

**A**

**Seminar report**

**On**

**SIX SIGMA**

Submitted in partial fulfillment of the requirement for the award of degree  
of MBA

**SUBMITTED TO:**

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## Acknowledgement

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## Preface

I have made this report file on the topic **SIX SIGMA**; I have tried my best to elucidate all the relevant detail to the topic to be included in the report. While in the beginning I have tried to give a general view about this topic.

My efforts and wholehearted co-corporation of each and everyone has ended on a successful note. I express my sincere gratitude to .....who assisting me throughout the preparation of this topic. I thank him for providing me the reinforcement, confidence and most importantly the track for the topic whenever I needed it.

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## **ABSTRACT:**

Six Sigma is a smarter way to manage business or department. It is a vision of quality that equates with only 3.4 defects for million opportunities for each product or service transactions. Strives for perfection.

We believe that defects free product can be in any organization implementing six sigma. In this paper, we presented an overview of the process which explains how six sigma increase the overall quality improvement task into a series of project management stages: Define, Measure, Analyses, Innovation, Improve and Control. We will describe dependence of six sigma on Normal Distribution theory and also process capability. It gives a small note on the assumptions made in six sigma methodology of problem solving and the key elements involved .A brief view on Defects Per Million Opportunities (DPMO) Analysis is given.

Ultimate objectives of the methodology to solve problems, improve the quality, profitability and customers satisfaction.

## **INTRODUCTION:**

The main objective of any business is to make profit. For increasing the profit, the selling price should increase and/or the manufacturing cost should come down. Since the price is decided by the competition in the market, hence the only the way to increase the profit is to cut down the manufacturing cost which can be achieved only through continuous improvement in the company's operation. Six sigma quality programs provide an overall framework for continuous improvement in the process of an organization. Six sigma uses facts, data and root cause to solve problems.

## **SIX SIGMA HISTORY**

Here's a brief history of Six Sigma, and the Six Sigma name. Additionally, comments I've received about Six Sigma contain aspects of Six Sigma history.

Since the 1920's the word 'sigma' has been used by mathematicians and engineers as a symbol for a unit of measurement in product quality variation. (Note it's sigma with a small 's' because in this context sigma is a generic unit of measurement.)

In the mid-1980's engineers in Motorola Inc in the USA used 'Six Sigma' as an informal name for an in-house initiative for reducing defects in production processes, because it represented a suitably high level of quality. (Note here it's Sigma with a big 'S' because in this context Six Sigma is a 'branded' name for Motorola's initiative.)

(Certain engineers - there are varying opinions as to whether the very first was Bill Smith or Mikal Harry - felt that measuring defects in terms of thousands was an insufficiently rigorous standard. Hence they increased the measurement scale to parts per million, described as 'defects per million', which prompted the use of the 'six sigma' terminology and adoption of the capitalised 'Six Sigma' branded name, given that six sigma was deemed to equate to 3.4 parts - or defects - per million.)

In the late-1980's following the success of the above initiative, Motorola extended the Six Sigma methods to its critical business processes, and significantly Six Sigma became a formalised in-house 'branded' name for a performance improvement methodology, ie., beyond purely 'defect reduction', in Motorola Inc.

In 1991 Motorola certified its first 'Black Belt' Six Sigma experts, which indicates the beginnings of the formalisation of the accredited training of Six Sigma methods.

In 1991 also, Allied Signal, (a large avionics company which merged with Honeywell in 1999), adopted the Six Sigma methods, and claimed significant improvements and cost savings within six months. It seems that Allied Signal's new CEO Lawrence Bossidy learned of Motorola's work with Six Sigma and so approached Motorola's CEO Bob Galvin to learn how it could be used in Allied Signal.

In 1995, General Electric's CEO Jack Welch (Welch knew Bossidy since Bossidy once worked for Welch at GE, and Welch was impressed by Bossidy's achievements using Six Sigma) decided to implement Six Sigma in GE, and by 1998 GE claimed that Six Sigma had generated over three-quarters of a billion dollars of cost savings. (Source: George Eckes' book, The Six Sigma Revolution.)

By the mid-1990's Six Sigma had developed into a transferable 'branded' corporate management initiative and methodology, notably in General Electric and other large manufacturing corporations, but also in organizations outside the manufacturing sector.

