

# [(What Is Design For Six Sigma

## Design for Six Sigma

Design for Six Sigma (DFSS) is a collection of best-practices for the development of new products and processes. It is sometimes deployed as an engineering - Design for Six Sigma (DFSS) is a collection of best-practices for the development of new products and processes. It is sometimes deployed as an engineering design process or business process management method. DFSS originated at General Electric to build on the success they had with traditional Six Sigma; but instead of process improvement, DFSS was made to target new product development. It is used in many industries, like finance, marketing, basic engineering, process industries, waste management, and electronics. It is based on the use of statistical tools like linear regression and enables empirical research similar to that performed in other fields, such as social science. While the tools and order used in Six Sigma require a process to be in place and functioning, DFSS has the objective of determining the needs of customers and the business, and driving those needs into the product solution so created. It is used for product or process design in contrast with process improvement. Measurement is the most important part of most Six Sigma or DFSS tools, but whereas in Six Sigma measurements are made from an existing process, DFSS focuses on gaining a deep insight into customer needs and using these to inform every design decision and trade-off.

There are different options for the implementation of DFSS. Unlike Six Sigma, which is commonly driven via DMAIC (Define - Measure - Analyze - Improve - Control) projects, DFSS has spawned a number of stepwise processes, all in the style of the DMAIC procedure.

DMADV, define – measure – analyze – design – verify, is sometimes synonymously referred to as DFSS, although alternatives such as IDOV (Identify, Design, Optimize, Verify) are also used. The traditional DMAIC Six Sigma process, as it is usually practiced, which is focused on evolutionary and continuous improvement manufacturing or service process development, usually occurs after initial system or product design and development have been largely completed. DMAIC Six Sigma as practiced is usually consumed with solving existing manufacturing or service process problems and removal of the defects and variation associated with defects. It is clear that manufacturing variations may impact product reliability. So, a clear link should exist between reliability engineering and Six Sigma (quality). In contrast, DFSS (or DMADV and IDOV) strives to generate a new process where none existed, or where an existing process is deemed to be inadequate and in need of replacement. DFSS aims to create a process with the end in mind of optimally building the efficiencies of Six Sigma methodology into the process before implementation; traditional Six Sigma seeks for continuous improvement after a process already exists.

## Six Sigma

Six Sigma (6 $\sigma$ ) is a set of techniques and tools for process improvement. It was introduced by American engineer Bill Smith while working at Motorola in - Six Sigma (6 $\sigma$ ) is a set of techniques and tools for process improvement. It was introduced by American engineer Bill Smith while working at Motorola in 1986.

Six Sigma, strategies seek to improve manufacturing quality by identifying and removing the causes of defects and minimizing variability in manufacturing and business processes. This is done by using empirical and statistical quality management methods and by hiring people who serve as Six Sigma experts. Each Six Sigma project follows a defined methodology and has specific value targets, such as reducing pollution or increasing customer satisfaction.

The term Six Sigma originates from statistical quality control, a reference to the fraction of a normal curve that lies within six standard deviations of the mean, used to represent a defect rate.

## Lean Six Sigma

Lean Six Sigma is a process improvement method that uses a collaborative team effort to improve performance by systematically removing operational waste - Lean Six Sigma is a process improvement method that uses a collaborative team effort to improve performance by systematically removing operational waste and reducing process variation. It combines the many tools and techniques that form the "tool box" of Lean Management and Six Sigma to increase the velocity of value creation in business processes.

## Engineering statistics

in a normal distribution. The goal of Six Sigma is to ensure that the acceptable specification limits are six standard deviations away from the mean - Engineering statistics combines engineering and statistics using scientific methods for analyzing data. Engineering statistics involves data concerning manufacturing processes such as: component dimensions, tolerances, type of material, and fabrication process control. There are many methods used in engineering analysis and they are often displayed as histograms to give a visual of the data as opposed to being just numerical. Examples of methods are:

Design of Experiments (DOE) is a methodology for formulating scientific and engineering problems using statistical models. The protocol specifies a randomization procedure for the experiment and specifies the primary data-analysis, particularly in hypothesis testing. In a secondary analysis, the statistical analyst further examines the data to suggest other questions and to help plan future experiments. In engineering applications, the goal is often to optimize a process or product, rather than to subject a scientific hypothesis to test of its predictive adequacy. The use of optimal (or near optimal) designs reduces the cost of experimentation.

Quality control and process control use statistics as a tool to manage conformance to specifications of manufacturing processes and their products.

Time and methods engineering use statistics to study repetitive operations in manufacturing in order to set standards and find optimum (in some sense) manufacturing procedures.

Reliability engineering which measures the ability of a system to perform for its intended function (and time) and has tools for improving performance.

Probabilistic design involving the use of probability in product and system design

System identification uses statistical methods to build mathematical models of dynamical systems from measured data. System identification also includes the optimal design of experiments for efficiently generating informative data for fitting such models.

