Master thesis

A Project Management Information System with Key Performance Indicators in a Multi-Project environment

An action research with IKEA AB

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Abstract

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Title: A Project Management Information System with Key Performance Indicators in a Multi-project environment – An action study at IKEA AB

Purpose: The purpose of this thesis is to describe how IKEA AB, works with projects today. Further, the aim is to give a suggestion on how a Project Management Information System could look like in the multi-project organization IKEA AB. In order to control and monitor, this study also includes performance measurements, in the form of KPIs, into the Project Management Information System.

Background: In today’s business life many companies are a multi-project organization with several ongoing projects at the same time. By using a Project Management Information System organizations are able to monitor, control and support projects. IKEA AB described having a set project methodology, but that project managers often work in their own way, and that this lead to a problem with monitoring and supporting project.

Methodology: The methodological approach in the study is action research. The contacts and interviews were conducted thru a semi-structured approach with people related to projects in different ways, project managers and management board members.

Findings: The findings of the study are that projects at IKEA AB are not conducted in a cohesive way. The suggestion for a Project Management Information System at IKEA AB containing of several parts; the system need to include a project plan, KPIs to monitor cost, time and resources, and project members feelings needed to be monitored during execution. The information also
needed to be presented in two separate dashboards to deliver the right information to the right person.

Keywords: Multi-project organizations, project management information system, project, project life-cycle, performance measurement, key performance indicators
Acknowledgements

This thesis is about project management for multi-project environments and represents our master thesis of Master of Business Administration program at Linnaeus University in Växjö.

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2014-05-26, Växjö

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Nora Fosse                Johan Jakobsson
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1. Introduction

This chapter gives a brief introduction to the topic of this study. It is followed by a problem discussion, which leads to the research question and purpose. Finally a discussion of the study’s delimitations are presented.

The aim of this study is to make a suggestion for how a Project Management Information System, aimed to enable IKEA AB to monitor and control projects, can look. This study is a part of a larger ongoing project funded by Tempus. Tempus is a European union’s programme that aims to strengthen innovation and entrepreneurship, and supports the modernizations of higher education in the EU’s surrounding area (WWW, about Tempus). The involved partners in this Tempus-project are, the school of business and economics at Linnaeus University, IKEA AB, Sigma Technologies, The Faculty of Technology at Linnaeus University, and the Computer Software Department at Kharkiv National University of Radioelectronics.

1.1 Background

During the last 30 years companies have realized and emphasized the increasing need of controlling business processes (Taticchi et.al., 2010). Project is an old kind of business process that has become more popular (Lundqvist & Marcusson, 2012) and is commonly used in many different kind of organizations (Schindler & Eppler, 2003). The ultimate purpose of all projects are to support the business strategy in some way (Kerzner, 2011), consequently, today projects are a vital part of organizations’ daily operation (Antvik & Sjöholm, 2012). Projects separate themselves from the ongoing operations in an organization by being unique, temporary, and focused (Maylor, 2010). How projects are conducted has however changed during the last decades, from being traditional, to a non-traditional form. The traditional project form is strongly based upon linear thinking, with well-structured life cycle phases and templates, forms, guidelines, and checklists. Unfortunately, today only a very limited number of projects within a company fall into the traditional category. The non-traditional project form is largely based upon business scenarios where the expectations and scope can change from day to day (Kerzner, 2011). The increase in complexity, both due to the quick change in scope, and the fact that the
users who contribute to the decision making process are physically separated, have led to an increased in importance of cooperation, teamwork, and continuous improvement (Maylor, 2010).

The IKEA group is a worldwide furniture company and is represented in 26 countries through 303 stores (http://www.ikea.com). IKEA AB is a shared service company that was founded in 1957 and is the parent company of several Swedish IKEA companies. IKEA AB has approximately 350 employees, primarily based in Älmhult. Their services aims to support IKEA companies on local, national and global levels. IKEA AB offers expert competence in order to facilitate the project process and enable other IKEA companies to focus on their core business. In addition IKEA AB also coordinate different projects within the IKEA AB departments. IKEA AB is an organization that conducts several projects at the same time. This means that project managers and project members often are involved in more than one project simultaneously. Today there is no system in place that enables IKEA AB to monitor and control projects in a cohesive way. Managers and stakeholders on different levels, both at IKEA AB and in other IKEA companies, have different requirements and needs regarding what information about projects they want, and in what form. Therefore IKEA AB have requested a comprehensive system, with key performance indicators, that facilitates the process of controlling and supporting the company’s projects (Claesson, 4 February 2014).

Many project management processes are included in a performance measurement system, such as defining targets, planning, communication, monitoring, reporting and feedback (Ibrahim et.al., 2010). Performance measurement systems are similar to information systems as they both aim to support decision-making. Information systems are created to provide useful information for decision making by storing, gathering, processing and managing information (Lee & Yu, 2012). Similar to projects (Kerzner, 2011), the goal of performance measurement system is to support companies’ strategy (Anthony & Govindarajan, 2007). There are three types of performance measurements, Key Result Indicators (KRI), Performance Indicators (PI), and Key Performance Indicators (KPI) (Parmenter, 2007). However, independent of what kind of system is to be developed, the system development process starts with a system analysis. The system analysis aim to increase the understanding for the current situation and requirements of the new system.
The development process then continues with more detailed planning of how to meet the user requirements set for the system. Finally the system is to be implemented and reevaluated to tune the final details (Romney and Steinbart, 2009).

When several projects are carried out in an organization simultaneously, the organization can be seen as having a multi-project environment (Zika-Viktorsson et al., 2006). Over the last few years the share of activities and budgets in multi-project organizations has significantly increased (Heising, 2013). Management of information is crucial for project success (Beynon-Davies et al., 2013). As an organization grows and changes, management and employees recognize the need for more and/or better information, and request a new or improved information system (Romney & Steinbart, 2009). The use of Project Management Information Systems (PMIS) is considered to be a good tool for project managers who manage multiple projects. However, little research has been done on PMIS in multi-project organization (Caniëls & Bakens, 2012). A Project Management Information System (PMIS) provides managers with central information about the project and facilitates the communication and cooperation in projects (Hurbean, 2013). It also enables project managers to track projects, from conception to conclusion. The purpose of a PMIS is to boost efficiency by making the development of the project life-cycle more visible for stakeholders (Braglia & Frosolini, 2012).

1.2 Problem discussion

Today there is no structured reporting for projects’ statuses on IKEA AB; the reporting mainly consists of interviews done occasionally. This has led to a problem for IKEA AB to monitor and control ongoing projects. Even though IKEA AB has a clear methodology and guidelines of how to carry out and manage projects, project managers often use their own methodology, but exactly how the different project managers work is today not clear (Claesson, 20 January 2014). This also makes comparing different projects impossible. In addition, the current monitoring of projects, and the documentation, is not done in a cohesive way and does neither satisfy IKEA ABs project management offices or higher levels of management (Claesson, 4 February 2014). One reason behind IKEA AB wanting a system is to monitor resources and costs, to be able to follow were the time and money is being spent. This to enable seeing if resources are used
according to the budgeted amount of hours on different projects. Since resources often carry the major part of the total cost for a project at IKEA AB, this is an essential part to monitor to be able to foresee if a project’s status is good or if there is risk for the project to fail.

In today’s complex business environment, managers need to make efficient decisions and have a clear focus. Management is faced with multiple challenges, such as resource and time management, in organizations that are involved in many projects simultaneously. This is specifically evident when there are many different projects with different scopes, complexities, and timelines (Caniëls & Bakens, 2012). The literature on project management is often seen from project managers’ view, but nowadays the functional managers also have the power and influence to drive a project to success by the way they provide support, decisions and resources (Kerzner & Saladis, 2009). To achieve long-term success, proactive management of the whole project portfolio has become increasingly important (Heising, 2013).

Information collection is a central part of project management. Collecting the correct information is crucial to achieve project success (Callahan et al., 2011; Romney & Steinbart, 2009). In multi-project environments it is common that one project manager leads multiple projects at the same time (Caniëls & Bakens, 2011), but also that project members and expertise are shared among several projects to increase the total efficiency (Besikci et al., 2012; Zika-Viktorsson et al. 2006). Add the fact that the great majority of senior project managers do not come from a background of finance or accounting, and collecting the right information becomes a hard task to handle (Callahan et al., 2011). A multi-project situation can also be a very stressful situation. This can lead to the wrong decisions being taken; therefore the right information provided at the right time is crucial (Kortam, 2009). Zika-Viktorsson et al. (2006) agrees with this, and also stress that multi-project organizations need routines and standardized work ways to provide proper information backing when taking decisions.

Previous studies on PMIS have predominantly concentrated on information system development for single projects (Snyder & Cox, 1985; Jaafari, 1996; Raymond & Bergron, 2008), but nowadays the PMIS systems are more complex and multifunctional (Ahlemann & Riempp,
2008). PMIS are therefore becoming increasingly more complex, and information systems
designers are facing a growing number of project processes that needs to be supported
(Ahlemann, 2009). Caniëls & Bakens (2012) look at how the elements of a PMIS in multi-
project organizations contribute to adequate decision-making, but also at what elements
contribute to project managers’ satisfaction with PMIS. But Caniëls and Bakens (2012) does not
take different levels of management into consideration. Ahlemann (2009) is the only author that
looks at different levels of management, but on the other hand focusses more on the IT-system
development instead of how to adapt the system towards the users and organization. Because of
the small amount of literature in this field, there is a need for a study that investigates how a
PMIS with performance measures as a basis for processing the information can look in a multi-
project organization with different levels of management.

Turner and Zolin (2012) state that a project can only be fully be evaluated in the months and
years following its completion. However, to foresee whether the project will be successful or not,
it is important to monitor and control the project during execution. This means that control
parameters are needed to help project managers make a judgment of the outcome of projects
(Turner & Zolin, 2012). In project management, just like in any organizational management,
control by measures is not easy. The need for measurement is related to the projects size and
complexity. Larger and more complex project are in more need of measurement; at the same
time, to measure that kind of projects is also more difficult (Kerzner, 2011). When designing a
system with measures, the choice of measurements needs to be precise and relevant (Kerzner,
2011). There are literally thousands of potential measures in an organization that can be reported
to managers. It is therefore important for managers to be selective about possible measures
(Simons, 2000). If wrong measurements are selected there is a risk that the measuring only
results in useless data (Kerzner, 2011). Callahan et.al. (2011) states that all projects need
documentation, thus information. Rüping (2003) stress the importance of documentation being
agile, concise and accessible. When adding too much information in a document, just like in a
performance measurement system, its usefulness will decline and it will become more difficult
for the person reading it to find what they need (Rüping, 2003). Managers might lose sight of
relevant information or be unable to see inaccuracies because they become overwhelmed by the amount of information that is available for decision making (Caniëls & Bakens, 2012).

You cannot improve or correct something that cannot be effectively identified and measured (Kerzner, 2011). To measure you need information (Callahan et al., 2011), and to get information you need data and documentation (Romney & Steinbart, 2009; Rüping, 2003). At the same time, too much documentation will put an administrative burden on the project managers and have a decreasing benefit (Rüping, 2003; Kerzner & Saladis, 2009; Kerzner, 2011). In this context, the design of PMIS can also be said to become more difficult. Diverse stakeholders’ interests need to be taken into account, and existing processes need to be taken into account when designing a PMIS (Ahlemann, 2009). With the above in mind our research questions are the following:

**1.3 Research questions**
How does IKEA AB control and organize projects today?
How can a PMIS look like in the multi-project organization IKEA AB, in order to control and monitor parallel projects?

**1.4 Purpose**
The purpose of this thesis is to describe how IKEA AB control and organize projects today. Further, the study will suggest how a project management information system could look like in the multi-project organization IKEA AB in order to control and monitor parallel projects.

**1.5 Delimitations**
As explained in the introduction, this thesis is a part of a Tempus project. However, the focus of this thesis will be in selecting relevant input and output according to relevant theory and the system user requirements. The thesis will not contain how the system should be developed from a systems engineering perspective.
1.6 Structure of thesis

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<td>In this part the theoretical foundation is presented. It consists of subjects that are considered to be of significant importance for the study's research question.</td>
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<td>Chapter 4 - Empirical data</td>
<td>The fourth chapter compiles the empirical data gathered by inter alia interviews.</td>
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<td>Chapter 5 - Analysis</td>
<td>The fifth chapter linking the theoretical framework with empirically collected materials. Also the suggestion for a PMIS at IKEA AB is presented.</td>
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<td>Chapter 6 - Conclusion</td>
<td>The last chapter describes the conclusions of the report and the authors' own reflections. The research question is answered and there is also given suggestions for further research.</td>
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2. Methodology

The following chapter will provide an insight into the approach of the study. The methodology used is presented and finally a discussion of the quality of the study.

2.1 Action research

This thesis is based on a cooperation between the authors and the client, IKEA AB, participating in this study, with the purpose to solve a problem and develop a solution. In consideration of this, the approach chosen for this thesis was action research (Bryman & Bell, 2013). In contrast to traditional research, where the researcher acts as an expert and the employees of the organization are passive, action research is a collaboration between the researchers and the organization (Moss et.al., 2007). The utility of action research is particularly high when the problem can be applied to the organizations’ processes, such as processes of change (Bryman & Bell, 2013). The project management information system that will be developed will contribute to change in the way that it aims to provide different levels of management with a cohesive way to monitor and control projects.

The literature on project management information systems is limited, especially on PMIS in multi-project organizations (Caniëls & Baken, 2012). The product of an action research should be useful in everyday-life, but at the same time focus on theory. It should also be possible to use the study and its outcome in situations other than the situation studied (Bryman & Bell, 2013). Our study aims to combine the subjects PMIS and performance measurement to discover what important aspects should be taken into account when choosing information input and information output from a PMIS. This will then be applied to IKEA AB to choose what information should go into and out of the system.

Action research may consist of four steps (Guiffrida et.al., 2011; Moss et.al., 2007). The traditional four stages of actions research is diagnosing, planning action, taking actions and evaluating action. However, as the timeframe of this thesis will not enable the researchers to
implement and evaluate the results, a four step model, based on Guiffrida et.al. (2011) and Moss et.al. (2007) is used in this study, which are presented in figure 2.1.

Figure 2.1 Model of action research (reference: Moss et al, 2007:292).

2.2 Step one: Identify problem and research question
In the first step the problem is identified and a research question is formulated (Moss et.al., 2007; Guiffrida et.al., 2011). Moss et.al. (2007) call this stage “practical problem motivate research question”. The practical problem at IKEA AB was that projects were not being documented in a cohesive way, and management board did not have the possibility to monitor projects in a coherent way. This step starts with the client initiating a cooperation, that have the purpose to solve a problem (Moss et.al., 2007). Just like Guiffrida et.al., 2011 says it should be, the research question was developed alongside the involved party, IKEA AB. In accordance to Moss et.al., 2007, after initiation, researchers carried out a comprehensive review of literature relevant to the subject, and thereafter a research question was formed and decided. It is advantageous to narrow the research question to enable the researcher to answer it fully in the context of the researcher's time and resources (Guiffrida et.al., 2011). This has been done by only including IKEA AB from the Tempus-Project, in this study.
2.3 Step two: Design of research

The second step concerns the design of the research and is called “research question defines research problem” by Moss et.al. (2007). According to Guiffrida et.al. (2011) the choice of research design is particularly important for action research, this since the outcomes may challenge and question prevailing views existing at the client. Therefore we had to make some methodological decisions.

