SIX SIGMA
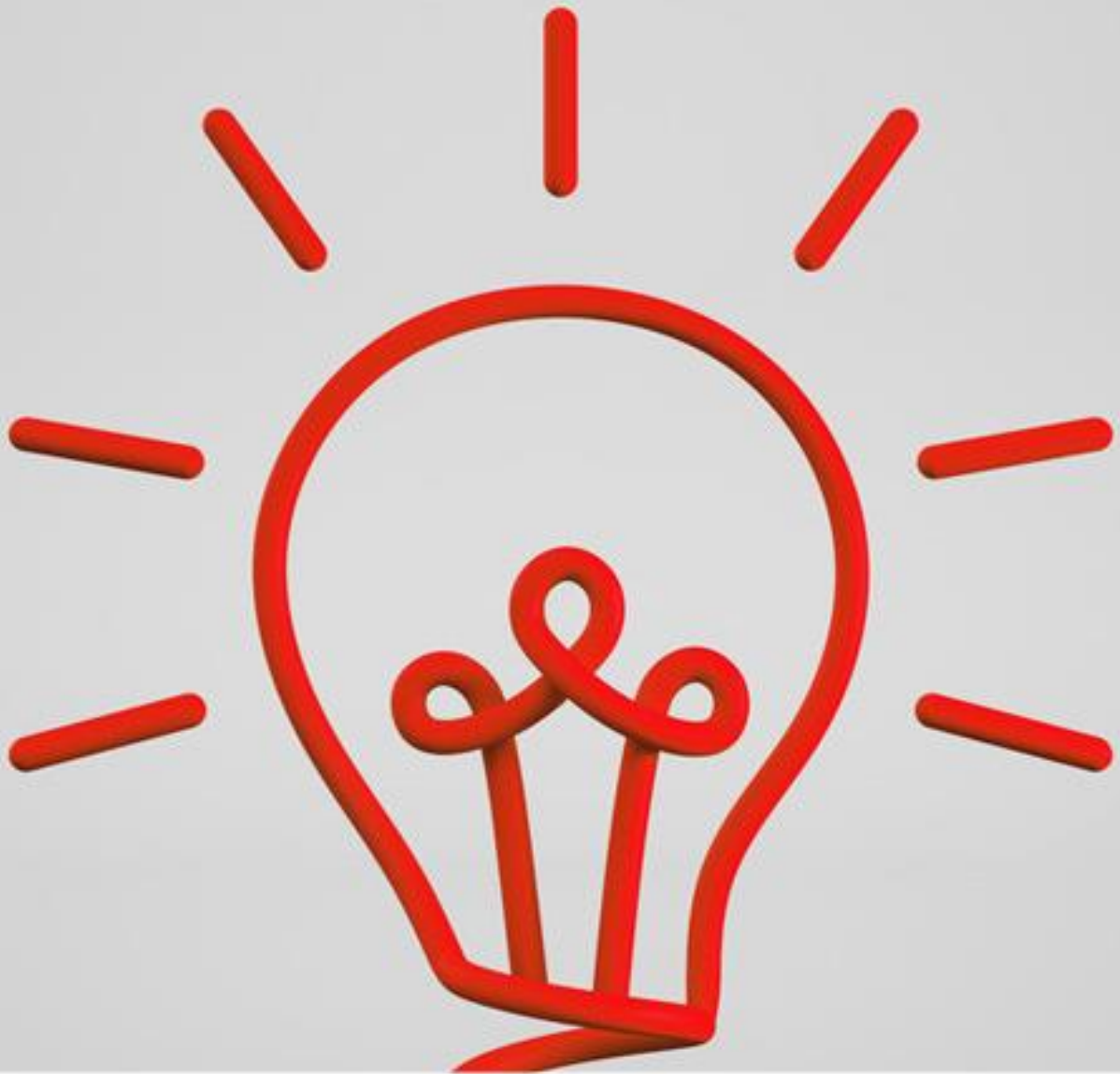## process improvement approach

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About the Tutorial

Six Sigma is a methodology for pursuing continuous improvement in customer satisfaction and profit. It is a management philosophy attempting to improve effectiveness and efficiency.

In this tutorial, you will learn what Six Sigma is and how to use Six Sigma in an organization.

