

Six Sigma Project Management

Managing Fast Track Projects at Plan & Secure
Capacity, IKEA

Acknowledgments

This master thesis concludes our Master of Science degree in Industrial Engineering and Management at the Faculty of Engineering, Lund University. The master thesis has been written at IKEA of Sweden, Älmhult, in collaboration with the Department of Industrial Management and Logistics, Faculty of Engineering, Lund University.

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Finally we would like to thank all of the employees at IKEA who have taken their time to help us and volunteered for interviews.

We hope that our project steering model will be implemented at Plan & Secure Capacity and that it will help Plan & Secure Capacity to excel in Fast Track Project execution.

Lund, January 2011

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Abstract

Title	Six Sigma Project Management - Managing Fast Track Projects at IKEA
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Keywords	Six Sigma, Project Management, Project Steering, Improvement Projects
Purpose	The purpose of the master thesis is to create a Six Sigma based project steering model for Fast Track Projects in order for Plan & Secure Capacity to be able to benefit from efficient project execution processes.
Methodology	The project is performed as a clinical research where workshops with project leaders have been held in order to test the model. The data collection is based on interviews with employees within the Plan & Secure Capacity process and on literature regarding project management and Six Sigma as well as internal documents at IKEA.
Conclusion	The analysis showed that the wished position for Fast Track Project execution at Plan & Secure Capacity, which is defined as DAIIT – Define, Analyse, Improve, Implement, Transition captures many of the ideas of best practice but does not reach it. The current situation, how Fast Track Project execution is actually conducted, is far from best practice. The project steering is mostly performed ad-hoc and there is little or no emphasis on documentation. In order for Plan & Secure Capacity to be able to reach best practice a project steering model based on the theoretical framework of Six Sigma, DMAIC (Define, Measure, Analyse, Implement, Control) and an implementation plan for how to implement the model in the most efficient way at Plan & Secure Capacity have been developed.

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1. Introduction

The purpose of this chapter is to act as a base for the rest of the master thesis. The chapter starts with an introduction of IKEA and the process of Supplying. This is followed by a description of the background of the master thesis and a presentation of the problem definition and the purpose. Finally the authors state the target audience, delimitations and provide a report outline.

1.1. IKEA

1.1.1. Company Description

IKEA was founded in 1943 by Ingvar Kamrad.¹ Since then IKEA has grown into one of the world's largest home furnishing companies, with 316 stores in 38 countries (September 2010).² IKEA has a vision of creating a better everyday life for the many people and is trying to fulfil this with the business idea of offering a wide range of home furnishings with good design and function at prices so low that as many people as possible will be able to afford them.³

The business year 2009 IKEA had a turnover of 21.5 billion Euro. Most of the sales, 80 percent, are in Europe with Germany as the largest market. IKEA has 1220 suppliers in 55 countries and 20 percent of purchasing is sourced in China.⁴

To avoid sub-optimization, IKEA wants to work as "One IKEA" which is IKEA's name for process orientation. IKEA is organised in three main processes: Creating the Home Furnishing Offer, Communicating & Selling and Supplying. IKEA is working in processes but has kept its organisational structure of functions.⁵ All employees should work in the same direction towards common goals. This would result in reduced implementation time for process improvements, reduced overall IT costs, simplified working methods and raised quality of documentation.⁶

1.1.2. IKEA Supplying

IKEA Supplying consists of four core processes, as presented in Figure 1. These processes are Purchase Development & Design Supply, Plan & Secure Supply,

¹ http://www.ikea.com/ms/sv_SE/about_ikea/facts_and_figures/index.html, 2010-09-15

² <http://franchisor.ikea.com/worldmap/interactive.html>, 2010-09-15

³ http://www.ikea.com/ms/en_IE/about_ikea/the_ikea_way/our_business_idea/a_better_everyday_life.html 2010-09-15

⁴ http://www.ikea.com/ms/sv_SE/about_ikea/facts_and_figures/index.html, 2010-09-15

⁵ Paul Björnsson, 2010-10-08

⁶ Master thesis project 1008, "Plan & Secure Supply" description p. 1

Supplier Development and Excellent Logistics for Availability. Around these four core processes, there are control processes and support processes.⁷ The master thesis will be carried out for the core process Plan & Secure Supply.



[Confidential]

Figure 1 The first level of the Supply Process

The objective of the Plan & Secure Supply process is to secure one common capacity plan for the coming 84 weeks that is accurate, agreed and executable for all business units. The plan is updated on a daily basis with a tactical revision five times a year.⁸ It also aims at optimising flows and securing an efficient implementation of the Logistics Development Plan. The outcome is to achieve excellence in operations, reduced total supply cost and have a high availability.⁹ The Plan & Secure Supply process consists of four processes: Plan Demand, Plan Supply, Plan & Secure Capacity and Plan & Optimise Supply Chain Network, as shown in Figure 2. The master thesis will be carried out for Plan & Secure Capacity.

⁷ Paul Björnsson, 2010-09-12

⁸ Paul Björnsson, 2010-10-08

⁹ Paul Björnsson 2010-09-12

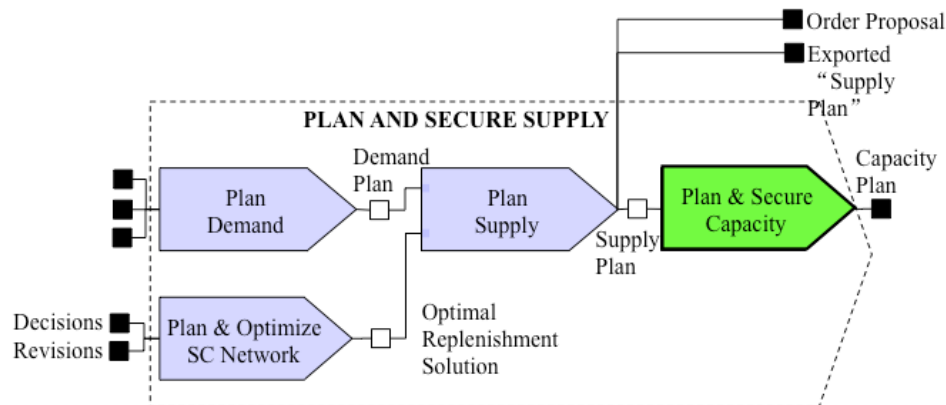


Figure 2 The Plan & Secure Supply process

The overall purpose of Plan & Secure Capacity is to create a Capacity Plan with the Supply Plan as input. Capacity has to be secured within trading, distribution centres, transport and retail.¹⁰

1.2. Problem Background

IKEA deals with availability problems in retail stores; the goods demanded by the customers are not always there when needed. An explanation for this are miscalculations in the capacity-planning phase. Even though simple problems causing the miscalculations are known to the employees they hesitate to raise them. This is because they perceive that the problems take too long to solve. The long execution times are due to problems being grouped together into large improvement projects.

Improvement projects are categorised by factors such as project execution time and budget into Global Projects, Fast Track Projects or Just-Do-It Projects. Global projects are projects that run over a longer defined time-period such as years. Fast Track Projects are projects that run for less than a year and are well scoped. Just-Do-It projects are short projects with an execution period below three months.

By performing Fast Track Projects, simple problems could be solved one by one, and not in a group, thereby the employees would see that their suggested improvements take place much faster and that would encourage them to raise problems.

The improvement project classification was implemented during 2009 and at this point only a few Fast Track Projects have been executed. This is amongst others

¹⁰ Paul Björnsson, 2010-09-12

due to the fact that there is no project steering model supporting Fast Track Projects.

IKEA has two project steering models; the PPS, Practical Project Steering, and the IPM, IKEA Project Management. The PPS is adapted for large projects hence it is rigorous and demands lots of time and resources, consequently not suited for smaller projects. IPM is instead perceived as too simple and lacks important activities. Consequently there is no project steering model suited for Fast Track Projects that would enable easier and faster execution of Fast Track Projects.

According to this background, Plan & Secure Capacity has advertised a project with the purpose of developing a project steering model for Fast Track Projects.¹¹

1.2.1. Problem Definition

To get a more efficient execution of Fast Track Projects, a standardised project steering model will be developed. To be able to develop an efficient project steering model, not being as rigorous as the PPS and not with too little support as the IPM, the Six Sigma theory is going to be used as a base. Six Sigma is chosen since it is well suited for projects solving only one problem and having a short execution time, just as Fast Track Projects.

The problems that the master thesis will solve are defined through the following questions:

- *How are Fast Track Projects managed at Plan & Secure Supply?*
 - *What is the wished position for execution of Fast Track Projects?*
 - *What is the current situation for execution of Fast Track Projects?*
- *How could the execution of Fast Track Projects be standardised in order to reach best practice?*
 - *What types of templates are needed for each step in DMAIC?*
 - *What types of checklists are needed for each step in DMAIC?*
 - *How should a manual for DMAIC be designed?*
- *How should the project steering model be implemented?*

1.3. Purpose

The purpose of the master thesis is to create a standardised project steering model for Fast Track Projects in order for Plan & Secure Capacity to benefit from efficient project execution. This will be achieved by implementing a Six Sigma

¹¹ Paul Björnsson, 2010-09-12

approach on a project steering model, adapted to fit the culture within IKEA. The deliverables of the master thesis are:

- An analysis of the Six Sigma maturity of the wished position and the current situation
- A project steering model, based on Six Sigma, for execution of Fast Track Projects
 - Checklists for each of the DMAIC phases in the Six Sigma model
 - Templates for each of the DMAIC phases in the Six Sigma model
 - Instructions on how to use checklists and templates
- A guide on how to implement the project steering model

1.4. Target Audience

The master thesis is mainly aimed for the employees in the Plan & Secure Capacity process at IKEA, since the purpose is to develop a new project steering model that should be used in future Fast Track Projects at Plan & Secure Capacity.

Our secondary target audience is students and academia who are interested in ways that the Six Sigma theory can be used in a project steering model adapted to improvement projects.

1.5. Delimitations

The master thesis is carried out for Plan & Secure Capacity, one of four processes at Plan & Secure Supply. Since only a few Fast Track Projects have been conducted at Plan & Secure Capacity, the scope is widened to consider entire Plan & Secure Supply when performing interviews. Plan & Secure Supply has been regarded since the working methods at Plan & Secure Capacity and Plan & Secure Supply are expected to be similar. At a later phase, the project steering model may be used in other parts of the Supply process, or even within other main processes at IKEA.

Since the aim of this study is to create a project steering model for Fast Track Projects the study is limited to the projects having the characteristics of those.

The model only considers the execution of improvement projects and not the scoping and qualifying of the project nor the selection and prioritisation.

1.6. Report Outline

Below follows a short summary of each chapter in the master thesis.

Chapter 1 The purpose of this chapter is to provide a background to the problem of the master thesis. The chapter also gives a brief

description of IKEA and the organisational structure of where this master thesis is performed. The purpose, delimitations and frequently used abbreviations are also presented in this chapter.

- Chapter 2 The second chapter presents the methodology used in the thesis and addresses the different forms of approaches, research choices, how to collect information and how to build arguments. Finally the credibility is discussed. The chapter is ended with a summary of the methodological choices from which the reader can get a good overview.
- Chapter 3 Chapter three is the first of two theory chapters, presenting the theories supporting project management. The general working process in a project is described as well as concepts connected to project management.
- Chapter 4 The fourth chapter introduces the background and theories of Six Sigma. It also presents how Six Sigma can be used in project management using the DMAIC – Define, Measure, Analyse, Improve, Control method.
- Chapter 5 The purpose of the fifth chapter is to provide a description of how project control at Plan & Secure Capacity is wished to be, as well as how it is performed today. The information in this chapter is based on project control documents as well as information obtained from interviews with people working at Plan & Secure Supply.
- Chapter 6 In the sixth chapter an analysis is performed in order to get describe the gap between the wished position of project management and best practice according to the Six Sigma project methodology. It also provides an analysis of the gap between the current situation and best practice. The chapter ends with a comparison of the three and their intermutual relation.
- Chapter 7 Chapter seven describes how the project steering model has been developed and explains how the model fulfils what is considered best practice according to Six Sigma.
- Chapter 8 The purpose of the eighth chapter is to provide guidance on how the developed project steering model should be implemented in the organisation in order for the current situation to reach best practice.

- Chapter 9 Chapter nine is the concluding chapter and presents the delivered deliverables briefly and discusses the advantages, disadvantages and possible improvement areas of the deliverables.
- Chapter 10 Chapter ten emphasises the Six Sigma project steering model's contribution to project management theory and Six Sigma theory.

1.7. Abbreviations

Abbreviations used throughout the thesis are listed below.

CTQ	Critical To Quality characteristics
DP	Decision Point
DAIIT	Define-Analyse-Improve-Implement-Transition
DMAIC	Define-Measure-Analyse-Improve-Control
FMEA	Failure Mode and Effect Analysis
FTP	Fast Track Project
GP	Global Project
IPM	IKEA Project Management
JDIP	Just Do It Project
PDCA	Plan-Do-Check-Act
PMO	Project Management Office
PME	Project Management and Execution
PPS	Practical Project Steering
SIPOC	Suppliers-Input-Process-Output-Customers
WBS	Work Breakdown Structure

2. Methodology

The purpose of this chapter is to present the research design and the working methods used for conducting the study. Different research techniques are presented and the authors discuss the credibility of the thesis.

2.1. Research Methodology

A study can be explorative, descriptive, explanative or normative.¹² When choosing the research form, the amount of already existing knowledge within the field of study is essential.¹³ An explorative study is used when there is little existing knowledge in the field of study. A descriptive study is used when there exists knowledge of the subject and the purpose is to describe the characteristics of the research object, but not to explain relations. An explanative study is used when searching for a deeper understanding of a subject and when the purpose is both to describe and explain. Usually explanative studies answer questions such as “why?”. The normative study is used when there is some knowledge and understanding about the subject, with the purpose of guiding and suggesting arrangements.¹⁴

2.1.1. Choice of Research Methodology

In this master thesis both a descriptive and a normative study will be performed. The descriptive study will be used to explain the current working methods within improvement projects. To suggest new working methods and give guidance for further improvements, a normative approach will be used.

2.2. Methodological Approach

Differing personal opinions affect the view of knowledge, and this is often affecting the different goals for the research. There are three different methodological approaches; analytical, systems and the actors approach.¹⁵

2.2.1. Analytical Approach

Performing analytical research means that the researcher wants to explain the reality in an as unbiased way as possible. Biased opinions are not considered and

¹² Björklund, M and Paulsson, U (2003) *Seminarieboken – att skriva, presentera och opponera*, p. 58

¹³ Wallén, G (1996) *Vetenskapsteori och forskningsmetodik*, p. 46

¹⁴ Björklund, M and Paulsson, U (2003) p. 58

¹⁵ Björklund, M and Paulsson, U (2003) p. 59

the knowledge is independent from the observer. Reality is viewed as an entirety, which can be split up into pieces where the sum of the pieces is equal to the entirety.¹⁶ A researcher using the analytical approach is trying to explain an effect by finding the underlying cause. This means that the more evidence the better explanation of the reality.¹⁷

2.2.2. Systems Approach

The systems approach is a complementary approach, often referred to as holistic or top down approach. Using the systems approach means that the researcher wants to explain the reality both in a biased and an unbiased way. In this approach, the total is separated from the parts and is often more than the sum of all parts, e.g. that $2+2+2=7$ and therefore the sum is more valuable than the components.¹⁸ The researcher tries to analyse connections and relations between the different parts in order to understand the underlying factors of certain behaviour. Synergy effects are essential and the relations between parts are often as important as the parts themselves.¹⁹

2.2.3. Actors Approach

In the actors approach the assumption is that reality is a social construction that is affecting people and that the people are affecting reality. The description of the reality is therefore dependent on the researchers' experiences.²⁰

2.2.4. Choice of Methodological Approach

The systems approach is chosen since the analysis of how Fast Track Projects are conducted and development of the project steering model will be decomposed in different stages e.g. the Define, Measure, Analyse, Improve and Control phases which will be studied separately. Thereafter the analysis and the model will be put together as an entirety.

2.3. Scientific Research

Three different scientific approaches have been regarded as possible for the master thesis; clinical research, action research and case study. The clinical research and action research have been considered since they both have a practical approach and

¹⁶ Björklund, M and Paulsson, U (2003) p. 59

¹⁷ Arbnor, I and Bjerke, B (1998) *Företagsekonomisk metodlära*, p. 72

¹⁸ Arbnor, I and Bjerke, B (1998) p. 73

¹⁹ Björklund, M and Paulsson, U (2003) p. 59

²⁰ Björklund, M and Paulsson, U (2003) p. 59

are often used in improvement projects. The case study has been considered since it is used when a certain situation is studied thoroughly.

2.3.1. Clinical Research

In a clinical approach an organisation has identified a problem that they need help solving and therefore they turn to a researcher. The clinical approach differs from the consulting role by using a theoretical frame to solve problems compared to the more practical approach used by consultants.²¹ It is mostly used for improvement projects and the researcher is participating in the project.²² The research is conducted simultaneously with the improvement project, which makes it possible to continuously test the results from the research. The clinical research is also characterised by a continuous dialogue between the researcher and the studied organisation.²³

2.3.2. Action Research

Action research is normally used in cases when a problem, that is dependent on a certain event or a very complex problem, is faced. A characteristic for action research is that not only the root and cause is being studied but also the process in between. This makes it easier to understand the interaction between different variables.²⁴ Also in action research the research is conducted simultaneously with the improvement process, and it has a repetitive nature with feedback processes that involve the people in the organisation being improved.²⁵ The major difference between action research and the clinical approach is that in action research the researcher discovers a problem in an organisation that has to be solved and then initiates it instead of the organisation discovering the problem and initiating the improvement by contacting a researcher.²⁶

2.3.3. Case Study

In a case study a specific entity is analysed in detail. This makes it possible to draw conclusions about certain matters that would not have been identified in a more shallow analysis. The case study is therefore often used when facing a complex situation that would not be possible to understand without a thorough analysis. The

²¹ Sköld, M (2007) *Synergirealisering: Realisering av produktsynergier efter företagssammanslagningar*, p. 62

²² Karlsson, C et al. (2009) *Researching Operations Management*, p. 6

²³ Sköld, M (2007) p. 62-66

²⁴ Wallén, G (2000) p. 111-115

²⁵ Denscombe, M (2009) *Forskningshandboken – för småskaliga forskningsprojekt inom samhällsvetenskaperna*, p. 169-170

²⁶ Sköld, M (2007) p. 62

case study can be used with different purposes e.g. to describe, explore, compare, explain or illustrate a situation, as described in Chapter 2.1.²⁷ The case study is closely related to action research and clinical research. The major difference is that the case study does not have the same emphasis on improvements and that the researcher is not participating in the environment being studied.²⁸

2.3.4. Choice of Scientific Research

Collaterally with the master thesis there will be an ongoing improvement project on which the authors will apply and test their theories. This situation means that the authors will be participating in the project. Since the master thesis is initiated by IKEA, the study is categorised as a clinical research.

Due to external circumstances it has however not been possible to test the model on an on going improvement project. Instead workshops have been held with project leaders who have evaluated the model, meaning that the model has been tested in another way than planned but that a clinical research still has been performed.

