



LEAN SIX SIGMA NUGGETS

A Fully Commented Project Documentation

Abstract

A financial service provider faces client attrition and with this, a decrease in revenue and market share due to process problems. Throughout the book, the project work and especially the application of typical Lean Six Sigma tools are elaborated using this case. At the end, a drastically enhanced process landscape leads to increased client satisfaction and loyalty that bring consequentially lasting improvement in business results.

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0. Introduction

0.1 What is Lean Six Sigma?

Lean Six Sigma{ XE "Lean Six Sigma" } is a world-wide applied, proven approach for process improvement that consists of tools from two very different methodologies, Lean{ XE "Lean" } and Six Sigma{ XE "Six Sigma" }.

Lean{ XE "Lean" } has been developed over decades by Toyota and contains a variety of tools tailored to reduce waste in processes.

The objectives of Lean are, amongst others,

- Reduction of turn-around-time
- Reduction of storage costs
- Reduction of work in progress
- Reduction of working capital
- Increase of process efficiency
- Increase of process capacity
- Improvement of throughput of goods and services from customer requirement to delivery
- Motivation of process stakeholders
- Increase in customer satisfaction
- Improvement of organisational results

Six Sigma{ XE "Six Sigma" } is a result of Motorola's successful fight of production problems, resulting in customer dissatisfaction in their TV plants in the 80th and focusses on reduction of the omnipresent variation in processes.

The objectives of Six Sigma are amongst others

- Reduction of defects and rework
- Improvement of quality and process capability
- Increase in predictability of process results

Introduction

- Increase in reliability of goods and services deliveries
- Increase of process capacity
- Motivation of process stakeholders
- Increase in customer satisfaction
- Improvement of organisational results

Due to the connection between variation and waste in a bi-directional cause and effect relationship, Lean Six Sigma{ XE "Lean Six Sigma" } has been developed in order to combine the tools of both methodologies into one tool set.

Lean: Reduction of Waste in Processes

Example: When sending goods using a logistics provider different mistakes can lead to customer dissatisfaction. For example, the turn-around-time might be too long. This usually occurs due to waste in the process like unnecessary waiting time, unnecessary long transport periods or due to rework after defects. This kind of defects usually require Lean tools. When eliminating waste in the process, other problems might be discovered that could possibly be dealt with using Six Sigma tools.

Looking at both approaches from the perspective of the process, it becomes obvious that Lean has a rather macro view, that shows a process from customer request all the way through to delivery. Contrary to that, Six Sigma is often used to analyse and solve specific problems within the process, often with a limited scope.

Over more than 20 years, Lean Six Sigma has been contributing to saving billions in dollars of costs as well as to generating additional revenue and income in a variety of organisations in nearly all branches. These organisations have been able to improve customer satisfaction and build stronger customer relationships as they turn around their processes in all stages of value creation. At the same time, they have been developing the next generation of leaders for their organisation whilst challenging them with problems to solve, to the benefit of the organisation. Even governmental ministries and agencies have been able to use this approach to increase customer satisfaction and process efficiency.

Whilst the tools within the Lean Six Sigma toolbox stem from both Lean and Six Sigma, the project management approach containing the phases DEFINE, MEASURE, ANALYSE, IMPROVE, CONTROL is taken from the Six Sigma toolbox. This project management cycle is often called DMAIC{ XE "DMAIC" }.

Six Sigma: Reduction of Defects in Processes

Example: When sending goods using a logistics provider defects can occur like damages, wrong destination or wrong invoices. These defects and the necessary rework will usually lead to late deliveries, i.e. deliveries later than the promised date. The resulting variation in the process usually leads to customer dissatisfaction due to lack of reliability. This kind of problems usually need Six Sigma tools to be tackled. Consequentially, eliminating root causes for variation very likely leads to reduction of waste in processes.

In addition to improving organisational processes, a Lean Six Sigma initiative often leads to contributing to strategic objectives. When Jack Welch led the implementation of Six Sigma in General Electric in the 90th, he intended and successfully implemented cultural change for General Electric (**Error! Reference source not found.**).

Table 0-1: General Electric's Cultural Change supported by Six Sigma

Situation before implementation of Six Sigma	Situation after implementation of Six Sigma
Sporadic use of tools and methodologies for quality improvement.	Proven approaches and tools for quality improvement are used in a disciplined and consistent manner.
Goods are shipped to customers and quality problems are fixed thereafter ("Ship and Fix" mentality).	Goods are shipped defect free in accordance to customer requirements.
Costs of quality problems are unknown or ignored.	Costs of quality problems are determined thoroughly and communicated to process stakeholders.
Values, mind-set and behaviour are driven by functions.	Values, mind-set and behaviours are process driven.
Business decisions are often based on gut feeling.	Business decisions are based on collection and analysis of objective data.

0.2 How does Lean Six Sigma Training Work?

Lean Six Sigma project leaders are the so called Green Belts{ XE "Green Belt" } or Black Belts{ XE "Black Belt" }. Green Belt training usually lasts about ten days and is delivered in parallel to the working on an organisation relevant improvement project. The cycle of training and application lasts three to six months. After completing the training, passing the Lean Six Sigma Green Belt exam and delivering impactful business results through the project, a Green Belt certificate is issued.

With this exam, the Green Belt is eligible to join a so-called Black Belt training, which typically lasts another ten days and is also done in addition to working on a more complex project. After passing the exam and completing a project successfully, a Black Belt certificate will be issued. After which, only a few outstanding Black Belts will go on to pursue the Master Black Belt certification track.

Lean Six Sigma as integral part of leadership education

In many private and public organisations, a successfully completed Lean Six Sigma project as project leader is a milestone on the career path of leaders.

A Lean Six Sigma project requires the project leader - be it Green Belt or Black Belt - to display a series of characteristics that make the genes for successful leaders. Absolute dedication to meeting customer requirements and a focus on improving business results as well as skills in data-based decision making are critical ingredients that will benefit organisational processes. Additionally, project leaders are required to lead a team of non-subordinates, communicate effectively with all levels of the organisation and fight for project results.

Not everyone, who display these qualities, automatically qualifies for a leadership position. However, the reverse could be said that project leaders who are not successful in delivering project results should be reconsidered in their eligibility for a leadership position.

Developing Lean Six Sigma project leaders, especially Black Belts and Master Black Belts is often a milestone in developing the next generation of leaders for the organisation as the Lean Six Sigma education and project work equips them with additional tools and skills that would come in handy in their day-to-day work as leaders.

0.3 Why Has This Book Been Written?

There are many books on the market, that cover Lean Six Sigma. Many of which are written from a high-level perspective covering the philosophy of this management methodology from various different angles. Additionally, there are books that describe the tools involved, their application and theoretical background in much detail.

