. In terms of the company's project management system, several modifications might be suggested. It would be recommended to improve the interface by creating a user friendly system in which all documentation can be easily found in a single interface, documentation should be continuously updated and reviewed, all project phases should be clearly identified along with the required deliverables of each phase. Finally, to improve resource management, a new system should be created so that resource availability, competence and skills could be easily identified across the whole organization.

Further Research: Although this study thoroughly analysed the gaps in organizational project management best practices, but still there is room for more research to deeply analyse the root causes associated to these gaps. Additionally, there are several other project management frameworks available, apart from the studied PMI standards, which could be interesting for gap analysis and improvement of organizational project management practices in engineering companies.

7. References

Alvesson, M. & Sveningsson, S., 2015. Changing organizational culture: Cultural change work in progress. Routledge.

Anantatmula, V.S., 2010. Impact of cultural differences on knowledge management in global projects. Vine, 40(3/4), pp.239-253.

Backlund, F., Chronéer, D. & Sundqvist, E. 2014. Project management maturity models–A critical review: A case study within Swedish engineering and construction organizations. Procedia-Social and Behavioral Sciences, 119, 837-846.

Besner, C. and Hobbs, B., 2006. The perceived value and potential contribution of project management practices to project success. Project management journal, 37(3), p.37.

Bhaskaran, S. & Gligorovska, E. 2009. Influence of national culture on trans-national alliance relationships. Cross Cultural Management: An International Journal, 16, 44-61.

Christie, A. (2006). Successes and challenges in maturing the PMO. Paper presented at PMI® Global Congress 2006—EMEA, Madrid, Spain. Newtown Square, PA: Project Management Institute.

Chui, K., 2013. Organizational project management maturity model. Project Management Institute. Retrieved from *http://www.knowledgecentury.com/download/OPM3_050607_HKCS.pdf.*

Crawford, J.K., 2007. Project management maturity model (p. 75). Boca Raton, FL: Auerbach Publications.

Dai, C.X., 2002, October. The role of the project management office in achieving project success. In PMI Annual Seminars & Symposium.

Demir, C. and Kocabaş, İ., 2010. Project management maturity model (PMMM) in educational organizations. Procedia-Social and Behavioral Sciences, 9, pp.1641-1645.

Disterer, G., 2002. Management of project knowledge and experiences. Journal of Knowledge Management, 6(5), pp.512-520.

Erwin, D.G. and Garman, A.N., 2010. Resistance to organizational change: linking research and practice. Leadership & Organization Development Journal, 31(1), pp.39-56.

Garvin, D.A., 1993. Building a learning organization. Harvard business review, 71(4), pp.78-91.

Giraudo, L. & Monaldi, E. (2015). PMO evolution: from the origin to the future. Paper presented at PMI® Global Congress 2015—EMEA, London, England. Newtown Square, PA: Project Management Institute.

Greener, S., 2008. Business research methods. BookBoon.

Hillson, D., 2003. Assessing organisational project management capability. Journal of Facilities Management, 2(3), pp.298-311.

Hinde, D., 2012. PRINCE2 study guide. John Wiley & Sons.

Hobbs, B., Aubry, M. and Thuillier, D., 2008. The project management office as an organisational innovation. International Journal of Project Management, 26(5), pp.547-555.

Hong, J.F. and Easterby-Smith, M., 2002, April. Transfer of organizational learning practices. In Third European Conference on Organizational Knowledge, Learning and Capabilities. Athens April (pp. 5-6).

Itegi, F.M., 2015. Improving organization performance: project management approach sustainable development in face of globalization.

Khoshgoftar, M. and Osman, O., 2009, August. Comparison of maturity models. In Computer Science and Information Technology, 2009. ICCSIT 2009. 2nd IEEE International Conference on (pp. 297-301). IEEE.

Kothari, C.R., 2004. Research methodology: Methods and techniques. New Age International.

Kumta, G.A. AND Shah, M.D., 2002. Capability Maturity Model. A Human Perspective, Delhi Business Review, 3(1).

Kwak, Y. H. 2003. The Story of Managing Projects, Quorum Books.

Leung, K., Bhagat, R. S., Buchan, N. R., Erez, M. & Gibson, C. B. 2005. Culture and international business: Recent advances and their implications for future research. Journal of International Business Studies, 357-378.

Levin, G. 2011. Organizational Project Management [Online]. LinkedIn. Available: http://www.linkedin.com/in/gingerlevin [Accessed 01-May-2017 2011

Manifesto, C.H.A.O.S., 2013. Think Big, Act Small. The Standish Group International Inc, 176.

Mariusz, H., 2014. Models of PMO functioning in a multi-project environment. Procedia-Social and Behavioral Sciences, 119, pp.46-54.

Mark, A., L.(2014). PMI's Pulse of the Profession: The High Cost of Low Performance. A Core Competency for Project and Program Success. In Project Management Institute.

Maylor, H. 2010. Project management, Harlow, Pearson Education.