By the year 2000, Six Sigma was effectively established as an industry in its own right, involving the training, consultancy and implementation of Six Sigma methodology in all sorts of organisations around the world.

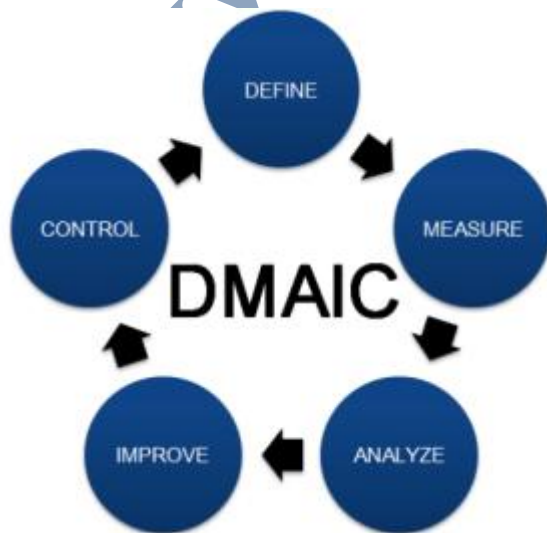
That is to say, in a little over ten years, Six Sigma quickly became not only a hugely popular methodology used by many corporations for quality and process improvement, Six Sigma also became the subject of many and various training and consultancy products and services around which developed very many Six Sigma support organizations.

## **Six Sigma Methodologies: DMAIC vs. DMADV**

Six Sigma is an innovative and adaptive set of methodologies geared toward improving the efficiency and effectiveness of corporate processes. Originally introduced by the Motorola Corporation in 1986, it has evolved to become present within the most successful business improvement strategies and is attributed with reducing the number of defects in manufactured goods to less than 3.4 per 1 million units.

Six Sigma uses two different sets of methodologies, DMAIC and DMADV, as lenses to examine and address complementary aspects of business processes. The DMAIC and the DMADV distinctions are aimed at viewing different sectors of a business simultaneously but addressing them separately. Despite unique distinctions, the methodologies overlap during the examination process and share the same end goal - improvement of business processes.

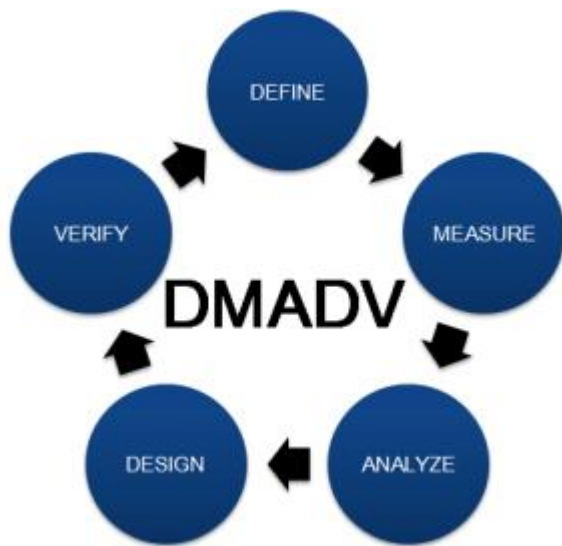
Each methodology has its own set of guidelines and goals targeted at improving business processes through the use of data collection and statistical tools. While the methodologies are designed to achieve the same thing, there are noteworthy differences between the two that should be considered by professionals in leadership roles or in business environments with a wide range of organizational settings.



## DMAIC

The set of Six Sigma methodologies that is most applicable to the manufacturing or production side of a product or service, DMAIC includes these project stages:

- **Define** - address the identification of specific processes to be examined
- **Measure** - record data and use metrics to track effectiveness and evaluate efficiencies
- **Analyze** - utilize critical thinking skills to review data and clarify goals
- **Improve** - create changes in business processes geared toward improvement and better alignment with corporate goals
- **Control** - build a system of checks and adjustments for ongoing improvement in production processes



## DMADV

The complementary set of Six Sigma processes that is most applicable to examining and improving the customer relations side of a company, DMADV includes these project stages:

- **Define** - address customer needs in relation to a product or service
- **Measure** - involve the use of electronic data collection to measure customer needs, response to product, or review of services
- **Analyze** - utilize metrics to evaluate areas where product or service can be better aligned to customer goals and needs
- **Design** - overlap the improvement of business processes that streamline corporate goals to best meet client and customer needs
- **Verify** - build a system of tests and models to check that customer specifications are being met through on-going improvements

For professionals interested in finding out more about how these powerful methodologies play out in a variety of business settings or how they could make an impact for your business, consider pursuing additional education in the field of Six Sigma. While both sets of Six Sigma methodologies can work hand-in-hand to

achieve a specific set of organizational and fiscal goals, professionals interested in one set of methodologies over the other can augment skills through a reputable online certificate program.