Contrary to that, this book explains the Lean Six Sigma methodology using a complete and detailed project documentation. The main case study as well as supporting cases are based on real Lean Six Sigma projects. To protect our clients, all names and data have been amended. The main project describes a finance company who faces client attrition and with this, a decrease in revenue and market share due to process problems. Throughout the book, the project work and especially the application of typical Lean Six Sigma tools are elaborated using this case. At the end, a drastically enhanced process landscape brings increased client satisfaction and loyalty that consequentially leads to lasting improvement in business results.

Application of Lean Six Sigma Tools

Providing a wide variety of tools for very different problem situations, data constellations and analysis approaches is one of the objectives of Lean Six Sigma. However, there is no real Lean Six Sigma project that requires the application of all available and taught tools. Therefore, one of the most important, and at the same time very often most difficult tasks of the project leader is the selection of the appropriate tools in various situations.

In the following case study, only a fraction of all available tools is applied and explained. Some other tools and their application are introduced using different and independent case examples.

The idea of this book was borne out of an ever-repeated question by our clients for Lean Six Sigma case studies to support their newly trained and still unexperienced Lean Six Sigma Green or Black Belts. In addition to the training, this book offers a step-by-step guide for working on a project. The reader of this book should be introduced to the basics of Lean Six Sigma in order to fully appreciate the value of this book.

The objective of this book is to provide a reference project for the work through all phases of the DMAIC cycle. And, it gives practical hints for the application of rather complex tools without explaining their theoretical background. This book focuses on application of these tools in the project rather than their theoretical derivation.

As mentioned above, Lean Six Sigma has been developed out of two approaches, Lean and Six Sigma. The core for Lean Six Sigma is still the Six Sigma process improvement approach that is enriched by powerful Lean tools that complement the Six Sigma toolbox. This book does not cover all possible Lean tools; it rather explains most of the Six Sigma tools and adds some Lean tools.

0.4 How is This Book Structured?

This book is structured following the Six Sigma project cycle DMAIC with its five stages Define, Measure, Analyse, Improve and Control.

Every chapter contains the following structure

1. Overview
2. Steps
3. Objective
4. Prerequisites
5. Results
6. Checklist
7. Tips
8. Team Dynamics
9. Project Work

In the Overview, the respective phase in the DMAIC cycle is shown.

In Steps, the steps of the respective phase are shown and the objective of this phase is determined in Objective.

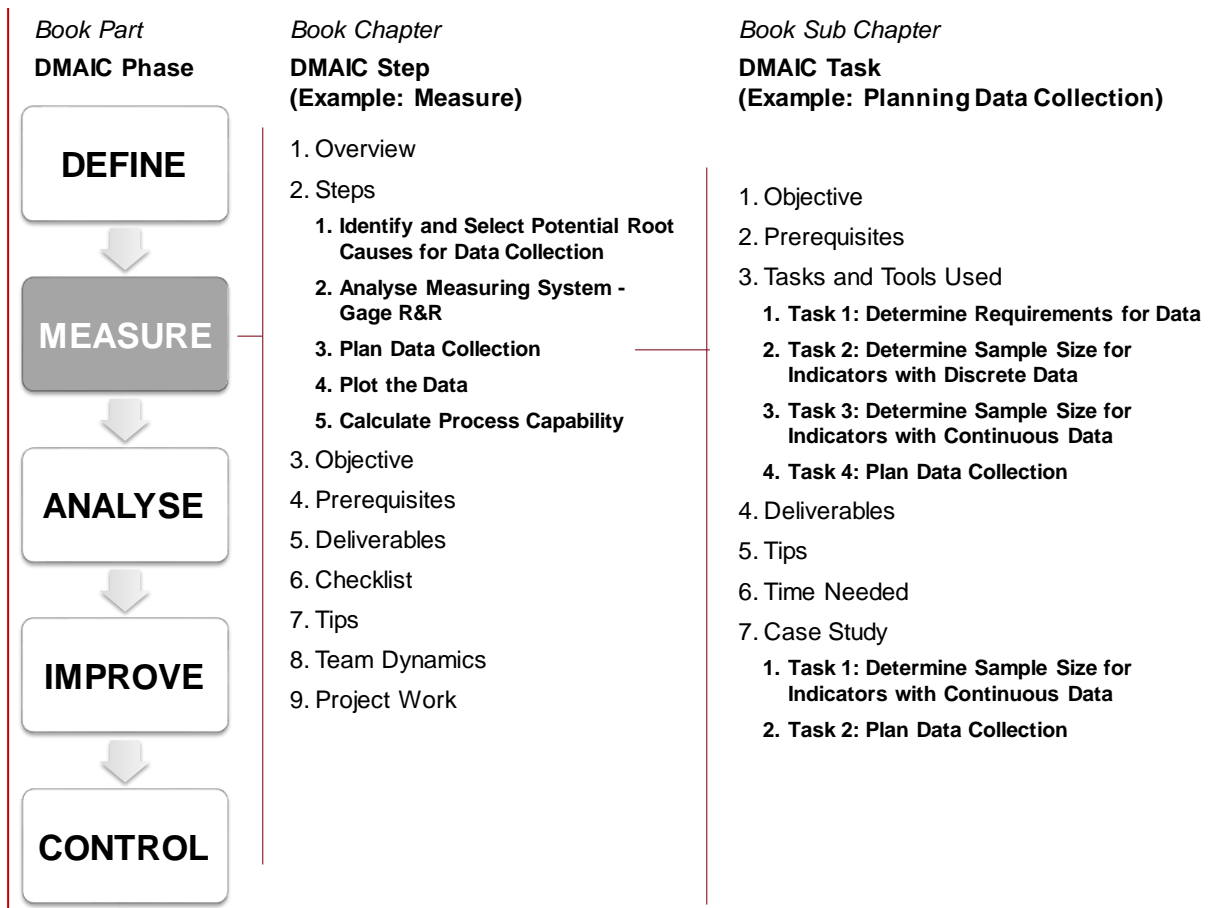


Figure 0-1: Example of the structure of this book for the phase "Measure" and step "Planning Data Collection"

In Prerequisites, necessary prerequisites for this phase are listed, whereas in Results, the expected results of this phase are mentioned.

In Checklist, a checklist for project leader and sponsor that might help to check completeness and success of the tasks in this phase after closing this phase is offered.

In Tips, potential methodical failures and some recommended preventative actions as well as fixes are discussed, while Team Dynamics offers some hints for frequently observed team dynamic failures.

In Project Work, the application of the aforementioned activities on the real case study is elaborated.

0.4.1 Improve: Developing Solutions

The next two chapters in "Improve" show how solution ideas are generated and developed with its risk assessed. These chapters cover the how-to for drafting an implementation plan.

This project phase delivers solutions for the problem with a well thought through implementation plan.

0.4.2 Control: Sustaining the Gains

The last chapter in "Control" is dedicated to managing the change as well as its introduction into the "normal process".

This project phase ensures sustainability of the results.