## Design for manufacturability

is applicable to the design process, a similar concept called DFSS (design for Six Sigma) is also practiced in many organizations. In the PCB design process - Design for manufacturability (also sometimes known as design for manufacturing or DFM) is the general engineering practice of designing products in such a way that they are easy to manufacture. The concept exists in almost all engineering disciplines, but the

implementation differs widely depending on the manufacturing technology. DFM describes the process of designing or engineering a product in order to facilitate the manufacturing process in order to reduce its manufacturing costs. DFM will allow potential problems to be fixed in the design phase which is the least expensive place to address them. Other factors may affect the manufacturability such as the type of raw material, the form of the raw material, dimensional tolerances, and secondary processing such as finishing.

Depending on various types of manufacturing processes there are set guidelines for DFM practices. These DFM guidelines help to precisely define various tolerances, rules and common manufacturing checks related to DFM.

While DFM is applicable to the design process, a similar concept called DFSS (design for Six Sigma) is also practiced in many organizations.

## DMAIC

cycle used for optimizing and stabilizing business processes and designs. The DMAIC improvement cycle is the core tool used to drive Six Sigma projects - DMAIC or define, measure, analyze, improve and control (pronounced d-MAY-ick) refers to a data-driven improvement cycle used for optimizing and stabilizing business processes and designs. The DMAIC improvement cycle is the core tool used to drive Six Sigma projects. However, DMAIC is not exclusive to Six Sigma and can be used as the framework for other improvement applications.

## G.I. Joe: Sigma 6

G.I. Joe: Sigma 6 is a line of military-themed action figures and toys produced by Hasbro, re-imagining the characters of the 1980s toyline, G.I. Joe: - G.I. Joe: Sigma 6 is a line of military-themed action figures and toys produced by Hasbro, re-imagining the characters of the 1980s toyline, G.I. Joe: A Real American Hero.

The Sigma 6 toy line served several purposes for Hasbro. First, it allowed them to depart from the classic 3 3/4-inch format of the A Real American Hero series of the 1980s; most Sigma 6 action figures stand at approximately 8 inches (200 mm) and have more articulation. Second, the new series offered them the chance to streamline the story and characters, stripping away old continuity and rebooting the franchise with younger versions of the cast, rendered in the anime style.

The line proved to be polarizing with G.I. Joe fans and ultimately unsuccessful at retail. Sigma 6 was cancelled after two years leaving many showcased sets and characters unproduced. In 2007 Hasbro went back to the classic 3 3/4"- 4" scale for the 25th anniversary line and beyond.

## Standard deviation

equations by the lowercase Greek letter  $\sigma$  (sigma), for the population standard deviation, or the Latin letter  $s$ , for the sample standard deviation. The standard - In statistics, the standard deviation is a measure of the amount of variation of the values of a variable about its mean. A low standard deviation indicates that the values tend to be close to the mean (also called the expected value) of the set, while a high standard deviation indicates that the values are spread out over a wider range. The standard deviation is commonly used in the determination of what constitutes an outlier and what does not. Standard deviation may be abbreviated SD or std dev, and is most commonly represented in mathematical texts and equations by the lowercase Greek letter  $\sigma$  (sigma), for the population standard deviation, or the Latin letter  $s$ , for the sample standard deviation.

The standard deviation of a random variable, sample, statistical population, data set, or probability distribution is the square root of its variance. (For a finite population, variance is the average of the squared deviations from the mean.) A useful property of the standard deviation is that, unlike the variance, it is expressed in the same unit as the data. Standard deviation can also be used to calculate standard error for a finite sample, and to determine statistical significance.

When only a sample of data from a population is available, the term standard deviation of the sample or sample standard deviation can refer to either the above-mentioned quantity as applied to those data, or to a modified quantity that is an unbiased estimate of the population standard deviation (the standard deviation of the entire population).

## Sigma Chi

Sigma Chi (??) International Fraternity is one of the largest North American social fraternities. The fraternity has 244 active undergraduate chapters - Sigma Chi (??) International Fraternity is one of the largest North American social fraternities. The fraternity has 244 active undergraduate chapters and 152 alumni chapters across the United States and Canada and has initiated over 350,000 members. The fraternity was founded on June 28, 1855, at Miami University in Oxford, Ohio, by members who split from the Delta Kappa Epsilon fraternity.

Sigma Chi is divided into seven operational entities: the Sigma Chi Fraternity, the Sigma Chi Foundation, the Sigma Chi Canadian Foundation, the Risk Management Foundation, Constantine Capital Inc., the Blue and Gold Travel Services, and the newly organised Sigma Chi Leadership Institute.

Like all fraternities, Sigma Chi has its own colors, insignia, and rituals. According to the fraternity's constitution, "the purpose of this fraternity shall be to cultivate and maintain the high ideals of friendship, justice, and learning upon which Sigma Chi was founded."

## Design

A design is the concept or proposal for an object, process, or system. The word design refers to something that is or has been intentionally created by - A design is the concept or proposal for an object, process, or system. The word design refers to something that is or has been intentionally created by a thinking agent, and is sometimes used to refer to the inherent nature of something – its design. The verb to design expresses the process of developing a design. In some cases, the direct construction of an object without an explicit prior plan may also be considered to be a design (such as in arts and crafts). A design is expected to have a purpose within a specific context, typically aiming to satisfy certain goals and constraints while taking into account aesthetic, functional and experiential considerations. Traditional examples of designs are architectural and engineering drawings, circuit diagrams, sewing patterns, and less tangible artefacts such as business process models.

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