The first basic methodological decision was whether the study would be based on a quantitative or qualitative approach. We did not intend to test existing theory or have a focus on "numbers", which is characteristic of quantitative research (Bryman & Bell, 2013). Instead our working method remained closest to a qualitative approach, which has been the starting point for the thesis. The procedure for qualitative research begins with selecting investigative sites and individuals. Then the obtained data, gathering of additional data can be done retrospectively, which is then interpreted and analyzed. Finally delivered results and conclusions (Bryman & Bell, 2013).

When choosing a qualitative research approach, the data collection methods need to be selected carefully to ensure that they reflect and conform the research question (Guiffrida et.al., 2011). To furthermore gain an understanding of the requirements needed in the data collection design it is important to define the key problems the client currently is experiencing. From this, the research question is redefined to better suit the problems the client is experiencing (Moss et.al., 2007).

As this study is part of the Tempus-project, and the projects purpose is to develop a project management information system, not only in theory, but also to be developed into a software system, the authors had to take this in consideration when choosing the methodology for data collection.

According to Romney and Steinbart (2009) there are five steps in a system development cycle. In system development, the first step is to conduct a system analysis by gathering the information needed to develop a new system. The most important part of system analysis is to identify and document users’ and managers’ information needs and requirements of the system. During the
second step, *conceptual design*, it is decided how the system should meet the users’ requirements identified in the system analysis. Specifications describing what the system is to accomplish and how it is to be controlled are developed. During the *physical design*, which is the third step, the broad user requirements of the conceptual design are translated into detailed specifications, which then are used to code and test the computer programs. Files and databases are created, documents for input and output are designed, computer programs are written, procedures are developed, and controls are built into the system. In the fourth step an *implementation and conversion plan* is developed. During this step the hardware and software is installed, personnel are trained, and the system is tested. This is all documented and the operational system is then delivered. In the fifth and last step, *operations and maintenance*, the system is fine-tuned and post-implementation reviews are conducted. Improvements are made and the improved system is delivered (Romney and Steinbart, 2009).

As explained in the introduction, the aim of this thesis is to choose what information needs to go into, and out of the system to satisfy all users of the system. This aligns with the two first steps in system development process, the *system analysis* and *conceptual design*. The three other steps were the responsibility of the students from Kharkiv National University of Radioelectronics and not relevant to this study.

To fulfill these steps the authors worked in an inductive process, which is in line with Guiffrida et.al. (2011) who states that action researchers who conducting qualitative researches also have more of an inductive approach. This was used to illuminate IKEA AB's problems and find a solution that meets the requirements, and to relate the requirements to existing research. However, because of the close cooperation with IKEA AB iterative elements have occurred throughout the study.

By following an information system development process, the system analysis has been conducted at the same time as the development of our theoretical conceptual design to meet the system users’ requirements (Romney & Steinbart, 2009). By gaining knowledge from the existing theories we were able to utilize this when creating our interview guide (see appendix 4). This enabled us to concentrate our questions to the main relevant topics for the study and utilize
our client’s knowledge in a better way when conducting interviews. It also enabled us to narrow and redefine the research question to better suit IKEA AB’s problem.

2.3.1 Quality aspects
Perceptions of quality are of vital importance in scientific work (Larsson, 1994). There are three major criteria for business research: reliability, validity and replication. However, qualitative researchers have discussed the relevance of the criteria for qualitative research. It is argued that the criteria are more focused on quantitative research and therefore is difficult to apply to qualitative research (Bryman & Bell, 2013). Larsson (1994) also point out the difficulties in applying the same criteria to quantitative and qualitative research. Instead several suggestions to secure the quality in qualitative research have been developed (Bryman & Bell, 2013; Larsson, 1994). Bryman and Bell (2013) presents Lincoln and Gubas quality criteria. The criteria are “trustworthiness” and “authenticity” (Bryman & Bell, 2013:402). The authenticity criterion has not been considered to have a significant influence, since it seeks to answer the more general research policy issues. The trustworthiness criterion is divided into four sub criteria; credibility, transferability, dependability, confirmability. Dependability often is seen as a sub criterion to credibility. The confirmability criterion is according to Bryman and Bell (2013) a criterion used to give a reviewer the ability to assess the study's strengths. With this in mind, the chosen aspects for our study are the following.

2.3.1.1 Credibility
This criterion aims to secure that descriptions of the studied environment been perceived in a proper way. To keep the credibility high in our study, we used respondent validation. Respondent validation is a process where the researcher confirms that the results and the content are accurate by letting the participants take part of the study (Bryman & Bell, 2013). This is something we have done continuously throughout the study. As we have had close contact with IKEA AB they have had the opportunity to comment on our work continuously. This was done in order to, as mentioned, increase the reliability of the study; prohibit sensitive information from getting published and avoid information without empirical foundation being part of the study.
Our interviews were recorded to reduce the risk of us missing important information. All interviews were transcribed to facilitate the analysis of the material and reduce the risk of misinterpretation. Recording interviews may cause the respondent to behave differently than if the interview was not recorded. The awareness of the fact that what is expressed in the interview is being recorded can make the respondent concerned, which can lead to the respondent withholding relevant information (Bryman & Bell, 2013). Aware of the risk by recording interviews, we decided nevertheless to record the interviews. This because we thought that recorded interviews would contribute to make our empirical data more reliably. The recording of interviews took place only after approval by the respondent.

2.3.1.2 Transferability
Transferability represents the extent to which the study may be replicated or transferred to other environments. Qualitative studies are often aimed to investigate a particular social environment on a detailed level, in contrast to quantitative studies that can be seen as more focused on width. This is one of the reasons that complicate the transferability of qualitative studies. The problems with achieving transferability in a qualitative study may to some extent be avoided if the researchers provide a detailed description of the environment and culture examined. This makes it possible for other researchers to determine whether it is suitable to transfer the results of the study to their environment (Bryman & Bell, 2013). In this thesis, we have aimed to provide as deep and clear description of IKEA AB as possible, and their problem that formed the basis for the study. The basis for this lies in the qualitative interviews conducted, documents, and the templates provided by IKEA AB.

2.3.2 Ethics
In action research methodology there are no guidelines for the ethical aspects (Guiffrida et.al., 2011). To ensure that the study was conducted in an ethical manner we choose to use Bryman and Bell’s (2013) four principle areas; harm of participants, informed consent, privacy, and deception.
2.3.2.1 Harm of participants
The first main ethical principle considers the harm of participants. This ethical requirement was included to ensure that participants did not risk being negatively affected because of their participation. This was ensured by discussing anonymity and confidentiality with participants. There are some problems with confidentiality in qualitative researchers. Bryman and Bell (2013) states that the researcher need to treat data carefully and consider the risk that organizations and individuals can be identified by the study. To ensure that this requirement has been complied with, we have signed a confidentiality agreement with IKEA AB. Furthermore, we have also offered respondents the option to remain anonymous.

2.3.2.2 Informed consent
The second ethical requirement from Bryman and Bell (2013) is informed consent. The main purpose of this requirement is to have an approval from the respondent about their participation. All our interviews were conducted with people who approved their participation, none have attended or been observed against their will, and before starting our interviews we described the purpose of the study was to ensure that all participants knew the purpose of the interview.

2.3.2.3 Privacy
The privacy requirement is closely related to the informed consent requirement and concerns whether the study impinge on the participants' privacy. This requirement is often more used in observing research or research without consent (Bryman & Bell, 2013). We have always had the aim to investigate respondents’ opinions and perspectives in their professional work roles and in their workplace. Our study has never involved any participants' private-life or personal opinions.

2.3.2.4 Deception
Finally the deception requirement is presented. This consists of, for example, the researcher not describing the study properly, using the study to achieve an underlying objective, or not giving a complete description of the aim of the study in order to not affect the participants' response (Bryman & Bell, 2013). This has never been a problem in our research. We've had a constant dialogue with the involved parties and organizations, thus avoiding inaccurate descriptions or
information, and as mentioned earlier we have described the purpose of the study to all respondents.

2.3.2.5 Conflicts of interest
The action researcher is facing dual roles, on one hand there is the expectations of the researched organization and on the other hand the research must include a theoretical contribution (Morton, 1999). Sometimes action research is done on a consulting basis or by individuals within the organization (Bryman & Bell, 2013). This has not been the case in this study, as we have not been hired on a consultant basis or are a part of the IKEA organization.

One situation that can occur in action research is that a results that can be perceived as negative for the client will be suppressed or toned down, especially if it could have a negative impact on participants’ involvement (Locke et al., 2013). This is something that we have been aware of but never experienced. With a good and frequent contact with IKEA AB we present all our results and we never felt a pressure to suppress any results.

2.4 Step three: Data collection and analysis
Data collection and analysis is the third phase of action research. In action research the data needs to be collected in a way that do not complicate the participants everyday routines (Guiffrida et al., 2011). This stage is called “research problem finds research answer” by Moss et al. (2007) and is where the researcher develops a model to solve the problem at hand based on the information collected in this step.

There are several ways to collect data. During this thesis triangulation has been used. Triangulation means that more than one source is used when a researcher examines a specific environment (Bryman & Bell, 2013). We have aimed to use triangulation during this study by interviewing several employees with the same work roles. By interviewing employees with similar roles confirmed information and issues regarding the project work-process at IKEA AB. For the collection of empirical data two types of approaches was used; interviews and documents which are presented in more detail below.
2.4.1 Interviews with the client
Since action research is based on a cooperation with the client, we had to conduct interviews with potential users of the future system to make it possible for them to express their visions and to conduct a system analysis and a conceptual design.

For the interview sessions, we chose to use and approach based on Bryman and Bells (2013) semi-structured interview technique. This do to the fact that some predetermined themes that had to be addressed in order to answer our research questions. By using a semi-structured interview technique, the respondents were given the opportunity to develop their answers without being controlled by the questions. At the same time, the interviewer was not forced to stay within predetermined questions. This enabled the interviewer to move across the themes and add supplementary questions (Bryman & Bell, 2013).

IKEA AB is a large organization and the fact that they work as shared service center with a purpose to serve other IKEA companies means that there are many employees, both at IKEA AB and in connection with IKEA AB via other IKEA companies. With the limited time in this study, it was not possible to have interview sessions with all of the employees in connection with IKEA AB, therefore a sample was necessary.

In the selection of the respondents a convenience sample has been used. This is mainly due to restrictions from the client, but also because representativity has not been central in our study. Through discussions and cooperation with the client we have been able to select relevant respondents for the study with regard to our problem and our purpose. The respondents have been potential users of the system, such as project managers and other employees associated with project-work that we have been recommended to contact. In addition, during our interviews we asked the respondent to recommend other persons who could be relevant for our study. This method is called snowball sampling and can be used when the researcher is unable to set up a frame for the sampling (Bryman & Bell, 2013).
Totally we conducted six interviews. Of the respondents, four were project managers and two were members of the management board. All interviews were conducted at IKEA AB in Almehult. In addition to the interviews we also had a meeting with Stefan Claesson and an introduction meeting for presentation of the requirements and the case.

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
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<tbody>
<tr>
<td>Anders Öhman</td>
<td>Project manager</td>
<td>2014-03-28</td>
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<tr>
<td>Annika Mattsson</td>
<td>Management board</td>
<td>2014-04-15</td>
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<tr>
<td>Daniel Frisk</td>
<td>Management board</td>
<td>2014-04-16</td>
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<tr>
<td>Helen Stendahl</td>
<td>Project manager</td>
<td>2014-04-15</td>
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<tr>
<td>Mats Hallström</td>
<td>Project manager</td>
<td>2014-04-29</td>
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<tr>
<td>Stefan Claesson</td>
<td>Project manager</td>
<td>2014-03-28</td>
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</table>

Anders Öhman

Anders Öhman is an experienced project manager. He has worked as a project leader on IKEA AB for about two and a half year. Before that he worked at the IKEA IT. There he had several roles for instance orderer, steering group member and project manager.

Stefan Claesson

Stefan Claesson is working as a project manager at the project management office, PMO, at IKEA AB. Stefan has worked within the IKEA group for a long time. During his career he has worked in several roles, he has been project manager at IKEA AB for the last three years.

Helen Stendahl

Helen Stendahl is a project manager on the HRSC department on IKEA AB. She has had a long career at IKEA and for example worked at IKEA Communications. However, she is relatively new to the role as project manager, she started as a project manager at IKEA AB in the beginning of 2013.
Mats Hallström

Mats Hallström is project manager at the meeting department on IKEA AB. He is responsible for creating and managing big events within and in connection to the IKEA Group. He started at IKEA AB one year ago, earlier he worked as an event planner in the music and event business.

Daniel Frisk

Daniel Frisk works as the Business manager for Business navigations at IKEA AB. His responsibilities are to assemble and present budgeting, prognosis, products and follow-up reports at IKEA AB. To help him he has a team of four co-workers. Daniel also has a permanent invite to IKEA ABs management board. Previously, Daniel worked at EY and has now worked at IKEA AB for about one hand a half year.

Annika Mattsson

Annika Mattsson is the functional manager at financial services at IKEA AB. She is responsible for making sure that her function delivers and develops everything in connections to financial accounting and financial accounting systems. The financial services department work with financial accounting systems on both global and local levels and supports about forty different units. She also has a place in the management board.

2.4.2 Documents

In addition to the completed interviews, we have also had access to documents and templates at IKEA AB. The documents have helped us to create a deeper understanding of the organization and its processes.

2.4.3 Processing of empirical data

In qualitative studies the amount of data often increase and is not structured, which poses a difficulty for the researcher (Bryman & Bell, 2013). To create a good understanding of IKEA AB and their working methods we have used templates and internal documents. These have been used in order to communicate the most complete picture as possible. In addition to this the templates and documents also has been used to complement the theory in the interview guide in
order to develop relevant questions. The interviews has as mentioned been recorded to avoid that relevant information would be lost. All interviews has after this been listened to and summed up.

2.4.4 Literature collection
Collection of relevant literature has been done by reviewing scientific articles and books provided by the university library. The primarily used databases for scientific articles have been Onesearch, Emerald and Google scholar. The selection of keywords used when searching in the databases are the following: Performance measurement in project, Project KPIs, Key performance indicators, Performance measurement systems, Project management, Project management information system, Information systems.