0.5 What Is Provided?

In addition to this book, a comprehensive set of aids is provided on DVD to the reader. These aids comprise of:

- All data used in case studies in this book are provided in the format Microsoft Excel (www.microsoft.com).
- All data plots and data analyses have been done using Microsoft Excel, partially with the add-on macro collection SigmaXL (www.sigmaxl.com). The respective data sets as well as graphical and analytical results are provided as well.
- The Lean Six Sigma project has been documented in detail using Microsoft Powerpoint. Therefore, all necessary files for phases Define, Measure, Analyse, Improve and Control are available on DVD, too.
- Additionally, a management presentation has been added to provide an example for communicating the project progress to the leadership team.

With this, it should be possible for you readers to follow through the typical Lean Six Sigma project work step by step, and to customise these steps for your own project.

Here is wishing you, the reader, success in your Lean Six Sigma project.

Uwe H Kaufmann

1. DEFINE

1.1 Overview



1.2 Steps

- 10. Problem Statement
- 11. High Level Process Map (SIPOC)
- 12. Voice of the Customer (VOC)

1.3 Objective

In the DEFINE phase, the foundation of a successful project is laid. The key to success is a project definition that is based on a real business problem and a description of the project objective and the people needed to solve the problem. Since each process serves one purpose – fulfilling the requirements of the process customer – the voice of the customer (VOC) will be collected and translated into measurable specifications. Additionally, a high-level overview of the process will be mapped in order to align the understanding about the scope of the process and its steps amongst all members of the project team.

The principal task of DEFINE is to establish a well thought-through project charter.

1.4 Prerequisites

The following prerequisites have to be met in order to be able to start this phase:

- A problem statement that is based on a relevant business case
- A sponsor who knows the problem and is able and willing to support and supervise a project for solving this problem.

DEFINE

- A project leader who is interested in improving the said process and is able to lead the project to success even if it costs additional effort.

1.5 Deliverables

This phase has the following deliverables:

- A project charter
- A prioritised list of customer requirements translated into specifications
- A high-level process map
- A stakeholder catalogue examining the support of key personnel for the project and measures to mobilise additional resources and backing if necessary.

1.6 Checklist

In order to check the successful completion of the DEFINE phase, the following questions need to be answered:

1. Why is this project important for the organisation? Why is it necessary to work on this project at this point in time?
2. How does this project contribute to the strategic objectives of the organisation?
3. Which problem is this project focussing on? What are symptoms for this problem? When and under what circumstances do these symptoms occur?
4. What are the goals this project is set out to accomplish? How will success of this project be measured?
5. Which process is to be studied? Has the process been mapped?
6. What is the scope of this project? Which products/services are included or excluded? What are start and end point of this project?
7. Who will be involved in this project? Who will be sponsor, team leader, team members and coach?
8. Have importance of this project and negative impact of the problem been communicated clearly?
9. Who are the process customers?

10. Which data have been collected that determine customer requirements on the process?
11. What are the project milestones?
12. Which quick wins have been identified and implemented?

1.7 Tips

1. The DEFINE phase should be kicked-off with a team meeting that is led by the project sponsor. His task is to explain the importance of the project and its contribution to achieving the strategic objectives of the organisation. The motivation and buy-in of the team members depends on them being convinced of the significance of the project.
2. The majority of the tools introduced in the following project phases focusses on process improvement rather than the acceptance, that is also required. Therefore, communication during all phases throughout the project is absolutely necessary and should target all team members, the leadership team and the stakeholders who could be affected by future process changes. It should be noted that there is no such thing as premature communication or over communication of the progress of the project.
3. By involving process stakeholders in all project phases such as data collection, process analysis and development of solutions, the acceptance of the project and especially of the upcoming changes and improvement ideas would be increased significantly.

1.8 Team Dynamics

In the beginning, project leader and team members are usually highly motivated since the project offers the chance to work on a new task that contributes to improving their own organisation as well as their own process. For Lean Six Sigma newcomers, this project offers new perspectives with advanced tools that lead to their personal development.

The most important prerequisite for high motivation and a positive atmosphere is the introduction by the sponsor who needs to set the right tone on behalf of the management team.

1.9 Project Steps

The Dormant Car Dealers team conducts the following project meetings:

Table 1-1: Project Meetings

No	Project Step	Date	Duration
01	Drafting project charter	17 Feb 2009	2h
02	Discussion of project charter in Quality Council	23 Feb 2009	
03	Fine-tuning project charter	24 Feb 2009	1h
04	Stakeholder Analysis	24 Feb 2009	1h
05	Mapping high-level process (SIPOC)	26 Feb 2009	2h
06	Voice of the customer – Planning	26 Feb 2009	3h
07	Voice of the customer – Analysing customer feedback data	12 Mar 2009	4h
08	Voice of the customer – Analysing customer feedback data and defining Quick Wins	16 Mar 2009	4h

2. Drafting the Project Charter

2.1 Objective

The project charter contains a summary of all information relevant to the start of the new project. The objective of the project charter is to elaborate the situation and to describe the scope for the project. A comprehensive project definition includes business case, problem statement, team composition, project milestones and project objectives.

The project charter{ XE "project charter" } is an agreement between the management of the organisation and the project team. This agreement may be amended later on during the project work. However, this does not mean that drafting it does not deserve utmost attention and care. Instead, it has to be completed to the highest degree so that the project has the best possible starting position. Amending this document later is possible and makes sense if the information available after data collection or analysis suggests a different focus or scope, i.e. previous assumptions were partially or to a great degree wrong.

2.2 Prerequisites

The following prerequisites have to be met in order to be able to start this step:

- A problem statement that is based on a relevant business case
- A sponsor who knows the problem and is able and willing to support and supervise a project for solving this problem.
- A project leader who is interested in improving the said process and is able to lead the project to success even if it costs additional effort.

2.3 Tasks and Tools Used

Tasks that have to be completed in this steps and tools suggested for these tasks are:

Table 2-1: Tasks to be completed in this step

Task	Tool
13. Elaborating the Business Case{ XE "business case" }	Graphical displays such as Pareto charts or pie charts or bar charts to support the explanation of the extend of the problem
14. Describing problem statement{ XE "problem statement" }, objective{ XE "objective" } and scope{ XE "scope" } of the project	Project charter
15. Determining project measures and estimating potential financial and non-financial benefits of this project	Project charter
16. Defining project team	Project charter
17. Planning project milestones	Project charter
18. Analysis of stakeholders	Stakeholder analysis

2.3.1 Task 1: Elaborating the Business Case

To ensure the success of the project, it is essential to ensure buy-in from the organisation.

Tip

Mobilising support for the project is much easier when the importance of the business case is clearly communicated to all stakeholders.

The importance of the project can be derived from financial indicators like losses are reduction in revenue due to the problem that is supposed to be eliminated. Additionally, customer or employee feedback can be used as trigger for working on this project.

Unfavourable customer or employee feedback can be caused by:

- Delayed deliveries of goods or services,
- Defective goods or unsatisfactory services,

- Long turn-around time in case of enquiries or claims,
- Unsatisfactory customer service or employee treatment,
- Unsatisfactory communication with employees or customers.