Audience

This tutorial has been prepared for the beginners to help them understand the basic functionality of Six Sigma.

Prerequisites

We assume the readers of this tutorial have prior exposure to Quality Control and Quality Assurance and related terminologies.

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1. SIX SIGMA – INTRODUCTION

Six Sigma is a highly disciplined process that helps us focus on developing and delivering near-perfect products and services.

Features of Six Sigma

- Six Sigma's aim is to eliminate waste and inefficiency, thereby increasing customer satisfaction by delivering what the customer is expecting.
- Six Sigma follows a structured methodology, and has defined roles for the participants.
- Six Sigma is a data driven methodology, and requires accurate data collection for the processes being analyzed.
- Six Sigma is about putting results on Financial Statements.
- Six Sigma is a business-driven, multi-dimensional structured approach for:
  - o Improving Processes
  - o Lowering Defects
  - o Reducing process variability
  - o Reducing costs
  - o Increasing customer satisfaction
  - o Increased profits

The word *Sigma* is a statistical term that measures how far a given process deviates from perfection.

The central idea behind Six Sigma: If you can measure how many "defects" you have in a process, you can systematically figure out how to eliminate them and get as close to "zero defects" as possible and specifically it means a failure rate of 3.4 parts per million or 99.9997% perfect.

Key Concepts of Six Sigma

At its core, Six Sigma revolves around a few key concepts.

- **Critical to Quality**: Attributes most important to the customer.
- **Defect**: Failing to deliver what the customer wants.
- **Process Capability**: What your process can deliver.
- **Variation**: What the customer sees and feels.
- **Stable Operations**: Ensuring consistent, predictable processes to improve what the customer sees and feels.
- **Design for Six Sigma**: Designing to meet customer needs and process capability.

Our Customers Feel the Variance, Not the Mean. So Six Sigma focuses first on reducing process variation and then on improving the process capability.

Myths about Six Sigma

There are several myths and misunderstandings surrounding Six Sigma. Some of them are given below:

- Six Sigma is only concerned with reducing defects.
- Six Sigma is a process for production or engineering.
- Six Sigma cannot be applied to engineering activities.
- Six Sigma uses difficult-to-understand statistics.
- Six Sigma is just training.

Benefits of Six Sigma

Six Sigma offers six major benefits that attract companies:

   Generates sustained success
- Sets a performance goal for everyone
- Enhances value to customers
- Accelerates the rate of improvement
- Promotes learning and cross-pollination
- Executes strategic change

Origin of Six Sigma

- Six Sigma originated at Motorola in the early 1980s, in response to achieving 10X reduction in product-failure levels in 5 years.
- Engineer Bill Smith invented Six Sigma, but died of a heart attack in the Motorola cafeteria in 1993, never knowing the scope of the craze and controversy he had touched off.
- Six Sigma is based on various quality management theories (e.g. Deming's 14 point for management, Juran's 10 steps on achieving quality).

2. SIX SIGMA – KEY ELEMENTS

There are three key elements of Six Sigma Process Improvement:

- Customers
- Processes
- Employees

The Customers

Customers define quality. They expect performance, reliability, competitive prices, on-time delivery, service, clear and correct transaction processing and more. This means it is important to provide what the customers need to gain customer delight.

The Processes

Defining processes as well as defining their metrics and measures is the central aspect of Six Sigma.

In a business, the quality should be looked from the customer's perspective and so we must look at a defined process from the outside-in.

By understanding the transaction lifecycle from the customer's needs and processes, we can discover what they are seeing and feeling. This gives a chance to identify weak areas with in a process and then we can improve them.

The Employees

A company must involve all its employees in the Six Sigma program. Company must provide opportunities and incentives for employees to focus their talents and ability to satisfy customers.

It is important to Six Sigma that all the team members should have a well-defined role with measurable objectives.

3. SIX SIGMA – ORGANIZATION

Under a Six Sigma program, the members of an organization are assigned specific roles to play, each with a title. This highly structured format is necessary in order to implement Six Sigma throughout the organization.

There are seven specific responsibilities or "role areas" in a Six Sigma program, which are as follows.