2.5 Step four: Presenting results
In the fourth and last phase the result of the action research is to be presented (Guiffrida et.al., 2011). This last phase of the project aims to finalize and apply the solution to practically solve the problem. Moss et.al. 2007 call this step “research answer helps solve practical problem”. Generally the results of an action research are just shared among the participants. But when presenting the results the researcher should be aware of the research use for practitioners in similar situations. To make it possible practitioners to use the results and in accordance to the guidelines of action research (Guiffrida et.al., 2011) the study was published after completion.
3. Literature review

This chapter entails a review of the subjects relevant for this thesis. As the purpose is to give a suggestion of how a PMIS can look like the chapter starts with a review regarding this, and then continues with important building blocks in a PMIS. The chapter is ended with a conceptual model that summarizes important aspects to take into account when developing a PMIS.

3.1 Project management information systems

To enable project managers to track projects, from conception to conclusion, a Project Management Information System (PMIS) can be used. A PMIS is an information system software application that helps managers to monitor projects during their life-cycle. No matter what software it uses, a PMIS's purpose is to improve information sharing, better accountability, increase transparency, decrease redundancy and duplication of content (Hurbean, 2013). PMIS are an important building block in today's project management (Ahlemann, 2009). It is a comprehensive system that supports the entire life-cycle of projects, project program, and project portfolios (Caniëls & Bakens, 2012). A successful PMIS should have an impact on efficient project management in terms of both job performance of project managers and project performance. It should improve communications among stakeholders, the accuracy of the project, and support better decision-making. But, it should also improve the handling of budget, schedule, and quality (Lee & Yu, 2012). A PMIS practically consists of a collection of solutions for document management, document control, and project collaboration (Hurbean, 2013). PMIS provide managers with pertinent information and collaborating tools. It enables projects to be managed from within coherent applications where tasks can be created, updated and tracked in real time. Project members and stakeholders should also have direct and real-time access to all documents regarding the project and tasks should be timely updated when alterations to the current scheduling is needed, providing all actors with immediate information (Braglia & Frosolini, 2012). The project managers can set up milestones and deadlines with, for example, Gantt charts to help keep the project members up-to-date and on schedule (Hurbean, 2013). Resources need to be able to report their progress in a common environment, enabling other project stakeholders to easily understand where the project stands in comparison to the project baseline (Braglia & Frosolini, 2012). Anyone linked to the project can view and post information.
in the system, enabling transparency and better accountability (Hurbean, 2013). Project stakeholders also need to have access to the full list of tasks they have been assigned (Braglia & Frosolini, 2012).

In a PMIS there are five different categories of function tools; planning, monitoring, controlling, evaluation, and reporting. *The planning function tools* have a purpose to prepare the overall project plan; they include work breakdown structure, resource estimation, and overall schedule. *The monitoring function tools* aim to regularly assess project progress. This could be in the form of progress reports and curves, to update operational reports such as present project completion, effective schedule, completed tasks, remaining tasks, and remaining days to completion. *The controlling function tools* are used by the project manager to make specific changes to the project. It makes it possible to fine-tune forecasts, modify tasks, reassign resources and cancel tasks. *The evaluating function tools* are used towards project auditing, such as identification of cost and schedule variations, and tracking of the use of resources. Lastly we have *the reporting function tools* that aim to give information about the most basic aspects of the project. They include a project overview as well as work-progress reports, budget overruns, and task and schedule slippages (Raymond & Bergeron, 2008).

As mention, PMIS is a kind of information system (Hurbean, 2013). To achieve a successful information system DeLone and McLean (1992) present success model that contains six important factors of an information system; System quality, information quality, system use, user satisfaction, individual impact and organizational impact. Through a thorough investigation of what is perceived as PMIS success, Lee and Yu (2012) have present a PMIS success model based on DeLone and McLeans (1992) Information System success model.

![Figure 3.1](Resource: Lee & Yu, 2012:85)
The differences between the systems are service quality. This represents the quality of service support provided to system, regardless if the support comes from inside the organization or from an external part. The System Quality measures the information processing system itself, the ease of use and accessibility. The information quality measures the output from the system and is dependent on how useful the information from the system is. It is also important for the information from the system to be timely and accurate to achieve a high quality. The users consumption and usage of the information output from the system is the System use. User satisfaction represents the recipients’ response to the use of the output from the system. The effect of information on the behavior of the user of the system is the Individual impact, and the organizational impact is the effect of the information system on the organizational performance (Lee & Yu, 2012).

A high utilization is often viewed as the ultimate goal of a new information system. System usages have been identified as one of the factors that best represent the success of an information system. Unless the users’ perspective is taken into account when the system is developed, usage will not occur, thereby creating an unsuccessful system (Ali et al., 2008). Ivarsson and Gorschek (2011) also stress the importance of the organization itself to decide on how a system is formed. This for the system to suit the structure and information held within the organization. Categorizing information enhances the understanding; at the same time it facilitates the use of the system. The categorization should be done in collaboration with the organization to prevent redundant and unnecessary categorizations to be created. This is also supported by Niwa (1991), who stresses the need for close cooperation with the users of the information system in order for it to be implemented smoothly and successfully. If users are not included in the process, they are prone to being negative towards the system and not exploit its capabilities. Employees’ being reluctant to use a system because they themselves have not helped to develop it is known as "the not invented here problem" (Niwa, 1991).

3.1.1 Information overload
Today IT has become a crucial tool for companies to manage and control their business (Maria do Céu, 2010). Nowadays we are living in an information age where the collected amount of data
has increased rapidly (Delen & Al-Hawadeh, 2009). While the IT has increased the amount of data, the time available to analyze and process it has not changed. This has resulted in information overload (Maria do Céu, 2010). Edmunds and Morris (2000) defines information overload as when people have so much information that it causes them stress, in the sense that it takes up much of their time. In the end this will affect their ability to make good decision. Maria do Céu (2010) and Caniëls and Bakens (2012) also states that an information overload situation can lead to decision makers “drowning” in information, making it impossible for them to sort out the most valuable information for decision making.

The effects of information overload can as mentioned lead to stress. But Edmunds and Morris (2000) also mentions that lowered job satisfaction and physical illness as effects of information overload. Information overload and performance are related, and increased amount of information can therefore lead to reduced performance (Caniëls & Bakens, 2012).

If information overload is a problem in a single project organization, and the problem only evolves in a multi-project organization. The amount of information can simply be multiplied by the number of projects run at the same time. With an increased complexity there is also an increased confusion about the information delivery. Therefore the quality of information is especially important in a multi-project organization (Caniëls & Bakens, 2012).

3.1.2 Informal factors
Informal factors and processes, such as work ethic, culture and management style, are important to take into account when designing a system. External factors are norms can affect the work ethic and are desirable behaviors that exist in the society where the organization is a part. It consists of a set of attitudes that often are referred to as the work ethic. Work ethic is manifested in employees’ diligence, their loyalty to the organization, their spirit and their pride in doing a good job. Culture is considered to be the most important informal internal factor. Organization’s culture consists of the common beliefs, norms of behavior, shared values, and assumptions that are implicitly accepted and explicitly manifested throughout the organization. Organization’s culture is often influenced by the CEOs personality and policies and the culture usually exists unchanged for many years. Management style is also an important factor to take into
consideration when developing a system. However, just like when it comes to culture, the management style often is influenced heavily by the CEO and is another way of saying “an institution is the lengthen shadow of a man” (Anthony and Govindarajan, 2007:100).

3.2 Projects
The definitions of a project are many, and project work covers a range of situations. Maylor (2010) describe three common themes in project definitions:

Unique: Projects have not previously been performed in the exact same way. Something in terms of time, place, and team carrying out the task and/or product or service being provided must be a novelty. This means that it is possible that similar project have been carried out, but aspects of uniqueness will always be a characteristic of projects (Maylor, 2010).

Temporary: Projects can be described as temporary organizations (Packendorff, 2003). This means that when the project is finished the team moves on, and, as mentioned earlier, project have a beginning and an end (Maylor, 2010). The project ends when its objective has been accomplished or canceled (Anthony and Govindarajan, 2007).

Focused: The goal of a project is to deliver its objective (Anthony and Govindarajan, 2007). This might be a product, service or result. Still, it is not certain that every project starts up with a comprehensive and clear idea of exactly what will be achieved (Maylor, 2010).

As mention in the introduction, Kerzner (2011) state that the most common constraints in projects are cost, time, and performance. Performance can also be replaced by scope or quality (Björkegren, 1999; Richman, 2005). These three components are known as “the triple constrains” (Kerzner, 2011;9). Often the requirements of a project are changed or enhances during the project, and the scope is changed (Kerzner, 2011; Al-Jibouri, 2002). This is called scope creep and can occur during any of the projects life-cycle phases (Kerzner, 2011).
3.2.1 Multi-project environment

A multi-project environment is, as the name implies, when an organization perform several projects simultaneously (Zika-Viktorsson et.al., 2006). Managing several projects has become a more common work method (Kortam, 2009). In a multi-project environment it is common that resources from various departments must be shared among project managers (Caniëls & Bakens, 2012; Zika-Viktorsson et.al., 2006). By sharing resources among different projects, the resource is used in a more efficient way; expertise are shared, and useful knowledge can be transferred between different projects (Zika-Viktorsson et.al., 2006).

Operating in a multi-project environment require a solid planning since the coordination between, and scheduling, projects is of importance (Besikci, et al., 2012). When working in a multi-project environment, switching between different projects is not unusual, and may create schedule delays that can be compared to setup time in industries. This means that frequent switching between projects can decrease efficiency (Zika-Viktorsson et.al., 2006). Inaccuracies in reporting are also something that may affect project performance, as it does not provide the necessary evidence to take the right decisions and actions. This is especially important in multi-project organizations since they often work with tight time plans and budgets (Kortam, 2009).

According to Kortam (2009) a multi-project organization need to have several dashboards that are adapted to different levels. He presents two levels of dashboards, which are shown in figure 3.2. Level 2 are the dashboards for every separate project, on this level all information related to a specific project will be presented. Secondly, at level 1 a dashboard for all projects is presented. This multiple project dashboard is aimed to monitor several projects simultaneously (Kortam, 2009).

![Figure 3.2 multiple dashboards](Resource: Kortam, 2009:10.5)
3.2.2 The project life-cycle

Regardless of a project's objectives, project undergoes a series of phases that can be described through a life-cycles’ view (Ahlemann, 2009; Kerzner, 2009; Pinto & Prescott, 1988). Kerzner (2009) divide the life-cycle into five phases; conceptual, planning, testing, implementation and closure. Ahlemann (2009) and Pinto and Prescott (1988) see the project life-cycle as four phases; first conceptualization (Pinto & Prescott, 1988) or Initiation (Ahlemann, 2009), planning, execution, and termination. In Kerzner's (2009) extra stage, testing, there is a focus on completion of the earlier stages. For example all documentation needs to be in place before going forward with the project. Testing can be seen as an extra preparation step, making it possible for the project to start (Kerzner, 2009).

The first phase the conceptualization or initiation phase is where an idea for a project is evaluated briefly. Pinto and Prescott (1988) describes this as the phase where a strategic need is identified. The parts that need to be evaluated are for instance costs, how much resources the projects need, time and the projects feasibility (Ahlemann, 2009; Kerzner, 2009). With the given information a decision whether to proceed with the proposed idea or not will be taken (Ahlemann, 2009).

The second phase is planning. This stage can be seen as a development of the conceptual stage (Ahlemann, 2009; Kerzner, 2009). Planning is defined as taking decision on objectives, procedures, and policies for the project (Ahlemann, 2009; Kerzner, 2009; Pinto & Prescott, 1988). Al-Jibouri (2002) adds that plans are used to ensure that the project is executed within the framework for time, cost and quality. This will give the major milestones of the project. Poorly made planning can create a disorganized environment and give a bad start position for the project. Kerzner (2009) adds that a thorough planning can increase the efficiency of operational actions, avoid uncertainty in the project, clarify the objectives which provide a better understanding, and serve as a basis for controlling and monitoring the project. Zwikael (2009) also states that the project plan is connected to the monitoring. He emphasizes that the ultimate purpose of project planning is to facilitate the execution and describe how the project will be monitored (Zwikael, 2009). Kerzner (2009) highlight the importance of planning by stating “The difference between the good project manager and the poor project manager is often described in
one word: planning” (Kerzner, 2009:46). By making a thorough project plan it is easier for all parts to control and monitor the project (Kerzner, 2009). Without good planning the execution phase will follow poor planning and in the end, regardless of execution quality, fail. Project planning must contain certain elements. These elements can vary among projects in different industries (Zwikael, 2009). Kerzner (2009) define the first two elements, schedule and budget, as the “quantitative aspects of planning” (Kerzner, 2009:464). Project managers also need to plan the project administration, this means for instance to decide what documentation is needed or to describe the involved people responsibilities in the project. Further the project managers also need to consider their leadership style and how to manage potential conflicts (Kerzner, 2009). Magnusson (2008) also describes the planning process and its expected outcome. Except from the elements mentioned by Kerzner (2009), they also mention the importance of clear descriptions of the projects goals, what the orderer should receive and what working method will be used. These parts will in the end of the planning process compos into the project plan (Magnusson, 2008). According to Zwickaels (2009) study the most important factors of project planning in service companies are time, costs, procurement and risks.

The following stage is the implementation (Kerzner, 2009) or execution phase (Ahlemann, 2009; Pinto & Prescott, 1988). By using the assigned resources the projects idea is carried out and implemented in the organization (Ahlemann, 2009; Kerzner, 2009; Pinto & Prescott, 1988). In this phase it is also important to collect information for two main reasons. Partly because the project manager needs to be able to control the project, but also to enable the management to get an overall view of how different projects are proceeding (Ahlemann, 2009).

During the execution phase it is important to continuously monitor the project. By doing this, it is easier to follow how the use of the project’s resources is in relation to the plan (Guo-li 2010; McBride 2008; Magnusson 2008). To ensure that the project achieves the objectives, monitoring is required. With a frequent monitoring the right actions can be deployed in time (Guo-li, 2010) Magnusson (2008) presents five key issues for project monitoring. The first three steps concern the comparisons according to the project plan. The areas that need to be compared are production, resources, and budget. Also Lauras et.al (2009) and Cannalire (2011) mention costs and time as important areas to monitor the performance for project managers. Kortam (2009)
states that when working in projects, especially when handling multiple projects, there is an importance of monitoring productivity and the resource management. The fourth issue will give a good overview of how much resources the project has left to use according to the project plan. Finally it is important to monitor if the profitability of the project has change, and compare it to the planned calculated profitability. This is the main issue when doing the financial monitoring of the project. Since the profitability is principally based on use of resources, all the other four issues will help to answer if and how the profitability will change (Magnusson, 2008). According to Guo-li (2010) areas of monitoring may vary between projects, as different projects have different areas of importance.

Finally the project reaches the termination phase, where the project is closed (Ahlemann, 2009; Kerzner, 2009; Pinto & Prescott, 1988) and handed over to the receiving department or organization (Ahlemann, 2009). The termination phase includes a comparison to the initial phase. This stage can also be helpful with prioritizing other projects (Kerzner, 2009). All projects do not go through all phases; some project will be terminated before they reach the termination phase due to problems with the profitability or feasibility (Ahlemann, 2009).

During a project's phases there is a need for documentation. Documentation is seen as an important factor to achieve project success (Ofori, 2013). Antvik and Sjöholm (2014) state that project documentation should be available for all project members. Preferably a common document space is used, either physical or electronic.