Financial indicators used to show the need for the project can be:

- Costs resulting from defects, unnecessary testing or rework,
- Revenue lost due to lack of capacities, down-time or long turn-around-time,
- Working capital due to unnecessary inventory or long turn-around-time,

All above mentioned situations are much more impactful if they are shown in a graphical way. These graphs should show both, the extend of the problem with its impact and the target that the project is supposed to achieve. Pareto or pie charts and even bar charts are well suited to show the contribution of the problem to the business case. If the problem situation has been developing over time, a time series chart might be able to show the growth of the problem.

All these charts should be easy to understand and able to serve as basis for decision making by the management team. Graphical displays of details like defect categories or claim categories are less suitable for this purpose than graphs showing the impact like additional costs, loss in capacity, customer attrition or employee turnover. A link to the strategy of the organisation as shown in Figure 2-3 is a powerful way to support management decisions. At the same time, it serves as a purpose for employees to support the project.

2.3.2 Task 2: Describing Problem Statement, Objective and Scope of the Project

Whereas importance of business case and problem for the project, and hence for the organisation, have been elaborated in the previous chapter, the detailed problem statement, project metrics including specifications for the process have to be defined.

Problem Statement

While business case shows an organisational perspective, the problem statement is strictly process related. There are two fundamental groups of problems:

- Turn-around-time related problems and
- Defect related problems.

Even though both groups are usually interrelated – i.e. long turn-around-time is often the result of defects in process or supplies – it is beneficial for managing the project to know and describe the fundamental characteristic of the problem together with its apparent metrics.

Target – Specification

Metrics are consequentially turn-around-time or defects. Turn-around-time as well as defects should be displayed as a percentage of fulfilment of a specification (target). This means, the specification for a turn-around-time related problem is a time target. However, the percentage of its achievement serves as metrics. Averages as metrics have to be omitted since averages can only be used as targets under very distinct circumstances.

Tip

Usually, there is only one metric that describes the problem leading to the business case. In case it appears necessary to use more than one metric to measure the problem, it could be a hint that the project scope is too large. Then the appropriate question to ask is: do these metrics and the underlying problems all need to be tackled in one project or are there multiple problems? The advantage of reducing the project scope lies in reducing the turn-around-time for the project which usually leads to the chance of showing results earlier and hence better buy-in for other projects.

Project Scope

When defining the process under investigation, the knowledge or, at least, the hypothesis about the root causes for the problem plays a key role since problems can only be solved by working on the root causes, not at the place where the symptoms appear.

For example, if credit applications carry defects, the root cause is most likely not found in the process of completing the credit applications but in the design of the form. Looking only into the process of application might not be enough to solve the problem.

Although, neither root cause nor solutions are known in the DEFINE phase, it is often possible to ensure the process that most likely carries the root causes is included in the scope. Having the process stakeholders in the team is an important prerequisite to achieve this. With this knowledge, start and end point of the process can be defined accurately. This determines the horizontal scope of the project.

Due to the patterns of occurrence of the problem, it might be possible to reduce data collection and analysis by defining a vertical scope. This scope determines for example, which products or services or which client groups should be included.

2.3.3 Task 3: Defining Project Metrics and Estimating Potential Benefits

Whereas in the previous task the organisational objective has been defined, it is now necessary to determine process metrics. This can be one or more. In case there are multiple metrics, the question should be asked whether all of them are to be tackled in the same project.

If multiple metrics have a similar characteristic, for example turn-around-time for a loan application and credit decision time for the same process, similar or the same root causes are to be expected. This means, covering these metrics in the same project makes sense.

If multiple metrics have different characteristics, for example turn-around-time for a loan application and wrong credit decisions, different root causes are to be expected. This means, it might be advisable to work on these problems in different projects.

Often, these metrics are not known or not known to a great detail. In this case, a high-level metric, an organisational metric can be used for the start. For example, customer satisfaction is a high-level indicator that more often than not does not show which part of the product or service delivery the customer is not satisfied with. After collecting the voice of the customer, this indicator should be replaced by a more specific metrics. For each metrics, baseline, ideal and target should be shown in the project charter.

Baseline{ XE "Baseline" } is the information about the process performance at the beginning of the project. In order to reduce the influence of seasonal and random variation of the process metrics, it might be necessary to show an average of the last three to six months. This does not work in case of systematic changes on the process during that period. Systematic changes can be driven by man-made process adjustments or can be drastic process issues that change the process performance more than the daily observable random variation. In this case, the average of all data points after that change should be taken as baseline.

Ideal{ XE "Ideal" } is the best possible performance for metrics. In case of turn-around-time related problems, best possible performance data can often be derived by benchmarking – structured or casual – with best in class competitors, related organisations or even from other units in the own organisation. In case of defect related

problems, the ideal should be zero defects. Anything else is a bad compromise. In case of technical processes that have a well-known best in class limit which cannot be surpassed under the current technical knowledge, this limit can be used as ideal.

Ideal is not something we develop ourselves by looking at our own process. The ideal has no practical meaning for the project work. However, it serves as a reference to set the target.

Target{ XE "Target" } is the specification for the metrics. It may be the same as the Ideal. More often than not it is different to the Ideal. The target for the metrics should be derived from the organisation's objective for this project. I.e. meeting this target should support meeting the overall objective for the project. For example, project objective is often increase of customer satisfaction. However, customer satisfaction cannot serve as target for the project because it is a lagging indicator that will only show success or failure much later. In this case, the project target should be derived after collecting the voice of the customer, identifying the drivers for low satisfaction and mapping the process that leads to low satisfaction. Having done these steps, it is usually possible to determine metrics as well as target for the project.

Tip

The target should be challenging. This usually leads to increased support by the management. Additionally, it enforces innovative solutions, i.e. disruptive solutions that are based on "out-of-the-box" thinking that introduces a paradigm shift. Less challenging targets can be achieved by solutions that are based on conservative thinking.

In addition to the already defined metrics, it might be beneficial to consider consequential metrics. A consequential metric{ XE " metric, consequential" } is not derived from the project objective, but is an often unintended result of working on this project. (Figure 2-1: Balance between Project Metrics and Consequential Metrics). For example, the reduction of turn-around-time in many processes might increase the risk for process failures. In order to avoid this effect, the consequential metric failure rate has to be monitored at the same time as normal project metrics get observed.

Often it is possible to calculate the potential financial advantage of a project. Based on the business case, the intended process improvement can be translated into a measurable financial benefit. The result is always an estimation that is based on a series of assumptions. These assumptions should be well grounded to ensure acceptance during the management presentation. It is a good practice to check the calculation of the

project benefit with the finance department before any important presentation. The financial benefit is a key criterion for project selection.

