

When Recognition Matters

WHITEPAPER

ISO 13053

QUANTITIVE METHODS IN PROCESS IMPROVEMENT - SIX SIGMA

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INTRODUCTION

Six Sigma is a process improvement methodology originally developed by Motorola in 1986. The purpose of this methodology is to bring business improvement, quality performance and increase in profit by addressing business issues that may have existed for a long time.

Six Sigma helps to identify what organizations do not know and emphasize what they should know.

Six Sigma is achieved when processes deliver only 3.4 defects per million opportunities (DPMO), which in other words means that they must work almost perfectly.

There are two key methodologies used for implementing Six Sigma.

1. DMAIC

2. DMADV

The DMAIC methodology is used when a product or process in existence in a company is not meeting customer specifications or is not performed adequately.

The DMADV methodology is used when a product or process is not in existence in a company and needs one to be developed, or the existing product or process has been optimized and still does not meet the level of customer specification or Six Sigma level.

- Both methodologies are used to drive defects to less than 3.4 per million opportunities.
- They are data intensive solution approaches. Intuition has no place in Six Sigma only cold, hart facts.
- They are implemented by Green Belts, Black Belts and Master Black Belts with the support of a champion and process owner.
- They provide methods to help meet the business/ financial bottom-line numbers.

Sigma score	Defects per million opportunities
2	308538
3	66807
4	6210
5	233
6	3,4



An overview of ISO 13053

ISO 13053 deals with the application of Six Sigma to ameliorate existing processes. This standard consists of two parts:

- ISO 13053, Quantitative methods in process improvement Six Sigma DMAIC methodology, Part 1
- ISO 13053, Quantitative methods in process improvement Six Sigma Tools and techniques, Part 2

The first part of this International Standard describes a methodology for the business improvement known as Sig Sigma. This methodology typically comprises five phases:

- 1. Define (D)
- 2. Measure (M)
- 3. Analyse (A)
- 4. Improve (I)
- 5. Control (C)

This part of the ISO 13053 recommends the best practices for each of the phases of the DMAIC methodology used during the execution of a Six Sigma project. It also recommends how Six Sigma projects should be managed and describes the roles, expertise and training of the personnel involved in such projects.

It is applicable to organizations using manufacturing processes as well as service and transactional processes.

Key Clauses of ISO 13053

ISO 13053 is organized into the following main clauses:

Clause 4: Fundamentals of Six Sigma projects within organizations

Clause 5: Six Sigma measures

Clause 6: Six Sigma personnel and their roles

Clause 7: Minimum competencies required

Clause 8: Minimum Six Sigma training requirements

Clause 9: Six Sigma project prioritization and selection

- Clause 10: Sig Sigma project DMAIC methodology
- Clause 11: Six Sigma project methodology Typical tools employed
- Clause 12: Monitoring a Six Sigma project
- Clause 13: Critical to success factors for Six Sigma projects
- Clause 14: Six Sigma infrastructures within an organization

Each of these key activities is listed below.

Clause 4: Fundamentals of Six Sigma project within organizations

The main purpose of a Six Sigma project is to solve a given problem in order to contribute to an organization's business goals. Six Sigma projects are commenced

The main activities of a Six Sigma project are to:

- Gather data;
- Extract information from the data through analysis;
- Design a solution; and
- Ensure the desired results are obtained.

Clause 5: Six Sigma measures

Several measures are used to quantify the performance of a Six Sigma project, such as:

- Defects per million opportunities (DPMO)
- Sigma score
- Rolled throughout yield (RTY)
- Return rate (RR)
- Number of problem reports (NPR)
- On-time delivery (OTD)
- Cost of poor quality (COPQ)

Clause 6: Six Sigma personnel and their roles

An organization seeking to implement Six Sigma should assign roles and consider whether they are applicable to its implementation. The main roles to be considered are::

- Champion Determines the strategy for the deployment of Six Sigma and sets the business objectives.
- Deployment Manger Oversees and manages the deployment of Six Sigma.
- Project Sponsor Champions and supports the Six Sigma methodology.
- Master Black Belt Supports the Black Belts in the application of the DMAIC methodology and the selection and use of the tools and techniques required.
- Black Belt & Green Belt Delivers the agreed benefits of a Six Sigma project to the organization.
- Yellow Belt Participates in Six Sigma project teams when a Six Sigma project is concerned with a process within which the Yellow Belt operates.