Mittermaier, H.K. and Steyn, H., 2009. Project management maturity: an assessment of maturity for developing pilot plants. South African Journal of Industrial Engineering, 20(1), pp.95-107.

Pardo del Val, M. and Martínez Fuentes, C., 2003. Resistance to change: a literature review and empirical study. Management Decision, 41(2), pp.148-155.

Pennypacker, J., 2001. Project management maturity benchmark: A Center for Business Practices (CBP) research report. Center for Business Practices Research Report, 179.

PM Solutions. (2014). Project management maturity & value benchmark. Retrieved fromhttp://www.pmsolutions.com/articles/PM_Maturity_2014_Research_Repo rt_FINAL.pdf

Project Management Institute, I. 2013. A Guide to the Project Management Body of Knowledge (PMBOK Guide). Newtown Square: Project Management Institute, Inc.,fifth Edition.

Project Management, I. 2008. Organizational project management maturity model (OPM3) : knowledge foundation, Newtown Square, Pa., Project Management Institute.

Rees-Caldwell, K. and Pinnington, A.H., 2013. National culture differences in project management: Comparing British and Arab project managers' perceptions of different planning areas. International Journal of Project Management, 31(2), pp.212-227.

Schindler, M. and Eppler, M.J., 2003. Harvesting project knowledge: a review of project learning methods and success factors. International journal of project management, 21(3), pp.219-228.

Seymour, T. & Hussein, S. 2014. The history of project management. International Journal of Management & Information Systems (Online), 18**,** 233.

Singh, R., Keil, M. and Kasi, V., 2009. Identifying and overcoming the challenges of implementing a project management office. European journal of information systems, 18(5), pp.409-427.

Smith, D., 2003. Five principles for research ethics. Monitor on psychology, 34(1), p.56.

Thomas, R. and Hardy, C., 2011. Reframing resistance to organizational change. Scandinavian Journal of Management, 27(3), pp.322-331.

Turley, F. 2010. An Introduction to PRINCE2®. Management Plaza.

Weldemariam, T.T., 2013. Assessment of project management capability-(A case study at Mesfin Industrial Engineering PLC, Mekelle–Ethiopia).

Yazici, H.J., 2009. The role of project management maturity and organizational culture in perceived performance. Project Management Journal, 40(3), pp.14-33.

8. Appendix

Appendix A – Interview questions to find out gaps in terms of project management practices (Project Management, 2008)

Personal Profile, Year of experience and role in this project?

Integration:
1. How is the project management plan developed and approved in NJ?
2. How do you manage project work, monitor and control the project status and progress?
3. How do you manage changes within the project (change requests, change control board, etc.)?

Stakeholder:
4. How do you identify key stakeholders (internal and external to the project)? How do you identify the stakeholders' needs, expectations and requirements and engagement?
5. How do you identify and plan appropriate methods for approaching and involving different stakeholders in the project?

Scope:
6. How do you define and validate the project scope and plan how to manage the scope throughout the project?
7. How do you create WBS? Is there any NJ standard to create WBS?
8. What is the change control procedure for scope requirements and Earned Value Measurement throughout project?
9. Do you have Standard Procedure, tools, templates, policies regarding the scope management from Neste Jacobs?

Schedule:
10. How do you estimate activity duration, sequence the activities and develop project schedule?
11. How do you follow up and control that you are on schedule (status reporting, earned value analysis, time to completion, etc.)?
12. Do you have Standard Procedure, tools, templates, policies regarding the schedule management from Neste Jacobs?

Cost:
13. How do you estimate costs of activities? Are estimates based on experiences from previous projects?
14. How do you develop the project budget and who is involved? How is the budget approved and by whom?
15. How do you monitor and control cost (using e.g. cost variance analysis, cash flow control, earned value analysis) to ensure that financial requirements and constraints are met?
16. Do you have Standard Procedure, tools, templates, policies regarding the cost management from Neste Jacobs?

Quality:

17. Do you set up and use quality plans in your projects and how do you perform the quality control?
18. Are there any checklists and standards available from Neste Jacobs to measure and ensure quality?

HR:

19. How the resource needs of the project defined, e.g. the competence and effort required for different activities, including need for tools and other support?
20. How are project resources acquired?

Risk:

21. How are project risks identified?
22. How do you analyse the risk? Is there any risk response plan available for the projects?
23. How do you learn from previous projects' ability to identify and manage risks, not to have the same problem in next project?
24. Do you have Standard Procedure, tools, templates, policies regarding the risk management from Neste Jacobs?

Communication:

25. How do you investigate internal and external communications needs and plan communication in the project (meetings, reports, media, etc. Considering cultural and time differences)?
26. How do you ensure that information is distributed to the "right" people, at the "right" time, using the appropriate media?
27. Does Neste Jacobs has any standards analysing and control procedure for communications?

Procurement:

28. How do you plan the procurement process and select suppliers in the project? What support do you have in the organization to ensure that the company's procurement policies are met?
29. How do you evaluate the suppliers' performance and deliveries evaluated?
30. How are supplier contracts managed during the projects? How is each procurement documented and closed after completion, for future reference?
31. Do you have any standard procedure and documentation from Neste Jacobs?