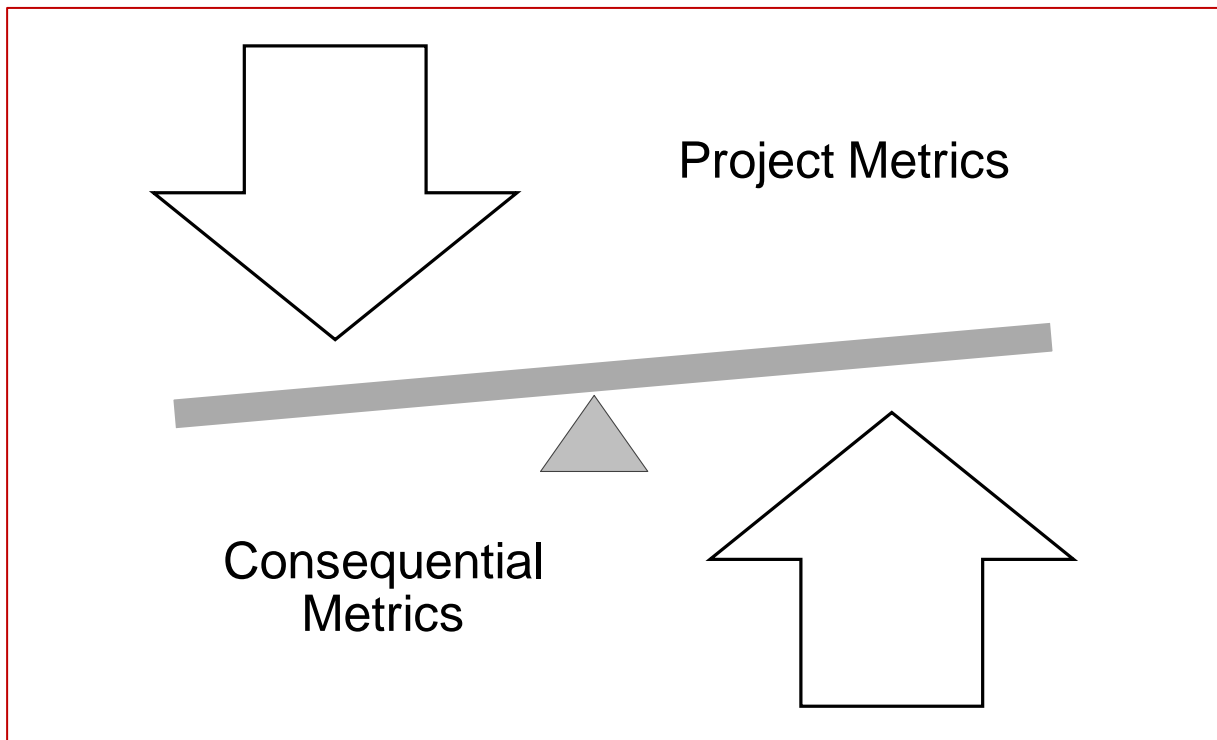


Figure 2-1: Balance between Project Metrics and Consequential Metrics

Increasing the customer satisfaction, loyalty and retention is another main driver for many Lean Six Sigma projects. Therefore, linking project metrics and project target to any customer related metrics is an important task before presenting a project proposal for project selection.

Whereas organisational benefit is a rather short-term indicator, customer related metrics are powerful long-term indicators that show the future of the organisation. Each project proposal needs to consider both perspectives.

2.3.4 Task 4: Selecting the Project Team

In order to implement a Lean Six Sigma project, a certain project infrastructure is necessary. This infrastructure includes (Figure 2-2)

- Lean Six Sigma Council or Quality Council{ XE "Quality Council" },
- Project Sponsor{ XE "Project Sponsor" },
- Project Leader, the so called Green Belt{ XE "Green Belt" } or Black Belt{ XE "Black Belt" },

- Project Team Members and
- Project Support.

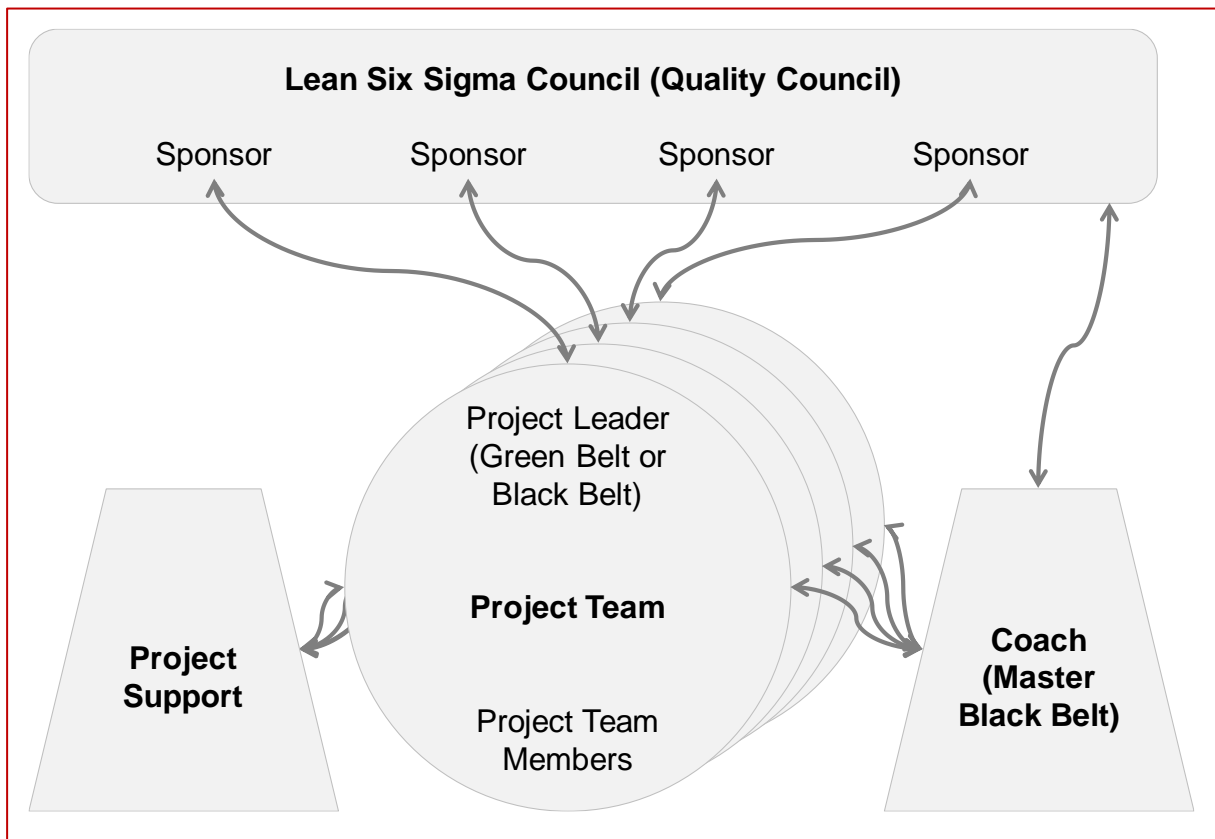


Figure 2-2: Lean Six Sigma Infrastructure

Whereas the Lean Six Sigma Council does not work on projects but guides and steers the introduction of the methodology as well as the project work, Project Sponsor, Project Leader and Project Team Members are assigned to certain projects.