Leadership

A leadership team or council defines the goals and objectives in the Six Sigma process. Just as a corporate leader sets a tone and course to achieve an objective, the Six Sigma council sets the goals to be met by the team. Here is the list of Leadership Council Responsibilities:

- Defines the purpose of the Six Sigma program
- Explains how the result is going to benefit the customer
- Sets a schedule for work and interim deadlines
- Develops a mean for review and oversight
- Support team members and defend established positions

Sponsor

Six Sigma sponsors are high-level individuals who understand Six Sigma and are committed to its success. The individual in the sponsor role acts as a problem solver for the ongoing Six Sigma project. Six Sigma is generally led by a full-time, high-level champion, such as an Executive Vice President.

Sponsors are the owners of processes and systems, who help initiate and coordinate Six Sigma improvement activities in their areas of responsibilities.

Implementation Leader

The person responsible for supervising the Six Sigma team effort, who supports the leadership council by ensuring that the work of the team is completed in the desired manner, is the Implementation Leader.

Ensuring success of the implementation plan and solving problems as they arise, training as needed, and assisting sponsors in motivating the team are some of the key responsibilities of an implementation leader.

Coach

Coach is a Six Sigma expert or consultant who sets a schedule, defines result of a project, and who mediates conflict, or deals with resistance to the program.

Duties include working as a go-between for sponsor and leadership, scheduling the work of the team, identifying and defining the desired results of the project, mediating

disagreements, conflicts, and resistance to the program and identifying success as it occurs.

Team Leader

It is an individual responsible for overseeing the work of the team and for acting as a go-between with the sponsor and the team members.

Responsibilities include communication with the sponsor in defining project goals and rationale, picking and assisting team members and other resources, keeping the project on schedule, and keeping track of steps in the process as they are completed.

Team Member

An employee who works on a Six Sigma project, given specific duties within a project, and has deadlines to meet in reaching specific project goals.

Team members execute specific Six Sigma assignments and work with other members of the team within a defined project schedule, to reach specifically identified goals.

Process Owner

The individual who takes on responsibility for a process after a Six Sigma team has completed its work.

Extended Definitions of Roles – Belt Colors

The assignment of belt colors to various roles is derived from the obvious source, the martial arts. Based on experience and expertise, following roles have evolved over the years.

Note: The belt names are a tool for defining levels of expertise and experience. They do not change or replace the organizational roles in the Six Sigma process.

Black Belt

The person possessing this belt has achieved the highest skill level and is an experienced expert in various techniques. As applied to the Six Sigma program, the individual designated as a Black Belt has completed a thorough internal training program and has the experience of working on several projects.

The black belt holder is usually given the role of a team leader, the person who is responsible for execution and scheduling.

Master Black Belt

A person who deals with the team or its leadership; but is not a direct member of the team itself. This may be equivalent to the role played by the coach, or for more technical and complex projects. The Master Black Belt is available to answer procedural questions and to resolve the technical issues that come up.

Green Belt

The Green Belt designation can also belong to the team leader or to a member of the team working directly with the team leader. A Green Belt is less experienced than a Black Belt but is cast in a key role within the team.

4. SIX SIGMA – GET STARTED

The starting point in gearing up for Six Sigma is to verify if you are ready to embrace a change that says, "There is a better way to run your organization."

Is Six Sigma Right for You?

There are a number of essential questions and facts that you need to consider in making a readiness assessment:

- Is the strategic course clear for the company?
- Is the business healthy enough to meet the expectations of analysts and investors?
- Is there a strong theme or vision for the future of the organization that is well understood and consistently communicated?
- Is the organization good at responding effectively and efficiently to new circumstances?
- Evaluating current overall business results.
- Evaluating how effectively do we focus on and meet customers' requirements.
- Evaluating how effectively are we operating.
- How effective are your current improvement and change management systems?
- How well are your cross-functional processes managed?
- What other change efforts or activities might conflict with or support Six Sigma initiative?
- Six Sigma demands investments. If you cannot make a solid case for future or current return, then it may be better to stay away.
- If you already have in place a strong, effective, performance and process improvement offer, then why do you need Six Sigma?

There could be many questions to be answered to have an extensive assessment before deciding if you should go for Six Sigma or not. This may need time and a thorough consultation with Six Sigma Experts to take a better decision.