### 3.3 M-model

A conceptual reference model can be used in the development of information systems. In contrast to design and implementations models, no technical aspects are taken into considerations in a conceptual reference model. Instead they focus on corresponding data structures and information processes, and do not answer to whether software should, or should not, be supporting the information system (Ahlemann & Riempp, 2008).
Ahlemann (2009) present the M-model, which embraces all tasks related to the initiation, planning, execution, and termination of projects. It describes the project life-cycle and the management levels involved. The phases in the project life-cycle are reflected on the outline of the “M”, see figure 3.3.

Three main management levels are presented in the M-Model. The lower third of the model is the operational project management level where the project manager is responsible for the planning and execution of a project. The middle part represents the project management office/committees. This management level represents all permanent or temporary organizational elements that are responsible for multi-project coordination, planning, and controlling activities that affect all projects. The upper third part of the M-Model represents the management board that is responsible for the entire project portfolio. The “roof” of the M-model represents the strategy definition and is an important input for project portfolio planning. In the foundation of the model we find the personnel and the financial system. These are important building blocks in the sense that they deliver information required for planning and controlling purposes (Ahlemann, 2009).

![Figure 3.3 M-model (Resource: Ahlemann 2009:23)](image-url)
In the initiation phase the idea generation is collected recorded and examined on a project management level. After this the idea evaluation is made on a project office level, where the projects feasibility, profitability, and strategic impact are analyzed. On a management level the project is evaluated in an organizational strategic and portfolio planning level, and a go/no-go decision is made (Ahlemann, 2009).

In the planning phase, the idea is translated into a project plan and necessary resources, like financing and resources, are provided as a project preparation on a project office level. On a project management level a detailed plan is created (Ahlemann, 2009).

During the execution phase the project is realized during the project execution part of the M-model. Information is collected and project controlling conducted by the project office. Information is then aggregated and sent to the management board where it is compared to the portfolio in a portfolio controlling step (Ahlemann, 2009).

In the termination phase the project ordered receives the project results as an internal project termination. In addition the project manager closes the project and the organization tries to catch lessons learned in the external project termination (Ahlemann, 2009).

### 3.4 Performance measurement systems

Performance measurement system (PMS) is a tool that improves the probability that the organization will implement its strategy successfully (Anthony and Govindarajan, 2007). This strategic control aims to ensure that the behavior of people is consistent with the strategy (Tuomela, 2005). By using a PMS, managers are facilitated in their tracking of the implementation of business strategy. This since the system enables them to compare actual results against strategic goals and objectives (Simons, 2000). A performance measurement system needs a mix of measures, both financial and nonfinancial performance indicators (Tuomela, 2005). But at the same time, too many measures will make the system to complex and uncontrollable. It needs to be a dynamic system that enables support in decision-making (Anthony and Govindarajan, 2007; Taticchi et.al., 2010; Lindvall, 2011; Kaplan & Aktinson,
When designing a performance measurement system, two types of decisions must be made. First, a decision about what type of information should be collected, and with what frequency of feedback, must be made. This is also known as the design features. Secondly, decisions about how to use the performance measurement system need to be made (Simons, 2000).

As mentioned in the background, there are several varieties of performance measures. Parmenter (2007) mention KRI (Key Result Indicators), PI (Performance Indicators) and KPI (Key Performance Indicators). These different indicators can be seen as different layers. KRI are measures that have longer time horizons, for example monthly or quarterly. These measures are the outer layer and describe the result over a specific time horizon. PI are measures one step closer to the core and describe what to do. The core of performance measures consists of KPIs. The purposes of KPIs are to provide guidance to achieve performance improvement (Parmenter, 2007). The KPIs often are evaluated after a project's completion, but to achieve improvement that is inadequate (Cheung et.al., 2004). Therefore KPIs need to be update frequently (Cheung et.al, 2004; Parmenter, 2007).

Key Performance Indicators (KPIs) are defined as a metric measuring operational or strategic performances that is essential for the organizations current and future success. The KPI can both define the whole organizations, or an individual, performance (Kerzner, 2011; Parmenter, 2007).

3.4.1 KPI complexity
KPI needs to be selected in the correct way to be a strong tool, it is a very complex procedure with several barriers. Different stakeholders see different things as important and work in different ways, which brings a complexity. Further on Kerzner (2011) mention that there are barriers associated with data collection, this in the form of determining what data needs to be collected. According to Cheung et.al. (2004) the collection of data need to be done with respect to the data, since it can contain sensitive information. Since KPIs is a complex tool it is important that the understanding of its use is evident from the users’ perspective (Kerzner, 2011). Franceschini et.al. (2007) states that the understanding of indicators is limited. To clarify the role and use of KPIs Kerzner (2011) suggests some general principles. These include that KPIs must
reflect the critical success factors of a project and that the KPIs should be decided in advance. KPIs also need to reflect the progress relative to a set goals or targets. In addition Kerzner (2011) claims that KPIs needs to drive change thereby should cover controllable factors. This in order to make it possible to take decisions based on the KPIs to provide a positive result. At the same time, the KPIs themselves do not describe what actions need to be done (Kerzner 2011).

3.4.2 How to select the right KPIs
When deciding to use KPIs there are several aspects to consider. The first thing is to decide what measurements should be used (Cheung et.al., 2004). There are several factors and questions that influence the choice and use of measuring. For example what is needed to be measured? How should the data be collected and when should it be collected? (Kerzner, 2011). Cannalire (2011) adds that the selection of KPIs needs to conform to all parties’ expectations of the project.

The second consideration regarding how to collect data for the selected measurements. How should data be collected and processed? According to Cheung et.al. (2004) one way to do this process is to use forms and process these manual. The final stage regarding calculation of the selected KPIs. The calculations for KPIs should be determined on forehand and when processed be delivered to the selected target groups (Cheung et.al., 2004).

3.4.3 Project KPIs
In projects, key performance indicators are very important to enable improvements. There are several areas of importance for project success and project management (Almahmoud et.al., 2012). Several researchers mention areas that are of importance for projects. What they all have in common is that they state the importance of cost, resources and time (Kortam, 2009; Almahmoud et.al., 2012; Cheung et.al., 2004)

But the most important part, according to Almahmoud et.al. (2012), is to monitor the performance of the project team. For instance this can be done by measuring the team communication, the members’ skills and training. Cheung et.al. (2004) also mention the project team as one area to measure. In contrast to Almahmoud et.al (2012), Cheung et.al. (2004) aims
to measure the project members feelings according to the project as a whole in this area. The purpose with this is to measure the members opinion of the project and its performance (Cheung et.al., 2004).

By measuring costs, involved parties can monitor how the actual costs relates to the approved plan (Almahmoud et.al., 2012; Cheung et.al., 2004). To monitor costs, Cheung et.al. (2004) suggests measuring percentage of work done, and in that way comparing the actual with the forecasted work so far in the budget. Further they suggesting that a percentage of budget used and variations from the budget as a measures to monitor the costs in a projects. In cost monitoring, delays from the original plan are also mentioned as a measure (Cheung et.al., 2004). Al-Jibouri (2003) propose that cost control can be measured by three ratios; planned performance, actual performance and efficiency. The planned performance is the planned earnings divided by planned expenditure. Actual performance is the same formula but using actual earnings and expenditures. By these two measures the efficiency can be calculated. That is done by dividing actual performance with the planned performance (Al-Jibouri, 2003).

Kortam (2009) states that time productivity and resource use are important to monitor, especially in multi-project organizations. Measuring the productivity aims to monitor the efficiency of the project. To measure this Kortam (2009) suggest taking milestones executed divided by the planned number of milestones and then comparing it to a stated target. Kerzner (2011) and Cheung et.al (2004) also suggests following the milestones, but preferring to measure it in different ways. Kerzner (2011) measure percentage of missed milestones while Cheung et.al. (2004) measure milestones achieved on time. Furthermore, Cheung et.al. (2004) mention that to measure time critical dates also need to be considered and measured. This can be made by monitoring how many critical dates that has been achieved according to the plan (Cheung et.al., 2004).

Resources have been claimed as an important area to monitor in a project, especially when the main resource is employees (Kortam, 2009). The use of resources can be measured according to days. By dividing working days with available days they can be compared to a set target. By
doing this, Kortam (2009) argue that the measure will give an overview and update of how the resources are used.

In addition to these areas Al-Jibouri (2003) mention that the project scope are likely to change and therefore the project will not proceed exactly according to the plan. To capture the changes in a project Kerzner (2011) argue that number of scope changes is a relevant measure for projects.

3.5 Conceptual model of the PMIS
A PMIS aims to help managers monitor, control, and support projects during their whole life-cycle (Hurbean, 2013), therefore how the project life-cycle is conducted at the client, needs to be investigated. The users of the system need to be taken into account and factors that affect system use, as the most important aspect of developing a PMIS, need to be taken into consideration. As the purpose of a project management information system and a PMS both are to help in decision making, it is also important to see whom is to make the decision and what information is needed. This can be summarized through the M-Model, as it takes both the project life-cycle and different levels of control and information into account. Throughout the developing process of a PMIS in a multi-project organization, all decisions regarding measurements need to be influenced by this factor. The risk of information overload is multiplied with the number of projects. Therefore the need to be precise and accurate in selection of measurements is even bigger. By doing this, KPIs can be developed from the information collected in the M-model and project life-cycle.

![Conceptual model](Resource: own model)

*Figure 3.4 Conceptual model (Resource: own model)*
4. Empirical data

In this chapter the empirical data is presented. First a description of IKEA AB and their project structure, PPS, is presented. This is followed by interviews conducted with project manages and management board members.

4.1 IKEA AB - An internal service company

IKEA AB is a service company who performs services for all Swedish IKEA companies. It was founded 1957 and has about 350 employees based in two locations, Helsingborg and Älmhult. The main assignment for IKEA AB is to provide expertise knowledge to other companies within the IKEA organization. Other IKEA companies are not constraint to using IKEA AB for services, instead they are free to use any external company to satisfy their requirements. This means that IKEA AB’s position is not obvious, and they compete with external companies when delivering their services (Introduction meeting, 9 February 2014).

IKEA AB is consists of four major departments; finance, meetings and travels, facility, and HRSC. Meetings and travels are responsible for all travels made by IKEA employees and for planning event and conferences. The finance department serves all Swedish IKEA companies and some companies abroad with financial services. All questions and issues regarding human resources are handled by HRSC (Human resources service center). For instance, HRSC are in charge of the work environment, recruitment, health and wages (Stendahl, 15 March 2014). The fourth department, facility, handles all IKEA properties and their maintenance (Claesson, 14 March 2014). They also have a project coordinating service, the project management office (PMO). Every department has their own project managers (PM) and assignment managers (AM). An assignment manager is a person responsible for a project too small to be named project. In addition the PMO have project managers that, as the arrows shows in figure 4.1, supports the rest of the departments and other IKEA companies (Introduction meeting, 9 February 2014). IKEA AB’s structure is presented in figure 4.1.
The role of the PMO department is to support project managers in the IKEA organization, provide the management board with project status reports and coordinate the project portfolio according to the current needs and dependencies. In larger and more complex projects the PMO department is also responsible for the project management. The projects handled by IKEA AB are of varying size and complexity. There is four main categories, assignment, mini, medium and mega (Claesson, 14 March 2014).

The overall strategies for the IKEA group are transferred to IKEA AB through different committees and forums. These committees and forums are focused on different areas, for instance there is a global finance committee. The global committees are then divided into subgroups, a subgroup of the global finance committee is for example accounting and reporting. IKEA AB has representatives in these forums that then bring the decisions regarding strategies back to the company for implementation and use these when taking decisions regarding what projects should be executed (Öhman, 28 March 2014). Even though IKEA AB is a flat organization, most of the big projects are mandatory to implement for the PMO. This is if they come from IKEA on a national level, or from a global level. The rest of the project portfolio is decided in the presence of a management board member who has knowledge of current strategies (Claesson, 14 March 2014).
Claesson stresses that IKEA have a very strong culture of believing in the employees. This is permeated throughout the organization, at IKEA AB you notice it especially by the way ideas for improvement can come from anyone. Claesson argue that at IKEA all employees can initiate a project, regardless of department or position. In this way, IKEA is a very flat organization. He further states that the IKEA organization shows courage and ambition by daring to invest in people without them having documented competence or experience. Instead, they look more to employees' personality and what they are capable of (Claesson, 14 March 2014).

4.2 Practical Project Steering - PPS

PPS, practical project steering, is the process used for project management at IKEA AB. On a project management level there are three steps; prepare → execute → conclude which are shown in figure 4.2. Each one of these steps contains different decision-points (DP) that all represent a steering group meeting. All the decision points have different purposes and different decisions that need to be taken. The function of the steering group is to make decisions on every decision point and support the project manager. Every DP is a basis for decision making produced by project management. The steering group meets and decides on the projects continued operation and the project manager is given the authority required to implement the decisions made. The steering group also have the opportunity to change the project.

![Figure 4.2 Internal instructions for PPS (Resource: Internal material)](Image)

As Figure 4.2 show, the PPS-process starts with DP1 and the prepare step, followed by the execute step and finally ends with the conclude step. A brief description of the decision points is presented in figure 4.3.
Figure 4.3 Decision points at IKEA AB (Resource: own figure)

Prepare

The purpose of the prepare step is to clarify what the project will contribute to, define objectives and delimitations, and describe how the project work will be executed. In the prepare step, two important documents are produced. The first one is a project directive that is the basis for decision to start a project. This decision is based on the judgment of the orderer and the project owner, which can be different persons or the same. The orderer has a customer role and has the responsibility to define the expected benefit, but also to manage consequences to the organization making use of the result. The project owner, on the other hand, has the supplier role that entails starting and securing the financing of a project, but also to issue the project directive,
secure that the project results fulfil the orderer’s expectations, and asses and manage the consequences in the supplier's organization. By analyzing the benefits and effects of the project, the orderer and project owner comes to an agreement, which comes in the form of the project directive. This also is DP1. After this, the project plan, i.e. the second document, starts to take form, this is the part of the preparation that formulate the objective of the project. After this a plan starts to form and a budget is set, staff is organized, working methods are set and risk potential risks are identified. All this then compiled into a project plan, which also is DP3. DP2 exist if the steering group meets to clarify the objectives before the plan is compiled.

**Execute**

The execute step purpose is to handle the need for change at an early stage, with active feedback and organized change management, and to produce a result that will achieve the project’s objectives. It is initiated by DP4, which is the decision to start the project and use resources.

DP5 is a point where scope creeps and need for change is handled. Scope creep is when the scope changes. This could be because of several different reasons, and DP5 can occur one or several times. DP6 is the delivering of results. Projects with several deliverables may have more than one DP6. This is also the point where a decision regarding whether the result is acceptable or not, is taken.