The Project Sponsor is usually a member of the Lean Six Sigma Council or a member of the middle or upper leadership team. The Sponsor is typically the one who is responsible for the process in focus. It is in his interest to improve this process in order to improve his own KPIs. More often than not, the Sponsor initiates the project.

He typically undergoes a Champion Training of at least two days in order to be prepared for his task. This Champion Training covers at least basics of the DMAIC methodology as well as his role and responsibilities in project selection, project definition and team supervision.

The Project Leader{ XE "Project Leader" } can be a trained Green Belt{ XE "Green Belt" } or a trained Black Belt{ XE "Black Belt" }. Whilst the Green Belt usually has less project

experience and is equipped with about two weeks of training, the Black Belt normally has more project experience and has got about four weeks of training.

The training for both, Green Belt and Black Belt, focusses – in different depth and scope – on theory and application of tools that are needed and used during all stages of the DMAIC cycle. For complex projects, it might be advisable to assign multiple Belts as leaders. Whilst a Black Belt takes over the general leadership for the project, multiple Green Belts might be assigned to different parts of the complex process. Project Leaders are not necessarily familiar with the process. However, process experience increases acceptance amongst Team Members and the chances for success especially for Belt newcomers.

Project Team Members{ XE "Team Member" } are involved in the project work. It is necessary that each part of the process in focus is represented by at least one permanent Team Member with process knowledge and experience.

Team Members usually receive one day of introduction into the Lean Six Sigma methodology. Some organisations prefer to train all Team Members with the Green Belt curriculum leading to faster project work and generating more readily available project leaders for future projects.

Additionally, it might be necessary to invite additional Team Members at certain phases to the project work. This Project Support{ XE "Project Support" } might be necessary during project selection and definition in order to let finance staff do the benefit estimation. Additional Project Support might come from IT in order to support data collection during the MEASURE phase.

Especially at the beginning of the introduction of Lean Six Sigma to an organisation, it is inevitable to have an external or internal coach, a Master Black Belt{ XE "Master Black Belt" } guiding Sponsor, Project Leader and the organisation through the ups and downs of the journey. Master Black Belts are experienced not only in leading projects but also in coaching Black Belts and Green Belts and therefore are usually rich in knowledge and experience.

In some cases, process customers or/and process suppliers are involved in the project work, permanently or temporarily.

2.3.5 Task 5: Scheduling Project Phases

As for any other project, for a Lean Six Sigma project a project schedule is needed. When planning the tasks, one has to consider that more often than not Lean Six Sigma projects

Drafting the Project Charter

are not full time assignments. Realistically, Project Leaders and Team Members can be expected to spend 10% or less of their time on project work – this is half a day per week. The amount of time necessary depends heavily on the project phase.

An unwritten rule says, that Lean Six Sigma projects have to be completed or at least brought into CONTROL phase within six months.

The DEFINE phase can be completed in one or a few weeks. Drafting the project charter normally takes only a few days, as mapping the high-level process does. Voice of the customer may need more time if it includes collecting data from customers through surveys, focus groups etc. If this data is readily available, compiling this data and drawing some conclusions are not time-consuming tasks that can be completed in a few days.

Based on experience, the MEASURE phase takes most of the time, because it almost always involves collecting data from the process because available data can usually not be used. If weekly or monthly cycles are expected in the process and shall be revealed through data, then the data need to be collected over multiple weeks or months.

For instance, monthly closures in finance processes and the related reporting generate a certain pattern that not only influences finance processes and staff. In this case, data around some month ends need to be in the data set. Omitting or disregarding this kind of data pattern generates a certain bias that may later mislead data analysis and solution development. In such cases, MEASURE needs to cover multiple weeks.

Although, the ANALYSE phase is the most complex phase in terms of number of tools to be considered and applied, it can usually be completed in a few weeks since most of the work can be done using computer-aided techniques.

For the IMPROVE phase, a similar amount of time should be allowed. In case, this phase requires conducting pilot runs of the improved process, it will require more time. Even though, solutions are never known at the beginning of the project work, for many projects it can be decided whether pilot runs would be needed at IMPROVE.

The CONTROL phase is often not included into the project turn-around-time since monitoring the new process is an ongoing task of the process owner anyway. However, the first part of this monitoring should be done during the CONTROL phase in responsibility of the Project Team in order to ensure sustainable results. After the team has proven capability and stability of the improved process over a reasonable time frame the process is handed over to the process owner. This time frame is often assumed to be

three months, but needs to be customised from process to process. Only after successful completion of CONTROL the project can be considered closed.

2.3.6 Task 6: Stakeholder Analysis

Apart from the above-mentioned project infrastructure, people who are directly or indirectly involved in the process or effected by changes in the process need to be considered. The so-called Stakeholders{ XE "Stakeholder" } need to be listed and analysed regarding their support for the project. Stakeholders are staff members or even external parties with or without management responsibilities who might influence typical project tasks like voice of the customer, data collection or implementation of improvements and therefore are key to the project success. As experience teaches, it is an advantage to systematically organise support for the project by planning appropriate interventions for all stakeholders necessary. Most of these interventions are communication and involvement activities. Therefore, a communication plan should be established summarising necessary interventions.

This communication plan about Lean Six Sigma projects includes activities like

- Information about Lean Six Sigma in organisation's newsletter or e-news
- Regular updates about the project status at all relevant meetings
- Introduction of project teams during their project work
- Presentation of project results – even after quick wins – at all levels and branches to generate support and prepare roll-out
- Status updates at employee meetings or town-hall meetings

Tip

Communication about projects and their objectives should start as early as possible. Although, the support of certain stakeholders is only needed at later project phases, it is advisable to keep them also updated and involved in order to avoid rumours and second hand information.

In addition to structured and centrally coordinated communication, the informal communication with some key stakeholders can be a vital part of the project work. Leaders do not like surprises, not even positive ones. They wish to know what is going on. Therefore, the project team has to feed them with information at all stages.

Before giving a presentation to the management team, it is always a good idea to prepare key personnel with relevant information so that they do not get this in front of all others the first time. Informal face-to-face communication is preferred over emails. This way, their concerns are known and questions can be answered, before giving the pitch to the management team.

2.4 Deliverables

This phase has the following deliverables:

- A project charter
- A stakeholder map with communication plan

2.5 Tips

1. It is advisable for Project Sponsor and Project Leader to prepare this step together. As a prerequisite, the Project Leader has to be nominated by the Quality Council before the start.
2. It is a good practice to have the Project Sponsor kicking off the first meeting and elaborating the importance of this project for the organisation. Other team meetings will be conducted without the Sponsor who is only invited if his support is needed or decisions are to be made. The sponsor should show presence even without being invited.
3. In case Project Sponsor and Project Leader are new to Lean Six Sigma, an experienced sponsor, Green or Black Belt or an internal or external coach should be assigned to support the team. This significantly increases the chance for success.
4. Normally, not all fields in the project charter can be filled in the first meeting since project metrics or targets might be unknown at that point in time. However, the project charter must not be regarded as less important. The necessary information will be put in as soon as available.
5. Very often, the importance of formal and informal communication is underestimated which leads to problems sooner or later during the project work. Conducting a stakeholder analysis is a MUST, not an option.