2.4. Qualitative and Quantitative Analysis

Data can be classified either as qualitative or quantitative. Which type of analysis to perform e.g. what type of data to collect, depends on the purpose of the study.

2.4.1. Qualitative Analysis

The purpose of a qualitative analysis is to explore an event through words and descriptions.²⁹ It is used when trying to understand dimensions, implications and variations at a certain event.³⁰ In a qualitative analysis many variables are being analysed from a small number of respondents.³¹ The result from a qualitative study is based on the researchers' interpretations and therefore it is very important that the researcher is aware of his or her attitudes so that the evaluations can be unbiased. The major advantages of using a qualitative analysis are that the theory will be well established in reality, that the data is detailed and that there is a tolerance for ambiguity and contradictions. The disadvantages are that the data might not be truly representative and that the explanations might be too simplified.³²

²⁷ Denscombe, M (2009) p. 59-63

²⁸ Wallén, G (2000) p. 115

²⁹ Lekvall, P and Whalbin, C (2008) *Information för marknadsföringsbeslut*, p. 213

³⁰ Starrin, B and Svensson, PG (2006) *Kvalitativ metod och vetenskapsteori*, p. 23

³¹ Darmer, P and Freytag, P (1999) *Företagsekonomisk undersökningsmetodik*, p. 125

³² Denscombe, M (2006) p. 244, 259-261

2.4.2. Quantitative Analysis

The purpose of a quantitative analysis is primarily to investigate relationships between different events and to investigate how different events and features are distributed within e.g. a population.³³ Unlike the qualitative analysis the quantitative method is using a small number of variables and is drawing conclusions about them by interviewing a large representative sample.³⁴ Since the quantitative analysis is based on numbers, results can easily be displayed in diagrams and tables. The numerical approach makes it easier to handle a large number of data. The disadvantages when using the quantitative approach is that there is a risk that the analysis techniques are not used in the correct way, that the interpretations are wrong and it might also be difficult to secure that the data collected is of good quality.³⁵

2.4.3. Choice of Qualitative and Quantitative Analysis

A qualitative analysis will be performed since relevant data will be collected through a relatively few numbers of interviews. A qualitative analysis is chosen since it thorough interviews will be the most valuable source of information when analysing the current situation and developing the project steering model.

2.5. Data Collection

When collecting data it is important to differentiate primary data and secondary data. Primary data is data that has been collected from the original data source by the researcher while secondary data is data that already has been collected and interpreted by somebody else.³⁶

In this master thesis both primary and secondary data will be used. For the chapters covering the theoretical framework secondary data will be used. Secondary data will also be used in order to understand the wished position of Fast Track Project execution at Plan & Secure Capacity. Primary data will be collected in order to get information on how Fast Track Projects actually are executed at Plan & Secure Capacity.

³³ Starrin, B and Svensson, PG (2006) p. 23

³⁴ Darmer, P and Freytag, P (1999) p. 124

³⁵ Denscombe, M (2006) p. 208, 240-241

³⁶ Bell, J (2010) *Introduktion till forskningsmetodik*, p. 125

2.5.1. Literature Study

In a literature study different types of written material is used. The literature study is an iterative process that lasts during the entire study. The process consists among others of deciding key words, literature searching, selection, evaluation and compilation.³⁷ Literature is classified as secondary data and it is therefore important to keep in mind that the literature collected can be biased and therefore it should be read critically.³⁸

2.5.2. Interviews

There are five different types of interviews and they can be structured on three different levels.

The different types of interviews are descriptive interviews, deep interviews, goal-oriented interviews, deepening interviews and focused interviews. Descriptive interviews are generally used in the beginning of a process to get a first understanding of e.g. an event. Deep interviews are conducted to get a deeper understanding of a specific event. Goal-oriented interviews are performed to get an understanding of a specific subject for which a direct question is asked. Deepening interviews are conducted during the data handling to get information that is lacking. Focused interviews treat several different themes during one interview occasion.³⁹

The three different levels of interviews are structured, semi-structured or unstructured. In a structured interview there is a thorough questionnaire and the interviewer makes sure that the respondent answers all questions. In a semi-structured interview the interviewer has a checklist with topics and related questions that should be discussed during the interview in a non-specified order. In an unstructured interview the interviewer is mostly listening to what the respondent has to say about a certain topic and follows up with questions on subjects that the interviewer finds interesting.⁴⁰

2.5.3. Authors' Choice of Data Collection

Literature Study

The literature that is going to be collected is non-fiction literature concerning Six Sigma, Lean Six Sigma, Project Management and other theories that are relevant

³⁷ Höst, M, Regnell, B and Runeson, P (2010) *Att genomföra examensarbete*, p. 59-60

³⁸ Björklund, M and Paulsson, U (2008) p. 67

³⁹ Darmer P, and Freytag P (1999) p. 253-255

⁴⁰ Darmer, P and Freytag, P (1999) p. 255-257

for the development of the working method. The literature study will also regard internal documents concerning e.g. project management and working methods used at Plan & Secure Capacity.

Interviews

To get an idea of how Fast Track Projects are executed descriptive interviews will be used in the beginning. During the data collection phase a mixture of deep interviews and goal-oriented interviews will be performed, depending on the respondent and the objective of the interview. During the analysis phase, deepening interviews will be used to help clarify aspects that still are not clear. Since the respondents have different backgrounds, positions and perspectives it would be difficult to conduct a structured interview. An un-structured interview on the other hand would not ensure that the important topics would be covered; therefore semi-structured interviews will be performed.

The respondents that have been interviewed have different backgrounds. Some of the respondents have been working in both Fast Track Projects and Global Projects, some have only worked in Fast Track Projects and two respondents have not been working in any project but are responsible for project management methodology within IKEA. The respondents have been chosen carefully and with the aim of getting many different perspectives on Fast Track Projects and project management methodology at Plan & Secure Capacity.

2.6. How arguments are built

There are usually three sets of logics when performing research. The approach could be either inductive or deductive; the discovering or the proving path, or a combination of both; abduction.⁴¹

2.6.1. Deduction

The most frequently used and most structured research method is deduction. The deductive approach describes a research method with the starting-point in theory. The hypothesis is consequently formed with theory as a base, which is tested empirically for verification. Conclusions are then drawn from existing theory.⁴²

⁴¹ Holme, I M and Solvang, B K (1997) *Forskningsmetodik – Om kvalitativa och kvantitativa metoder*, p. 51

⁴² Björklund, M and Paulsson, U (2003) p. 62

2.6.2. Induction

The opposite of deduction is the inductive approach. Induction is used when observations and results collected from reality act as a frame of reference. This means that no theoretical studies are performed beforehand; instead the collected material acts as a base for making general and theoretical conclusions.⁴³ The inductive approach has been criticised among scientists since the theory does not include anything more than what is already in the empirical material.⁴⁴

2.6.3. Abduction

Abduction uses both the deductive and inductive approaches, switching between theory and reality.⁴⁵ This means that abduction is a combination of the deductive approach, where relations are investigated by varying many variables and analysing the effects afterwards and the inductive approach where the effect is known and the underlying factors of it are analysed, without the possibility of varying the factors.⁴⁶ The relation between induction, deduction and abduction is illustrated in Figure 3 below.

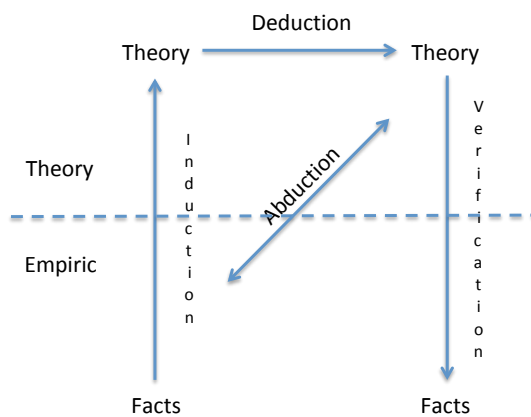


Figure 3 The inductive and deductive approach,⁴⁷ abduction added by the authors

⁴³ Björklund, M and Paulsson, U (2003) p. 62

⁴⁴ Wallén, G (1996) p. 47

⁴⁵ Björklund, M and Paulsson, U (2003) p. 62

⁴⁶ Wallén, G (1996) p. 48

⁴⁷ Arbnor, I and Bjerke, B (1998) p. 107

2.6.4. Choice of Argumentation

A deductive approach will be used for the study since the authors will study relevant theory in order to develop a working method adapted for the industry.

2.7. Credibility

Credibility refers to the authenticity of a source or a message. To ensure the credibility of a study different factors can be evaluated; validity, reliability and objectivity. In all studies, a high validity, reliability and objectivity are desirable but must be put in relation to the cost of obtaining these.⁴⁸

2.7.1. Validity – Analytical Point of View

Validity is to what extent a study is able to scientifically answer the questions it is intended to answer.⁴⁹ Validity can be interpreted in two ways. When regarding a test, validity refers to what is really measured. When concerning a result, it refers to if the result really reflects reality.⁵⁰ Controlling validity can only be done indirectly since the only way to control it directly is if the truth already is known. In that case it would be meaningless to control it since it would mean that the already known truth would be controlled to see if it really is the truth.⁵¹

A high validity for a study can be obtained by using different perspectives. One example is by using triangulation. Another way of increasing validity is to ask clear questions in interview situations and make sure that the questions are not biased.⁵²

2.7.2. Reliability

Reliability concerns accuracy of the results, e.g. if the same results would be obtained if the tests are performed again. Reliability can be increased using control questions in questionnaires and interviews and also by triangulation. The reliability can be measured or controlled by repeating the test.⁵³ In the case of living creatures, as humans, a measurement or test cannot be repeated to ensure reliability since there is a possibility that the test object has been influenced, which changes

⁴⁸ Björklund, M and Paulsson, U (2003) p. 59

⁴⁹ Björklund, M and Paulsson, U (2003) p. 59

⁵⁰ Arbnor, I and Bjerke, B (1998) p. 249

⁵¹ Arbnor, I and Bjerke, B (1998) p. 250

⁵² Björklund, M and Paulsson, U (2003) p. 59

⁵³ Arbnor, I and Bjerke, B (1998) p. 250

the starting position.⁵⁴ A general definition is that reliability should be independent from random failures.⁵⁵

Reliability and validity can be resembled with a dartboard. If the hit rate is concentrated but dislocated from the centre, the reliability is high but the validity is low. A hit rate that is spread all over the dartboard is neither of high validity nor reliability. When a hit rate is both centred and concentrated, the test has high reliability and validity.⁵⁶ An illustration of the phenomena is presented in Figure 4.

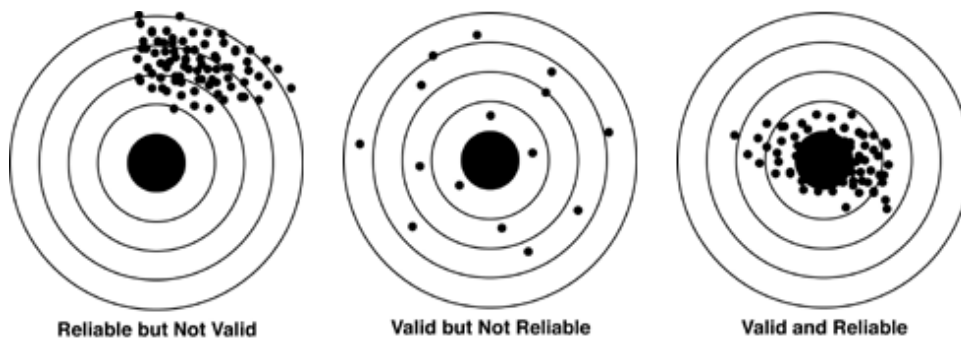


Figure 4 Illustration of validity and reliability⁵⁷

2.7.3. Objectivity

The objectivity is to what extent the inherited values of the researchers affect the research. By clearly explaining and motivating the choices made by the researchers in the study, the reader gets the possibility to evaluate the study's result and hence, increase the objectivity of the research.⁵⁸

2.7.4. Criticism of Sources

It is important to have a critical point of view towards references to ensure an as unbiased study as possible. Acknowledging the critique in the thesis also makes the reader aware of them.

⁵⁴ Wallén, G (1996) p. 66

⁵⁵ Wallén, G (1996) p. 67

⁵⁶ Björklund, M and Paulsson, U (2003) p. 60

⁵⁷ Björklund, M and Paulsson, U (2003) p. 60

⁵⁸ Björklund, M and Paulsson, U (2003) p. 59

2.7.5. The Credibility of the Master Thesis

Validity

The validity of the master thesis has been ensured by posing clear, unbiased, questions to the respondents. The validity has also been secured by making a summary of the interview that has been sent to the respondent for approval in order to make sure that the interviewers have understood the respondent correctly.

Reliability

IKEA is a dynamic organisation where working routines change and differ between projects, which means that if the study would be repeated other results would probably be obtained, however the general conclusions would probably be similar. The reliability has been ensured by using control questions during the interviews. Reliability has also been secured by having two interviewers at each interview, which has decreased the risk of biased interviews.

Objectivity

Objectivity has been ensured by not letting any of the authors' personal opinions affect the study. The authors do neither have any prior engagement with IKEA that could affect the result of the thesis. The objectivity in the theoretical frame has been ensured by using different literature originating from different references.

Criticism of Sources

Only a few Fast Track Projects have been conducted at Plan & Secure Capacity at this point of time. Therefore interviews have also been conducted with employees not having experience of Fast Track Projects but who have experience of smaller projects. Since no project steering model is actually used in Fast Track Projects or in smaller projects one has to take into account that there is probably as many different ways of controlling projects as there are project managers at Plan & Secure Capacity. Since a large number of interviews have been conducted and similarities in project control have been identified the authors are of the opinion that they have however been able to capture a general way of project control at Plan & Secure Capacity.

For the theoretical framework references suggested by the university have been used. They should therefore be considered reliable. Literature recommended by IKEA has also been used. The literature recommended by IKEA is widely accepted so there are no suspicions that it would not be reliable.

2.8. Methodological choices

The methodological choices made by the authors are summarised below.

- Research methodology – Descriptive and normative study
- Methodological approach – Systematic approach
- Scientific research – Clinical research
- Analysis approach – Qualitative analysis
- Data collection will primarily consist of a literature study and interviews
- A deductive approach will be used since the study will start in the theory and be applied on the industry.

3. Project Management

Chapter three is the first out of two chapters describing the theoretical framework of the master thesis. This chapter covers the project management theory and the general project steering model and its components.

3.1. Project and Project Management Definition

A project is a task that is performed by a temporary organisation in order to achieve a predetermined result. Projects are not limited in size or in persons involved but are always temporal and have a clear start and a clear end.⁵⁹ Projects can be used for different kinds of assignments, but most commonly they are used for realising visions or business goals.⁶⁰ It is important to have a clear distinction between the project activities and the line organisation activities to ensure that there is no confusion about who performs what.⁶¹

Working in projects requires project management but it is often ignored.⁶² However organisations that use project management experience better customer relationships, shorter development times, higher reliability and a clearer orientation towards goals.⁶³

For well functioning project management it is important to have a supporting function, generally called a Project Management Office (PMO). The PMO is responsible for developing and administrating project methodology. It should have a resource and competence centre where education as well as administrative support is offered. The PMO is also responsible for distributing the results and experiences from finished projects to the rest of the organisation.⁶⁴

3.2. Project Methodology

A project methodology consists of processes, roles and templates and is usually formed as a project steering model. The aim of a project methodology is to provide a governance structure that enables project control but that at the same time is not

⁵⁹ Tonnquist, B (2008) *Projektledning*, p. 5

⁶⁰ Tonnquist, B (2008) p. 10-12

⁶¹ Tonnquist, B (2008) p. 6-7

⁶² Eriksson, M and Lilliesköld, J (2007) *Handbok för mindre projekt*, p. 3

⁶³ Meredith, J and Mantel, S (2010) *Project Management – A Managerial Approach*, p. 13

⁶⁴ Tonnquist, B (2008) p. 6-7

being too limiting. Research shows that it often is the lack of a project methodology that is the reason for project failure.⁶⁵

For a project steering model to be used it is important that the model is as simple as possible and that the working methods provided in the model are well established. The working methods can be established by internally market the project steering model and by educating the employees in how to use the model.

It is important that the project methodology provides a clear distinction between which problems should be solved through a project, using the project steering model, and which should be classified as organisational tasks, not using the project steering model. Criteria for when a problem should be solved through a project can e.g. be a certain execution time or budget level.⁶⁶

3.3. The Generic Project Steering Model

The generic steering project model consists of four phases; Pre-study, Planning, Implementation and Conclusion. In the Pre-study the prerequisites of the project are analysed and the task is specified. The Planning consists of producing a detailed plan on how to realise the project. In the Implementation the actual work is performed. In the Conclusion the project is evaluated, terminated and a follow-up of the project goals, customer perception of the project and benefits of the project is performed.⁶⁷ In all phases there are check-up points, milestones and gates, which should be approved before moving on to the next phase.⁶⁸ An illustration of the general project process is presented in Figure 5.



Figure 5 The Project Process

Except from the generic project steering model there are a number of different project steering models on the market. What distinguishes the project steering

⁶⁵ Tonnquist, B (2008) p. 329

⁶⁶ Tonnquist, B (2008) p. 330-332

⁶⁷ Tonnquist, B (2008) p. 15

⁶⁸ Eriksson, M and Lilliesköld, J (2007) p. 8

models from each other are the different number of phases and the titling – the structure and the content is quite similar in all models.⁶⁹

3.3.1. Pre-study

The Pre-study answers questions such as; is the problem definition correct? Is the project result desired? Are the prerequisites to start the project fulfilled? The Pre-study should result in a pre-study report, which acts as the decision basis for proceeding with the project, or not.

Pre-study Report

The Pre-study Report should include an analysis of the project background and a definition of the purpose and goals of the project as well as the scope and prerequisites of the project. The stakeholders have to be identified and it is important to make sure that the stakeholders' requirements are aligned with the project goals. A current state analysis should also be conducted using e.g. a SWOT analysis. Using the results from the analyses a solution proposal can then be established. With the solution proposal as a base, a profitability analysis and a first draft of the project plan should be performed. The analyses conducted in the pre-study should finally be compiled in a pre-study report.⁷⁰

3.3.2. Planning

A well-defined plan is a key success factor. The Planning phase should include a time plan, resource plan, project plan, a budget and a risk analysis. How to create a time plan, project plan and a risk analysis is discussed below.⁷¹

Time Plan

A Time Plan could be based on breakdown planning. A prerequisite to the breakdown planning is a Pre-study Report or a project specification, and that the project goals are measurable. The breakdown planning follows 7 steps:

- *Conduct a Work Breakdown Structure (WBS)* – A WBS is a systematic breakdown of the project into smaller parts. The result is illustrated in a hierarchical diagram.
- *Identify work tasks* – When the WBS has been created; work tasks to each activity are identified. These work tasks act as a base for the distribution of work.

