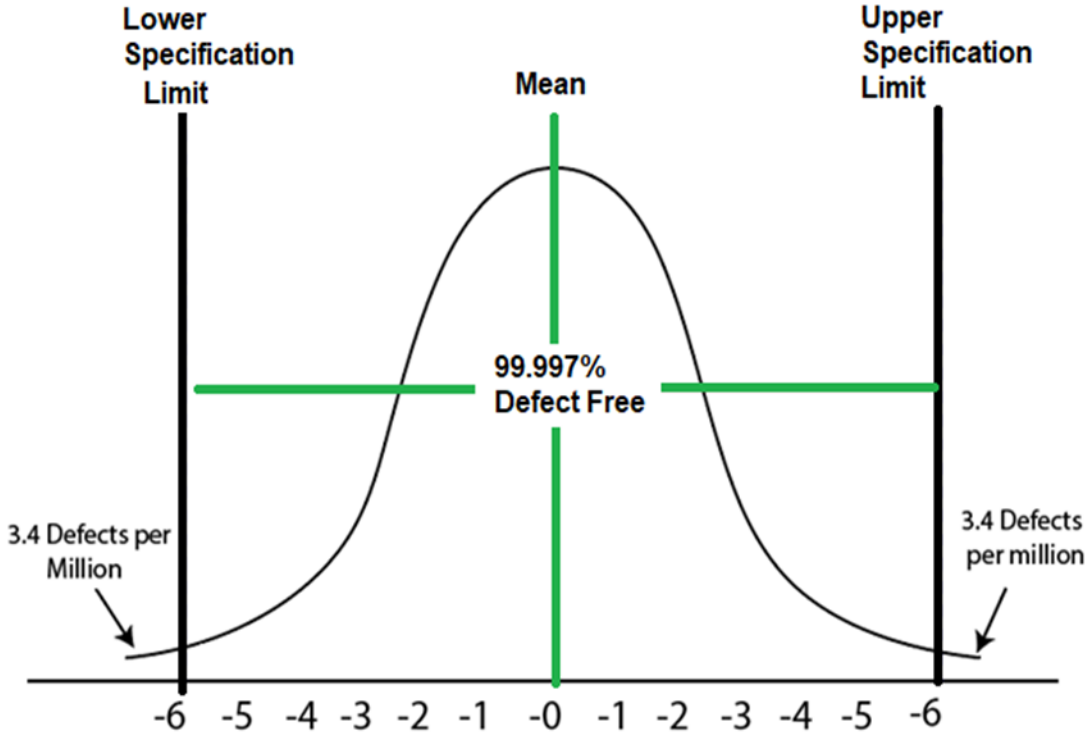
Six Sigma

Six Sigma is the process of producing high and improved quality output. This can be done in two phases – identification and elimination. The cause of defects is identified and appropriate elimination is done which reduces variation in whole processes. A six sigma method is one in which 99.99966% of all the products to be produced have the same features and are of free from defects.



Six Sigma Curve

Characteristics of Six Sigma:

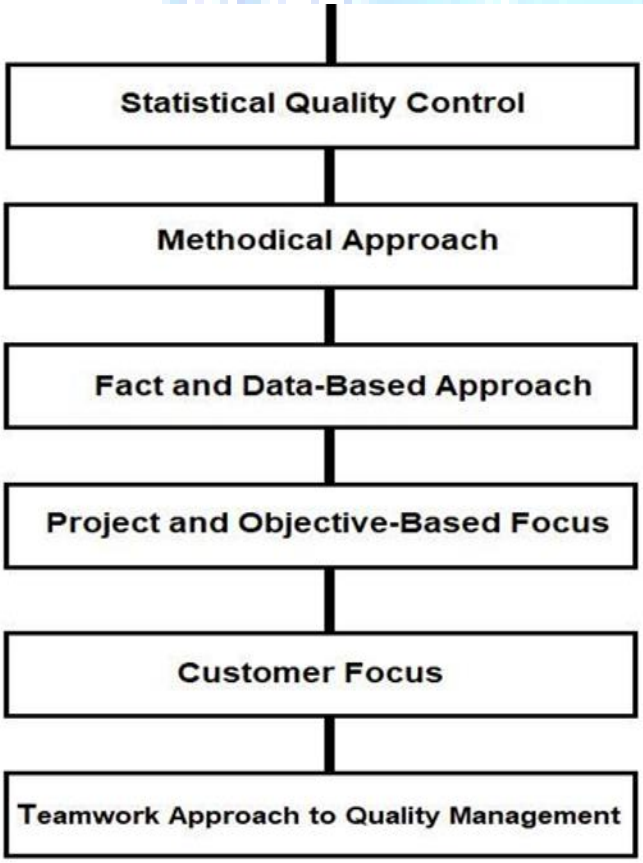
The Characteristics of Six Sigma are as follows:

1. **Statistical Quality Control:**

Six Sigma is derived from the Greek Letter σ (Sigma) from the Greek alphabet, which is used to denote Standard Deviation in statistics. Standard Deviation is used to measure variance, which is an essential tool for measuring non-conformance as far as the quality of output is concerned.

2. **Methodical Approach:**

The Six Sigma is a systematic approach of application in DMAIC and DMADV which can be used to improve the quality of production. DMAIC means for Design-Measure- Analyze-Improve-Control. While DMADV stands for Design-Measure-Analyze-Design-Verify.



Characteristics of Six Sigma

3. **Fact and Data-Based Approach:**

   The statistical and methodical method shows the scientific basis of the technique.

4. **Project and Objective-Based Focus:**

   The Six Sigma process is implemented to focus on the requirements and conditions.

5. **Customer Focus:**

   The customer focus is fundamental to the Six Sigma approach. The quality improvement and control standards are based on specific customer requirements.

6. **Teamwork Approach to Quality Management:**

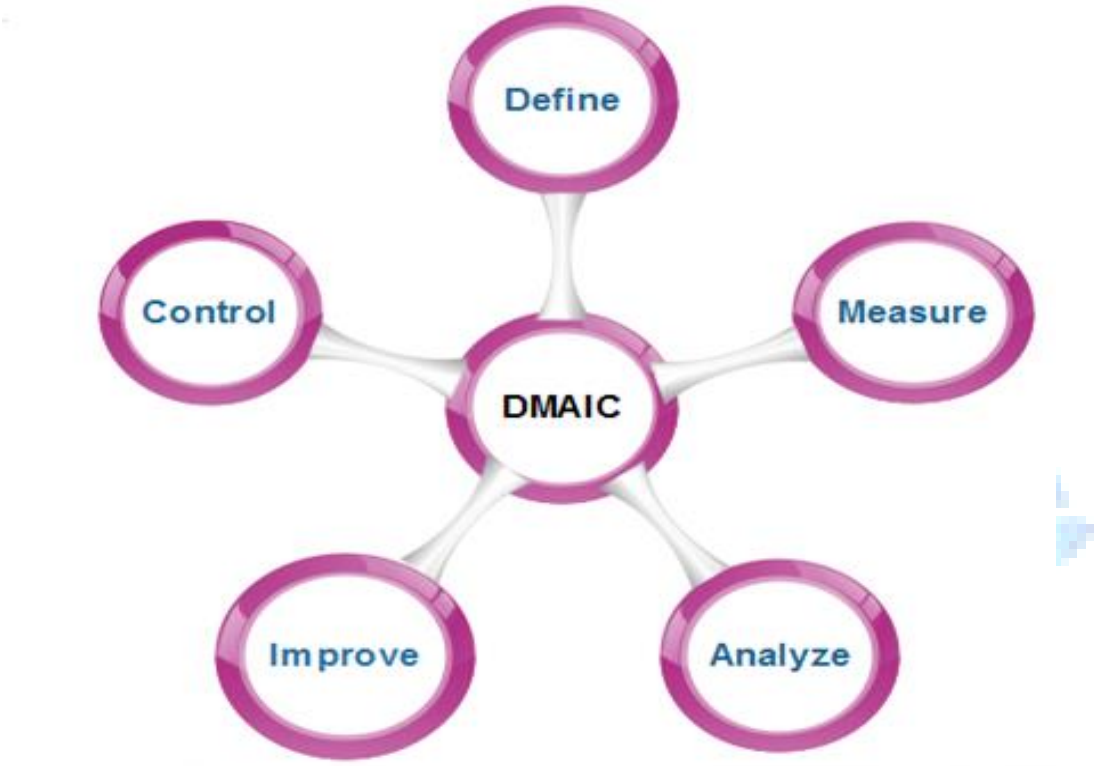
   The Six Sigma process requires organizations to get organized for improving quality.