6. A Lean Six Sigma project is a project that deserves a project plan. However, the project plan is not complex and should be done with tools like MS Excel or even MS Powerpoint. There is no need to learn and apply tools like MS Project for this purpose!

Team Work

For the effectivity of this step and hence for the success of the whole project, all team members shall take part in all necessary sessions.

2.6 Time Needed

For this step, two to three meetings with a one to two hour duration each should be planned for since completing the project charter usually requires consulting non team members, inviting them or even collecting some data to understand the extend of the problem.

2.7 Case Study

This case study introduces the project work on a Lean Six Sigma project for a bank. This bank has been restructured and has moved the focus of the banking activities to new areas. One of the newly built business areas is the car loan business for used cars. This sales finance is done via car dealers who sell used cars and with them often car loans. Hence, car dealers are agents of banks selling loans together with cars. Usually, a Car dealer has contracts with a series of banks in order to avoid exclusivity to the benefit of prices for car buyers and the dealer himself.

After gathering some experience with this new business, it became apparent that the car loan processes need a critical analysis and improvement in order to achieve similar business success as shown in sister companies of the same enterprise. Due to positive feedback from colleagues in other banks, owners and management decided to roll-out a comprehensive Lean Six Sigma journey throughout the bank.

Since Lean Six Sigma is new to the bank and due to its history of application in mostly manufacturing companies, the acceptance level amongst the staff is relatively low. Therefore, it is even more important to lead all Lean Six Sigma projects of the first wave to a successful completion which is a necessity for generating acceptance and support for a bank-wide roll-out.

- OurBank has gone through acquisition resulting in strategy change.
- Projected growth in business with Dealers of used cars is 100% in 2004 and 70% in 2005.
- Share of sales finance volume with Car Dealers is projected to develop from 8% of total volume to about 16% over in two years.
- Project is aimed to support Sales Force to optimise acquisition efforts and to maximise potential of acquired Car Dealers

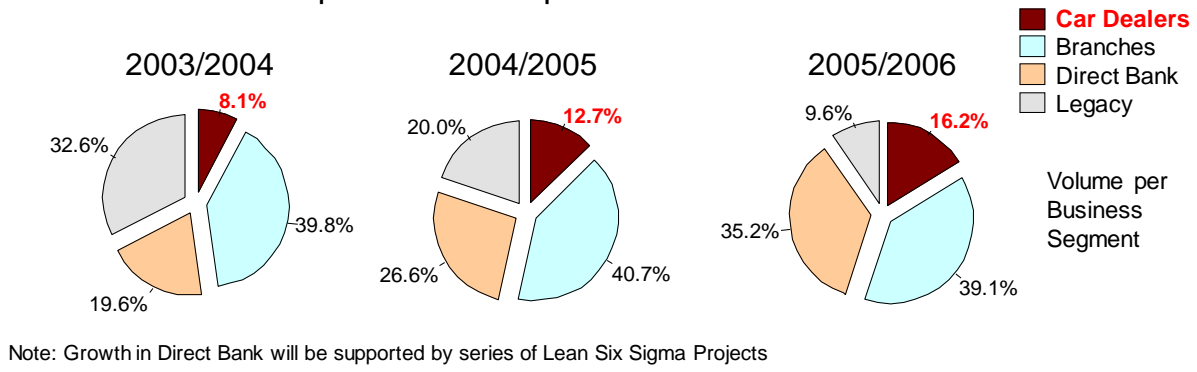


Figure 2-3: Project Background

2.7.1 Task 1: Elaborating the Business Case

During the latest Quality Council, a series of Lean Six Sigma projects was selected in order to support the strategy of the bank with improvements in its core processes. One of these projects has the objective to improve the results of the used car loan business. The project is called “Dormant car Dealers” and focusses on growth in the car dealer business. The strategic objective of increasing the business volume in this segment in the following two years by 100% and 70%, respectively, is not possible to achieve with the existing processes.

The Quality Council has assigned Gerald Hausser, Director Sales, to be sponsor for this project, although he has some reservations and is absolutely not sure whether Lean Six Sigma is the right method to help him meet the objective. Before the first project meeting, he together with Anke Smart, an experienced Black Belt, have filled in the project charter to the extent of their knowledge. Additionally, they have invited team members, they would like to participate in this project after getting approval by their management members. Gerald presents the project charter, explains the background for this project starting with the business strategy and takes questions from all participating colleagues (Figure 2-3).

2.7.2 Task 2: Describing Problem Statement, Objective and Scope of the Project

All team members are aware of significant investments into marketing and IT support for the sales finance business for used cars. They ask whether these investments are not effective. Gerald, the project sponsor, explains the problem. Out of 423 newly acquired car dealers, a significant number is inactive. This means, these car dealers do not generate revenue with our bank for a longer period. This does not mean they do not sell cars through financing. This means they sell used cars and have other banks doing the bank loan deals. Our bank does not have and cannot get exclusive contracts with these car dealers.

Business Case	OurBank's Strategy was set with the Car Loan Business for used cars being first priority with significant increase in Car Loan Revenue in two consecutive years by 100% and 70%, respectively. However, Car Loan business - despite investments in marketing and sales staff - did not take off as expected.	
Problem Statement	OurBank had invested in marketing to close contracts with 423 Car Dealers in 28 Regions. However, over more than six months many contracted Car Dealers did not sell loans of OurBank. About 58% (245) of Car Dealers became dormant for more than 3 months. Costs for acquiring new Car Dealer is 500% of cost of recurring business with existing.	
Project Objective	To reduce the number of inactive (dormant) Car Dealers to below 10% until Sep 2004 resulting in increase of revenue and profit.	
Project Scope	Start:	Contract with new Car Dealer closed
	End:	Car Dealer informed about Result of Car Loan Approval, Documents sent
	Included:	Marketing and Sales Activities
	Excluded:	Car Dealers acquired after project start

Figure 2-4: Project Charter – Problem Statement

The conclusion drawn by the management after being aware of this situation is, that the process between closing a contract with a new car dealer and selling our loan to his clients needs to be analysed.

In order to evaluate this situation and as a basic metrics for any improvement project, an error definition needs to be found. After going through some numbers and getting an impression of this sales finance business, the defect definition is established: A dealer of used cars is inactive or dormant if he has not generated any revenue for our bank for at least three months. Doing a quick check on the available data shows, that about 58% of our car dealers are dormant. Our Black Belt Anke Smart does a quick calculation and explains that this means, our process has a Sigma value of about 1.3. (Figure 2-4).