⁶⁹ Tonnquist, B (2008) p. 16

⁷⁰ Tonnquist, B (2008) p. 33-35

⁷¹ Eriksson, M and Lilliesköld, J (2007) p. 23

- *Identify dependencies* – Decide what activities need to be performed before another.
- *Make a time estimation of the length of the project*
- *Identify the critical path* – The longest line of dependent activities, and also the shortest possible execution time of the project.
- *Allocate resources* – Assigning work tasks and responsibilities, allocating material.
- *Make a Gantt chart* – Shows how the activities of the project are connected.⁷²

Project Plan

The Project Plan includes defining the problem to be solved, the timeframe, the resources available and the team members. It is regarded as the contract, between the project leader and the sponsor, defining how the team will conduct the project. The Project Plan is completed during the planning phase and should be accepted by the sponsor before the implementation phase.

A common disposition in a Project Plan is illustrated below:

- *Background* – Describing the problem.
- *Goals* – The goals should be measurable, as precise as possible and accepted by all team members.
- *Organisation* – All project team members and contact details and responsibilities should be listed.
- *Project model* – The project model should define the phases of the project with gates, milestones and dates connected to these. Every phase should have a goal which, when completed, should put the project closer to the final result.
- *Risk judgement* – Short description of risks connected to the project and a contingency plan
- *Handling of documents* – Describes how project documentation should be stored.
- *Attachments* – Attachments to the project plan usually include the time plan.⁷³

⁷² Eriksson, M and Lilliesköld, J (2007) p. 24-34

⁷³ Eriksson, M and Lilliesköld, J (2007) p. 35-40

Risk Analysis

A risk is an occurrence with a negative outcome and it has a source and if it occurs also a consequence. There are many different methods for identifying risks. One method is the minimum risk method, which aims at identifying risks within certain delimitations. The method consists of two phases: first it ranks the risks by regarding the potential effect of the risk and the probability of occurrence then the appropriate way of avoiding or controlling the risks is decided upon.⁷⁴

3.3.3. Implementation

In the Implementation phase the actual problem is being solved.

Project Follow-ups

It is important to conduct continuous follow-ups during the project execution in order to be able to inform the stakeholders about the project progress. Follow-ups are conducted on the project plan and on the risk analysis. All projects deal with the triple constraint; time, cost and performance, further described in 3.4 Concepts within Project Management, which are also important to follow-up.

The project status is summarised into a report with an updated time plan, which is distributed to the sponsor. The focus of the report should be the changes from the original project plan.⁷⁵

Communication and Information

It is important that the project goals are clearly understood by the stakeholders and this is best ensured using communication. It is also important with communication in order to ensure that the right information is available to all stakeholders.

The easiest way of sharing information is by using an open database. Some information can be confidential but to as a large extent as possible the information should be accessible to all stakeholders.⁷⁶

3.3.4. Conclusion

The project Conclusion starts when the project result has been delivered. The purpose of the Conclusion is to ensure that the project result is the desired and that the experiences from the project are documented and transferred to the organisation. The Conclusion phase ends with project closure.

⁷⁴ Eriksson, M and Lilliesköld, J (2007) p. 42

⁷⁵ Eriksson, M and Lilliesköld, J (2007) p. 65-69

⁷⁶ Eriksson, M and Lilliesköld, J (2007) p. 52

Final Project Report

The Final Project Report consists of a summary of the project's performance and experiences. The Final Project Report usually includes the following topics:

- *General summary* – A short summary of how the project has proceeded, what results have been achieved, the difference between planning and outcome and eventual problems and how they have affected the project.
- *Goal follow-up* – Summarises what goals were achieved and what goals were not.
- *Experiences and improvement proposals* – Experiences are listed and discussed. It is important to describe what went well and what went wrong and why. An appropriate way of distributing the experiences to the rest of the organisation should also be identified.
- *Summarisation of the time and resource planning* – A Follow-up if tasks were finished on time and on budget.⁷⁷

3.4. Concepts within Project Management

There are plenty of concepts used in project management models. Some of the most important ones are presented below.

Resources

Resources can be material or personnel. When a project is started the need of material and personnel resources should be specified.

⁷⁷ Eriksson, M and Lilliesköld, J (2007) p. 70-73

The Triple Constraint

Project management includes controlling the resources for a project regarding time, cost and performance, which often are limited resources of the project. The three factors are connected, meaning that if one is changed, at least one of the other two will be changed as well. The three constraints and their relationship can be symbolised by a triangle, illustrated in Figure 6 below.⁷⁸

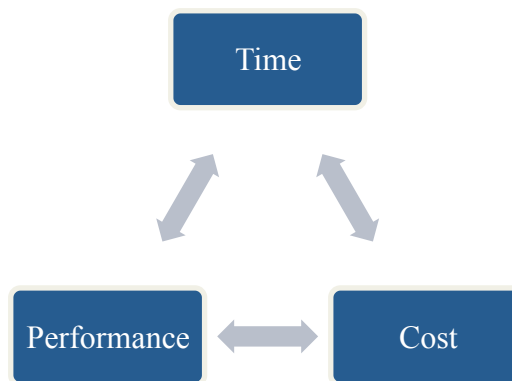


Figure 6 The Triple Constraint⁷⁹

Milestones and Inchstones

A milestone is a pre-decided check-up date when a certain result should have been achieved. A milestone should be connected to a goal that can be easily measured. Milestones ensure that results essential for the success of the project are identified and fulfilled on time.⁸⁰ For a more detailed planning inchstones can be used in between milestones. Inchstones are subtasks with defined deliverables and delays the project if not completed on time. They are used to help detecting delays early on in order to be able to take corrective measures.⁸¹

Project Gates

A follow-up of a project is called a project gate. The gate offers an opportunity for the project sponsor to evaluate the project's result up to this point. The evaluation indicates if the project goals can be achieved both in a short and long term

⁷⁸ Eriksson, M and Lilliesköld, J (2007) p. 12

⁷⁹ Eriksson, M and Lilliesköld, J (2007) p. 12

⁸⁰ Eriksson, M and Lilliesköld, J (2007) p. 13

⁸¹ Barba, M D (2008) p. 58-61

perspective. A project can be closed at a project gate if the goals no longer are reachable or if there are not enough resources to finish the project.⁸²

There are different classifications of project gates. They can be either rigid or flexible. For a rigid gate all deliverables must be completed before the project can move on. Flexible gates can be divided into permissive gates and permeable gates. For permissive gates the project can move on even though some deliverables are not yet completed, there should however be limited time left for completion. For permeable gates tasks having long lead times may be authorised to start even though not all deliverables have been delivered, while some tasks have to wait for authorisation and could end up never being authorised.⁸³

Stakeholders

A stakeholder is someone who is affected by the project result and therefore has some kind of interest in the result. In small projects it is usually easy to identify all stakeholders, but in large projects they become harder to identify since large projects affect a greater number of stakeholders. Regardless of the number of stakeholders or who they are, it is important that all stakeholders are reached by correct information regarding the project.⁸⁴

Sponsor

The sponsor is the person ordering the project and is also responsible for allocating resources to the project. The sponsor and the project receiver do not have to be the same person.⁸⁵

⁸² Eriksson, M and Lilliesköld, J (2007) p. 14

⁸³ Bertil Nilsson, 2010-12-20

⁸⁴ Eriksson, M and Lilliesköld, J (2007) p. 18

⁸⁵ Tonnquist, B (2008) p. 15

4. Six Sigma

In this chapter Six Sigma theories and models are presented. The purpose of the chapter is to provide a background for understanding what is considered important from a Six Sigma perspective when developing a project steering model.

4.1. The Background of Six Sigma

4.1.1. The Concept

Six Sigma is one of the most ambitious improvement programs initiated in the western countries and has in some areas become a standard for improvement work.⁸⁶ The three main components of Six Sigma are result-oriented leadership infrastructure and competence and problem solving methodology.⁸⁷ Six Sigma has five focus areas which acts as a basis for improvements, these are presented below:

- Understand and reduce variations
- Make improvements from customer needs and expectations
- Understand the underlying process
- Identify and solve chronic problems
- Focus on achieving measurable results⁸⁸

4.1.2. The History

Six Sigma is not a completely new way of thinking but instead a result of many years of working with improvements in different ways.⁸⁹ The Six Sigma framework was developed at Motorola in the 1970's as a response to their poor product quality. To deal with the poor quality the customers were focused upon and managers at all levels were educated in quality improvement. The many improvement projects that were launched resulted in good results and therefore more resources were put on improvement projects. In 1986 an improvement organisation was launched with a clear infrastructure, common problem solving techniques and education, the improvement organisation was named Six Sigma.⁹⁰

⁸⁶ Sörqvist, L and Höglund, F (2007) *Six Sigma – Resultatorienterat förbättringsarbete som ger ökad lönsamhet och nöjdare kunder vid produktion av varor och tjänster*, p. 7

⁸⁷ Sörqvist, L and Höglund, F (2007) p. 31

⁸⁸ Sörqvist, L and Höglund, F (2007) p. 27-31

⁸⁹ Sörqvist, L and Höglund, F (2007) p. 10

⁹⁰ Sörqvist, L and Höglund, F (2007) p. 10-12

4.1.3. Six Sigma Statistically

Motorola formed the model behind Six Sigma using standard deviation from statistical theory. The name Six Sigma originates from the Greek letter sigma which is used for symbolising standard deviation.

The performance of a process can be decided by analysing its usefulness. Usefulness is defined as the relation between the tolerance width and its spread. Using the Six Sigma model the tolerance width should be ± 6 standard deviations and the spread should not shift more than $1,5$ standard deviation in any direction, illustrated in Figure 7. This corresponds to a maximum of 3,4 parts per million failures when using Six Sigma. The model is however more of a philosophy than an actual goal of having less than 3,4 failures per million error possibilities.⁹¹

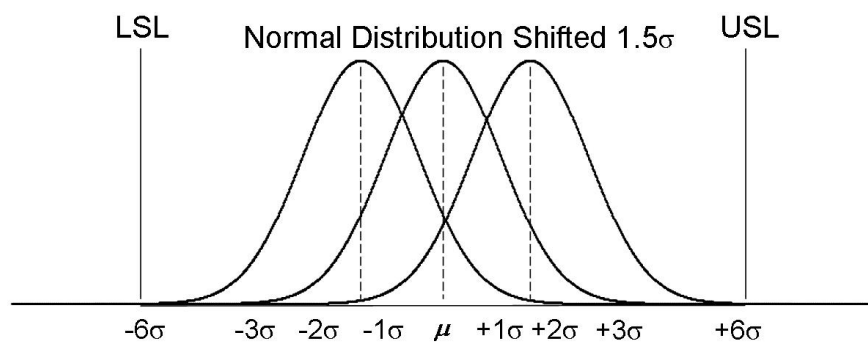


Figure 7 The model behind the name Six Sigma⁹²

4.2. Six Sigma in Service Industry

Six Sigma has historically been regarded as a model used only in manufacturing but lately a Six Sigma model adapted to service industry has been developed, consequently Six Sigma is used more and more in the service industry. The most demanding task when implementing Six Sigma in service industry is that the service processes usually are difficult to measure. To make it easier to apply Six Sigma in service processes it is therefore very important to clearly specify and concretise the process, in order to be able to measure it, before applying the model.⁹³

⁹¹ Sörqvist, L and Höglund, F (2007) p. 28

⁹² <http://www.smartersolutions.com/blog/forrestbreyfogle/wp-content/uploads/2009/02/34ppm-graphic81.jpg>, 2010-10-11

⁹³ Sörqvist, L (2008) *Ständiga förbättringar*, p. 128-129

In manufacturing it is common that the improvement project is initiated by an analysis of an internal process whereas in service industry it is usually initiated by customer needs. The service processes are usually on a lower maturity level than manufacturing processes. Because of the lower maturity level it is common that the service processes are not only improved but also developed when applying Six Sigma. Another characteristic of the service adapted Six Sigma model is that the critical-to-quality characteristics usually interact directly with the critical-to-customer characteristics, which is not the case in the manufacturing oriented processes.⁹⁴

4.3. Different roles within Six Sigma

For a Six Sigma project to be successful it is important that management is showing their support for the project. It is therefore very important that management is visible and that they are showing what they want by action and not only by words.⁹⁵ It is also important that management is communicating the reasons for deploying Six Sigma.⁹⁶ Applying Six Sigma efficiently requires not only a strong management but also different roles. The most common roles are the different coloured belt roles and the Champion. The roles are divided into five different hierarchal levels as illustrated in Figure 8. The levels are dictated according to the employees' amount of knowledge in Six Sigma and their responsibilities within the improvement project.⁹⁷

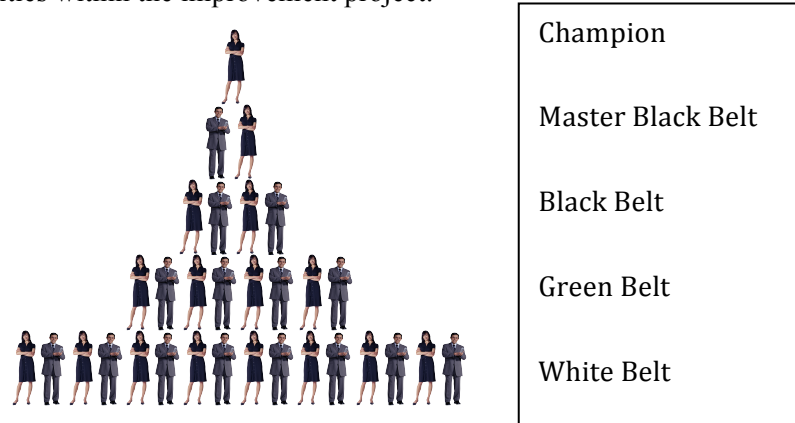


Figure 8 The roles within Six Sigma⁹⁸

⁹⁴ Magnusson, K Kroslid, D and Bergman, B (2007) *Six Sigma - The Pragmatic Approach*, p. 143-148

⁹⁵ Sörqvist, L (2008) p. 143-145

⁹⁶ Magnusson, K Kroslid, D and Bergman, B (2007) p. 80-88

⁹⁷ Magnusson, K, Kroslid, D and Bergman, B (2007) p. 37

⁹⁸ Magnusson, K, Kroslid, D and Bergman, B (2007) p. 39

A Champion generally leads the Six Sigma steering committee and is a member of the senior management team. Champions are involved in the process of choosing which improvement projects to implement and are ensuring that projects are started and executed.⁹⁹

The main task of Master Black Belts is to be a supporting function for the Black Belt and Green Belt. Master Black Belts support by teaching, acting breakthrough experts and coaches for the Black and Green Belts.¹⁰⁰

Black Belts are considered to have the most important role for the day-to-day execution of improvement projects. They generate Six Sigma projects and are project managers for large cross-functional projects.¹⁰¹ Black Belts are also coaching Green Belts with small and local projects and are used as specialists within Six Sigma.¹⁰²

The main task for Green Belts is to apply Six Sigma tools on improvement projects. This is done either as project leaders for small or as improvement project members.¹⁰³ Green Belts also identify and recommend improvement projects and teach Six Sigma to local teams.¹⁰⁴

The White Belt concept is not very common but the organisations using it are referring to operators, clerks and frontline staff in improvement projects.¹⁰⁵

4.4. Identify, Prioritise and Select Improvement Projects

4.4.1. Identify Projects

In order to identify an improvement project an activity with possible improvement potential has to be identified.¹⁰⁶ In order to identify improvement areas it is important to gather information about the current situation using measurements, evaluations and analyses. Important sources of information when looking for improvement areas are secondary data, information from employees, information from customers and benchmarking.¹⁰⁷

⁹⁹ Magnusson, K, Kroslid, D and Bergman, B (2007) p. 38

¹⁰⁰ Pyzdek, T (2003) *The Six Sigma Handbook – Revised and Expanded*, p. 40

¹⁰¹ Magnusson, K, Kroslid, D and Bergman, B (2007) p. 39-40

¹⁰² Sörqvist, L (2008) p. 189-190

¹⁰³ Magnusson, K Kroslid, D and Bergman, B (2007) p. 39-40

¹⁰⁴ Pyzdek, T (2003) *The Six Sigma Handbook – Revised and Expanded*, p. 41

¹⁰⁵ Magnusson, K Kroslid, D and Bergman, B (2007) p. 39

¹⁰⁶ Sörqvist, L (2008) p. 255

¹⁰⁷ Sörqvist, L and Höglund, F (2007) p. 115-118

4.4.2. Prioritise and Select Projects

When improvement projects have been identified, a selection process takes place. In the selection process the projects are evaluated on their utility and value.¹⁰⁸ A prerequisite for a good selection is that the projects are prioritised.¹⁰⁹ Prioritisation is based on strategic and tactical factors. Strategic factors are the effects of the improvement such as economical savings, increased customer satisfaction etcetera. Tactical factors are the appropriateness of executing a certain improvement such as if the project is aligned with the employees' attitudes.¹¹⁰ The prioritisation is based on a combination of strategic and tactical factors. Usually a decision matrix is a good support for conducting the prioritisation.¹¹¹

It is important to focus on improving chronic problems instead of urgent problems. Urgent problems are often small interferences that occur on a daily basis and are on an accepted level of disturbance. Chronic problems are problems that have been accepted in the organisation and therefore no one reacts to when they occur. It is more important to focus on the chronic problems since these are areas of real breakthrough and where measurable results can be obtained.¹¹²

4.5. DMAIC

It is of great importance for an improvement project that a uniform project steering model is used. This ensures that improvements are made in a structured way and that a common language is used.¹¹³ When using Six Sigma a standardised model named DMAIC is commonly used for project management. DMAIC ensures a standardised working procedure and consists of five phases. These are Define, Measure, Analyse, Improve and Control.¹¹⁴ Using the model the problem is first being defined, thereafter facts about the problem are collected through measurements. The facts are then analysed with the purpose of finding the main cause of the problem. When the main cause has been identified the process is being improved and necessary follow-ups and controls are established to ensure that the improvement will be efficient over time.¹¹⁵

¹⁰⁸ Sörqvist, L and Höglund, F (2007) p. 119

¹⁰⁹ Magnusson, K Kroslid, D and Bergman, B (2007) p. 56

¹¹⁰ Sörqvist, L and Höglund, F (2007) p. 119

¹¹¹ Sörqvist, L and Höglund, F (2007) p. 119

¹¹² Sörqvist, L and Höglund, F (2007) p. 28

¹¹³ Sörqvist, L and Höglund, F (2007) p. 96

¹¹⁴ Sörqvist, L (2008) p. 51

¹¹⁵ Sörqvist, L and Höglund, F (2007) p. 73

4.5.1. The Define Phase

The purpose of the Define phase is to create a common understanding of the problem that is going to be solved and the consequences of the problem.¹¹⁶

<p>The Define Phase</p> <ul style="list-style-type: none">• Decide project importance• Make a project chart• Make a team chart• Identify critical to quality characteristics• Make a process map

Project Importance

The Define phase starts with calculations of the possible return of the project. When calculating the return it is important to not only consider monetary results but also the return considering customers and co-workers.¹¹⁷