**Conclude**

The conclude step is where the result is transferred, and experiences are summarized and properly documented in order to provide a good prerequisite for future projects. If DP6 is the delivery of results, DP7 is the transfer of results. This means that the project manager is no longer responsible for the project. But the project managers is still responsible for drawing up and distributing the final report, which is the document produced in the conclude step. Everybody from the project should contribute to the final report. DP8 is when the steering group approves the final report. The purpose of the final report is to avoid “reinventing the wheel”, i.e. repeating the same mistakes.
PPS templates

The PPS structure at IKEA AB offering the user several templates, for instance project plan and risk templates, which are found in the appendix. The project plan in PPS includes basic information such as project owner, project manager and a description of the background to the problem. It should also contain an objective clarifying where the result, timeframe, costs and priorities are presented. Furthermore, the project plan needs to describe the compositions of project organization, how resources are planned to used, a schedule and the risks attached to project. The risks are often handled in a separate template. The risk template is built as an excel sheet where a several factors are filled in. Based on these factors the risk is put into a diagram, where the risks impact and probability is evaluated. It is a way to highlight the risks and prioritize them.

4.3 Specifications of requirements

During the initiation of this thesis a project manager and member of the project management office function presented some requirements and ideas to us. These requirements were based on the perceived need of a future system aimed to more easily control and monitor projects. The main issues were to control and follow up the costs and resources used in projects. Since budget was not a frequent used tool in projects at IKEA AB the cost for ongoing projects was hard to monitor. One of the requirements for the system was to monitor cost, this entailed making a standardized cost presentation mandatory in all projects. To monitor resources, IKEA AB wanted to be able to see resources commitments in projects (Introduction meeting, 9 February 2014). In addition there was a desire to monitor time spent on projects for individuals, partly to see if the employees worked according to the assigned hours, partly to see the progress of the project compared to the project plan. The output from the system was then to be delivered to several levels; the project management level, the project management office level and the management board level. The different levels had different requirements regarding the presentation of information and the level of detail. The management board only required a holistic view of the output, in contrast to the project managers and the project management office, whom required more detailed information (Introduction meeting, 9 February 2014; Claesson, 14 march 2014). To encourage standardized working methods, IKEA AB wanted to create an opportunity to
generate the project plan through the system (Claesson, 14 March 2014). Claesson also describes that there needs to be a way to change the plan because of scope creep. At Ikea AB it is common for the scope of projects to change, especially during DP2 and DP5. To get a real-time plan to compare actual outcome to it is important to be able to change the plan in accordance to the new forecast (Claesson, 14 March 2014). There was also a desire to measure project members feeling. Along with Claesson it a proposal was discussed for how the project members’ feelings could be measured. The proposal was that project members would fill out their feelings by choosing between four smileys, two levels of green and two of red. There was also a request for KPIs in the system to measure the projects’ performance (Claesson, 14 February 2014).

4.4 Interviews
The interviews are divided into project managers and management board members. In addition, each interview is divided into current situation and future requirements. This was done because some of the future requirements were based on the perception of the current situation.

4.4.1 Project managers

4.4.1.1 Anders Öhman, project manager
Anders Öhman is a project manager at IKEA ABs PMO department. Earlier he has worked at IKEA IT. The interview was conducted 28 March 2014.

Current work method
Öhman has a long experience in project management. Today he works in the project management software Microsoft project. When performing projects, Öhman follow the PPS structure, but he has adapted its templates. In his experience, IKEA AB is an organization that is not responsive to heavy documents, instead they preferring for instance PowerPoint presentations. At his former employer, IKEA IT, they always used formal templates, but Öhman believe this is because IKEA IT has a different level of maturity in working with projects.

When starting a project, Öhman works out the scope of the project, required resources, time and a budget. Since a project can have several delivery points, Öhman includes them when
presenting the schedule for the project. Öhman frequently communicate with the project members to get an overview of the project and its activities. By checking if activities are finished and how the work proceeds, Öhman can quickly see the status of the project, which he proclaims as an important element when working with several projects parallel. The way of communication varies among the projects. Öhman often share project documents and information with persons connected to the project, especially if there are external parties involved.

To control projects risks is one of the key factors to good monitoring. Working with risks is, according to Öhman, very important since risks can affect the entire project's existence. Öhman believes that the risk template in PPS is too complicated. Therefore he has developed his own template which is more adapted to his work approach. The template contains of the same elements as that used in PPS but with a different structure.

Öhman always uses budgets for all projects. For him creating a budget is obvious, but mentions that the use of budgets varies at IKEA AB. For different projects different budget are used. Öhman use two types of templates regarding costs depending of a project's complexity. The first one comes from PPS and is detailed, this one is often used for larger and more complex project and the second template is a simple template. For projects that are harder to calculate the benefit of Öhman replace the numbers with text. The text then describes how the project will affect the organization. During the execution of a project the budget is not monitored, it is done when the project is finished. The elements that are followed up are resources, travel costs, system costs and costs for consultants. To check how project members feel Öhman currently use a model that consists of four elements on meetings during the project. The model check both work related aspects and private aspects. This is done in larger projects.

When a project is completed Öhman writes a final report, which the receiving organization approves. The final report is a mix between a report and a manual for the receiving organization. The report also includes lessons learned from the project. To be prepared if a similar project or problem should occur in the future Öhman saves documents communicated during the project.
**Future requirements**

As an experienced project manager Öhman does not see a new system as a complete working tool. He argues that those working in Microsoft Project are satisfied with it, since it can cover most requirements. However, there are some things he is currently missing and see as an opportunity to integrate in a future system. These are time reporting, project members’ feelings and a portfolio overview of ongoing projects. Time reporting is something that Öhman see as lacking in the current situation, and sees as an advantage to integrate. As project manager, he wants to be able to look at each of the project members time reporting. The time reporting can also be a tool to see how many of the assigned hours that are available for use.

Öhman see an advantage in letting the project members continuously report their mood because in the end it is the project manager's responsibility to keep track of the project team. He believed that the suggestion with different colored smileys would be good and suggests that the input for this is placed in connection to the time reporting.

To control a project in a successful way Öhman see Gantt scheme as one part. With a Gantt scheme it is easier to overview times and tasks. In addition to Gantt scheme he sees the activity list that he uses as a key factor during the project. The activity list describes what activities should be done, who is responsible and what the status of the activity is. When operating several projects simultaneously Öhman states the importance of easy get an overview of a project's status. Today he sees a lack of a consolidated view of all projects.

Although Öhman is satisfied with Microsoft project he is not afraid of put data into a new system even if it will create duplication of work, as long as the input can be done in an easy way. He states that experienced project managers maybe just will put in basic data such as delivery points.

4.4.1.2 Stefan Claesson, project manager
Stefan Claesson is a project manager and member of the PMO at IKEA AB. The interview was conducted 28 March 2014.
Current work method

Claesson works as a project manager in the project management office. He has worked both as a project manager but also as a support for project managers conducting projects. When Claesson first began at IKEA AB he was not aware of PPS and its structure. Nowadays when conducting projects he typically works in the software system Microsoft project. Claesson uses Microsoft project as a tool for planning and monitoring the project. Earlier he would make the project plan in a PowerPoint presentation. The structure he uses for projects follows the PPS steps. In addition to Microsoft project, Claesson use several templates from PPS. For instance, he uses templates for managing risks in a project, see appendix 2. In the risk template Claesson describes that risks can be graded on a scale depending on the impact and probability. However he emphasizes that his use of templates may vary depending on a project's size and complexity.

In the initiation of a project Claesson states that the most important thing is to understand the underlying reasons for the project. These are things like why the project occurred and what the aim of the project is. If this is not clear before the start, it is easy for projects to not comply with its purpose, or for mistakes to be made during the execution. Further Claesson describes that planning often is done along with potential project members. The reasons for this is that the project manager does not always have detailed knowledge in all areas required for the project. When presenting the project for both management and the project group, Claesson think that the templates purposed for this are too heavy to use. Instead he uses PowerPoint when presenting a project. When the project finally has resources committed to it, he sees a problem in monitor that people really devote the time decided. According to Claesson this problem occurs because employees attached to a project does not always work with that project full time. Today he therefore lack some kind of time reporting. Claesson states that he is quite alone in continuously reporting time spent on a particular project. Currently he use a simple excel sheet where he report how much time he has put on each of his ongoing projects.

When conducting projects Claesson works with a budget to create a picture of the project. However, the budget is not connected to the PPS structure. Instead it is Claessons own model,
which includes for instance resources. He states that the budget mostly is for he himself to monitor the costs and resources.

In order to capture how team members are feeling, Claesson uses the regular meetings during a project. During the meetings everyone can express their opinions and feelings, but there is no set way to measure it. At the PMO they also use green and red dots to indicate what mood the employees are in.

To make a project successful Claesson stresses that communication is the most crucial factor. Furthermore, he mentions that it is important to have the right expertise in a project, and that there is clarity of what should be achieved.

*Future requirements*

For a new system Claesson sees several opportunities. Since he himself was not familiar with Microsoft project or PPS when he started working at the PMO, he believes this new system could provide support for new and current project managers who do not use these.

As a part of the new system Claesson sees time reporting as crucial. He himself rounds the time reporting to whole hours. A more detailed time reporting will, according to Claesson, only face opposition because of the increased administration. In the projects that have used time reporting, this was done in a separate template, which increased the administration. Time reporting is something that he sees several advantages with, both to monitoring how resources spend their time, but also to compare used resource hours with the planned hours.

Based on his own experience, Claesson sees a way of some kind of indication of how project members feel as an important part of the system. He states that this is especially important in projects without or with weak described goals. Today there is no measuring of people’s feelings. Claesson describes project tend to be as a small organization of its own and that with employees from several departments it is not sure that all department managers keeps track of how their employees feelings or mood.
In addition Claesson want to see some general info about the project, such as contact information and objectives. Further he prefers to have risks, tasks and costs included in the system. By having all of these things at one place he believes would facilitate project management and make it possible for the PMO office to keep track of how projects are going. A holistic view over the ongoing projects that shows indications of how they are going would also give the PMO office the opportunity to, in an easy way, see what projects might need support.

4.4.1.3 Helen Stendahl, Project manager
Helen Stendahl work as a project manager on the human resource service center, HRSC. The interview with Helen was conducted 15 April 2014.

Current work method
Today Stendahl work according to the PPS structure. She believes that there are too many templates available from PPS and have experienced it hard to choose the right templates in the right situations. To overcome this problem, the HRSC department has created their own checklist, which includes a number of topics that need to be considered during the planning phase. Further detailed planning can then be included as an appendix. These appendixes are, according to Stendahl, not always structured in a standardized way and the documentation can therefore be unorganized. At her former employer, IKEA Communications, she worked with SharePoint as a tool to share documents and as a tool to control the project. On HRSC department of IKEA AB they do not have any tool for project- or document management. Stendahl does not work in the project management system Microsoft project, she believes there is enough support from PPS to manage the projects. The downside with the routines they use now is that there is no clear structure for documents. She has experienced that there have been several versions of one document and that wrong version is used, which sometimes made the project felt disorganized.

Planning is something that Stendahl emphasizes as central for projects. Through a thorough planning you can avoid unexpected occurrences later or having to change the direction of the project. She states that through good preparatory work everything will be much easier in the project. During planning Stendahl also consider potential risks. She describes that they have not
worked with risks as much earlier. However, now they use a template to estimate and analyze the potential risks. This template is not the same as the in used in PPS. On the HRSC department they do not have detailed budgets for projects, but Stendahl describes that their customers often has a budget frame that they must stay within.

Time reporting is something that Stendahl has not worked with at IKEA AB. At her former workplace, IKEA Communications, they had structured time reporting. Stendahl mentions that the only current time reporting that they do is related to external consultants. Their own working hours are not reported; instead it is up to each person to pay attention when approaching their limit of hours or when it is too many hours.

Through frequent communication with the project team Stendahl quickly creates a good picture of how project members feel. She emphasizes that communication is an essential part and that all project members feel involved in the project. In the current routines Stendahl can see a problem in that the members do not always say exactly how they feel, but instead keep it for themselves.

Stendahl emphasizes communication and information as the most important factors when working in projects. An additional factor is to have access to the right resources when they are needed. She sees a problem in that resources often work 100% with something else and are not available for the project. In the end this can affect the original schedule. She believes that this problem can be solved by give project managers’ mandate to pick out resources to the project.

*Future requirements*

Stendahl see a potential in a system where everything are gathered in one place, especially when working in several projects at once. She believes that such a function could help avoiding problems with messy organization and documentation. Further she also think that a more standardized way of working would facilitate the communication since everyone then would “speak the same language” or have a common foundation.
Stendhal’s experience of time reporting is that it is a very time consuming procedure. But she also sees it as a potential tool for monitoring a project. However, it must be done in a simple manner without unnecessary reporting step.

Regarding the problem with project members not always describe exactly how they feel, Stendahl sees an advantage in that project members can indicate how they feel in a more anonymous way. She believes the proposal with smileys in different colored would give the project members the opportunity to indicate their feelings.

4.4.1.4 Mats Hallström, Project manager
Mats Hallström, Project manager working at the meeting function who first and foremost works with events. The interview with Mats was conducted 29 of April 2014.

Current work method
Today Hallströms workflow in projects is similar to PPS, but just like many others he has taken the model and made it his own.

He is very clear with that he always gets a project directive from the ordered with purpose of the project, goals and a to what cost it may be delivered. After this he works with the ordered and his team to create a project plan before initiating the project for real. He thinks that it sometimes is hard to get orderers to give him a project directive and often he is given it in an oral form. He then puts together a project plan that he sends and gets a confirmation on before starting the execution phase. The project planning always has to be done in a thorough way before starting the project. If this is not done the project will not be successful. It is not only negative for IKEA if a project does not work out as planned, it also has a negative impact on the project managers disposition among co-workers. When it comes to PPS he uses the project plan template from the system.

Hallström always place time, cost, and quality in a pecking order by putting a number besides them to add up to 10. So time+cost+quality=10. He believes this is a good system to have a clear
vision of the priorities in the project. During the planning Hallström also describes that he makes a list of tasks and divides among his team.

Hallström often work in several projects at the same time. This is hard and he often experience that he sometimes confuses different elements between the different projects. At the meeting function Hallström has colleagues that are responsible for keeping all documents in one place and having them updated. He also works in “project place”, but also emphasizes that he is the only one that uses it. He does not use Microsoft projects, as he believes it is too comprehensive and that he does not have the need for it.

During the project workflow it is important to have milestones and checkpoints. But for this to go as smooth as possible, Hallström again emphasizes the importance of planning before the project starts and goes in to the execution phase.

When it comes to time reporting Hallström only uses it to report his own time. Often he has predetermined time frames and costs when he works with people, both internal and external personnel. When reporting his own time he uses a simple excel file.

Hallström points out that IKEA AB is very bad at follow up projects. He believes it is important to go back to the ordered or receiving organization to see if they are satisfied with the result. When it comes to feeling he believes that it is important that his project team is feeling well, but he does not have a system to measure it.

Future requirements
Hallström believes that the new system should be simple and not to administratively heavy. He again stresses the importance of planning. He also describes that he misses a common working space where it is possible to facilitate administration.