Everyone understands that acquiring a new car dealer costs about 500% of the costs of a retained one. Apart from that, it is a waste to establish contracts that do not produce any revenue.

2.7.3 Task 3: Defining Project Metrics and Estimating Potential Benefits

During the next Quality Council, proposals for project definition and especially the suggested project metric “% of Dormant Car Dealers” are discussed and finalised. The Quality Council determines a project target for the metrics of 10%. Since the project starts in February, the time for achieving this target is set to September.

“% of Dormant Car Dealers” is a metric that can be used to evaluate the project results long-term. However, this lagging indicator cannot be used to control the process short-term. Therefore, the team has to establish leading indicators that can be used to control the process. Their relationship with the project metric needs to be verified.

	Metric	Baseline	Ideal	Goal
Primary Metrics	Rate of Dormant Car Dealers = Attrition Rate	58%	0%	< 10% by End Sep 2004
Consequential Metric	Error in Decision Making: Increase in Number of Car Loans from Dormant Car Dealers must not increase credit risk.			
Financial Benefits	EUR 200 k	Additional profit generated out of Dormant Car Dealers’ loans over a period of one year.		
Customer Benefits	Car Dealers and their customers will receive improved service whilst closing Car Dealer contracts for their used cars.			

Figure 2-5: Project Charter – Project Metrics

Because of the expected increase in business volume for the loan application process and the resulting higher workload for the process stakeholders, the quality of the process, especially the quality of credit decisions has to be monitored closely in order to avoid a drop. This may cause customer dissatisfaction or increase of risk for the bank. Therefore, “credit decision errors” is declared a consequential metric. The team does not need to do any data collection or monitoring of this indicator because this process is audited on a monthly basis anyway.

The potential financial benefit for reaching the target of the percentage of dormant car dealers has been estimated by Finance based on some assumptions like average loan amount and average loan margin for the bank.

Success of this project will very likely result in better service for dealers and customers (Figure 2-5)/

2.7.4 Task 4: Selecting the Project Team

Figure 2-6 gives an overview of the people directly involved in the project work. In addition to project sponsor Gerald Hausser, Anke Smart has been nominated as Black Belt for this project by the Quality Council. She is being supported by two Green Belts, Dan Wong and Valerie Kluge. The Green Belts work on different parts of the project in scope.

Project Title	Reactivation of Dormant Car Dealers			
Project Sponsor	Mr Peter Michael, Director Sales			
Project Leader	Ms Kirsten Gabler, Key Account Manager Car Sales, Black Belt; Mr Dan Wong, Operations, Green Belt for Loan Processing (Y ₁); Ms Valerie Kluge, Sales, Green Belt for Client Contacts (Y ₂)			
Team Members	Mr Thomas Schlager, Sales; Ms Axel Winter, Operations; Ms Anne Zwirn, Operations; Mr Christian Keil, Marketing; Mr Mark Hunger, Car Dealer (client)			
Financial Support	Ms Penny Busch, Accounts			
Project Schedule	Phase	Planned	Actual	Status
Project Start 16 Feb 2004	Define	12 Mar 2004	12 Mar 2004	completed
	Measure	23 April 2004	30 April 2004	completed
	Analyze	14 May 2004	14 May 2004	completed
	Improve	18 Jun 2004	25 Jun 2004	completed
	Control	29 Oct 2004	29 Oct 2004	Completed

Figure 2-6: Project Charter - Header

The young Green Belts are less experienced and will therefore be guided through the project by Gerald and Anke. Anke oversees the project as Black Belt. The Sponsor Gerald has been prepared for this project phase through a two-day Champion Training recently that covered project selection and definition, Belt nomination and all project phases.

Whilst Anke Smart has gone through a Black Belt training some years ago, both Green Belts are being trained in parallel to the project work. The project work is planned in a way that application of tools on the project follows the respective Green Belt training phase.

Dr Rainer Sandmann, a trained and well experienced Master Black Belt is familiar with Lean Six Sigma and serves as coach for the project team, especially for sponsor and project leader. Knowing and analysing the banking processes in detail is not his responsibility. He rather serves as an independent coach who does not necessarily participate in team meetings. He is supposed to guide the project leaders with his advice, helps them to prepare the team meetings, especially in selecting the right tools at the right time and by interpreting results together with them.

Penny Busch was nominated by Finance to support the team in steps like estimating the financial benefit or cost-benefit-analysis before deciding about improvements.

Team members are selected by sponsor and Black Belt in a way that the whole process can be diagnosed. The sponsor has got support from his management colleagues for their team members to spend a certain amount of time on this project. Team members are expected to spend about 10% of their time, i.e. half a day per week on the project.

2.7.5 Task 5: Scheduling Project Phases

As for any other project, a Lean Six Sigma project needs a project plan (Figure 2-7). In the project plan DEFINE has to be completed within four weeks. Seven weeks are scheduled to be used for MEASURE, whilst ANALYSE and IMPROVE should take considerably less time.

Implementing improvements is scheduled to be completed in June, i.e. benefits out of this project will be delivered within the new fiscal year beginning in May.

Based on experience, the step data collection (Step 9 in Figure 2-7) takes considerably more time than other steps in DEFINE, MEASURE and ANALYSE.

In many projects, the step implementing solutions (Step 20 in Figure 2-7) takes a significant amount of time until completion.

In contrast, this step is scheduled to be completed faster in this project because changes are most likely limited to client care processes and loan processing and hence fully under control of the team and easy to be implemented.

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that does not have to do anything with Sales but should only be used to work on Operations. Being a sponsor means, he has to do his best to bring the project to success. He is therefore being evaluated as neutral by the team. As a sponsor he should be most supportive, not just neutral. The strategy the team came up with is to keep him informed all the time, give him the feeling that his experience is most valuable to the team and make him part of the progress and consequentially of the success. The communication strategy is tailored for his communication style, i.e. face-to-face communication and telephone conversation is preferred over electronic communication.

Department	Name	Support Level	Strategy
Senior Management	All	X → O	Inform ab't Quick Hit Success
Director Sales	Peter	X → O	Let him own Success
Sales (Car Dealers)	All	X → O	Make it their success, involve
Marketing	Car Loan Bus	X → O	Involve in team work
Operations	Car Loan Bus	X → O	Involve in team work
Car Dealers	All	XO	Ok
Car Dealer	Mark	XO	Ok!

Opposed
 Uncooperative
 Indifferent
 Help it Work
 Enthusiastic Support

X ... Current Support Level
O ... Support Level Needed

Figure 2-8: Stakeholder Analysis

Sales staff have a similar mind-set as their director. However, having their director sponsoring this project reduces the resistance automatically by a significant degree.

Each project team member takes over a certain task to support the stakeholder influencing strategy because of their manifold personal relationships with Sales staff. Some are meeting for football games; others have their kids at the same school or live in the same part of town. These personal relationships are much more powerful for overcoming organisational hurdles than official interventions are.

The team decides to review the stakeholder analysis at the end of each project phase and decide then about amending the strategy.