Project Chart

One of the main purposes of the Project Chart is to make sure that all team members have a common understanding of the purpose of the project and how it is going to be executed.¹¹⁸ Another purpose of the Project Chart is to ensure that the problem, that the project is going to solve, is well defined.¹¹⁹ The project chart should also include a detailed plan for all activities and project milestones. The deliverables for each phase i.e. Define, Measure, Analyse, Improve and Control, have to be clearly defined, this is to make it easier to focus throughout the project.¹²⁰

Team Chart

To ensure that all team members understand their own and other participants' roles in the project it is important to make a Team Chart. In the Team Chart all team members and their roles and responsibilities in the project are listed. The different roles in a project are the Sponsor, who should be a member of the senior

¹¹⁶ Sörqvist, L and Höglund, F (2007) p. 74

¹¹⁷ Magnusson, K Kroslid, D and Bergman, B (2007) p. 75

¹¹⁸ Magnusson, K Kroslid, D and Bergman, B (2007) p. 156-157

¹¹⁹ Magnusson, K Kroslid, D and Bergman, B (2007) p. 156-157

¹²⁰ Magnusson, K Kroslid, D and Bergman, B (2007) p. 156-157

management team, the Team Manager, who should be a Black Belt or Green Belt and the rest of the team members, consisting of Green Belts and White Belts.¹²¹

Identifying Critical to Quality Characteristics

It is important to identify which outputs of a process that are most important for the improvement project, the critical to quality (CTQ) characteristics.¹²² The CTQ's can be customer need requirements, production ability, efficiency or other characteristics that are critical to quality. To be able to use a characteristic as a CTQ it has to be measurable and it has to be possible to assign requirements and specifications to them.¹²³

Customer needs are preferably identified using a Voice of the Customer analysis or the Kano model in which customer needs are gathered and analysed.¹²⁴

A FMEA – Failure, Mode and Effect Analysis can also be used to identify CTQs. Using FMEA all outputs to different functions in the process are identified. Thereafter the output failure modes, potential consequences of failure, detect ability and the likelihood of occurrence are analysed and the outputs with the largest consequences, lowest detect ability and highest likelihood are characterised as CTQs.¹²⁵

Process Mapping

To understand the whole process it is important to analyse the current state. This can be made using a cross-functional process map. The cross-functional process map illustrates the value delivered to the customer as well as the process flow and unplanned effects of the process such as scrap and complaints.¹²⁶ When making a process map it is important that the process is well defined so that the process starting and end points are known as well as the width of the process.¹²⁷

Using the process map a SIPOC – Supplier, Input, Process, Output, Customer model should be conducted. The purpose of the SIPOC is to identify the inputs and outputs of the process.¹²⁸ The inputs of the process are the factors influencing the outputs and the outputs of the process are the ones that are going to be improved.¹²⁹

¹²¹ Magnusson, K Kroslid, D and Bergman, B (2007) p. 158

¹²² Magnusson, K Kroslid, D and Bergman, B (2007) p. 159

¹²³ Sörqvist, L and Höglund, F (2007) p. 77

¹²⁴ Sörqvist, L and Höglund, F (2007) p. 77

¹²⁵ Pyzdek, T (2003) *The Six Sigma Project Planner*, p. 101

¹²⁶ Pyzdek, T (2003) *The Six Sigma Project Planner*, p. 95

¹²⁷ Sörqvist, L (2008) p. 332-334

¹²⁸ John, A Meran, R Roenpage, O and Staudter, C (2009) *Six sigma + LEAN toolset*, p. 34

¹²⁹ Magnusson, K Kroslid, D and Bergman, B (2007) p. 159

The SIPOC also helps to identify the main suppliers and customers affecting the process. An example of a SIPOC is illustrated in Figure 9.¹³⁰

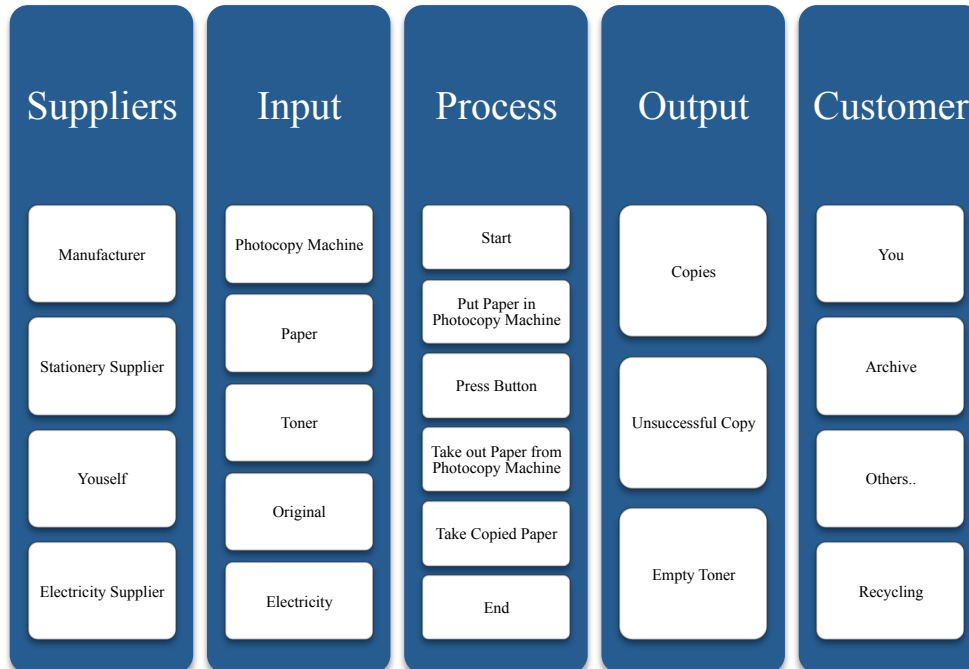


Figure 9 The SIPOC model¹³¹

4.5.2. Measure

In the Measure phase the key metrics of the process are defined as well as the project baseline and how to measure project progress and success.¹³²

The Measure Phase
<ul style="list-style-type: none"> Decide need of information Identify measurements Choose and design measurement method Test the measuring method Realise the measurement

¹³⁰ Sörqvist, L (2008) p. 332-333

¹³¹ Sörqvist, L (2008) p. 332

¹³² Pyzdek, T (2003) *The Six Sigma Project Planner*, p. 113

Identify Important Measurement

Measurements important for the project have to be identified. This can be done using a measurement matrix. In the matrix the strength of the relationship between the CTQs and outputs of the process are illustrated as strong, moderate, weak or none as shown in Table 1. To ensure that all outputs are measurable it is important that all outputs correspond to at least one measurement.¹³³

Table 1 The Measurement Matrix¹³⁴

CTQ	Output 1	Output 2	Output 3	Output 4	Output 5	Output 6
CTQ 1						
CTQ 2						
CTQ 3						
CTQ 4						
CTQ 5						
CTQ 6						
CTQ 7						

Set the Need of Information

When the important measurements have been identified, it should be decided what kind of information that is needed. Secondary data should be reviewed to see if it is sufficient and reliable. If not, primary data has to be collected.¹³⁵ When analysing what information is needed it is favourable to collect the need of data in a matrix to get a good view of what data already exists, what has to be collected, who collects what etcetera as shown in Table 2.¹³⁶ By defining what data is needed for the project unnecessary work such as collecting the wrong data can be avoided.¹³⁷

¹³³ John, A Meran, R Roenpage O and Staudter, C (2009) p. 57

¹³⁴ John, A Meran, R Roenpage, O and Staudter, C (2009) p. 57

¹³⁵ Sörqvist, L and Höglund, F (2007) p. 80

¹³⁶ John, A Meran, R Roenpage, O and Staudter, C (2009) p. 59

¹³⁷ Sörqvist, L and Höglund, F (2007) p. 80

Table 2 Information Need Matrix¹³⁸

What?	How?	Who?	When?	Where?

Choose and Design Measurement Method

In this step instructions on how to make the measurements are developed and added to the Information Need Matrix¹³⁹. There are different ways to collect data depending on what information is needed. There are amongst others manual measuring methods, automatic measuring methods and observations. It is important to educate the employees who conduct the measurements and write instructions on how to conduct the measurements in order to ensure consistency.¹⁴⁰

When a method has been chosen a measurement form should be constructed. The measurement form could include sample sizes, measurement intervals, duration of measurements, responsibilities etc according to the specific need of the measurement method.¹⁴¹

Test the Measuring Method

It is important to test the measuring method in order to decide the quality of the data being collected.¹⁴² To decide the quality of the data the following should be analysed, if applicable; reliability, reproducibility, accuracy, stability, linearity, granularity and validity.¹⁴³

Plan and Realise the Measurement

It is important to plan the measuring to ensure that the data collection is not neglected, misunderstood or not documented properly. In comprehensive projects the measurement phase should be planned as thoroughly as if it was a small project in the project. This includes making a time plan for the data collection.

¹³⁸ John, A Meran, R Roenpage, O and Staudter, C (2009) p. 59

¹³⁹ John, A Meran, R Roenpage, O and Staudter, C (2009) p. 60

¹⁴⁰ Sörqvist, L and Höglund, F (2007) p. 81

¹⁴¹ Magnusson, K Kroslid, D and Bergman, B (2007) p. 162

¹⁴² Sörqvist, L and Höglund, F (2007) p. 81

¹⁴³ John, A Meran, R Roenpage, O and Staudter, C (2009) p. 71-72

When collecting data it is important that it is collected according to the measurement plan, and that any deviation from the plan is documented.¹⁴⁴

4.5.3. Analyse

All collected data should be analysed in order to understand variables and underlying factors. The Analyse phase differs a lot depending on the problem but the general steps are that improvement areas first are identified, then the reasons for the problem are identified and finally the main causes are identified. The identified improvement areas and main causes are used as an input to the generation of solutions in the Improve phase.¹⁴⁵

<p>The Analyse Phase</p> <ul style="list-style-type: none">• Identify improvement areas• Identify reasons for the problem• Identify main causes
--

Two analysis approaches are used within Six Sigma, a quantitative analysis of variations and a more qualitative analysis of processes and flows.¹⁴⁶

Quantitative Analysis

The quantitative approach is based on variations and is measured numerically through statistical analyses illustrated with graphical solutions, in which the sources for variations can be appointed and possible correlations discovered.

Using the identified variations and correlations hypothesis are made in order to identify the underlying factors for the variations and correlations. The underlying factors are identified using experience and creative thinking.

In the quantitative analysis, hypothesis and theories for the underlying factors of variation are identified through graphical solutions as histograms or scatter charts. Using the graphical solutions reasons for the variations are analysed based on experiences and creative thinking. The potential reasons are then structured by cause and effect in e.g. cause and effect matrixes.

The hypothesis are then ranked using data analysis, structured decision matrixes, risk analyses or more subjective experience based evaluations. The hypothesis with

¹⁴⁴ Magnusson, K Kroslid, D and Bergman, B (2007) p. 163

¹⁴⁵ Sörqvist, L and Höglund, F (2007) p. 82

¹⁴⁶ Sörqvist, L and Höglund, F (2007) p. 82

the highest likelihood of being a main cause of the problem are then chosen for further analyses to fully understand the factors and their effect on the problem. These analyses are often conducted using statistical tools such as hypothesis testing, regression analysis. When the causes of the problem and their effect on the variations are fully understood the work can proceed toward finding suitable solutions.¹⁴⁷

Qualitative Analysis

Qualitative analysis is performed on problems that cannot be measured or on problems that do not depend on variations. Six Sigma was earlier not a useful tool for these problems but when the concept started to include lean tools, it has become more efficient.

The first step in the qualitative analysis includes a detailed mapping of the process, initially constructed in the Measure phase. From this a flowchart is constructed, which provides a solid understanding for the layout, the function and the structure of the process. This is followed by an analysis of the process flow and efficiency, in order to find shortages and problems. Recommended analyse methods are bottleneck analysis, flow analysis, lead time analysis, value analysis or risk analysis. The third step is to identify the possible reasons for the problem, which is done using brainstorming. The last step is to identify the primary causes of the problem. This can be done using e.g. cause and effect matrixes.¹⁴⁸

4.5.4. Improve

The input to the Improve phase is a list of different root causes to the problem being analysed. The purpose of the Improve phase is to develop a solution to the identified problem.¹⁴⁹

<p>The Improve Phase</p> <ul style="list-style-type: none">• Generating solutions• Selecting a solution• Developing the solution• Testing the solution• Implementing the solution
--

¹⁴⁷ Sörqvist, L and Höglund, F (2007) p. 84-86

¹⁴⁸ Sörqvist, L and Höglund, F (2007) p. 86-88

¹⁴⁹ Sörqvist, L (2008) p. 316

Generating Solutions

Depending on the complexity of the problem different amounts of possible solutions are needed. A very complex problem would normally need many possible solutions to be evaluated to make sure that the best solution is chosen, whereas fewer solutions are needed for less complex problems.¹⁵⁰

Benchmarking can be used for generating solutions. In benchmarking best practices are identified and goals for the future state of variables based on best practice are set. Benchmarking can also be used to create a new improved process map, it is important to describe how the process is going to deliver value to the customer.¹⁵¹ Competitors can also be studied for identifying solutions. Competitors are usually not eager to collaborate and therefore the competitor analysis usually has to be performed on facts that are available to the public.¹⁵²

Another method for generating solutions is brainstorming. When using brainstorming the brainstorming group should consist of representatives from different functions in order to give a greater variety on the suggested solutions. It is also important that all participants have a proper understanding of the problem that is going to be solved.¹⁵³

Selecting a Solution

When different solutions have been developed it is important to evaluate them to be able to select the solution that fits the organisation the best.¹⁵⁴

The solution selection can be conducted using concept screening and a sensitivity analysis. In the concept screening a selection matrix based on customer needs is developed.¹⁵⁵ Economical values of the solution, difficulties with implementation, effect of the result and time consumption should also be considered in the matrix.¹⁵⁶ When the criteria have been chosen they are weighted to reflect their importance. The solutions are then evaluated and ranked according to the criteria. After the ranking the solutions can be combined and improved. The improved solutions are then ranked again and a sensitivity analysis can be conducted on the

¹⁵⁰ Sörqvist, L and Höglund, F (2007) p. 88

¹⁵¹ Pyzdek, T (2003) *The Six Sigma Project Planner*, p. 150

¹⁵² Sörqvist, L (2008) p. 377

¹⁵³ Sörqvist, L (2008) p. 369

¹⁵⁴ Sörqvist, L and Höglund, F (2007) p. 89

¹⁵⁵ Ulrich, K and Eppinger, S (2008) p. 134-135

¹⁵⁶ Sörqvist, L and Höglund, F (2007) p. 89

improved solutions. The team then chooses one or more solutions based on the ranking and on the sensitivity analysis if it has been performed.¹⁵⁷

Developing the Solution

The selected solution should then be developed on a more detailed level. The detailed solution should include necessary changes in the organisation, delimitations of the solution etcetera. The solution development should ultimately result in a plan that provides a detailed and systematic description of the project execution.¹⁵⁸

Testing the Solution

When the solution has been developed it should be tested before launching it in full scale. The testing makes it possible to decide if there are any improvements of the solution needed before launching it in full scale.¹⁵⁹ The testing can be conducted as a pilot, prototype etcetera.¹⁶⁰ Before the testing it is important to train the involved employees and during the testing the results should be documented in order to make it easier to identify where improvements of the solution are needed.¹⁶¹

Implementing the Solution

During the implementation of the solution it is important that the implementation plan is followed to ensure an efficient implementation and good results.¹⁶² To make it easier to plan the activities in the project it should be broken down into sub activities using a tree-diagram. For each sub activity a risk analysis can be made, for example with a FMEA. When the risks have been identified an action plan how to address the risks should be created. For the actual planning of the project a Gantt chart is preferred.¹⁶³

A problem with implementing improvements is resistance from employees. To avoid resistance as much as possible it is important to let the employees feel that they are a part of the change and that they have the possibility to impact on it. It is also important to inform the employees about the project so that they feel that they are listened to. Education can also be used to make employees less resistant to

¹⁵⁷ Ulrich, K and Eppinger, S (2008) p. 136-137

¹⁵⁸ Sörqvist, L and Höglund, F (2007) p. 90

¹⁵⁹ Sörqvist, L (2008) p. 364

¹⁶⁰ Sörqvist, L and Höglund, F (2007) p. 89

¹⁶¹ John, A Meran, R Roenpage, O and Staudter, C (2009) p. 262-263

¹⁶² Magnusson, K Kroslid, D and Bergman, B (2007) p. 186

¹⁶³ Sörqvist, L (2008) p. 396-397

change. For all of this to succeed it is important that the management is clearly showing their support for the project and that an education plan is used.¹⁶⁴

The Improve phase ends in a chart where the deliverables that were identified in the Define phase are compared to what was actually delivered. The sponsors and the receiving organisation have to accept the deliverables before the Improve phase is finished.¹⁶⁵

4.5.5. Control

When an improvement project has been implemented it has to be secured, otherwise there is a risk that the working method goes back to the earlier state and the problems appear again.¹⁶⁶ The main purpose of the Control phase is therefore to standardise and control the improved working method. Other important activities include a last follow-up of the project, collecting and passing down experiences and to make a final report with the actual savings calculated.¹⁶⁷

The Control Phase

- Standardise the process
- Last follow-up and verification
- Final report and delivery

Standardise the Process

An important part in controlling an improvement is to establish working routines to ensure that the process is executed in a standardised way.¹⁶⁸

The documentation of the optimised process can e.g. be instructions, checklists, routines, manuals and flow-charts. When developing the documentation it is important to transmit why the work has to be standardised and how the documentation should be designed in order to be as accessible and useful as possible, since it will be used in the daily work.¹⁶⁹

¹⁶⁴ Sörqvist, L and Höglund, F (2007) p. 90-92

¹⁶⁵ Pyzdek, T (2003) *The Six Sigma Project Planner*, p. 154

¹⁶⁶ Sörqvist, L (2008) p. 317

¹⁶⁷ Sörqvist, L (2008) p. 317

¹⁶⁸ Sörqvist, L (2008) p. 398

¹⁶⁹ Sörqvist, L (2008) p. 399

To maintain the changes in the organisation, policies have to be updated or changed. A process control plan should also be developed which helps ensuring that the organisation continues to enjoy the benefits of the Six Sigma project.¹⁷⁰

Last Follow-up and Verification

The last follow-up should be conducted as late as possible to ensure that the routines have been implemented. The follow-up should have three dimensions:

- Result
- Methodology
- Return

Following up the result means verifying that the objectives and goals are satisfied. The methodology follow-up refers to evaluating how well the project has been conducted and how the Six Sigma program could be improved. The follow-up of the return means verifying the effects of the project in terms of savings, profit and customer satisfaction.¹⁷¹

Final Report and Delivery

The Final Report should present the objective, the methodology and the achieved results. It has two purposes; to document the project and to distribute the results in the organisation. Sometimes it is difficult to do this in the same report and consequently it is common that a final report of a Six Sigma project is presented in a technical report and a briefer report.

When the project group delivers the improved process to the organisation, the responsibility shifts from the project team to the organisation. Therefore it is important that the persons affected by the improvement project have a full understanding of the changes.