Clause 7: Minimum competencies required

This clause indicates the minimum competencies required from the Six Sigma personnel (mentioned is clause 6) for each skill/role combination

Clause 8: Minimum Six Sigma training requirements

Training can be provided in a number of ways, either as formal classroom style courses or through other training media such as e-Learning or similar distance learning courses.

The table below presents the recommended training requirements for each of the Six Sigma personnel described in Clause 6.

Category	Champion/ Deployment Manager	Sponsor	Master Black Belt	Black Belt	Green Belt	Yellow Belt
Instruction (Days)	3	1	10	20	5	1
Tutorials (Dyas)	-	-	2	5	1	0
Number of qualifying Six Sigma projects	-	-	2	2	-	0

Clause 9: Six Sigma project prioritization and selection

Projects should be selected to meet clear organizational objectives. The outcome of each project should contribute to the overall improvement of an organization.

Clause 10: Six Sigma project DMAIC methodology

Six Sigma projects are usually executed by the DMAIC process. The DMAIC methodology contains the following phases:

- Define,
- Measure,
- Analyse,
- Improve, and
- Control.

It's used to improve an existing business process.

Clause 11: Six Sigma project methodology – Typical tools employed

This clause summarizes the tools that are usually used within a Six Sigma project. Some examples of these tools include:

- Capability/ performance,
- Customer focus group,
- Descriptive statistics,
- Gantt chart,
- Process flow chart, etc.

Clause 12: Monitoring a Six Sigma project

Six Sigma projects should be monitored regularly to know whether they are running to schedule.

Clause 13: Critical to success factors for Six Sigma projects

Two items that are critical to a successful outcome of a Six Sigma project are:

1. The existence of well-defined and maintained stakeholder management plans, and

2. The project should be data driven.

Clause 14: Six Sigma infrastructures within an organization

The type of infrastructure chosen by an organization depends on several factors. The infrastructure within an organization can be:

- Large Over 1000 employees at a site
- Medium 250 to 1000 employees at a site
- Small Less than 250 employees at a site





4. Improve

DMAIC Methodology

The most commonly used model of Six Sigma teams for process improvement is DMAIC, which is an acronym for the five following phases:

D	Define	 Identify who you work is for (your customer) Identify the work you do (your product/service) What do you need to do your work (your suppliers)? What are the "key characteristics" of your product/service? (i.e. 'Critical To Quality: those features/requirements that most directly affect your Customers satisfaction with your product/service)
М	Measure	 Map the process Evaluate the measurement system Measure the current performance
А	Analyze	 Analyze the capability of critical measurements in process Analyze variation in key characteristics and determine what controls the variation
I	Improve	 Reduce variation and/or eliminate defects in the process Eliminate non-value-added steps/processes
С	Control	 Implement control plans to monitor/maintain improvements over time Continue to reduce variation and eliminate defect, toward Six Sigma performance

Link of ISO 13053 with other Quality Methodologies and Techniques

Apart from Six Sigma, other management techniques, quality improvement and management methods include:

- Lean Six Sigma
- Total Quality Management (TQM)
- Lean
- Kaizen
- Quality Circle
- Toyota Way
- Zero Defects
- Etc.

ISO 13053 opposed to ISO 9001

Six Sigma methods are powerful tools to assure top performance in the factual approach to decision making. It uses a process approach to achieve quality and continuous improvement, which outlines the quality principles in ISO 9001.

What are the Business Benefits of Six Sigma?

All organizations that have implemented Six Sigma correctly, have achieved significant benefits. Some examples of these benefits include:

- Improved quality of product or process as perceived by the customer;
- Decrease in total defects;
- Improved process flows;
- Enhanced knowledge;
- Increased productivity;
- Reduction in process cycle times;
- Development of staff skills;
- Common language throughout the organization;
- Decreased time to market; etc.
 - · GE produces annual benefits of over \$2.5 billion across the organization from Six Sigma
 - Six Sigma reportedly saved Motorola \$15 billion over the last 11 years
 - Honeywell recorded more than \$800 million in savings

Steps for obtaining a PECB Certification

For organizations:	For individuals:
1. Implement the management system	1. Participate in the training course
2. Perform internal audit and reviews	2. Register for the certification exam
3. Select preferred certification body	3. Sit for the certification exam
4. Perform a pre-assessment audit (optional)	4. Apply for the certification scheme upon successful completion
5. Perform the stage 1 audit	5. Obtain certification
6. Perform the stage 2 audit (on-site)	
7. Perform a follow-up audit (optional)	
8. Register the certification	
9. Assure continual improvement by conducting surveillance audits	





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