As Six Sigma continues to evolve and address 21<sup>st</sup> century business issues and goals, professionals that demonstrate a mastery of these practices could find many applicable opportunities in a variety of industry settings. Through online courses taught by industry leaders, professionals and businesses can achieve practical business solutions and certification as a green belt, black belt and master black belt in Six Sigma.

## **SIX SIGMA IMPLEMENTATION ROLES**

The six sigma methodology is filled with many roles. When it comes to the implementation roles of six sigma, most lean experts would agree that the following roles should be included in the implementation team. Of course there are no universal rules governing your six sigma implementation structure, so making changes to these prescribed roles is up to the discretion of the individual organizations and their unique needs.

- **Executive leadership**

Those assuming the role of executive leadership are typically the top level executives who hold the primary responsibility for seeing the implementation of six sigma through from start to finish (finishing referring to when a goal is met). Those holding the executive leadership role are also responsible for the selection of project members and the delegation of responsibilities to those team members. Executive leaders need to be committed to the vision of six sigma in order to motivate the members of the implementation team. Without this dedication to seeing the six sigma implementation process through, it can become easy to get discouraged and consider abandoning the process. Executive leaders also must realize that there may come times when they must take a step back and allow team members to run free with their ideas. This includes making resources available to them in the hope that these investments will lead to worthwhile improvements.

- **Champions**

Those who are assuming the Champion role are typically members of upper management. Champions are responsible for the implementation of six sigma in the organization. The Champion is typically selected by those assuming the role of executive leadership. It is the responsibility of the Champion to understand Six Sigma principles. The Champion must act as a guide for his implementation team by serving as a mentor and facilitator. Champions are typically the first to obtain formal training or are hired before any other member of the implementation team because they have already been certified as a Champion. Champions are responsible for not only bringing the most pressing issues of the organization to light but also to generate ideas for projects that will lead to the improvement of these concerns.



Champions also work to resolve cross-functional issues that may slow down the flow of information and the acquisition of the appropriate tools needed to move forward with obtaining and measuring data and then ultimately instigating changes.

Champions also act as mentors to Black Belts, the next roles that are assumed in the six sigma implementation process.

- **Master Black Belts**

Master Black Belts are chosen by the Champions to coach others within the group of those working in the implementation of the six sigma methodologies. This coaching process includes the mentoring of those who have assumed lower roles (black and green belt roles) within the group. Ultimately, the Master Black Belts are responsible for delivering the results of the projects that are being conducted. They must perform many statistical tasks in order to ensure the consistent application of six sigma throughout the entire organization. A Master Black Belt must have strong leadership skills. It is ideal when the individual assuming the Master Black Belt role is well respected in the organization. This respect works to the Master Black Belt's advantage as he must be able to influence decisions.

Master Black Belts are entrusted with the responsibility to not only maintain the momentum of a six sigma implementation, but also to keep costs down and maintain the focus of the group's efforts on the customer throughout the entire implementation process. A Master Black Belt position is typically a temporary position that is needed from time to time as new projects present themselves. Therefore a company can either hire a Master Black Belt for a specific project or choose to train one with Master Black Belt certification to also assume other job responsibilities in the organization when his specific six sigma skills are not needed.

- **Black Belts**

Black Belts are typically members of middle management who are primarily responsible for executing the six sigma plan of action. Black Belts are typically more technically oriented than other roles within the implementation process. Their job is to create, facilitate, train, and lead teams, with an analytical approach. While other previously mentioned roles involve the employee's focus on identifying projects for six sigma, the role of a Black Belt is to use statistical tools to lead other team members and assure successful results.