To succeed with project the most important factors are time, good planning and the right competency with the project members. To have a good communication is also important and giving all the project members access to the same information in order to increase transparency.
When presenting our suggestion with different color smiles Hallström was very positive to the idea of project members reporting their feeling through that system. This since it makes it possible for people to communicate their feeling without having to taking a “face to face” contact.

4.4.2 Management board members
The system being developed is not only a tool to facilitate the project flow for project managers, it also has a purpose to communicate projects statuses and make the monitoring of projects easier.

4.4.2.1 Annika Mattsson, member of management board
Annika is a member of the IKEA AB management board, but also the function manager of Financial services at IKEA AB. The interview was conducted 15 April 2014.

Current work method
Today Mattsson feels that project managers need to prepare more before taking the project to the management board. She also believes that project managers sometimes underestimate risks in their initial project directives.

Mattsson believes that by communication she captures her coworkers “feelings”. She daily uses a green or red dot that she places at her workstation depending on her mood. She does not collect the feelings from employees to monitor them.

When asked about PPS, Mattsson believes that it is a good and logic method to use in projects. But she recognizes that project manager often uses their own models instead of using the templates in PPS. When project managers present projects for the management board they often use power points.
**Future requirements**

Mattsson also thinks that the most important thing is to see if the project is moving according to plan, both when it comes to cost and time, but also with competence. It is important for project managers to look at the project and try to see if they have the right resources with the right knowledge in the project or if other resources with other knowledge are necessary? Mattsson also expresses the importance of working in ways that are similar to the way they work today, and to keep the structure and process that PPS have. She sees this as a way of ensuring that people “talk the same language”.

Project managers need to do preliminary studies more thorough and consider the change part more carefully. Not just to prevent the project from not performing as planned, but also because if the project performs bad co-workers lose their commitment.

When we presented our suggestion with different colored “smileys” she was very positive to the idea. Mattsson believed that it would be good, by only having red or green options, project members have to make a choice and cannot choose to be neutral.

4.4.2.2 Daniel Frisk, member of management board

Daniel Frisk is a permanent member of the management board and is the functional manager at Business navigation on IKEA AB. The interview with Daniel was conducted 15 April 2014.

**Current work method**

Frisk connection to projects is first and foremost his work in the management board. Today there is no follow-up of; costs in different projects, time spent on a project, or internal pricing. Frisk stresses the fact that the follow up of the project, both during and after, does not exist today.

When it comes to budgeting Frisk believes that there is a cohesive way it could be done, but it is not done today. Today Frisk monitors his teams feelings by using an excel based method that translates numbers to colors; Green equals 1, yellow equals 0, and red equals -1. Every member reports their feelings regarding; the mood in the team, workload, deliveries and personal feelings.
Future requirements

Frisk would like to use the project management information system to have some kind of time reporting system to see how much resources actually spent on a project. As there is no connected time reporting at IKEA AB today, this would also give them the opportunity to in the future have the possibility to connect the PMIS to other systems.

From management point of view, Frisk believes that it would be desirable to get an overview of the project current costs against the total budget. To compare the actual costs against planned costs in the business case. Today they have no way to follow time reporting. Frisk suggests getting a percentage of used time against budget.

When it comes to budget Frisk believes that it needs to be simple. Frisk suggests a template with resources time, direct costs and continues operational costs. This to get a clear view of what costs are connected to the projects, and what costs are connected to the product created in the project and its continues operational costs. He also believes that transit cost, such as implementation of a product, should be connected to the projects costs. In addition he also stresses the fact that the view of a project's status need to be simple and give a brief overview. The most important thing is to see the deviations from the plan.

As a member of the management board Frisk believes it would be good if the risks in a project was presented, and present a worst case/best case scenario, but also likely scenarios. He does not believe that it has to be just economic risks, but also other risks. It needs to be represented in a simple way. Using traffic lights would be sufficient. Frisk believes that the existing system that he uses, with colors works good. When we presented our suggestion with different colored “smileys” he was positive to the idea.
5. Analysis

In this chapter the empirical data will be analyzed along with the theory. The chapter will begin with a system analysis of the current situation and the future requirements at IKEA AB. This is followed by a conceptual design that is structured according to the conceptual model presented in the literature review. The analysis is ended with a suggestion for a PMIS at IKEA AB.

5.1 System analysis

The first step of the system development cycle is the system analysis. This part aims to identify users’ needs and requirements of the system (Romney & Steinbart, 2009). Therefore the current work methods and future requirements has been analyzed.

5.1.1 Current work methods

After a review of the working methods at IKEA AB it is clear that there are differences in project working methods between project managers. Of all the interviewed project managers, only Stendahl worked completely according to PPS. However, the other project managers based their working methods on PPS and its structure with decisions points (DP), but adapted the guidelines and template to their own situation and requirements. Management board member Mattson, who state that project managers tend to create their own models of PPS, also confirms this view. Project managers Öhman and Hallström both describe that they changed the PPS templates to better fit themselves. Öhman believe that the IKEA AB organization is not used to working with heavy documents.

When it comes to risks, the adaptation of PPS is shown here as well, as only one of the project managers, Claesson, use the PPS risk template to evaluate risks in a project. Risks are important, this can be shown by the fact that all project managers frequently work with it. Stendahl described that her department have not worked with risks to any great extent in the past, but that it has developed toward a more risk aware department today. Furthermore, both Öhman and Hallström stresses that risk is an important factor when working in projects. However, management board member Mattsson believes that project managers often underestimate the risks connected to a project. Therefore there is a need for all project managers to be thorough when looking at risks.
When it comes to working with budgets, this varies at IKEA AB according to Öhman. This is something that also management board member Frisk is aware of, and states that even though they could, project manages does not use a cohesive way of making budgets. This perception was confirmed during the interviews. Both Öhman and Claesson always use their own versions of budget for projects. The other project managers do not specify the costs in the same way.

There was also a variation in how to capture employees’ feelings. Most of the departments worked continuously with this, for instance, Mattsson at financial services and Claesson in the PMO described that at their functions they use red and green “dots” to indicate the mood. Frisk mentioned that he monitors feelings by members reporting their feelings in an excel sheet according to four areas; team mood, workload, personal feelings and deliveries. In larger projects Öhman regularly use a four-element model to check both private and work related feelings of the project members. Project managers Stendahl and Hallström both stated that most of the communication regarding project members’ mood and feelings take place informally.

The monitoring of projects is mostly done via activity lists consisting of tasks for the project. All project managers use some form of list over activities or tasks. Time reporting is rare and judged by the interviews it is only one project manager, Öhman, who does this on a regular basis. Öhman works with time reporting of the project members as a part for monitoring the project. PMO member and project manager Claesson only time reports his own hours, but he believes that there is a need for time reporting form project members. From a management board perspective monitoring of projects is nonexistent according to Frisk. He states that there is neither monitoring during project execution or evaluation of completed projects in the conclusions phase.

5.1.2 Future requirement
In the original requirement, IKEA AB requested; a way to monitor cost resources commitment, time reporting, planned time for a project compared to used time, and a way to change the project plan do to scope creep. There was also a desire to be able to create a project plan from the information going in to the system. This was first and foremost to create value for the project
managers. IKEA AB also wanted different presentations to different levels of management. This entailed a holistic view for management board, and a more detailed view for project management office and project managers.

All of the respondents consider time reporting and monitoring of project members feeling to be of great importance. Both PMO member Claesson, and Management board members Mattsson and Frisk also wants time reporting so they can see both how many hours each project member has spent, but also how much time in total for all members is left to spend on the project according to the project plan. This can be compared to the original requirement of looking at planed time compared to spent time. Further, Öhman and Claesson wishes to have an activity list to see what has been done, what is left to do and who is responsible for the different tasks.

Project manager Stendahl thinks it should be possible to gather all document and information in one place for each project. Hallström, whom also has experienced a problem with many different documents in a project, seconds this. Hallström also believe that good communication and transparency in information connected to the project is important among the project members.

Both Stendahl and management board member Mattsson believe in a more standardized way of working in projects to facilitate the communication and enable people to “speak the same language”. Further, project managers Stendahl and Hallström emphasize the need for the system to be simple and easy to use.

Mattson believes that the most important thing for board member is to see if the project is moving according to plan. This also aligns with Frisk, who thinks it is important to see deviations from the project plan both when it comes to time and cost. Just like Hallström and Stendahl, Mattsson thinks planning is a crucial element for project success. Frisk also wants to see planned hours per resources and spent hours. When it comes to costs they need to include all costs connected to the project, including transit costs when implementing the project at the receiving organization. Further, risks are something that both management board members Mattson and Frisk, and PMO member and project manager Claesson considers important, and wants to see in the system.
<table>
<thead>
<tr>
<th>Requirements</th>
<th>Position Name</th>
<th>PM</th>
<th>PM/PMO</th>
<th>PM</th>
<th>PM</th>
<th>MB</th>
<th>MB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planned vs. actual cost</td>
<td>Öhman</td>
<td>X</td>
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<td>X</td>
<td>X</td>
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<td>Planned vs. actual time</td>
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<td>Planned vs. actual resources hours</td>
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<td>Time reporting</td>
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<td>Documents, one place</td>
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<td>X</td>
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<tr>
<td>Holistic view of projects</td>
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<td>X</td>
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</tbody>
</table>

Table 5.1 revised specification of requirement. Summary of the requirements from the different respondents. PM (Project Manager), PMO (Project Management Office), MB (Management Board)

5.2 Conceptual design
When developing a new system the second step, according to Romney and Steinbart (2009), is the conceptual design. Based on the user requirements presented in the system analysis, the conceptual design aims to describe how the users requirements can be fulfilled. To get a high utilization of a new PMIS, it is important to involve the organization and the users (Ivarsson and Gorschek, 2011; Ali et al., 2008; Niwa, 1991). Several aspects can differ between organizations and affect the design of PMIS. Based on the conceptual model made from the literature review three major aspects need to be taken into consideration; the number of different levels of management, how the organization works in the different steps of the life cycle, and what requirements the users of the system have. The system usage is based on the users consumption of the output from the system (Lee & Yu, 2012). With IT it is more common to experience
problems with information overload (Delen & Al-Hawadeh, 2009). Such a situation can create decreased performance, and in a multi-project organization the problem increases the more projects you have. The quality of the information therefore becomes an essential aspect in multi-project organizations (Caniëls & Bakens, 2012). The information quality is measured in the output of the system towards the users and depends on the systems quality that represents the processing of input to the system (Lee & Yu, 2012). To achieve a high system quality and information quality, aspects from when creating a performance measurement system can be used. Like Turner and Zolin (2012) states, it is important to monitor and control projects during the execution, and to be able to improve the project during execution KPIs can be used. KPIs capture the most important information to provide guidance in achieving performance improvement (Parmenter, 2007).

Information processes are important in Lee and Yu (2012) PMIS success model, and it is also what conceptual reference models concentrate on (Ahlemann & Riempp, 2008). The M-model presented by Ahlemann (2009) embraces all tasks related to the different steps in the life-cycle of projects and it describes the information need in the different management levels involved.

5.2.1 IKEA and the project life-cycle
According to Hurbean (2013) a PMIS aims to help project managers monitor projects during the entire project life-cycle. The project life-cycle consists of a series of phases that all projects go through (Ahlemann, 2009; Kerzner, 2009; Pinto & Prescott, 1988). The IKEA AB project process and work structure, PPS, has three project life-cycle steps, prepare, execute, and conclude. Even though project managers at IKEA AB does not fully follow PPS, all of them have a similar flow in their working process, and use the decision points (DP) from PPS as guide marks (Öhman; Stendahl; Hallström). PPS can be compared to the different life-cycle phases presented in the literature by Alhemann (2009), Kerzner (2009), and Pinto & Prescott (1988).

Prepare
The prepare step in PPS can be compared to the initiation (Ahlemann, 2009) or conceptual (Pinto & Prescott, 1988) phase, and the planning phase put together. In the initiation phase the project is evaluated briefly and a decision whether to proceed with the project is taken (Ahlemann, 2009).
This could be compared to DP1 and the project directive in the prepare phase in PPS. Further on, in PPS the project plan is produced in DP3, which can be compared to the planning phase of the life-cycle. The planning phase is very important in projects. It is also of even more importance in multi-project environments (Besikci, et al., 2012). According to both Kerzner (2009) and Zwikael (2009) a thorough plan will ease the monitoring and controlling of a project. The project managers Stendahl and Hallström, whom both emphasized the importance of a thorough planning, and board member Mattson who states that she wants a more thorough planning, also confirm this.

According to Kerzner (2009), the first two important elements in a project plan are budget and schedule. In PPS, the plan starts to take form after the project directive has been approved. A budget is set, staff is organized, working methods are set and potential risks are identified. All this is then compiled into a project plan, which also is DP3. A lot of information is put into the project plan, as can be seen in appendix 1. The original requirement of the project plan being produced in the system, risks, and the requirements regarding planned vs. actual time, cost and resources hours all have their first indata in this document. This aligns with Zwikael (2009), who state that risk, time, costs and procurements are the most important factors of project planning in service companies. The risks at IKEA AB are handled in a separate template, see appendix 2. Therefore the information from the PPS project plan and risk template should go into the system, thereby enabling the system to produce a project plan, and acting as the planning function tool in the PMIS (Raymond & Bergeron, 2008) created for IKEA AB.

Execution

In the project life-cycle, the planning phase is followed by the execution phase (Kerzner, 2009; Ahleman, 2009; Pinto & Prescott, 1988), just like PPS, which starts by DP4 and finished by DP6 according to the PPS structure. Several authors stress the importance of monitoring projects during the execution (Guo-li, 2010; McBride, 2008; Magnusson, 2008). Frisk states that the management board does not monitor project during the execution phase today, but he sees a demand and need for this, which also was an original requirement from IKEA AB. Guo-li (2010) also emphasizes that monitoring is central to ensure that projects meet their set goals. Monitoring and controlling are also highlighted as important parts of a PMIS (Raymond & Bergeron, 2008).
The ways project managers at IKEA AB control and monitor projects varies a lot. According to Cannalire (2011), Lauras et.al. (2009) and Magnusson (2008) budgeted costs and time are important areas to monitor during execution. This is in line with the requirements from IKEA AB. Both project managers (Öhman, Claesson, Stendahl & Hallström) and management board (Frisk) state that time and resources are important to monitor during project execution. Resources are also one of two things that Kortam (2009) claim as important when working in a multi-project environment. The second thing that needs to be considered is productivity (Kortam, 2009). By working with several projects simultaneously, the organization can use resources in a more efficient way (Caniëls & Bakens, 2012; Zika-Viktorsson et.al., 2006). However, Claesson has experienced problems with having people attached to a project part-time. He experienced a difficulty in monitoring whether people actually devote the budgeted time or not. Here there is a clear demand for supervision and monitoring of resources time use.

All the interviewed management board members and project managers want to monitor project members’ feelings. Almahmoud et.al. (2012) states that this is one of the most important objectives to monitor when conducting projects. This is also supported by Cheung et.al. (2004).