¹⁷⁰ Pyzdek, T (2003) *The Six Sigma Project Planner*, p. 159-161

¹⁷¹ Sörqvist, L and Höglund, F (2007) p. 93

5. Project Control at Plan & Secure Capacity

The purpose of this chapter is to give an understanding of how project management in the Plan & Secure Capacity process is wished to be conducted and how it is actually being conducted. The information in this chapter is based on project control documents used at Plan & Secure Capacity and interviews with employees at Plan & Secure Supply. Plan & Secure Supply has been regarded since few Fast Track Projects have been conducted at Plan & Secure Capacity and the working methods at Plan & Secure Capacity and Plan & Secure Supply are expected to be similar.

5.1. Project Control at Plan & Secure Capacity in General

The common opinion at Plan & Secure Capacity is that it takes too long time to solve problems. This is due to long project execution times, which in turn is a consequence of the fact that small problems at Plan & Secure Capacity are grouped together to be solved in large Global Projects. This is done instead of solving the problems one by one in smaller projects i.e. Fast Track Projects. The reasons for grouping the problems together are based on tradition, there exists a project steering model for large projects but not for small ones and since it is easier to allocate resources from the IT department if the project is large. If small problems were to be solved one by one in Fast Track Projects, they would be solved faster and the employees would be more pleased. One prerequisite for a greater number of Fast Track Projects is an easy- to- use project steering model that guides the project team through the project execution.

Experiences and documents from previous projects are commonly not shared at Plan & Secure Capacity. There are a few project portfolios stored at different databases but they do not cover all projects that have been conducted and there is no efficient search function for the project. This makes it difficult to locate information. Neither is the existing project steering model improved continuously, which could result in obsolescence

5.2. The IKEA Culture

The entrepreneurial spirit at IKEA results in a situation where a lot of ideas for new projects are generated and therefore it is important in a project steering model that it does not inhibit the entrepreneurial spirit at IKEA. A project steering model should therefore not be too strict or inflexible since that could result in a loss of entrepreneurship. The interviews at Plan & Secure Capacity indicate that the

IKEA culture is non-academic and prefers working methods and nomenclature that are adapted to IKEA. To have a steering model that is easy to use and that works as a support is important for Plan & Secure Capacity, who do not wish to have a bureaucratic model being forced upon them. There is not much emphasis on documentation at Plan & Secure Capacity and therefore it is important that the project steering model does not include too much documentation. It is also important with as little text in the model as possible since employees tend to prefer to quickly cut to the case. The employees also appreciate that the purpose of what they are doing is always clear; therefore/accordingly, consequently/ it is very important to communicate the purpose of the project steering model. The employees emphasise a fast start up of projects and it is therefore very important to explain the importance of a well thought-out start up of the project in order for them to follow the Define phase of the project steering model.

5.3. Wished Position for Process Improvement Projects

The wished position for execution of improvement projects at Plan & Secure Capacity is that they should be performed in three categories; Just Do It Projects, Fast Track Projects and Global Projects. This structure was implemented in 2009 and the wished position has not yet been reached since not many projects have been executed in these categories.

5.3.1. Just Do It Projects (Out of scope)

Just Do It Projects are often small projects that are locally initiated. They focus on solving a real problem for the process users. They are characterised by not requiring much resources and having short execution times. Just Do It Projects are short in time and should ideally be implemented within three months. They are also characterised by a low degree of formality and that they often are a result of the continuous improvement culture within IKEA.

The wished position for execution of Just Do It Projects is that the PDCA – Plan, Do, Check, Act cycle is used. The different steps in the cycle are characterised by the following and are illustrated in Figure 10.

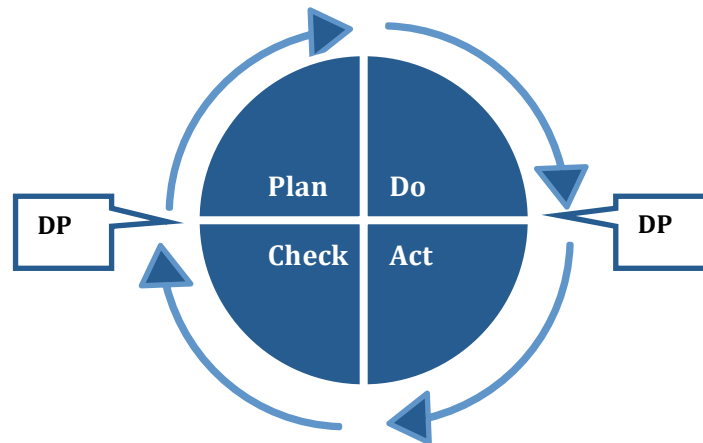


Figure 10 The PDCA cycle

- **Plan** – Includes identifying the problem and how to improve.
- **Do** – Concerns implementing the change.
- **Check** – Includes follow up of the result to ensure the desired result is achieved.
- **Act** – Is about acting on what is found. This could be to implement the changes throughout the entire process and to share the results with other processes.

There are two mandatory decision points in Just Do It Projects. The first one is to get the improvement idea approved by the process owner before implementing the change, which is done after the Plan phase but before the Do phase. The second decision point is between the Check phase and Act phase. The purpose of it is to transfer the improvement to the process owner to secure that it is implemented throughout the process and that it is shared with other processes.¹⁷²

5.3.2. Fast Track Projects

Fast Track Projects are improvement projects that have a minimum yearly saving of one million Euros and that have a time horizon of maximum 12 months from project launch to finished implementation. A Fast Track Project improvement is typically initiated by the process leader or process owner, and approved by the process council. Fast Track Projects go through the process presented in Figure 11.

¹⁷² Supplying (2009) p. 111-112

The process consists of three main activities: scoping and qualification, selection and prioritising, and project execution.

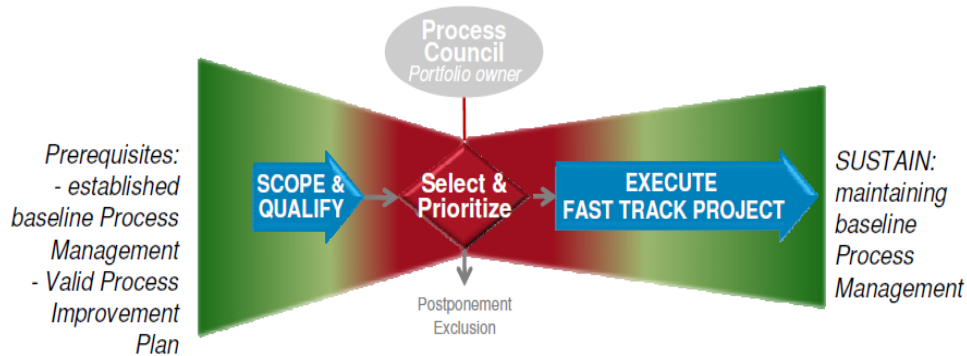


Figure 11 Fast Track Project process¹⁷³

The scoping and qualification activities are done in a micro pre-study. The micro pre-study aims at answering questions such as:

- What is the scope of the improvement?
- How is the problem related to the overall goals?
- What are the risks and potential rewards?
- What actions would need to be taken?
- How could the improvement be measured?

The micro pre-study report serves as a decision basis for the selection and prioritisation of the projects.

The Process Council performs the selection and prioritisation of projects. When prioritising projects several aspects need to be taken into account:

- Have a balanced project portfolio
- Secure that the projects are:
 - Strategically aligned
 - Aligned with other projects
- That projects have high probability of delivering on time, within budget and within the designed scope
- That the projects use employees and other resources efficiently
- The total portfolio of both current and future process improvement projects

¹⁷³ Supplying (2009) p. 113

When a project has been chosen it should be executed, which is the main focus of the master thesis. The wished position for Fast Track Project execution at Plan & Secure Capacity is defined as the DAIIT method – Define, Analyse, Improve, Implement and Transition, described further below.

The DAIIT method

DAIIT consists of five phases and three management parts overlapping the phases. The management parts are Design Process, Manage Change and Manage Project execution, as illustrated in Figure 12.

Design Process refers to management directly related to the improvement and the development of it. Manage Change refers to the change management that is needed to get a sustainable process improvement and Manage Project refers to the management of the actual project in order to deliver on time and as expected.

What is important to note is that there is no project steering model adapted to the DAIIT method, there are only some guidelines and some suggested working tools. This is probably one reason for that the DAIIT method has not been used within the few Fast Track Projects that have been conducted.

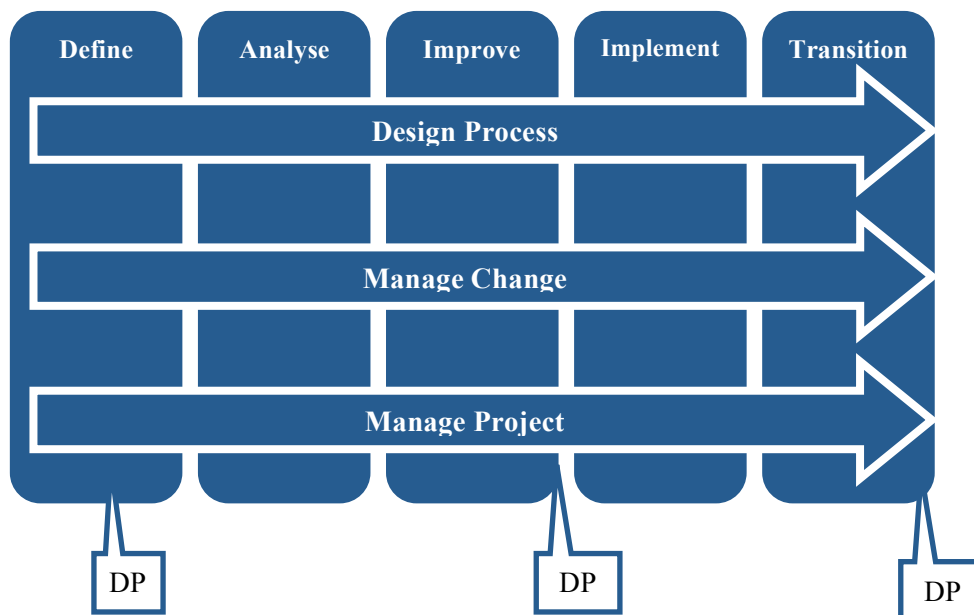


Figure 12 The phases and dimensions of the Fast Track Project method

Define

The Define phase starts with refining and concretising the pre-study. This is done by reviewing the description of the current situation, the desired result of the project and how the result of the project should be measured. The vision of the project should also be concretised.

The stakeholders should be identified and a plan on how to manage and deliver the change has to be developed. The plan is important for ensuring that the stakeholders are kept informed and that they are educated to be prepared for the change.

In the Define phase the project team is put together. It is recommended that the project team consist of team members both understanding and not understanding the process, team members having the process receiver perspective and team members having process management knowledge.

A project plan covering all phases in the project should also be conducted and the Define phase should end with a project kick-off ensuring that all team members understand the project. It is also important to make sure that all team members understand the working method of Fast Track Projects.

The deliverables from the Define phase are:

- A conceptual solution description of the suggested process change
- A project plan including a change management plan
- A project team which should be introduced to the problem situation

Before moving on to the Analyse phase there is a decision point where the Define phase has to be approved.

Analyse

The purpose of the Analyse phase is to get an understanding of the problem that is going to be improved. For a good analysis it is important that the problem is observed using numerous perspectives and that several methods are used for analysing.

The Analyse phase starts by collecting baseline process management material. A decision on what other data that is needed for a deepened understanding of the process is then taken. When the data is collected it is important to make sure that it is measured in an appropriate way.

When the problem is fully understood an analysis of the reasons and main causes for the problem is conducted. Different methods are used for the analysis. When the reasons for the problem are understood, the improvement opportunities should

be analysed. These should be listed and documented in order to be used in the Improve phase.

At the end of the Analyse phase the problem definition, target definition, stakeholder analysis, change management plan, project plan and project scope should be reviewed and updated if needed.

The deliverables from the Analyse phase are:

- Analysis of performance
- List of improvement opportunities
- Updated project plan

Improve

The purpose of the Improve phase is to develop and design a solution to the problem. The list with improvement opportunities identified in the Analyse phase is used as an input. The identified improvement opportunities are first prioritised and then the best solution is chosen. When prioritising the improvement opportunities the following should be taken into account: the expected impact on the problem, likelihood of success, investment requirements and if the receiving organisation will accept it. The highest ranked improvement opportunities can be combined to create an ultimate solution.

When the ultimate solution is decided upon the solution should be tested, if needed. If the solution goes through the testing it should be implemented. In order for the solution to be implemented an implementation plan should be conducted. The implementation plan includes: who performs the work, when it will be performed, where will it be performed and finally how to communicate the solution to the stakeholders.

It is also important to ensure that the extent of the required change is understood. It involves reviewing the to-be process, updating the stakeholder list and understanding what actions have to be taken versus all key stakeholders. The change management plan also has to be updated so that it is clear how to manage the required change. It is also important to make a plan on how to manage risks associated with the change. The project plan has to be updated as well to ensure that it is in line with the chosen solution.

The deliverables from the Improve phase are:

- Solution ready to be implemented
- Communication plan
- Training plan

- Updated project plan.

Before continuing to the Implementation phase the solution has to be approved at a decision point.

Implementation

In the Implementation phase the project has a direct impact on the employees in the process. It is in this phase that plans are put into action and the solution is turned into real business benefits. When the solution has been implemented it is not possible to go back therefore corrective countermeasures have to be taken if the solution is not delivering the desired results.

The project team's role in the Implementation phase is of a monitoring and corrective nature. The project team markets the improvement and explains why and how the improvement should be used, which is done using the change management plan. It is crucial that the project team monitors the process performance to ensure that the improvement actually is delivering the desired results. If not the project team should be prepared to analyse why the result is not as desired and to take corrective actions. The project is also evaluated and lessons learned are documented.

The deliverables from the Implementation phase are:

- Actual results
 - Measurements
 - Lessons learned
 - Cost follow-up
 - Particular successful examples
- Updated project plan
- Other opportunities identified
- Need for further action

Transition

In the transition phase the process performance is stabilised and standardised. Remaining actions of the project are closed and a follow-up of the project is planned. The purpose of the project follow-up is to ensure that the result of the implementation is sustained in the long term. The project should then be handed over to the line organisation.

At the handover it is important to re-establish the baseline process management so that it suits the improvement. The key stakeholders also have to be continuously informed on project outcome.

The deliverables from the Transition phase are:

- Updated process base line
- Ownership transfer
- Project closure reports

The Transition phase ends with a decision point at which the project is closed by the Process Council.¹⁷⁴

Tools

The tools that are suggested to be used with the DAIIT method are the following:

- Process walkthrough analysis
- Value analysis
- Moments of truth
- Responsibility handover analysis
- Integrated lead time and cost analysis
- FMEA – Failure Mode and Effects Analysis
- 5-why analysis
- Ishikawa analysis¹⁷⁵

The structure of the DAIIT method is good but the problem is, as mentioned, that there is no project steering model related to DAIIT why it is not used. There is neither any other project steering model developed for Fast Track Projects. Because of the lack of an efficient project steering model, not many Fast Track Projects have been performed.

5.3.3. Global Projects (Out of scope)

Global Projects are often initiated based on a strategy from a top down perspective. Characteristics for Global Projects are that they have an implementation time over 12 months and an annual saving of more than 10 million Euros. They are normally IT based projects and usually several problems are solved in the same project. The wished position for Global Projects is the PPS which is described further in Chapter 5.5.1.

Within Global Projects there is often a confusion of which tasks that should be performed by the project team and which should be performed by the line organisation. This is a consequence of long execution times where the project team

¹⁷⁴ Supplying (2009) p. 112-134

¹⁷⁵ Supplying (2009) p. 135-158

and line organisation are working closely together for a long time which makes it difficult to separate the project team's activities and the line organisation's activities. In addition it is difficult to have a well-defined scope in projects solving several problems hence it makes it even more difficult to separate the activities. A consequence when the project team is solving problems that should be solved within the organisation is that business knowledge is being transferred from the organisation to the project team. This means that when the project is closed, important business knowledge that should have been kept within the organisation is lost.

5.3.4. Characteristics of JDIP, FTP and GP

The characteristics of the three categories of process improvement projects are summarised in Table 3 below.

Table 3 Characteristics of project types¹⁷⁶

	Just Do It Projects	Fast Track Projects	Global Projects
Characteristics	Solve an urgent problem in the process	Implement a small process change. Often process improvements that do not require major IT tool changes	Solve a big global process change. Often combined with introducing completely new supporting IT tools
Typical Savings	Minor	Medium	Major
Typical Lead-time	Max 3 months	Max 12 months	Often over 12 months
Initiated by/Approved by	Process Leader / Process Owner	Process Owner / Process Council	Process Council
Performed by	Just Do It Team	Process Leader and a small dedicated core team	Program / Project Organisation
Method	PDCA	DAIT	PPS
Typical Example	Training initiative to	Move a process task from one organisation to	Global process improvement

¹⁷⁶ Supplying (2009) p. 111

	raise competence in a specific organisation	another to create more efficiency from an overall perspective	initiatives like new purchasing process and category organisation
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5.4. Current Situation for Process Improvement Projects

Only a few Fast Track Projects have been executed at Plan & Secure Capacity up to this date. Consequently the scope when performing interviews has been widened to include employees that have been involved in both Fast Track Projects and other small projects. No project steering model is used for Fast Track Projects/small projects and therefore there is probably as many project management styles as there are project managers. By conducting several interviews with employees at Plan & Secure Capacity some general project management have however been identified. These have been summarised using the general project steering model, consisting of the four phases; Pre-study, Planning, Implementation and Conclusion.

5.4.1. Pre-study

An improvement project starts with an idea of something that needs to be improved. The idea is summarised into a Process Improvement Proposal (PIP) where the following topics are addressed:

- The current state of the process. This is a description of the situation as of today.
- The wished position. This is a description of how the process should be after a successfully implemented process improvement.
- The main problems that should be solved through the process improvement.
- The pre-requisites and key success factors for a successful project.
- The persons that will be affected by the process improvement.
- Preferred project leader and key project team members.
- The estimated saving the project will generate.
- The estimated cost of the project.
- The estimated project time from project launch to implementation.
- A process map.
- The recommended improvement method to be used for the improvement project; as Just Do It Projects, Fast Track Projects or Global Projects.

The PIP goes through a selection and prioritisation process and if accepted, a project directive is sent to the assigned project leader. It is the project leader's

responsibility to create a project team. When creating the project team it is important to find the right persons with the right competences, which complement each other. To have an employee from the receiving organisation in the project team usually makes the understanding of the current situation much deeper and a better solution can be achieved this way.

5.4.2. Planning

When the project leader has chosen the project team members the project leader defines the project goals together with the team. If the project team is large the project is sometimes moved on to the Implementation phase even though the goals have not yet been completely defined. The reason for moving on before the goals have been defined is that it is perceived better to get started with the Implementation phase than to spend time on defining the goals.

The opinions about scoping the project differ; some argue that it is important with a well-defined scope whereas others argue that with a too well defined scope the ability to act is limited.