General:

32. Do you think NJ MS is efficient system to work with?
33. Do you think there are gaps among the project execution and project standards in NJ?
34. Do you have defined Project sponsor, steering board, receiver and project team?
35. What are the typical phases of Neste Jacobs project model?
36. Does your organization use and maintain a common project management framework, methodology, and process set for its projects?
37. How do you document, manage and share project lessons learned? Are you happy with current structure of lessons sharing?
38. Do you have a PMO (or similar unit/s) in the organization with a clear responsibility for supporting projects and project stakeholders at different levels?

Appendix B – Questionnaire to assess level of organizational project management maturity and organizational project management practices

Questionnaire part -	Project Name:
Organizational Project Manturity	
Project Management Processes	

Integration Management:	In case you have additional information
What practices (processes, tools, documents, etc.) do you apply for this project integration management? *(please select the documents available)* ☐ Project Charter ☐ Project Management Plan ☐ Change Control Board	
0 0 We have no such practices in our projects	

Stakeholder Management	In case you have additional information
What practices (processes, tools, documents, etc.) do you apply for project stakeholder management? *(please select the documents available)* ☐ Stakeholder Management Plan ☑ Stakeholder Identification document ☐ Stakeholder Engagement document	
0 0 We have no such practices in our projects	

Scope Management	In case you have additional information
What practices (processes, tools, documents, etc.) do you apply for project scope management? *(please select the documents available)* ☐ Scope Management Plan ☐ Requirements collection document ☐ Scope Validation Document ☐ WBS Work Breakdown Structure	
0 0 We have no such practices in our projects	

Time Management	In case you have additional information

What practices (processes, tools, documents, etc.) do you apply for project time management? *(please select the documents available)* ☐ Schedule Management Plan ☐ Sequence Activities ☐ Activity Resource estimation ☐ Activity Duration estimation ☐ Schedule control document ☑ Earned value analysis	
0 0 We have no such practices in our projects	

Cost Management	*In case you have additional information*
What practices (processes, tools, documents, etc.) do you apply in project cost management? *(please select the documents available)* ☐ Cost Management Plan ☐ Activity cost estimation ☐ Project budget document ☐ Cost Control Document	
0 0 We have no such practices in our projects	

Quality Management	*In case you have additional information*
What practices (processes, tools, documents, etc.) do you apply in project quality management? *(please select the documents available)* ☐ Quality Management Plan ☐ Quality control document	
0 0 We have no such practices in our projects	

Human Resource Management	*In case you have additional information*
What practices (processes, tools, documents, etc.) do you apply for human resource management in projects? *(please select the documents available)* ☐ HR Management Plan ☐ Resource aquisition Plan ☐ Resource development plan ☐ project team management	
0 0 We have no such practices in our projects	

Risk Management	*In case you have additional information*
What practices (processes, tools, documents, etc.) do you apply for project risk management? *(please select the documents available)* ☐ Risk response plan ☐ Risk Management Plan ☐ Risk Identification document ☐ Risk Analysis document	
0 0 We have no such practices in our projects	

	In case you have additional information
Communications Management	*In case you have additional information*
What practices (processes, tools, documents, etc.) do you apply for project communications management? *(please select the documents available)* ☐ Communication Management Plan ☑ Manage communications ☐ Control communications document	
0 0 We have no such practices in our projects	

Procurement Management	*In case you have additional information*
What practices (processes, tools, documents, etc.) do you apply for project procurement? *(please select the documents available)* ☐ Procurement closing document ☐ Procurement Management Plan ☐ Procurement contract ☐ Procurement control	
0 0 We have no such practices in our projects	

Project Governance

Roles and responsibilities in project governance	*In case you have additional information*
What project roles are defined and implemented for project governance and project sponsorship in your organization? Are their responsibilities and level of authority clear? *(please select the documents available)* ☐ Project Sponsor ☐ Project Steering group ☐ Resource owner role ☐ Receiver role	
0 We don't have any roles defined for project governance in our organization	

Project governance process	*In case you have additional information*
What practices (processes, tools, documents, etc.) do you apply for project governance? *(please select the documents available)* ☐ Project Charter ☐ Budget Baseline document ☐ Scope Baseline document ☐ Change control board ☐ Business case ☐ Schedule Baseline document	
0 0 We have no such practices in our projects	

Organizational Support		
Project life cycle model		*In case you have additional information*

Have you defined and implemented a common project life-cycle model, including the following elements? *(please select the documents available)*	
0	0 No we don't have a common life-cycle model

Support for knowledge sharing between project managers	*In case you have additional information*
What practices (processes, tools, etc.) do you apply for ensuring knowledge sharing between project managers?	
0	0 No not at all

Project Management Office (PMO)	*In case you have additional information*
Do you have a PMO (or similar unit/s) in the organization with a clear responsibility for supporting projects and project stakeholders at different levels?	
0	0 No we don't have a PMO