As mentioned, costs are crucial areas to monitor (Lauras et.al.,2009; Cannalire 2011), which is consistent with IKEA ABs requirements. Today there is no common “language” for communicating costs, nor are budgets always used by all project managers (Öhman). A standardized way of working is suggested by several of the respondents from IKEA AB (Stendahl, Mattson & Frisk). To monitor a project’s budget time and costs Magnusson (2008) describes that it should be compared with the outcome to provide a good picture of the current situation. In a PMIS, different Stakeholders, such as different levels of management, should be able to access up-to-date information (Hurbean, 2009) in a way that facilitates the monitoring of what the project status is (Braglia & Frosolini, 2012). This aligns with Öhman, Claesson, Mattsson, and Frisk whom all wants to be able to see planned against actual cost, time, and resource hours in the system. This should act at as the monitoring function tool that makes it possible to regularly assess project progress (Raymond & Bergeron, 2008).
Zika-Viktorsson et.al. (2006) state that one problem that can occur when executing projects in a multi-project environment is that efficiency decreases when switching between several projects. Both Stendahl and Hallström confirm that they experienced this. When switching between projects they have a hard time to separate projects from each other, and what can be compared to set up time appears (Zika-Viktorsson et.al., 2006). To eliminate the set up time, the PMIS needs to give the user an overview of the project in a quick and easy way (Braglia & Frosolini, 2012). Stendahl and Hallström also feel that it is hard to find documents related to the project sometimes and believes they should be put in one place, to avoid confusion. Regarding this, Antvik and Sjöholm (2014) and Braglia and Frosolini (2012) both state that documentation for a project should be gathered in a common place and be available for all project members.

When the project’s scope changes this is named scope creep (Kerzner, 2011; Al-Jibouri, 2003). The scope creeps in projects at IKEA AB are dealt with in PPS during both DP2 and DP5, and can occur several times during a project's execution. It is also commonly occurring at IKEA AB (Claesson, 14 march 2014). To enable change and modification of forecasts being able to change the scope should be a part of the system as a controlling function tool (Raymond & Bergeron, 2008).

Conclude
The last phase in the project life-cycle is the termination phase (Ahlemann, 2009; Kerzner, 2009; Pinto & Prescott, 1988), which can be equated with to the conclude phase in PPS. Both PPS and Ahlemann (2009) describes that if there is a receiving organization, the project is handed over during this phase. In PPS this is DP6-7 and Öhman described that he finishes a project by writing a final report, which functions both as a manual for the receiving organization and a report where an evaluation of the project is made. But no other project members state that they make a final report of the project. Frisk stresses that follow-up of projects does not exist at IKEA AB today. According to Raymond and Bergeron, (2008) there should be an evaluation function tool and a reporting functioning tool the enables project auditing and that gives the most basic aspects of the projects execution. By gathering the final data regarding outcome versus the project plan and enabling the system to summarize this in a type of “final report” would enable and facilitate a follow-up projects at IKEA AB. This is also supported by Kerzner (2009).
5.2.2. Revised M-model

Just like the original requirements, and the revised requirement from IKEA AB, say the system should, the M-model (figure 3.3), present different sets of information to different levels of management (Ahlemann, 2009). On IKEA AB there are three different levels of management that require different information. There is the project management level, the PMO level and the management board level. The levels at IKEA AB aligned with the levels presented in the M-model by Ahlemann (2009). Looking at the lower level of the M-model, project manager level (fig. 5.2), the process steps can be compared to the PPS process as well. The idea generation is similar to the creation of DP1 and the project directive, detailed planning is DP2-3 and the project plan, Project Execution is DP4-6 and internal project termination is DP7-8. Just like with the project life-cycle, the steps initiation phase and planning phase are combined into one in PPS, in the form of the prepare stage. At IKEA the idea generation can come from anywhere in the organization. Some projects come from top management on a global or national level and are therefore mandatory to execute. If they are not mandatory, it is up to PMO to decide if the project is worth doing and if there is time for it. But, idea generation and portfolio planning is not a part of the requirement from IKEA AB for the system. Also since one of the aims of the system is to produce a project plan and monitor the project during execution, initiation can be seen as unnecessary. The requirements from IKEA AB and the important criteria for each step of the project life-cycle are presented in the M-model in the table below.
As can be seen in the table above the different levels at IKEA AB have matching requirements on several points. All levels at IKEA AB want a holistic view of the projects. Further, all of the management levels also want to monitor risks, feelings, time report and comparison of planned and actual performance of time, cost and resources, but there are differences between the levels. There is a risk that if all elements for all projects are presented, this will give too much information to the PMO and management board. Management board members Mattsson and Frisk both state that the most important thing is to see deviations from the plan. Therefore they will focus more on variations between planned vs. actual. As can be seen in Table 5.2 the management board and PMO require the same things. However, the project managers will work...
with projects on a more detailed level. This creates a demand for several dashboards. In a multi-project environment, like IKEA AB, this is needed in order to both watch details for each project, but also to get a portfolio overview (Kortam, 2009).

Both the PMO member Claesson and management board members Frisk and Mattsson want to see all projects, in contrast to the project managers just want to see their own projects. Management board and PMO level requirements can be compared to Kortam’s (2009) multiple project dashboard, but also the M-Models Portfolio controlling (Ahlemann, 2009). Because PMO and management board have the same requirements, there is only a need for two dashboards in the system for IKEA AB. First there is need to have a holistic and provide an overview of the projects. Secondly there is a need for a more detailed level for every project, this can be compared to Kortam’s (2009) level 2. This aligns with the purpose of a PMIS to both help support the project during the life-cycle, but also to support the project portfolio (Caniëls & Bakens, 2012).

5.2.3 KPI
To monitor projects most important parts, key performance measures, KPIs, can be used. This was also a part of the original requirements from IEKA AB (Claesson, 4 February 2014). The aims of KPIs are to achieve performance success (Kerzner, 2011; Parmenter, 2009). A performance measurement system aims to facilitate the tracking of the implementation of a business strategy (Simons, 2000) and when working in projects the ultimate purpose is to support the business strategy (Kerzner, 2011). Since projects represent strategy then the purpose of PMIS, to help managers monitor projects (Hurbean, 2013), is closely related to a PMS purpose. KPI are core performance measures aimed to improve performance (Parameter, 2007), and a successful PMIS should have a positive impact on project performance (Lee & Yu, 2012). In order to really support improvements both Cheung et.al. (2004) and Parmenter (2007) states that the indicators need to be updated frequently. Further, Cheung et.al. (2004) also point out that KPIs used to evaluate ended projects does not help in achieving improvements in the project.

The requirements from IKEA AB to monitor cost, time and resources during a project's execution, are supported by what Almahmoud et.al. (2012), Cannalire (2011), Lauras et.al.
(2009) and Cheung et.al. (2004) considers important. Almahmoud et.al. (2012) and Cheung et.al. (2004) proclaims the importance of monitoring how team members feel just like IKEA AB does. However, the requirements that PMO and management board have of monitoring risks are not fully consistent with the theory. Measuring risks during execution will not provide guidance for performance improvement, although it is an important area to consider during the planning of a project (Zwikael, 2009). Thus, the following requirements needs to be measured; costs, resources, time and feelings.

*Costs*

To measure costs in a project it is important that the PMIS provide the basis in the planning phase, this since comparing actual costs with the planned costs is essential according to Almahmoud et.al. (2012) and Cheung et.al. (2004). This is in line with IKEA ABs requirement to see the actual vs. the planned costs. Cheung et.al. (2004) also suggest measuring the variations from the budget and percentage of budget used.

For this system our suggestion is to measure costs both by measuring the actual costs compared to the total planned costs, but also by variations. Variations were one of the management board requirements. Al-Jibouri (2003) similarly advocates measuring the variations, but sees it as measuring efficiency since this compares actual performance with planned.

\[
\frac{Actual \ costs}{Budgeted \ costs} = \% \ of \ used \ budget
\]

\[
\left(\frac{Actual \ costs}{Budgeted \ costs \ so \ far} - 1\right) \times 100 = \% \ Variations \ according \ to \ budgeted \ costs
\]

To use these KPIs several inputs are required. The base is the costs estimated in the project plan, which is used for comparison. To measure the variations there is a need to estimate when costs will occur during the project. This can be done by estimating cost up until critical dates or deliveries. In addition, the actual costs needs to be calculated, which is the same as the aggregated costs so far.
Resources

To monitor resources have been claimed especially important in multi-project environments, and when the main resource is employees (Kortam, 2009). This has also been a requirement from IKEA AB. Claesson described that he experienced problems with monitor resources in projects. To measure resources Kortam (2009) suggest that the actual use of resources should be compared to the maximum potential use of resources. Kortam (2009) use days to get an overview of the resource used. On IKEA AB, where one employee may work with multiple projects every day, we argue that hours will be a better value. Further the budgeted or assigned hours will correspond the maximum use of resources.

\[
\frac{\text{Actual spent hours}}{\text{Budgeted hours}} = \% \text{ of used hours}
\]

\[
\left( \frac{\text{Spent hours}}{\text{Budgeted hours so far}} - 1 \right) \times 100 = \% \text{ Variations from forecasted resource use}
\]

To satisfy the requirements to monitor individuals and to make sure that the hours they are supposed to spend on the project are used, but also to make sure that they are not working more than planned hours, these calculations also needs to be done on an individual level as well.

\[
\frac{\text{Actual spent hours employee 1}}{\text{Budgeted hours employee 1}} = \% \text{ of used hours employee 1}
\]

\[
\left( \frac{\text{Spent hours employee 1}}{\text{Budgeted hours so far employee 1}} - 1 \right) \times 100 = \% \text{ Variations from forecasted resource use employee 1}
\]

To get input to these measures the time reporting required from IKEA AB can be used both to monitor resource use overall and for individuals.

Feelings
Almahmoud et.al. (2012) states that monitoring the project team performance is one of the most important factors. Cheung et.al. (2004) consider that this aspect can be measured by asking how the project members feel. This means that project members may make an assessment of how they feel about the project and how they themselves feel about the current situation Cheung et.al. (2004). After discussions with IKEA AB and the respondents, we can contemplate that this must be done in a simple way in order to avoid more administration. Therefore we suggest a possibility for project members to report their mood will be placed in connection to the time reporting. The way of measuring project members’ mood will be the proposal described in the first requirements. This means that project members will be given a choice between four smileys. Two levels of green and two levels of red. This was also presented to respondents during the interviews.

Time

To record the project time productivity, organizations can use milestones (Kerzner, 2011; Kortam, 2009; Cheung et.al., 2004). All authors have different ways to present the productivity. Kotram (2009) suggest that productivity is presented by dividing executed milestones with planned number of milestones, which then is compared with a specified target. Kerzner (2011) and Cheung et.al. (2004) prefers to measure it with missed milestones respective achieved milestones in time. Further Cheung et.al. (2004) also critical dates need to be measured and suggest to measure them by how many critical dates achieved compared to the plan. Milestones are also included in the PPS project plan and can be compared to the tasks and activity-lists used by the project managers. Critical dates can be compared to the decision points and deliveries in PPS. According to Hurbean (2012) project managers should be able to set up milestones and deadlines in a PMIS. Deadlines can be compared to the decision points in PPS and can be seen as critical dates.

For milestones, this will be measured by number of executed milestones divided by planned number of milestones. This will give us an indicator that tell us if the project proceeding according to the plan or not. Kerzner's (2011) or Cheung et.al.s (2004) suggestions, missed milestones, respective achieved milestones, will be measures that is more of an evaluating nature which does not provide guidance for performance improvements. To make these measures more
useable, it would demand further output to indicate when a milestone was achieved and how long it took for the milestone to be achieved. Instead Kortam’s (2009) suggestion of achieved divided by planned milestones would make a better KPI for IKEA. This would indicate how many milestones according to plan should have been achieved compared to milestones actually achieved in a timely manner. This means that if there are milestones not achieved it would indicate a delay in the project and need for evaluation by the PMO to see if there is a need for support.

To get this measure at IKEA AB, milestones and dates would have to be put into the system. The project manager or project members most the fill in when the milestones is achieved. The critical dates will be measured, aligned with Kortam (2009), measured by how many critical dates are achieved compared to the plan. To measure this the critical dates need to be filled in and also when it is achieved.

\[
\frac{\text{Milestones achieved so far}}{\text{Milestones planned so far}} = \% \text{ of planned Milestones achieved}
\]

\[
\frac{\text{Critical dates achieved so far}}{\text{Planned critical dates so far}} = \% \text{ of planned critical dates achieved}
\]

However, a PMIS does not only consist of KPIs. As Hurbean (2013) mention, a PMIS consists of a collection of solutions for document management, document control, and project collaboration and has a purpose of improving information sharing. The respondents Hallström and Stendahl emphasize the need for a common working space. Hallström also mentions the need for transparency among the project members and the importance to give them access to all relevant documents. Therefore a common space where documents can be uploaded and shared should be built into the PMIS at IKEA AB.

Risks are also a requirement from IKEA AB to have in a PMIS. If risks are not dealt with they might lead to reduced performance. Therefore the number of risk connected to a project within
the high-medium and high-high range in the PPS risk template (appendix 2) should also be presented to both dashboards.

Culture and management style are two evident informal factors (Anthony & Govindarajan, 2007) existing at IKEA. Management style when it comes to projects is evident in the way they often start, with a meeting of project members and stakeholder having a meeting where everybody decided and agreed on what the objectives and benefits of the project. This increases the need for the system to be developed close to the users, as close collaboration is custom at IKEA AB.

5.2.4 Suggestion for a PMIS at IKEA AB

Our suggestion for a PMIS at IKEA AB aims to support projects during the whole life-cycle. In the prepare phase a possibility to create a project plan is needed. This is the input and the base for the monitoring of a project and is produced by the project manager. There is no need for PMO or management board to be involved in the project plan creating, since it is the project manager’s responsibility. To avoid the not invented here problem data in the project plan is based on the current PPS template (Appendix 1). In the project plan data such as basic information, background to the project, project organization, schedule, decision points and milestones, risks, time, cost and resource plan are inserted. The last three, time, cost and resource plan is also the input for the KPIs regarding these factors. However, there is a demand for adding information in the project plan to be able to use the KPIs. In appendix 3 a suggestion for how a new project plan can look is presented. This project plan for instance includes critical dates and estimated costs for each date.

For IKEA AB we found that there is a need for two levels of dashboards. The management board and PMO level is aimed to enable monitoring of projects during the execution in a holistic way. The project manager level will also create possibility to monitor, but as mentioned it should also provide a project plan. This means that the PMIS will support the project manager level not only during execution. To meet the user requirements our suggestion for the two dashboards at IKEA AB can be seen in figure 5.3 below.
Figure 5.3 suggestion for dashboards at IKEA AB

Dashboard for project managers

The dashboard for the project managers will, as figure 5.3 shows, contain a lot of details. The project plan that has been created should also be possible to change during the project execution. This in case if a situation of scope creep occurs. To avoid problems with unorganized documentation it should be possible to upload documents relevant to the project and the project stakeholders on the project level. To monitor how the project is progressing the dashboard for project manager level will present the percentage of planned milestones and critical dates that has been achieved. This will indicate if the project deviates from the plan.
The KPIs selected to monitor costs are percentage of actual costs compared to total cost according to project plan, and variation from costs planned according to critical dates. This will provide the project manager with both a picture of how much of the planned costs that has been spent, but also with information of how the project is performing according to the plan so far.