It is considered important to discuss with the stakeholders early on in the project execution in order to understand the problem, the purpose of the project, the wished position and what the customers are expecting. The discussions with the stakeholders are commonly facilitated by including a member of the receiving organisation in the project team.

Planning of check up points, such as milestones and gates, is conducted in the Planning phase and the number of check up points is directly depending on the complexity of the project. It is also affected by the geographical location of the project team. If the project team is on the same geographical location it is regarded to not be as important to plan all check up points since meetings are easier to setup than if the project team members are in different locations. Detailed planning of project activities at Plan & Secure Capacity is not very common and the plans that are made are seldom updated as the project is executed. In some projects the planning phase does not even include making a time plan. In those cases only the delivery date is decided and the rest of the time plan is created gradually when the project is executed.

5.4.3. Implementation

It is considered important to get an understanding of the process before finding the main causes of the problem. Sometimes the PIP is considered to provide enough information to get an understanding of the process but other times interviews with employees in the process are conducted in order to get a better understanding.

What data that should be measured or investigated is usually decided through a discussion with the steering committee, often based on input from the project leader who has a detailed knowledge of the subject. Generally no new measurements are developed for the measuring but already developed measurements are used.

It is regarded important to find the main causes to the problem so that the actual problem is treated and not the symptoms of it. Finding the main causes is considered so important that a broad search for potential reasons of the problem usually is skipped, the project team instead moves on to immediately identify the main causes. The analyses for finding the main causes differ a lot depending on the problem type. In projects with relevant quantitative data, statistical tools are used. In projects that lack relevant quantitative data brainstorming within the project team and with representatives from the receiving organisation is used.

Finding the solution to the identified problem is done in many ways. If the wished position has been well defined by interviewing stakeholders a brainstorming for solutions is often conducted within the project team. The project team comes up with several different solutions and then decides on which solution to choose by analysing them with pros and cons and by making a risk analysis. Sometimes logical reasoning, quantitative analysis and mathematical calculations are also used for choosing a solution.

Occasionally representatives from the project team, the receiving organisation and experts within relevant areas brainstorm together to find a solution. The experts provide a deeper understanding of details regarding the solution and they should have the final decision for their area of specialisation. This type of brainstorming usually discusses only one solution, going into details rather than generating many different solutions.

The opinion within Plan & Secure Capacity is that the larger the project is the greater is the importance of testing the solution. If the project is relatively small it is therefore more common to only let a couple of representatives from the receiving organisation give their point of view on the solution instead of testing it.

Education is performed both before and during roll-out. The amount of education is depending on the solution. What is regarded most important when educating is to have engaged and skilful educators, that the educators are project team members and preferably also members of the receiving organisation. Educating normally takes the form of a presentation or seminar. The presentation can be conducted for the manager of the receiving organisation, for the users in the receiving organisation or for both. Education can also be in form of documents explaining

the new working method. When the solution is implemented and the receiving organisation has been educated the project is handed over to the line organisation.

5.4.4. Conclusion

During the implementation there is a follow-up which is usually conducted to ensure that the solution is providing the desired result. If the solution does not meet the expectations, changes to it are made. Generally there is however no follow-up on how the budget is kept or on how the actual project execution went. Neither is a project summary performed and the common opinion at Plan & Secure Capacity is that even if there was one it would not be used anyway.

There are no procedures to ensure that changes last in the organisation over time. However some employees argue that there is no need of procedures since if the solution is good enough the change will automatically last. If the solution is good but people tend to use the “old” procedure anyway the best way to avoid this is considered to be to make it impossible to use old procedures, hence eliminating parallel working methods. Sometimes interviews with the line organisation are performed by the project team to ensure and verify adoption of the changes, but in general it is the receiving organisation that is responsible for follow-ups of the long-term results.

5.5. Project Steering Models at IKEA

There exist two different project steering models at Plan & Secure Capacity. These are the Practical Project Steering model, PPS and the IKEA Project Management model, IPM. The PPS is the wished position for Global Projects and parts of it are also used for execution of other project types even if the PPS is not optimal for those. The broad use of the PPS is due to the lack of appropriate project steering models. The IPM model is quite unknown among employees at Plan & Secure Capacity.

5.5.1. Practical Project Steering Model

The most commonly used project steering model at Plan & Secure Capacity is the Practical Project Steering model developed by Tieto. The top management’s wish is that the PPS should be used for all Global Projects.

The PPS is a generic model, which means that it is possible to use it on different types of projects. The common opinion at Plan & Secure Capacity is that the model is too rigid to be used for Fast Track Projects, which creates a need for a new model. The PPS does not provide a detailed plan on how to conduct a project but provides guidance in project management.

The PPS has three main processes:

- Commitment – Definitions and agreements
- Management – Execution of decision, strategy choice and delegation
- Feedback – Follow-ups, reconciliation and castigation

The model consists of eight decision points, DPs, which are pre-determined occasions when decision-makers meet and decide on continued operations. The first four DPs have the purpose of describing the wished result and the last four have the purpose of fulfilling the wished result. They are illustrated in Table 4 below.

Table 4 Decision Points¹⁷⁷

Decision Point	Description
1	Preparation start, responsibilities for DP2 and DP3 assigned
2	New calculations and prerequisites reviewed, preparations continue or are terminated
3	Project definition, requirements and solution description established
4	Initiate execution
5	Follow up on project and risk, verification of result
6	Delivery to user
7	Handover to administration
8	Project accomplished

The model has a strong focus on the DPs and does not offer tools for measuring, analysing the problem, implementing solutions or standardising the developed solution. The emphasis is instead on ensuring that the activities are performed using checklists. The project team decides by themselves how to complete and fulfil the checklists. This gives a greater choice to the project team but makes it more difficult to use standardised working methods within project execution.

The PPS nomenclature is widely spread within Plan & Secure Capacity and most people know what a DP is. The problem is that there are many different interpretations on the exact meaning of each DP. The DP considered most

¹⁷⁷ Tonnquist, B (2008) p. 335

important at Plan & Secure Capacity is DP3 since it is where the decision to proceed with the actual improvement is taken. There are many different interpretations of DP3, which is probably due to the fact that project leaders are in a hurry and just want to get the DP3 cleared. This leads to problems later in the projects since e.g. the scope and budget are not detailed enough for efficient project execution.

There is a three-day course in PPS offered to project managers and project team members; unfortunately this course has not eliminated the confusion around the DPs.

The PPS is web based which means that one can access all checklists, templates, and manuals through the web, which makes it easy to use. There is however no storage of previous projects in the application, which makes it difficult to share knowledge and lessons learned through previous projects.

The entrepreneurial spirit at IKEA has resulted in that the PPS is not followed in the wished manner in Global Projects, since it is regarded as too strict. This has in turn lead to a disorder in project execution and that project execution varies a lot between projects. Since there is such a difference in project execution and in expectations on team members it is difficult to have an efficient project execution. One other reason for the PPS not being used in the intended extent is the fast growth of IKEA that makes employees prioritise a fast start up of new projects instead of a thought through, planned start up, which the PPS emphasises. The project team does not consider that using the PPS more extensively would probably shorten the total project execution time even though the start up would take a little longer.

5.5.2. IKEA Project Management

The IPM model has been internally developed at IKEA with the purpose of creating a project steering model adapted to IKEA. The reason for developing a model internally was that the previously externally developed models were not used in the intended way. By creating the model internally the belief was that it could be more adapted to the IKEA culture and that it could be briefer and less formal than the externally developed models. However the IPM is neither commonly known nor used at Plan & Secure Capacity today, one of the reasons could be that when aiming to be brief some important features of a project steering model had to be rejected which has lead to an insufficient model.

The IPM is based on an adapted version of the theoretical model PDCA – Plan, Do, Check, Act in the IPM called Idea, Plan, Do, Evaluate, illustrated in Figure 13.

The emphasis in the model is on defining and planning. There is also an emphasis on the final project report, which constitutes of achievement of goals, project execution, experience feedback and an evaluation of the project and customer perceived quality.



Figure 13 The Idea-Plan-Do-Evaluate cycle

The model offers few tools for project execution; mostly it only offers checklists and some guidance for defining, planning and final report development. The model does not offer any guidance for measuring, analysing the situation, finding solutions to the problem, implementing and standardising the developed solution. This makes it difficult for an inexperienced project manager to manage a project as well as it makes the project execution vary a lot between projects since no standardised working method for project execution is provided.

6. Identifying Distances to Best Practice

The purpose of this chapter is to get an understanding of where the wished position and the current situation at Plan & Secure Capacity can be placed in relation to a complete Six Sigma model, best practice. The analysis will furthermore illustrate how much the wished position and current situation have to be improved in order to reach best practice.

6.1. Background

The terminology of best practice used in the master thesis refers to a project management approach fully adapted to the Six Sigma project methodology i.e. the DMAIC model, described in Chapter 4.5. The wished position refers to how Fast Track Project should be executed at Plan & Secure Capacity according to the DAIIT method described in Chapter 5.3.2. The current situation refers to the current project management of Fast Track Projects described in Chapter 5.4.

The analysis is divided into the five phases of Six Sigma project methodology, DMAIC. For each phase the most important activities, according to theory, are listed and compared to both the wished position and the current situation. This is done in order to get an understanding of the distance for both the wished position and current situation to best practice. Some of the activities might seem generic such as “selecting a solution” but the activity refers to the best practice way of selecting a solution. The activities are weighted according to their importance, identified through theory. The best practice weight of the Define phase for e.g. the wished position is calculated by summarising the weights for each best practice activity fulfilled in the Define phase. Since the analysis is conducted using the DMAIC phases as a reference, activities performed in the wished position and current situation have been split up and allocated to the DMAIC phases in order to get a clear structure.

6.2. Best Practice versus Wished Position

The DAIIT method provides guidelines on how to manage a project using DAIIT but there are no checklists or templates supporting the project execution. This results in a lack of emphasis on documentation and is one of the reasons why the wished position at Plan & Secure Capacity fails to meet best practice.

The more thorough analysis is divided into sections according to the best practice model DMAIC.

6.2.1. Define

In the Define phase of the wished position some of the best practices are performed such as conducting a project chart, team chart and a process map. The wished position is though lacking some of the best practices in the Define phase such as identifying the project importance, identifying critical to quality characteristics and conducting a SIPOC analysis.

Not identifying the project importance leads to difficulties in prioritising the projects and it could lead to a situation where important projects are not allocated enough resources.

Since the CTQs are not identified in the wished position it is difficult to understand what the most important characteristics of the process are. Lacking this understanding could lead to the wrong emphasis put on both the problem and the solution.

To not conduct a SIPOC means that a complete understanding of the process' inputs, outputs, suppliers and customers is missing. In the wished position a stakeholder analysis is however conducted, which means that the suppliers and customers are identified anyway. Conducting a stakeholder analysis instead of a SIPOC means that the inputs and outputs of the process are not understood which could lead to the wrong emphasises being put on the problem and in the end, on the solution.

The analysis is summarised in Table 5 below, showing that there are still aspects of best practice that have to be fulfilled in order for the wished position to reach best practice.

Table 5 The relation between best practice and wished position in the Define phase

Best Practice	Weight	Wished Position
Project importance	15 %	
Project chart	30 %	✓
Team chart	10 %	✓
Critical to quality characteristics	20 %	
Process mapping	15 %	✓
SIPOC	10 %	
Six Sigma Maturity	55 %	

6.2.2. Measure

The wished position at Plan & Secure Capacity includes deciding the need of information, identifying the measurements, choosing and designing the measurement method and finally realising the measurement. The part of best practice that is missing is testing the measuring method. Not testing the measuring method could lead to that measures are neither valid nor reliable.

How well the Measure phase of the wished position corresponds to best practice is illustrated in Table 6 below.

Table 6 The relation between best practice and wished position in the Measure phase

Best Practice	Weight	Wished Position
Decide need of information	30 %	✓
Identify measurements	20 %	✓
Choose and design measurement method	20 %	✓
Test measuring method	10 %	
Realise measurement	20 %	✓
Six Sigma Maturity		90 %

6.2.3. Analyse

The Analyse phase of the wished position contains all steps of the Analyse phase's best practices. What is missing though, is a proper documentation of the Analyse phase.

The relation between best practice and the wished position in the Analyse phase is presented in Table 7 below.

Table 7 The relation between best practice and wished position in the Analyse phase

Best Practice	Weight	Wished Position
Identify improvement areas	25 %	✓
Identify reasons for the problem	25 %	✓
Identify main causes	50 %	✓
Six Sigma Maturity		100 %

6.2.4. Improve

The Improve phase of the wished position is close to best practice. The generation and selection of solutions as well as the testing and implementation of the solution are made in similar ways both in best practice and in the wished position.

The best practice of developing the solution after it has been selected is not done in the wished position. By not developing the solution further it could lead to the fact that the implemented solution is not the optimal solution.

Table 8 illustrates how well the wished position corresponds to best practice in the Improve phase.

Table 8 The relation between best practice and wished position in the Improve phase

Best Practice	Weight	Wished Position
Generating solutions	25 %	✓
Selecting a solution	25 %	✓
Developing the solution	10 %	
Testing the solution	15 %	✓
Implementing the solution	25 %	✓
Six Sigma Maturity		90%

6.2.5. Control

In the wished position of the Control phase all of the best practices are conducted; the working method is standardised, a final report is written, the project is delivered and the experiences from the project are shared.

The similarities between best practice and the wished position in the Control phase are illustrated in Table 9.

Table 9 The relation between best practice and wished position in the Control phase

Best Practice	Weight	Wished Position
Standardise the working method	30 %	✓
Last follow-up and verification	25 %	✓
Final report and delivery	25 %	✓
Share experiences	20 %	✓
Six Sigma Maturity		100 %

6.2.6. Summary of Best Practice versus Wished Position

The analysis of the gap between the wished position at Plan & Secure Capacity and best practice is illustrated in Table 10 and Chart 1. The chart illustrates how much of best practice that is emphasised by the wished position. It shows that the wished position is close to best practice in all phases except Define. The greatest emphasis on fulfilling best practice should therefore be on the Define since it is the weakest and consequently have the best improvement possibility but also since the Define phase are crucial for project success.

Since the phases are parts of a model, and not performed separately, they should also be treated together and therefore a total Six Sigma maturity level gives a good perspective on how Six Sigma mature the wished position is. The total Six Sigma maturity level is calculated as the sum of the percentage of maturity level for each phase divided by the number of phases. The total Six Sigma maturity level is 87% for the wished position as presented in Table 10. This shows that the wished position, in total, is close to best practice.

The wished position at Plan & Secure Capacity was recently established and the intention is to keep the wished position with only minor changes. A prerequisite for best practice at Plan & Secure Capacity is accordingly that the wished position and the best practice are relatively aligned in order to be able to adapt best practice without larger changes. The analysis shows that this is the case for the Six Sigma best practice and therefore a Six Sigma adapted project steering model suits Plan & Secure Capacity well.

Table 10 Percentage of Six Sigma maturity in the wished position

	Define	Measure	Analyse	Improve	Control	Total
Percentage of Six Sigma maturity	55%	90%	100%	90%	100%	87% <small>¹⁷⁸</small>

Wished Position

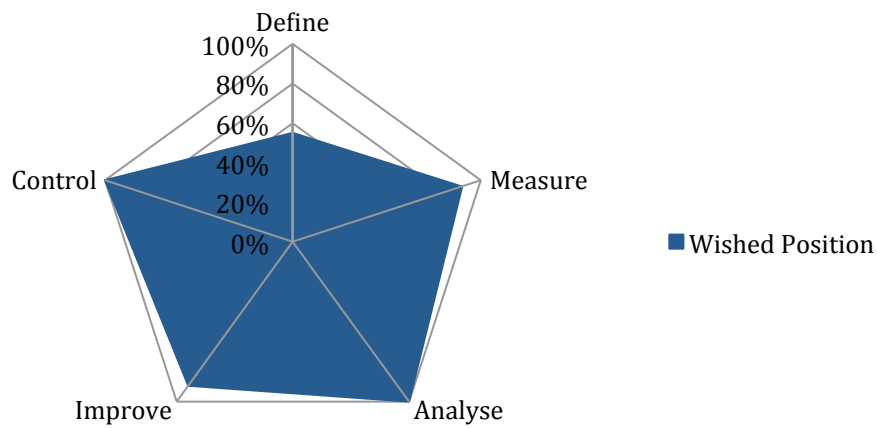


Chart 1 Wished position in relation to best practice

6.3. Best Practice versus Current Situation

The purpose of this chapter is to analyse the differences between best practice and the current situation in order to understand the extent of change needed in order to reach best practice.

There are great differences between the current situation and best practice. One of the main differences is the current lack of routines for project management. This has led to a high deviation in project execution and consequently there is confusion among the team members about what is expected from them during project execution. Another difference between the current situation and best practice is the lack of documentation, which leads to difficulties in sharing experiences and that synergy effects between projects are missed out.

¹⁷⁸ 87% = (55 + 90 + 100 + 90 + 100)% / (5*100) %

Below follow a more thorough analysis of the current situation compared to best practice.

6.3.1. Define

The best practices of the Define phase currently being conducted are that a team chart is created, a process map of the current situation is attached and the critical to quality characteristics are analysed through interviews with the receiving organisation. A downside is that the project teams are not documenting the activities enough.

The activities in the Define phase that should be conducted according to best practice but are not; are deciding the project importance, the project chart and the SIPOC analysis.

The project contribution and expected benefit are provided in the PIP, but not analysing them more in the Define phase results in that the current situation does not meet the expectations of deciding the project importance.

Currently the PIP initiating the project is considered as a project chart. The PIP is however lacking many of the important features of the project chart such as a detailed time plan, resource planning, identification of deliverables and a deeper understanding of the problem and the goals of the project. This leads to projects being conducted without a clear direction. It also means a lack of control over the resources and time needed for the project.

The common opinion at Plan & Secure Capacity is that the suppliers, customers, inputs and outputs to the process are known and that further analysis such as a SIPOC is unnecessary. Not making a SIPOC could lead to some of the suppliers, customers, inputs or outputs being missed which could result in incorrect conclusions about the problem being drawn. This could ultimately lead to an improper solution being selected.

The comparison of best practice and the current situation for the Define phase is illustrated in Table 11 below.

Table 11 The relation between best practice and current situation in the Define phase

Best Practice	Weight	Current Situation
Project importance	15 %	
Project chart	30 %	
Team chart	10 %	✓
Critical to quality characteristics	20 %	✓
Process mapping	15 %	✓
SIPOC	10 %	
Six Sigma Maturity		45 %

6.3.2. Measure

Currently the Measure phase consists of deciding what information is needed, then the measurement is realised without any further analysis. Thereby several important best practices in the Measure phase are missed.

Which measurements to use for measuring are not analysed nor is the measuring method. This is due to the fact that measurements and how to measure are regarded to be commonly known, consequently analyses are considered unnecessary. To not analyse which measurements to use nor the measuring method involves a risk of collecting improper data in an incorrect manner.

The measurement method is not tested. Not testing the measuring method could lead to non-valid and non-reliable data being collected by mistake which in the long run could result in selecting the solution on the wrong basis.