Six Sigma Methodologies:

Two methodologies used in the Six Sigma projects are DMAIC and DMADV.

DMAIC

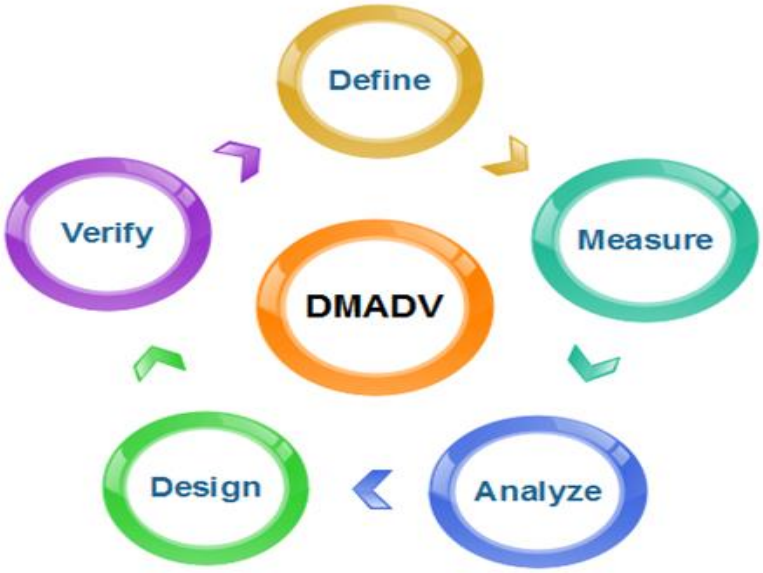
DMAIC is used to enhance an existing business process. The DMAIC project methodology has five phases:



1. **Define:** It covers the process mapping and flow-charting, project charter development, problem-solving tools, and so-called 7-M tools.
2. **Measure:** It includes the principles of measurement, continuous and discrete data, and scales of measurement, an overview of the principle of variations and repeatability and reproducibility (RR) studies for continuous and discrete data.
3. **Analyze:** It covers establishing a process baseline, how to determine process improvement goals, knowledge discovery, including descriptive and exploratory data analysis and data mining tools, the basic principle of Statistical Process Control (SPC), specialized control charts, process capability analysis, correlation and regression analysis, analysis of categorical data, and non-parametric statistical methods.
4. **Improve:** It covers project management, risk assessment, process simulation, and design of experiments (DOE), robust design concepts, and process optimization.
5. **Control:** It covers process control planning, using SPC for operational control and PRE-Control.

DMADV

DMADV is used to create new product designs or process designs. The DMADV project methodology also has five phases:



1. **Define:** It defines the problem or project goal that needs to be addressed.
2. **Measure:** It measures and determines the customer's needs and specifications.
3. **Analyze:** It analyzes the process to meet customer needs.
4. **Design:** It can design a process that will meet customer needs.
5. **Verify:** It can verify the design performance and ability to meet customer needs.