To show resource use on the project manager level, the percentage of used hours will be presented both for the project as whole but also for each and every project member. In addition variations from forecasted hours will be used to see if the resource use follows the plan. However, the individual time reporting may provide the PMO and management levels with more information than necessary. Frisk, from the management board, stated that time reporting would be a good tool. But at the same time, management board want to have a holistic view of the projects and Frisk stresses that the view of projects needs to be simple and give a brief overview. PMOs role in the IKEA AB organization is to implement projects and support other organizations in their project management. Both PMO (Claesson) and management board (Frisk) want to have the possibility to go further into detail in a project if necessary. Öhman describes that as a project manager he wants the ability to follow each of the members time reporting. Therefore the aggregated hours for all the project members will be presented on the PMO and management board level, while individual time records are available on the dashboard for the project manager.

Since several project managers emphasized that the project manager are responsible for project members’ well-being. Therefore the mood of project members will be presented on this level. The project members’ feelings need to be presented to the project manager from each individual to make it possible for the project manager to take action and increase project team performance. The working methods with feelings have similarities with the proposal of different colored smiley and all respondents positively received the proposal. Therefore this will be used in the system.

The risks are handled in the same way in both dashboards. The numbers of important risks are shown. By having an overview of how many high-medium and high-high risks, this will indicate to the project managers that there are risks that need to be dealt with in order to increase the
probability of the project being successful. Also a complete list of risks will be presented on a project management level in accordance to the new suggested project plan.

Dashboard for Management board and PMO
The second dashboard, aimed to serve PMO and management board, will provide a holistic view of all the projects with just the most important information, in form of KPIs. They will be able to see variations from forecasted total resource hours for a project, variation from planned costs, percentage of planned milestones achieved, and percentage of planned critical dates achieved. They will also have the option to go into projects on a project manager level. This, to enable them to take a closer look at the projects they see have high variations from plan. Finally the number of high-medium and high-high risks in the PPS risk-template is presented in this dashboard. This is because if the project has many risks in these categories this might lead to decreased project performance, and therefore action need to be taken.

When a project is closed and handed over to the receiving organization a final report should be possible to produce. The final report will be based on the KPIs final values. These need to be summarized and presented to all levels of management.

The success factors presented by Lee and Yu (2012) have been kept in mind with selecting the suggested measures for IKEA AB, but not all where relevant in this study. Service quality and the support provided to the PMIS have not been taken into consideration. The system quality and the processing of information have been used by transforming information that goes into the system to KPIs. By using two dashboards the information is easy and accessible for the user. To achieve a high information quality we have analyzed IKEA AB requirements together with theory regarding PMIS. This in order to provide users of the system with desired and usable information. By using variations according the planned values so far, a timely and accurate view of the current situation in the project is presented. To achieve a high system use it is important to involve the organization and the users (Ivarsson and Gorschek, 2011; Ali et al., 2008; Niwa, 1991). The selected dashboards, KPIs, and information for the system have therefore been sent to the project manager and PMO member Stefan Claesson for validation. This in accordance to action research methodology and to ensure that the requirements from the involved organization
are met. He confirmed that the suggestion were good and useful and fulfilled the requirements of facilitating monitoring and controlling project, both on an organizational level and an individual level.
6. Conclusions
In this ending chapter the conclusions are presented, and the study's research questions; How does IKEA AB control and organize projects today? How can a PMIS look like in the multi-project organization IKEA AB, in order to control and monitor parallel projects? are answered and reflected over. Finally suggestions for future research are presented.

6.1 Results and reflections
After an examination of how IKEA AB work with projects today we can conclude that they have guidelines and a working methodology to follow, but the employees does not work in a cohesive way. Today IKEA AB have the PPS structure and the employees have the possibility to use its instructions and templates. However, the project managers tend to use their own customized versions of PPS. They state that PPS is too advanced and therefore they adapted it to fit their own situation. One project manager also states that IKEA AB is not susceptible to heavy documents yet, and that is one of the reasons of why they adapt PPS to suit themselves.

We can also state that most of the departments work continuously with capture employees’ mood, but the approaches differ. Some departments work with red and green dots so employees can communicate their mood. From the project managers it can be stated that the communication about feelings and members’ mood are conducted mostly informal.

From the management board members perspective no follow-up or monitoring of projects occurs. Neither during a project execution or afterwards. In addition to this a management board member also experiencing that project managers are not always properly prepared when they come to the management board for discussions on the project. The monitoring of projects by project managers was usually done using activity or task lists. From this we can learn that even though there is structured ways of working with projects, this is not always used. Therefore it is important to take a close look at the actual working methods, before creating a system, in order to take the user into consideration.
It can be stated that the project plan is an essential part of both project implementation and a PMIS, therefore this needs to be a part of the system. In the PMIS the project managers should be able to create a project plan. The project plan is the foundation for monitoring during execution and evaluation during the conclude phase. To avoid the “not invented here problem” we decided to use the existing PPS project plan as a base when creating an alternative project plan. The project plan also had to capture all essential information that was to be used as input to the suggested KPIs. Our revised project plan is shown in appendix 3.

We can conclude that IKEA AB has three levels of management interested in monitoring projects. The management board and PMO want to monitor the same things and get a holistic view of the projects, while the project managers require more detailed information. Therefore we suggest that a PMIS should consist of two dashboard levels. The purpose of having different amount of information is to meet the requirements of the different management levels, and to avoid information overload.

To give the management board and PMO a holistic view of projects costs, time and resources, they will be presented in the first dashboard level. The focus will be to look at variations when actual costs and resources hours are compared to what the plan states it should be, to indicate deviations. Milestones and critical dates achieved will be compared to the planned in order to monitor if the project will be finished on time.

The second dashboard level will present more detailed information for each project. This level is aimed for project managers, but will also be available for management board and PMO if required. Here the project plan, according to appendix 3, is created to give the input for the KPIs on all levels, but also to give the basic information regarding the project. In addition to what is presented in the dashboard for management board and PMO, the dashboard on the project manager level also consist of percentage of used resource hours and costs compared to the plan and project members feelings. The resource hours and project members’ feelings are presented both on an individual level, and on a project team level. Project members enable monitoring of resource hours by time reporting and this being compared to planned hours in the project plan.
Feelings will be monitored by project members report their mood, choosing between the suggested four smileys.

Finally our suggestion is that the PMIS should be able to serve all levels of management with a final report of a project. The final report consists of the final data from the KPIs and should be presented to all three levels of management. This will just be an overview of the outcome in numbers and will not have the detailed level of a final report described in PPS. But it will still give a possibility to evaluate the project according to the KPIs.

When creating a project management information system we can see that several things are more important than others. When working in a multi project environment, diminishing information presented is the most important object, since the information is multiplied with the amount of projects. Therefore we see that combining information through KPIs is an effective way to communicate the most important and demanded information, and to avoid information overload.

Overall we see the most important elements when creating a PMIS in a multi project environment is to:

- Take existing working methods into consideration and include them in the development process
- Look at existing information systems in place to avoid to register or create the same information, but also to see if it is possible to use information from the current system in the new PMIS
- Look at the information requirements from the potential users, especially if there are several different types of users
- Take consideration of the information providers and what the incentive is for them to put information into the system

During the literature review we realized that the literature is most focus on how PMIS are perceived and used instead of what is important when creating a new PMIS. We believe that our suggestion will ease IKEA ABs monitoring of projects and will be one step further against a
more common language when working with projects. However, there are still parts that need to be worked with.

The close contact with IKEA AB has helped to avoid problems with descriptions of the organization and processes. Further, we have experienced that the respondent have shared all relevant information, which has helped to confirm descriptions of processes and work methods at IKEA AB.

### 6.2 Further research

The area of multi-project environments and PMIS is an area that has not been research to any great extent. Also, PMIS in combination with performance measurements is an area that has not been fully investigated yet. We therefore believe it would be interesting to further investigate how these areas can be linked together.

Since we worked with PMIS with a qualitative approach, a qualitative approach would be interesting. Is there a demand for PMIS in multi-project environments or PMIS combination with performance measurements? Quantitative approaches could also be used to investigate if there are differences in the use of PMIS between industries or companies of different sizes.

In this thesis no calculations reading if the benefits form a PMIS outweighs the cost of development and implementation. We therefore see a potential for research of how to calculate the costs, and financial benefits associated with the implementation of a PMIS.

Finally it would be interesting to conduct research about the implementation of a PMIS, and what factors can be claimed as important for a successful implementation. In addition to the business related approach to creating a PMIS, there is the physical design and the system science approaches. During our research we have only seen a few examples of how a PMIS actually can be designed, in combination with performance measurement or multi-project environment the need for further research is even greater.


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About Tempus - 2014-03-25
About the IKEA group, 2014-02-05:
http://www.ikea.com/ms/sv_SE/this-is-ikea/about-the-ikea-group/index.html

Personal communication
Anders Öhman, Project manager on Project management office 2014-03-28, interview

Annika Mattsson, Management board member, 2014-04-15, interview

Daniel frisk, Management board member, 2014-04-15, interview

Helen Stendahl, Project manager on Human resources service center, 2014-04-15, interview
Mats Hallström, Project manager on Service & Meetings, 2014-04-29, interview

Stefan Claesson, 2014-02-04, Project manager on Project management office, Problem and case introduction [Mail]

Stefan Claesson, 2014-03-14, interview and presentation of requirements

Stefan Claesson, 2014-03-28, interview

Introduction meeting, 2014-02-14
Appendix

8.1 Appendix 1, Project plan

Project Plan overview, IKEA AB

**Basic information**
Orderer: 
Project owner: 
Project manager: 
Background: *Briefly describe the background of the project*

**Project idea**: The project idea should describe the connection between the expected benefits and the project objectives by summarizing the purpose of the project and in what sense the project contributes to it.

**Project objective**
Result: *the result of the project and list the deliverables*
Time: *<yyyy-mm-dd>*
Cost: *<xxxxxxx>*

**Priority of the objective**: Define the priority between the dimensions result/time/cost.

**Limitations**: Clarify the project objectives by defining what is NOT included in the result, that is, the responsibilities of other projects, the orderer or the main organization.

**Project organization**
Steering group:
Project management:
Reference group, users:
Sub-project/Working team: (can be several)

**Resource plan**

**Schedule, decision points and milestones**
Date, DP, MS, Description

**Risks**

Priority, Risk name, description, Response description
8.2 Appendix 2, Risk template

Risk template

In the risk template the risk is specified by:

- Description of risk
- Type of risk
- Probability
- Impact
- Current priority
- Proposed/implementation response
- Status
- Person responsible
- Date measured finished

By filling this out, the risk is then automatically put into the graph below.

Risk evaluation - Priorities

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<td>Eliminate?</td>
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<td>Monitor?</td>
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<td>Monitor?</td>
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<td>Manage/Monitor?</td>
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Probability of the event occurring
Appendix 3 - Revised project plan

Basic information

Orderer:

Project owner:

Project manager:

Background: Briefly describe the background of the project

Project idea: The project idea should describe the connection between the expected benefits and the project objectives by summarizing the purpose of the project and in what sense the project contributes to it.

Project objective

Result: the result of the project
- List of the deliverables <yyyy-mm-dd>

Time: Start<yyyy-mm-dd> - End<yyyy-mm-dd>

Cost: total <xxxxxxx>
Resource costs<xxxxxxx>
Onetime costs <xxxxxxx>
Continuous costs (after implementation) <xxxxxxx>

Priority of the objective: Define the priority between the dimensions result/time/ cost.

Limitations: Clarify the project objectives by defining what is NOT included in the result, that is, the responsibilities of other projects, the orderer or the main organization.

Project organization

Steering group:

Project management:

Reference group, users:

Sub-project/Working team:
Resource plan
Name of resource 1 - % of time dedicated to project of 40h week
Name of resource 2 - % of time dedicated to project of 40h week
Name of resource n... - % of time dedicated to project of 40h week

Schedule
Decision points (critical dates):
DP1, Description <yyyy-mm-dd>, estimated costs so far xxxxxxx
DP2, Description <yyyy-mm-dd>, estimated costs so far xxxxxxx
DP3, Description <yyyy-mm-dd>, estimated costs so far xxxxxxx
DP4, Description <yyyy-mm-dd>, estimated costs so far xxxxxxx
DP5, Description <yyyy-mm-dd>, estimated costs so far xxxxxxx
DP6, Description <yyyy-mm-dd>, estimated costs so far xxxxxxx
DP7, Description <yyyy-mm-dd>, estimated costs so far xxxxxxx
DP8, Description <yyyy-mm-dd>, estimated costs so far xxxxxxx

Milestones:
Milestones 1, Description <yyyy-mm-dd>
Milestones 2, Description <yyyy-mm-dd>
Milestones n..., Description <yyyy-mm-dd>

Risks
Risk 1- Prio, description of response, description of risk
Risk 2- Prio, description of response, description of risk
Risk n...- Prio, description of response, description of risk
The interviews were held in Swedish and the interview guide was written in Swedish.

Translated interview guide:

**Theme 1. Background information**
- About us
- About the project
- Background of the assignment and use of a system
- Describe relevant terms

The interview person present itself (work role, experience, how long they worked within the organization)
- Have you worked with projects earlier? What is your relation to project?
- Have you had different roles? Project manager, member orderer
If orderer - how does the process of a project look when a project is ordered?

**Theme 2. Project work, current situation**
- Describe how a normal project is conducted? Preparation, execution and follow up
- How do you use PPS during the project process? (Do you follow PPS? Is it something that you miss when working with PPS? If not working with PPS: what are the reasons why you not use it?)
- How do you think the templates in PPS work? Do you use them? Are they too simple/complicated? When you filled in a template where do you store them?
- What computer program do you use? Are they linked?
- Is there anything you miss to control a project or improve the project process? (Is there any information that you miss during a project or any additional information that you feel would create value?)
- What areas do you believe are most important to measure to monitor and control in a project?
  - Within these areas, do you see any specific things that need to be measured?
- How much information do you consider to be reasonable to put into the system? Do you see a risk in inputting too much information?
- Would you be willing to enter the same information in multiple places?
  (eg, using the PPS template, then use the system, which is based on the same PPS template)
- What factors do you see as most important to success with a project?
- What is Ikea's overall strategies and how do they expressing in your daily work?

**Theme 3. Requirements**

Present the requirements and the aim for the different management levels.

- How would you like to see such a system would be designed?
- How do you think is the best way to report information? How should it be formed and what should a system contain for you to be use it?
- How do you think project managers perceive the system? What obstacles do you see?

**Theme 4. Other**

- Is there anything else that you feel should be included or needed to take into account in this kind of system?
- Do you have anything else you want to convey?
- Is there anyone you would recommend us to interview?