Best practice compared to the current situation for the Measure phase is illustrated in Table 12 below.

Table 12 The relation between best practice and current situation in the Measure phase

Best Practice	Weight	Current Situation
Decide need of information	30 %	✓
Identify measurements	20 %	
Choose and design measurement method	20 %	
Test measuring method	10 %	
Realise measurement	20 %	✓
Six Sigma Maturity		50 %

6.3.3. Analyse

The most important activity of the Analyse phase, identifying main causes, is currently being conducted using interviews with stakeholders and cause and effect diagrams. The other activities of the Analyse phase are however not being performed.

The improvement areas are identified through interviews with stakeholders but no further process analyses are conducted in order to identify improvement areas. Not using process analyses to identify improvement areas means that some improvement areas can be missed out.

No broad searching for reasons of the problem is performed before identifying the main causes. This could lead to important reasons of the problem not being taken into account when identifying the main causes which in turn could result in the identified main causes actually not being the true main causes. This could in the long run lead to the selected solutions not being the optimal one, since the selection is based on the wrong assumptions.

The best practice versus current situation regarding the Analyse phase is illustrated in Table 13.

Table 13 The relation between best practice and current situation in the Analyse phase

Best Practice	Weight	Current Situation
Identify improvement areas	25 %	
Identify reasons for the problem	25 %	
Identify main causes	50 %	✓
Six Sigma Maturity		50 %

6.3.4. Improve

In the Improve phase many of the best practices are currently conducted; solution generation, iterative development of the chosen solution, solution testing and implementation of the solution in the organisation. However, many of these steps lack proper documentation procedures.

The only step missing in the Improve phase is that the selection process of the solution is not conducted according to best practice. In the current situation the selection is based on a “gut feeling” and a list of pros and cons for each possible solution. This means that the solutions are not evaluated on the same criteria, which could lead to a biased selection of solution.

The gap between best practice and the current situation for the Improve phase is illustrated in Table 14 below.

Table 14 The relation between best practice and current situation in the Improve phase

Best Practice	Weight	Current Situation
Generating solutions	25 %	✓
Selecting a solution	25 %	
Developing the solution	10 %	✓
Testing the solution	15 %	✓
Implementing the solution	25 %	✓
Six Sigma Maturity		75 %

6.3.5. Control

Currently documents and routines are developed in order to standardise the new working method, just as best practice advocate. This step is unfortunately the only part of best practice in the Control phase currently being conducted.

One follow-up is currently being performed, it is however performed directly after implementation and a complete follow-up is missing. Not performing a follow-up a while after project closure, means that the long term effects of the project are not analysed. Sometimes conducting the follow-up is delegated to the line organisation which increases the risk of the follow-up of the results never being conducted.

Not writing a final report means that there is no documentation presenting the result of the project. A follow-up on how the budget and time plan was kept neither is conducted. Not performing a final report makes it difficult to distribute the results of the project throughout the organisation. It also makes it difficult to share experiences and learn from other projects.

There is currently no emphasis on sharing experiences between projects. This could lead to the fact that similar projects are conducted in different parts of the organisation without gaining synergy effects of each other.

The relation between the current situation and best practice in the Control phase is illustrated in Table 15 below.

Table 15 The relation between best practice and current situation in the Control phase

Best Practice	Weight	Current Situation
Standardise the working method	30 %	✓
Last follow-up and verification	25 %	
Final report and delivery	25 %	
Share experiences	20 %	
Six Sigma Maturity		30 %

6.3.6. Summary of Best Practice versus Current Situation

A summary of the current situation compared to best practice is presented in Table 16 and in Chart 2. Table 16 shows that that the current total Six Sigma maturity level is low, only 50 %. A lot of effort is therefore needed in order for Plan & Secure Capacity to reach best practice. Table 16 and Chart 2 also shows that it is the Define phase and the Control phase that have the lowest Six Sigma maturity

level and consequently it is in these phases that the most change is needed in order to increase the Six Sigma maturity level.

An explanation of the low Six Sigma maturity level could be that there is no project steering model adapted for Fast Track Projects, which means that many important steps during project execution easily are skipped or forgotten. Skipping steps during the project execution is probably done with the aim of shortening project execution times.

Skipping steps can lead to responsibilities being unclear, wrong data being collected etcetera. This can in the long run result in longer project execution times.

Another reason for the low best practice rating could also be the entrepreneurial culture at IKEA. The culture emphasises improvements which has resulted in that the main focus in project execution is on solution generation and implementation and other activities are neglected.

Table 16 Percentage of Six Sigma maturity in the current situation

	Define	Measure	Analyse	Improve	Control	Total
Percentage of Six Sigma maturity	45%	50%	50%	75%	50%	50% <small>179</small>

Current Situation

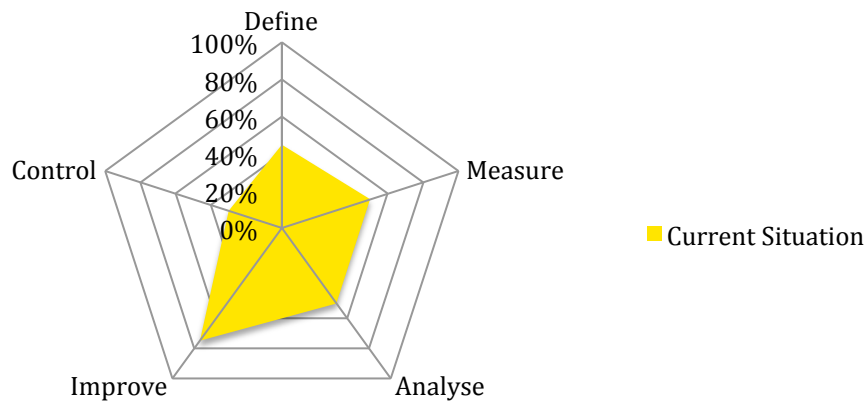


Chart 2 Current situation in relation to best practice

¹⁷⁹ 50% = (45 + 50 + 50 + 75 + 30)%(5*100)%

6.4. Conclusion

The analysis shows that neither the wished position nor the current situation meets the expectations of best practice. An illustration of their Six Sigma maturity as well as their relation to each other is illustrated in Chart 3 below.

Current Situation - Wished Position - Best Practice

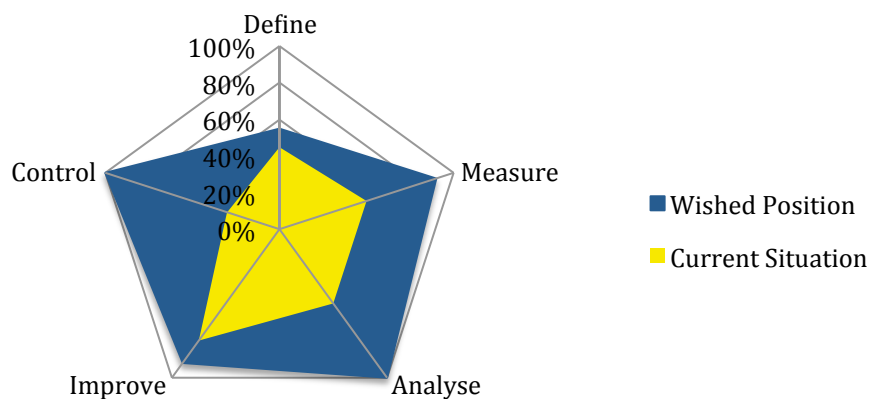


Chart 3 Relation between current situation, wished position and best practice

Comparing the wished position and the current situation in Chart 3, a gap between how projects are wished to be managed and how they are managed in reality, is easily identified. The gap exists since not many project leaders follow the guidelines, DAIIT, that should be used for Fast Track Project execution. If FTPs were performed as wished, there would be no gap and the project execution of today would have a 87% Six Sigma maturity level.

The chart shows that the strongest correlation between the wished position and current situation is in the Improve phase, where they both perform well. The current situation is close to the wished position in the Define phase as well, this, however, must be put in relation to the fact that the wished position has only a mediocre maturity level in the phase. In the Control phase there is a substantial distance between the wished position and the current situation. This indicates that the DAIIT working method is currently little emphasised in the Control phase.

The wished position has overall a high Six Sigma maturity level since the DAIIT method includes many of the components considered important according to Six Sigma theory. This facilitates the transition of the wished position to Six Sigma

best practice. For the wished position to be able to reach best practice, an increased emphasis on documentation is needed to give the organisation a possibility to learn and improve. An increased focus on documentation will be obtained by implementing a project steering model adapted to best practice. The greatest focus in the model should be on fulfilling best practice in the Define and Control phases since they are the weakest and consequently have the most improvement possibility. The model will shift the wished position so that it becomes what is considered best practice and consequently the wished position will attain a full Six Sigma maturity level. The developed project steering model is explained in Chapter 7 and is presented in Appendix A.

It is only when the wished position has reached best practice that the current situation can also reach best practice. When the project steering model, based on Six Sigma, has been developed and is declared as the standard for Fast Track Project execution, the model needs to be used in order for the current situation to reach best practice. To get the model to be put in use, a thorough implementation plan of the project steering model is crucial and establishes the adaption of the model, which finally leads to a current situation equal or close to best practice. Establishing the adaption of the project steering model an implementation plan has been developed and is presented in Chapter 8.

7. The Project Steering Model

In order for the wished position at Plan & Secure Capacity to reach best practice, a project steering model for Fast Track Project execution has been developed. The project steering model and how it helps the wished position to reach best practice, is presented in this chapter.

7.1. Introducing the Project Steering Model

The purpose of the project steering model is to provide a tool that Plan & Secure Capacity can use in order to reach best practice in project management. The model is based on the theory of Six Sigma and Project Management and is adapted to fit the culture at IKEA. The project steering model is supposed to be used for all Fast Track Projects and is divided into checklists, templates and a manual. The manual should act as a supporting tool when the checklists are not completely understood. A mini version of the manual with a good overview of the phases and activities has also been developed to be used when not much support is needed for the project execution. This mini version is presented in the beginning of the manual.

The project steering model covers the execution of Fast Track Projects but not the preceding processes of *scope and qualify* and *select and prioritise*. The model act as support from when the process council has approved the project until project closure, with an additional follow-up approximately two years after project closure.

The project steering model has been designed with the purpose of it being web-based, which enables several users to access the documentation simultaneously. The Temporary Project Summary and the Project Summary, are documents that act as abstracts for the project. They should be easy to access from the database which would encourage the use of them, which finally leads to a better sharing of experiences in the organisation. Using a web-based project steering model would also enable version management, which decreases the problem of different versions of documents.

The model and the manual will be described in the following chapters. First follow a description of the checklists and templates and then an introduction to the manual.

The model and manual are presented in Appendix A and in Appendix B.

7.2. The Checklists and Templates

First a short explanation of the generic documents used in several of the DMAIC phases followed by a more detailed description of the documents used in the different DMAIC phases.

Standardised Documentation

As many checklists and templates of the project steering model as possible are standardised in order to increase the efficiency of the model. The standardised documents are listed and explained below:

- Meetings
- Responsibilities
- Document Update

All meetings, except the Start-up Meeting, start by approving the work performed in the previous phase and the updated documents. Then the meeting continues by introducing the activities of the upcoming phase and ensuring that all team members understand the working model. This includes explaining the phase, the expectations of it and also distributing and documenting responsibilities. The responsibility document is created to ensure that everyone understands their responsibilities and to guarantee that tasks do not overlap or are not forgotten.

An update of certain documents is needed and performed in some of the phases. This is to ensure that the data in the documents is not obsolete which could lead to decisions based on wrong information.

The DMAIC phases

The templates and checklists for each phase of the model are described below.

Define

The purpose of the Define phase is to get a clear understanding of the problem and of the goals of the improvement. The Define phase consists of the following checklists and templates:

- Temporary Project Summary
- Project Start Meeting
 - Responsibilities in the Define Phase
- Project Chart
 - Time Plan
- Education Plan

- Update Documents
- Define/Measure Meeting

A Temporary Project Summary is included in the Define phase in order to make the project searchable for others within the organisation already during the project execution. This increases the possibility of sharing experiences, strongly emphasised by Six Sigma, and of gaining synergy effects from similar projects being conducted concurrently in other parts of the organisation.

The Project Chart is one of the most important documents of the project steering model. In the Project Chart the problem is defined as well as the purpose, current situation, wished position and deliverables. The Project Chart also addresses the project importance by declaring the expected benefits of the project. A team chart, timetable and process map are also included in the Project Chart. The Project Chart can be perceived as being extensive but since this document acts as a control document for the entire project execution it is important that it is done thoroughly. A well executed project chart is important since it helps fulfilling many of the best practices of the Define phase such as; project importance, Project Chart, team chart and process mapping.

To make the project steering model adapted to Plan & Secure Capacity’s emphasis on change management, an Education Plan should be conducted already in the Define phase. The purpose is to ensure that the stakeholders are educated already during the project execution so that they are prepared for the change when the improvement is implemented.

The Critical to Quality Characteristics analysis and the SIPOC analysis, Suppliers, Inputs, Process, Output, Customers (in the model called SIPOS in order to fit the IKEA culture), are recommended by Six Sigma literature to be performed in the Define phase. In the project steering model they have however been transferred to the Measure phase. This is due to the fact that identifying CTQs and conducting a SIPOC are more closely related to measuring and since the authors advocate a clear focus on defining and start-up throughout the Define phase the analyses have been transferred. How best practice in the Define phase is fulfilled using the project steering model, is illustrated in Table 17 below.

Table 17 Fulfilment of best practice in the model: Define phase

Best Practice	The Project Steering Model
Project importance	✓
Project chart	✓

Team chart	✓
Critical to quality characteristics	<i>Fulfilled in the Measure phase</i>
Process mapping	✓
SIPOC	<i>Fulfilled in the Measure phase</i>

Measure

The purpose of the Measure phase is to understand the current state of the process and the problem in order to expose the underlying causes of the problem. The Measure phase consists of the following checklists and templates:

- Define/Measure Meeting part 2
 - Responsibilities in the Measure phase
- Critical To Quality Characteristics
 - SIPOS – Suppliers, Inputs, Process, Output, Stakeholders
 - VOS – Voice of the Stakeholder
 - FMEA – Failure Mode and Effect Analysis
- Data Collection Plan
- MSA – Measure System Analysis
- Realise the Measurement
- Document Update
- Measure/Analyse Meeting

Identifying the critical to quality characteristics is essential for deciding what information that is needed in order to understand the process and the problem. To identify the CTQs an IKEA adapted VOS (in the theory VOC – Voice of the Customer) and a FMEA are conducted. These have been chosen since they use two different perspectives for identification of the CTQs. In the VOS the stakeholders are interviewed in order to identify the CTQs while in the FMEA potential failures of the process are identified and the failures with the highest risk priority are classified as CTQs. According to best practice the measurements should then be identified which in the project steering model is done using an IKEA-adapted SIPOS. When the measurements have been identified, which measurements to use for measuring the CTQs are decided upon using a Measurement Selection Matrix.

Choosing and designing the measuring method is important according to best practice. In the model this is done using a Data Collection Plan, which ensures that the data is collected in a desirable way. The chosen measuring method is then tested, according to best practice, through a Measure System Analysis, which amongst others identifies the validity and reliability of the measuring.

When all preparations have been made for the measuring, it should be realised.

How best practice in the Measure phase is fulfilled using the project steering model is illustrated in Table 18 below.

Table 18 Fulfilment of best practice in the model: Measure phase

Best Practice	The Project Steering Model
Decide need of information	✓
Identify measurements	✓
Choose and design measurement method	✓
Test measuring method	✓
Realise measurement	✓

Analyse

The purpose of the Analyse phase is to identify the main causes of the problem. The Analyse phase starts by analysing the process in order to get a thorough understanding of the process and to identify improvement areas. Thereafter the potential reasons of the problem and the main causes of the problem are identified. The checklists and templates of the Analyse phase are the following:

- Measure/Analyse Meeting Part 2
 - Responsibilities in the Analyse Phase
- Value Analysis
- Flow Analysis
- Root Causes
- Document Update
- Analyse/Improve Meeting

In order to get a thorough understanding of the process and to identify improvement areas a Value Analysis and a Flow Analysis should be conducted. The Value Analysis and Flow Analysis have been chosen since they are simple to perform and since they complement each other, which increases the possibility of identifying all important improvement areas.

Best practice stresses the importance to get an understanding of the reasons of the problem and the main causes of the problem, this is done through a Root Causes analysis using a cause-and-effect diagram. Understanding the causes of the

problem is crucial when developing the solution, otherwise there is a risk that the effects of the problem, and not the problem, are treated.

How best practice in the Measure phase is fulfilled using the project steering model is illustrated in Table 19 below.

Table 19 Fulfilment of best practice in the model: Analyse phase

Best Practice	The Project Steering Model
Identify improvement areas	✓
Identify reasons for the problem	✓
Identify main causes	✓

Improve

The purpose of the Improve phase is to find a solution to the problem and to implement it. The Improve phase consists of the following checklists:

- Analyse/Improve Meeting part 2
 - Responsibilities in the Improve phase
- Criteria
- Generate Solutions
- Select Solution
- Pilot Testing
 - Pilot Testing Time Plan
- Updated Education Plan
- Implementation Plan
 - Implementation Time Plan
- Process Documentation Update
- Implement the Solution
- Results of Implementation
- Document Update
- Improve/Control Meeting

The Improve phase starts by generating criteria and corresponding weights of importance. The criteria are later used to evaluate the generated solutions. It is important that the criteria are developed before generating solutions since there otherwise is a risk that criteria are developed to fit a certain solution.

For solution generation brainstorming has been chosen. This is since it is a simple way of generating solution and it advocates a broad mind for the solution

generation. When generating the solutions the information obtained from the Analyse phase should be used as inspiration.

The solution selection is then done by evaluating the generated solution using the developed criteria. Before moving on to the implementation phase the selected solution has to be approved by the Process Leader or the Process Owner. If the solution is not approved the solution should be redesigned or another solution should be selected until approval.

Just as in best practice the solution should be tested before being implemented in full scale. The Pilot Testing template provides tools for planning the testing carefully and to evaluate the testing in order to decide if any improvement of the solution is necessary. There is a project gate after the testing. An analysis whether the tested solution can achieve the project goals is made, if it cannot the solution should be improved. The gate is important because it gives the process leader the opportunity to approve the solution for implementation.

Before implementing the solution it is important that the stakeholders are educated in order to be able to benefit from the improvement. When a solution has been chosen the Education Plan, first created in the Define phase, should be updated in order to include education of the solution.

The full scale roll-out should then be planned using the Implementation Plan document; activities are assigned, a time plan is conducted and a contingency plan is developed. Before the roll-out all process documentation including process map and working methods are updated.

Using the Results of Implementation checklist the results from the full-scale implementation are analysed to ensure that the implementation is fulfilling the purpose, the wished position and the deliverables. When the above is fulfilled it should be communicated to the rest of the organisation to ensure long lasting results.

Table 20 below shows that using the project steering model all steps of best practice in the Improve phase are fulfilled.