The Cost of Six Sigma Implementation

Some of the most important Six Sigma budget items can include the following:

- Direct Payroll for the individuals dedicated to the effort full time.
- Indirect Payroll for the time devoted by executives, team members, process owners and others, involved in activities like data gathering and measurement.
- Training and Consultation fee to teach Six Sigma Skills and getting advice on how to make efforts successful.
- Improvement Implementation Cost.

Six Sigma Start-up

Now you have decided to go for Six Sigma. So what is next?

Deploying Six Sigma within an organization is a big step and involves many activities including define, measure, analyze, improve, and control phases. Here are some steps, which are required for an organization at the time of starting Six Sigma implementation.

- **Plan your own route**: There may be many paths to Six Sigma but the best is the one that works for your organization.
- **Define your objective**: It is important to decide what you want to achieve, and priorities are important.
- **Stick to what is feasible**: Set up your plans so that they can match your influences, resources and scope.
- **Preparing Leaders**: They are required to launch and guide the Six Sigma Effort.
- **Creating Six Sigma organization**: This includes preparing Black Belts and other roles and assigning them their responsibilities.
- **Training the organization**: Apart from having black belts, it is required to impart training of Six Sigma to all the employees in the organization.
- **Piloting Six Sigma effort**: Piloting can be applied to any aspect of Six Sigma including solutions derived from process improvement or design redesign projects.

Project Selection for Six Sigma

One of the most difficult challenge in Six Sigma is the selection of the most appropriate problem to attack. There are generally two ways to generate projects:

- **Top-down**: This approach is generally tied to business strategy and is aligned with customer needs. The major weakness is they are too broad in scope to be completed in a timely manner (most six sigma projects are expected to be completed in 3-6 months).
- **Bottom-up**: In this approach, Black Belts choose the projects that are well-suited for the capabilities of teams. A major drawback of this approach is that, projects may not be tied directly to strategic concerns of the management thereby, receiving little support and low recognition from the top.

5. SIX SIGMA – METHODOLOGY

Six Sigma has two key methodologies:

- **DMAIC**: It refers to a data-driven quality strategy for improving processes. This methodology is used to improve an existing business process.
- **DMADV**: It refers to a data-driven quality strategy for designing products and processes. This methodology is used to create new product designs or process designs in such a way that it results in a more predictable, mature and defect free performance.

There is one more methodology called **DFSS** - Design For Six Sigma. DFSS is a data-driven quality strategy for designing or redesigning a product or service from the ground up.

Sometimes a DMAIC project may turn into a DFSS project because the process in question requires complete redesign to bring about the desired degree of improvement.

DMAIC Methodology

This methodology consists of the following five steps.

Define --> **M**easure --> **A**nalyze --> **I**mprove --> **C**ontrol

- **Define**: Define the problem or project goal that needs to be addressed.
- **Measure**: Measure the problem and process from which it was produced.
- **Analyze**: Analyze data and process to determine root cause of defects and opportunities.
- **Improve**: Improve the process by finding solutions to fix, diminish, and prevent future problems.
- **Control**: Implement, control, and sustain the improvement solutions to keep the process on the new course.

We will discuss more on DMAIC Methodology in the subsequent chapters.

DMADV Methodology

This methodology consists of five steps:

Define --> **M**easure --> **A**nalyze --> **D**esign -->**V**erify

- **Define**: Define the Problem or Project Goal that needs to be addressed.
- **Measure**: Measure and determine customers' needs and specifications.
- **Analyze**: Analyze the process to meet the customer needs.
- **Design**: Design a process that will meet customers' needs.
- **Verify**: Verify the design performance and ability to meet customer needs.

DFSS Methodology

DFSS is a separate and emerging discipline related to Six Sigma quality processes. This is a systematic methodology utilizing tools, training, and measurements to enable us to

design products and processes that meet customer expectations and can be produced at Six Sigma Quality levels.

This methodology can have the following five steps.

Define --> **I**dentify --> **D**esign --> **O**ptimize --> **V**erify

- **Define**: Define what the customers want, or what they do not want.
- **Identify**: Identify the customer and the project.
- **Design**: Design a process that meets customers' needs.
- **Optimize**: Determine process capability and optimize the design.
- **Verify**: Test, verify, and validate the design.

End of ebook preview

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