A Black Belt will typically have about 4-5 weeks of professional full-time training in statistical methods and tools. Once trained, a full-time Black Belt will typically spend 2-3 years working as the individual responsible for six sigma execution. It is then typically most advantageous for that individual to return to whatever their original assignment was within the organization. This reasoning is based on the fact that after having worked so intimately with the six sigma mentality for several years, this employee can then re-apply those lessons learned into daily operations. This leads to constant re-adjustment which aligns perfectly with the purpose of implementing six sigma methods in the first place.

- **Green Belts**

Green Belts are responsible for helping the Black Belts to execute projects while simultaneously attending to their own specific job responsibilities. Green Belts typically have part time responsibilities when it comes to their involvement in the six sigma implementation. Green Belts must also receive formal instruction to become certified, however the time commitment to this instruction is significantly less than the before mentioned implementation roles. It is the responsibility of the Green Belts to incorporate six sigma quality tools and language into their daily operations.

- **Yellow Belts**

Yellow belts represent everyone else on the six sigma implementation team (and in some cases throughout the whole organization). Yellow Belts are commonly part of a company-wide initiative to implement six sigma but these individuals have not typically received any formal six sigma training nor are they expected to play active roles in quality improvement projects. Although Yellow Belts are not briefed on the details of the project, they do help Green Belt meet project goals and objectives as administrators, operations personnel.

### **Other implementation roles**

In addition to the implementation roles within six sigma that have just been described, there are more roles that can be assumed that aid in the implementation process. Here are just a few examples of the other implementation roles that exist:

- **Financial analyst** - A financial analyst is a third party consultant whose services are solicited for the objective examination of project results. A financial analyst will typically also have Green Belt training.
- **External consultant** - An external consultant is hired in to help the implementation process by providing various levels of needed training. It is the job of the consultant to make certain that the proper training tools are in place so that failures in the first phases of implementation efforts are avoided. Consultants also can help in customizing the organization's approach to Six Sigma following the adoption of some of the more basic principles.
- **Experts** - In major engineering or manufacturing sectors an "expert" is hired to improve overall services, products, and processes for their customers.
- **Sponsor** - A sponsor is a senior executive who sponsors the six sigma implementation.
- **Leader** - The "Leader" is another term used to describe the senior-level executive who is responsible for the business's six sigma implementation.
- **Team member** - The term "team member" can be used to describe the role of the professional or organization's employee who has a general awareness of what six sigma is and can bring relevant experience to a particular project, but who is not necessarily formally trained in any of the six sigma implementation roles.
- **Process owner** - This individual "owns" or is responsible for the business process that is the target of a Six Sigma project.

## **APPLICATIONS**

Six Sigma mostly finds application in large organizations. An important factor in the spread of Six Sigma was GE's 1998 announcement of \$350 million in savings thanks to Six Sigma, a figure that later grew to more than \$1 billion.

According to industry consultants like Thomas Pyzdek and John Kullmann, companies with fewer than 500 employees are less suited to Six Sigma implementation, or need to adapt the standard approach to make it work for them.

Six Sigma however contains a large number of tools and techniques that work well in small to mid-size organizations.

The fact that an organization is not big enough to be able to afford Black Belts does not diminish its abilities to make improvements using this set of tools and techniques.

The infrastructure described as necessary to support Six Sigma is a result of the size of the organization rather than a requirement of Six Sigma itself.

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## **CONCLUSION:**

The term “sigma” is used to designate the distribution or the spread about the mean of any process. Sigma measures the capability of the process to perform defect-free work. A defect is anything that results in customer dissatisfaction. For a business process, the sigma value is a metric that indicates how well that process is performing. Higher sigma level indicates less likelihood of producing defects and hence better performance.

Six sigma is a performance standard to achieve operational excellence. With six sigma, the common measurement index is “defects-per-unit” where a unit can be virtually anything – a component, piece of material, administrative form etc.

Conceptually, six sigma is defined as achieving a defect level of 3.4 ppm or better. Operationally, six sigma is defined as staying within half the expected range around the target. The approach aims at continuous improvement in all the process within the organisation. This works on the belief that quality is free, in that the more we work towards zero-defect production, the more return on investment we will have. The advantages of six sigma approaches are reduction in defects/rejections, cycle time, work in progress etc. and increase in product Quality & Reliability, customer satisfaction, productivity etc. leading ultimately to excellent business results.

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