Table 20 Fulfilment of best practice in the model: Improve phase

Best Practice	The Project Steering Model
Generating solutions	✓
Selecting a solution	✓
Developing the solution	✓
Testing the solution	✓
Implementing the solution	✓

Control

The purpose of the Control phase is to complete the project work and to ensure the project's long-term success. The Control phase also includes transmitting the project results to the rest of the organisation and to give recommendations for further actions. The checklists and templates used in the Control phase are listed below:

- Improve/Control Meeting Part 2
- Responsibilities in the Control phase
- Standardise Process
- Final Project Report
- Project Summary
- Project Handover Meeting

According to best practice it is important to standardise the improved process in order to ensure that the change is long term and that the process does not fall back to the state before the implementation. The model addresses this in the template Standardise Process in which the project team is encouraged to standardise the process.

In the Final Project Report the project is being evaluated both on project return and contribution. Lessons learned during project execution regarding both project methodology and the process are listed. There is also a focus on future improvement areas discovered during the project execution. The information collected in the Final Project Report is then used for sharing experiences from the project to the rest of the organisation. It is important with a well executed Final

Project Report since it contains many of the important best practices of the Control phase.

The purpose of the Project Summary is to make the project easy to access for others in the organisation. The Project Summary is searchable for others through the web-based platform in which all project documentation is stored. The Project Summary is therefore a useful tool for spreading the results and sharing experiences. The Project Summary replaces the previously conducted Temporary Project Summary.

The Handover Meeting acts as the final gate for the project where the team members approve the standardisation of the process and the documents created in the Control phase. When these are approved the responsibility of the improved process is transferred to the process owner. The only responsibility left for the project team after the hand over is a final project follow-up and verification that should be conducted approximately two years after project closure.

As illustrated in Table 21 below all steps of best practice in the Control phase are fulfilled using the project steering model.

Table 21 Fulfilment of best practice in the model: Control phase

Best Practice	The Project Steering Model
Standardise the working method	✓
Last follow-up and verification	✓
Final report and delivery	✓
Share experiences	✓

7.3. The Manual

The manual is a complement to the checklists and templates and is not mandatory to use, it acts as a support for using the checklists and templates. The manual has been developed in order to make the checklists and templates as easy to use as possible. How much the manual is used during the project execution depends on the Fast Track Project execution experience of the project manager and the project team members.

The manual begins with a short introduction to the project steering model, explaining the overall purpose of it. It also explains that the manual should act as a support to the checklists and templates and that the use of the manual depends on the experiences of the project team.

The introduction to the project steering model is followed by a short introduction to the concept of Six Sigma and DMAIC. A summary of the most important steps of the project steering model is also provided. The summary can be used to ensure that all steps of the project steering model are conducted.

It also provides descriptions of all the checklists and templates. The descriptions explain the purpose of the checklists and templates and describe how to use them. The manual also provides examples of how to complete the templates.

8. Implementation

The previous chapter explained how the wished position could be brought to best practice by using the project steering model. In order for the current situation to also reach best practice the model has to be implemented. The purpose of the implementation chapter is therefore to give guidance on how this should be done. Note that this chapter only provides a framework and not a full implementation plan.

Implementing the model includes preparing the organisation for the roll-out and conducting the roll-out. Using the implementation plan the current situation can be brought to best practice.

8.1. Preparations for Roll-out

Several activities should be conducted before the roll-out of the model; management support, communication plan, education plan, risk analysis and a pilot test. If these activities are not conducted properly there is a risk that the model does not help achieve best practice, due to that it is not used or that it is used improperly. If the roll-out is unsuccessful it is difficult to rewind and try to re-launch it therefore the preparations for the roll-out are extremely important.

The preparations needed before roll-out are presented in following chapters.

8.1.1. Management Support

For the model to be used within Plan & Secure Capacity it is important that the management both at Plan & Secure Capacity and in the entire Capacity Process are truly showing their support for the model. In this way it is ensured that the model gets a high prioritisation within the organisation. It is also important that the responsibility for the project steering model is transferred to the Project Management Office at IKEA named the PME, Project Management and Execution, to ensure that the model is continuously improved and that the employees are educated in the use of the project steering model. At the PME, this person should preferably be the Project Management Matrix Manager for the Capacitying process.

8.1.2. Communication Plan

When the management for the project steering model is clearly defined a communication plan should be developed. It is important that the purpose of the

project steering model; to make Fast Track Project execution more efficient, is clearly communicated to the organisation.

The employees have expressed a desire for a model that is easy to use and that is not too complicated or complex, characteristics that the project steering model possesses. Therefore it is important that these factors are communicated and clearly illustrated when marketing the model.

The communication plan should have different approaches depending on whom it addresses. For managers in the receiving organisation it should be detailed whereas for other stakeholders it should only pinpoint the most important aspects of the model.

8.1.3. Education

To be able to use the project steering model properly it is important that the employees are educated in Six Sigma and in the use of the project steering model. The education should be adapted to fit different levels of the organisation. Preferably an organisation specialising on teaching Six Sigma should educate.

The project leaders should get a substantial education in Six Sigma, a so-called Black Belt education. It is important that they get an understanding for the methodology, the model and for the tools that are used in the model since a thorough understanding of Six Sigma creates a long-term perspective of the methodology in the organisation.

For the project team members the education does not have to be as thorough. The education should briefly explain the basics of Six Sigma. It should then focus on explaining how to use the model and the included tools. The education should also address the advantages of the model such as providing a more efficient project execution.

8.1.4. Risk Analysis

Risks with the implementation must be analysed and action plans should be developed in order to deal with the risks. Table 22 illustrates the identified major risks connected to the implementation of the project steering model and the corresponding action plans.

Table 22 Risk Analysis

Identified risk	Action Plan
Management is not enough involved in the implementation of the model.	The support from management can be ensured by involving managers early on so that they get an understanding of the model and the implementation.
The need of resources for the implementation is underestimated.	The risk of underestimating resources can be avoided by considering previous project experiences.
The project steering model education is not good enough.	By inviting Six Sigma specialists to teach Six Sigma the quality of the education can be ensured.
The projects chosen have a too large scope.	The project selection is part of the selection and prioritisation process, and is therefore outside of the scope of this master thesis.
The improvement projects are not connected to the organisation's strategies and objectives	The project alignment with the organisation's strategies and objectives is part of the selection and prioritisation process, and is therefore outside of the scope of this master thesis.
The model is not used since it is regarded to be too complex	The risk of the project steering model perceived as too complex could be decreased by communicating the model properly and by having a continuous improvement where users can contribute with opinions and suggestions on how to make the project steering model more user friendly.

8.1.5. Pilot Project

Before the roll-out of the model a pilot project should be performed. When the pilot has been conducted the result of it should be evaluated and the model improved, if necessary. If the pilot project receives good results these should be communicated to the organisation to encourage the employees to use the model when it has been implemented in the organisation.

8.2. Roll-out

During the roll-out it is important that there is a support function that can answer questions regarding the model. The support function should consist of the Project Management Matrix Manager and a team from the PME, who also have the

important task, according to Six Sigma, to perform a continuous improvement of the model. It is also important that the model is measured so that the effects of it can be analysed. Excellent project execution should be rewarded which in turn will increase the use of the model. Lessons learned from well-executed projects should also be distributed to the organisation.

8.2.1. Measuring

It is important to have a good understanding of the degree of use of the project steering model in order to be able to take corrective measures. In order to understand the degree of use, the following measurements have been developed:

- Percentage of initiated Fast Track Project using the project steering model.
- Percentage of number of Fast Track Projects using the project steering model that are finished.
- Average project return per Fast Track Project using the project steering model.

The first measurement helps create an understanding of how much action that is needed in order to increase the use of the model. It can also be used for understanding how different actions impact on the use of the model. The second measurement should be used for creating an understanding of the efficiency of the model. If the measurement shows low figures it is an indication of that either the project steering model has to be improved or the use of the model has to be improved. The last measurement indicates the success of the project and low figures indicate that either the project steering model or the use of the model has to be improved.

8.2.2. Continuous Improvements

Six Sigma is about continuous improvement and it is therefore very important that the model is constantly improved. Improvement opportunities of the project steering model are listed in the Final Project Report and should be used as input for improvements of the model, as well as the lessons learned also listed in the Final Project Report. In addition the results of the measuring should be used as input for improvements of the model. The Project Management Matrix manager should be responsible for the continuous improvements.

8.2.3. Rewards

It is important with incentives to ensure the use of the project steering model. A recommended incentive is to recognise project teams that have executed Fast Track Projects with an excellent result. The project teams should be recognised by

advertising the teams on the IKEA intranet and by distributing the results of the project to the organisation. Recognising the project teams helps marketing the project steering model and distributing lessons learned to the entire organisation.

9. Conclusion

In this chapter the deliverables of the master thesis are presented. Pros and cons, as well as improvement areas for the project steering model and the implementation plan are also presented.

9.1. Deliverables

The main purpose of the master thesis has been to develop a project steering model based on the theory of Six Sigma. In order for the model to actually be used, a guide on how to implement the project steering model has also been developed.

The deliverables of the master thesis, as presented in Chapter 1.3 are listed below:

- An analysis of the Six Sigma maturity of the wished position and the current situation
- A Six Sigma based project steering model for execution of Fast Track Projects
 - Checklists for each of the DMAIC phases in the Six Sigma model
 - Templates for each of the DMAIC phases in the Six Sigma model
 - Instructions on how to use checklists and templates
- A guide on how to implement the project steering model

9.2. The Six Sigma Maturity

The Six Sigma maturity level is a measure developed by the authors to be able to compare the wished position and the current situation to best practice according to Six Sigma.

9.2.1. The Wished Position

The wished position for Fast Track Project execution is defined as DAIIT – Define, Analyse, Improve, Implement, Transition, a method exclusively developed for Fast Track Projects. The DAIIT method captures many of the ideas of DMAIC, having a 87% Six Sigma maturity level. The main reasons for DAIIT not reaching best practice are that DAIIT it lacks many of the activities considered best practice in the Define and Control phases, crucial for project success. The DAIIT method does neither provide any checklists nor templates.

9.2.2. The Current Situation

The current situation, how Fast Track Project execution is actually currently conducted, has a 50% Six Sigma maturity level. This can be explained by the fact that project steering is often performed ad-hoc and there is little emphasis on documentation. Neither are there any checklists nor templates used for Fast Track Project execution. However the Improve phase in the current situation is performed comparatively well and is the phase closest to fulfil best practice.

9.2.3. Conclusion

A summary of the Six Sigma maturity for the wished position and the current situation is illustrated in Chart 4 below. Studying the wished position and the current situation in the chart it becomes clear that there is a gap in Six Sigma maturity between them. The reason for the gap is that projects leaders tend not to use the DAIIT working method for Fast Track Project execution. If FTPs were performed in the wished manner the current situation would have 87% Six Sigma maturity, just as the wished position has today.

Introducing a Six Sigma based project steering model shifts the wished position to a full Six Sigma maturity level. Implementing the project steering model in the organisation the current situation is also shifted to a full Six Sigma maturity level.

Current Situation - Wished Position - Best Practice

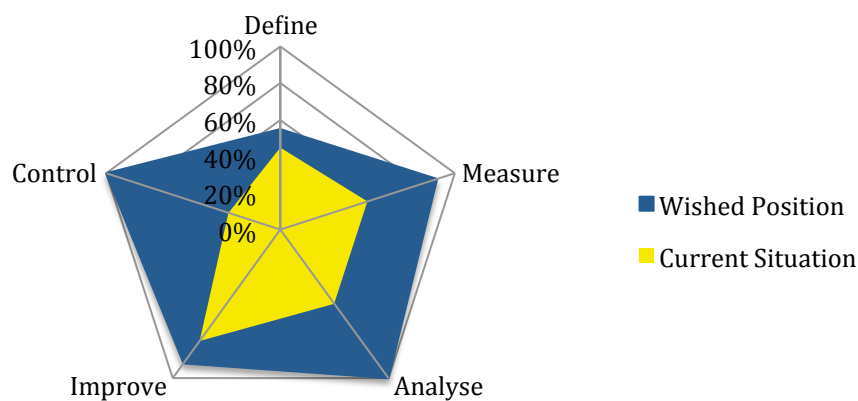


Chart 4 Relation between current situation, wished position and best practice

9.3. The Model and the Manual

The project steering model has been developed using Six Sigma and project management literature. Information obtained from interviews with experienced project managers within Plan & Secure Capacity has also been used. The project steering model aims at standardising the work conducted in Fast Track Projects in order for Plan & Secure Capacity to benefit from a more efficient project execution process. The model consists of checklists and templates that are divided into the five DMAIC phases of Six Sigma – Define, Measure, Analyse, Improve and Control. A lot of effort has been put on making the project steering model as user friendly as possible and to adapt it to the culture at IKEA.

The manual with instructions on how to use the checklists and templates has been developed in order to make the model as easy to use as possible. The manual acts as a support for the model and it provides examples and more detailed explanations of the checklists, templates and tools provided in the project steering model.

The intention is that the model and manual should be used together. The use of the manual depends on the experience of using the project steering model; a more experienced project leader might not need the manual as much as a less experienced project manager.

9.3.1. The Pros and Cons of the Model and the Manual

The project steering model that has been developed based on the DMAIC phases suits Fast Track Project execution at Plan & Secure Capacity well. This is because the working method for Fast Track Project is based on DAIIIT, which can be considered well aligned with the DMAIC framework since it has a 87% Six Sigma maturity level, as illustrated in Chapter 6.2.6. Using the model for execution of Fast Track Projects therefore gives Plan & Secure Capacity a good support for reaching best practice and improving the project results.

The model has been adapted to the culture at IKEA. Among others the model includes nomenclature commonly used at IKEA, it includes project steering aspects important to Plan & Secure Capacity as well as working methods already used at Plan & Secure Capacity. Throughout the development of the model there has also been an emphasis on making the model as user friendly as possible, which is highly appreciated at Plan & Secure Capacity.

The model will also make it easier for Plan & Secure Capacity to execute Fast Track Projects this should result in that more Fast Track Projects are being conducted. Conducting more Fast Track Projects leads to that smaller problems will be solved faster and thereby employees will not hesitate to raise problems as

much as they currently do. When more problems are raised and solved there will be fewer miscalculations in the Plan & Secure Capacity process which leads to a higher availability in retail stores. This ultimately leads to more satisfied customers.

Even though the culture at IKEA has been taken into account when developing the model it could have been even more adapted to the culture by using more of the already known nomenclature and especially by making the model even briefer. By making the developed model even briefer some of the parts considered best practice would have had to be erased, meaning that the model would not have followed best practice entirely but it would probably have been easier to implement it. There is consequently a constant balancing between the model being enough adapted to Six Sigma and being brief enough to suit the culture at Plan & Secure Capacity.

The Analyse phase only treats qualitative analyses and therefore important information that could have been attained using a quantitative analysis is lost. The reason for leaving out the quantitative analysis is that it is difficult and sometimes impossible to conduct on process improvement projects.

The manual provides a good support for inexperienced project leaders and for project team members. Using the model it is easy to introduce new employees to the Fast Track Project working methods. The theory of Six Sigma and the purpose of it could however have been explained even more in the manual in order to provide a thorough understanding of the underlying theory.

9.3.2. Potential Improvements of the Model and the Manual

The project steering model could have been even briefer and more adapted to the IKEA culture. This would though have led to sacrifices of some of the DMAIC activities. However adapting the model even more to IKEA would probably have resulted in the model being easier to implement and becoming more used.

The Analyse phase could have been improved by including more tools to the analysis. The tools could then have been optional so that the tools most suitable for the specific project only are used. Especially qualitative tools could have been included. These have however been left out since they are considered to be on a too detailed level for the purpose of the model.

The manual could have been improved by offering more theory about Six Sigma. It would provide project teams with a deeper understanding of the underlying factors of the project steering model. The culture at IKEA is however not emphasising theory why a more extended explanation of Six Sigma has been left out. The

manual could also have been improved by making it interactive so that questions about the project steering model could be posed, this is however outside the scope of the project.

The project steering model has not been tested on an actual project due to time limits. Testing the project steering model would probably lead to additional ideas of improvements of the model and the manual.

9.4. Implementation Plan

In order to meet best practice at Plan & Secure Capacity the model has to be used. To be able to use the model it has to be implemented. The implementation plan deals with both preparations needed before roll-out and actions needed when the model has been implemented.

During the preparation for roll-out management have to show their support. A communication plan and an education plan also have to be established. A risk analysis also has to be conducted as well as a pilot testing of the project steering model.

When the roll-out has been carried out it is important that the use of the project steering model is encouraged. This is done by measuring results of the use of the model and communicating them to the organisation. Rewarding the use of the model also encourages the use of the model. Furthermore it is important that the model is continuously being improved.

9.4.1. Pros and Cons of the Implementation Plan

The implementation plan provides a good view of what aspects are needed to take into account when introducing the project steering model. It emphasises that preparations before the roll-out are crucial in order to get the project steering model used. It also accentuates the importance of education and communication.

The cons of the model are that it is not fully developed i.e. it does not provide checklists and templates that should be used for the implementation. The project steering model that has been developed does however provide tools for conducting an education and communication plan that could be used for the implementation of the model. A more detailed implementation plan with adapted checklists and templates has not been developed since it is outside the master thesis' scope.

10. Contribution to Academia

The purpose of this chapter is to identify the developed project steering model's contribution to Six Sigma theory and to general project management theory.

In the Six Sigma literature there are templates and checklists that could be used for project management. The templates and checklists are however only lined up and there is little explanation of how they should be combined to create a structured project steering model.

The developed project steering model contributes to the theory of Six Sigma by putting the templates and checklists that Six Sigma offers into a context and giving advice on how to use them to create a structured project execution. The project steering model captures the most important ideas of Six Sigma and illustrates how these could be combined together in a project steering model. The project steering model also illustrates the interrelationship between the templates, checklists and the theory of Six Sigma and furthermore the model illustrates how to use the Six Sigma theory in practice.

The project steering model also contributes to project management by offering a project steering model that is simple to use, generic and adaptable to other organisations.

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Appendix A

The Project Steering Model [Confidential]

-DMAIC-

**The checklists for
efficient Fast
Track Project
execution**

IKEA®

The Project Steering Model

The Project Steering model is supposed to be used for execution of Fast Track Projects at Plan and Secure Supply. The Project Steering Model provides checklists, templates and a manual on how to use the checklists and templates.

The project steering model has its base in Six Sigma theory and has been adapted to fit the culture at IKEA. The purpose of the model is to offer an easy to use project steering model that helps Plan and Secure Supply to excel in execution of Fast Track Projects.

The Checklists and Templates

The checklists and templates should be used for execution of Fast Track Projects. If any of the checklists or templates is difficult to understand please consult the manual.

The Manual

The manual is a complement to the checklists and templates and is not mandatory to use, it acts as a support for the checklists and templates. The manual has been developed in order to make the checklists and templates as brief and easy to use as possible. How much the manual is used during the project execution depends on the experience of Fast Track Projects amongst the project manager and the project team members.

Appendix B

The Project Steering Manual [Confidential]

-DMAIC-

**The manual for
efficient Fast
Track Project
execution**

IKEA®

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