

FROM CONCEPT TO IMPLEMENTING MODE OF SIX SIGMA:AN OVERVIEW

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Abstract—Six Sigma Methodology is a kind of flexible approach which can change its path for solving any problem as per the requirement of the needs. It is a type of approach which is the combination to brainstorming the session as well as in designing and redesigning the process parameter and operating conditions. Six Sigma is a management oriented method to manage the man, machine and money collectively and take advantage of the available business assets. The concept was introduced to minimize and eliminate defects from a system whether manufacturing or service. In this section the author trying to define the different Six Sigma approaches and shows how these are correlated with each other in solving any problem. This paper is about the approach that an organization should withhold in implementing Six-Sigma.

Keywords—Six-Sigma; Quality Management; Business Excellence; DMAIC; DMADV

1. INTRODUCTION

Quality control is as old as industry itself. From the time man began to manufacture, there has been interest in quality of output. This aspect of manufacturing is constantly gaining importance nowadays because poor quality results in poor outcomes in terms of turnover. Globalization and instant access to information are the causes of products and services keep changing the way of customers' behavior (Gibbs & Iacovidou, 2004). Therefore with changing requirements the processes are changing and this causes the poor quality issues to escalate. Hence a quality management system (QMS) with a proven potential with the flexible nature is the need of the hour (Miller, 2013). Six Sigma is such a QMS in which flexible nature allows us to use the tools suitable for each process and a simple process flow helps in achieving the quality goals (O'Neill & Duvall, 2005). Six Sigma relates to the quality of any system output (Dedhia, 2005).

2. CONCEPT OF SIX SIGMA

Six Sigma is about Revise the process, Analysis the process, Restructure the process, Optimizing the process parameter, Designing the process, Manage the process and Control the process (C. Kaushik, Shokeen, Kaushik, & Khanduja, 2007) (Cheng, 2008) (Agarwal & Bajaj, 2008) (Figure 1)

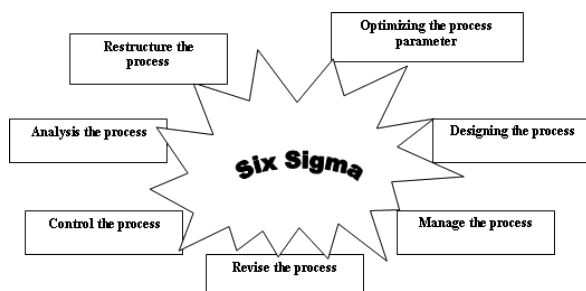


Figure 1 Features of Six Sigma

Statistical meaning of the Sigma is termed as the divergence from the target. It can also be called as the movement away from the desired object. This type of

variation can be of the type of positive as well as negative. To make the variation positive, it is required to square the values of the variation. From the square variance, calculate the square root which would give the standard deviation denoted by Sigma. The principle of Six Sigma is near to perfection with excellence (P. Kaushik, 2011). Numerically, the number of defects per million opportunities shall be less than 3.4 defects. Some people think about Six Sigma that it is a certification process-No this is a methodology adopted by any organization to perfect its processes to get high quality and earn customer satisfaction. The goal of the Six Sigma is to reduce the variation in the process to minimum and achieve minimum standard deviation (Dhiraj & Deepak, 2014). Six Sigma is a wide-ranging system exercised to accomplish, maintain and maximize business success. Customer centric, Data driven decisions, Process perfection and Empowered teams are the basic elements of Six Sigma to implement in better way. It is a system of management to achieve the world class performance.

3. SIX SIGMA AS QUALITY MANAGEMENT

Primarily Six Sigma is a methodology for ordered quality step up. Six Sigma as the revolutionary quality management approach that measures and boosts quality and which has become a world standard for meeting customer needs (Ehie & Sheu, 2005). Six Sigma is a quality management methodology and is customer driven and when this practice is added to the practice of management, it ultimate results are nothing but Total Quality Management. Six Sigma is a way to realize the philosophy and values associated with total quality management (Thomas & Barton, 2006). Six Sigma methodologies and tools are wide ranging and are important components of total quality management. Six Sigma as a quality improvement initiative as well as quality management framework (Ng, Tsung, So, Li, & Lam, 2005). Because this quality improvement is a prime ingredient of total quality management (TQM), many companies find that adding a Six Sigma program to their current system gives them all or almost all the elements of

TQM. There are many quality philosophies and business models in use such as TQM, Kaizen, lean and continuous improvement and Six Sigma is not necessary better than these, but it can provide long term benefits to companies which use it wisely and adapt it to their specific needs. The problem solving tools used within a Six Sigma program are typically the same TQM tools that were popularized during the 1980's (Thomsett, 2005). TQM requires the participation of all members of an organization in improving processes, products, services and even the culture in which they work (Khadijah, Bashayer, & Azrilah, 2016). Six Sigma is nothing new and is merely a rewarded and repackaged form of traditional quality principles and techniques (Qureshi, 2012). Six Sigma is a generic quality management method that can be applied to any business process. It provides both a measure and a target for quality, together with a set of techniques that help practitioners remove the defects that inhibit service quality.

4. SIX SIGMA METHOD

Methodology of Six Sigma has brought revolution among the organizations across the globe till its origin. Six Sigma define-measure-analyze-improve-control (DMAIC) methodology basically runs on mostly questions. Each phase can be summed up into one line describing the questions. The first phase i.e. define can be describe as the customer voice. Customer can be internal or external. Second phase i.e. measure can be described as implying various tools in calculating the current status of the problem. In third phase of analysis, a deep investigation of process using various statistical tools to find out the root causes associate with the process. In implementation improve phase the corrective actions proposed by the Six Sigma teams are implemented. In final phase i.e. control the status of process after implantation is analyze.

Define Phase: Before the start of any Six Sigma project, it is always be required to be clear that what you want to achieve at the end of the project. For this, define phase does the thing. This phase is about to define the scope, defining the core process, defining the problem, define the key user's requisites and define the key user. Voice of the user and identifying the key customer is the main role of this phase (P. Kaushik & Mittal, 2015).

Measure Phase: With the start of the measure phase, all measurements are taken related to the problem areas and before proceeding with the measure phase it is required to deeply understand the following issues- What necessitates to measured? How it should be measured?

The process of measure phase starts with the observation of current process followed by identify related factors, decide the type of data to be measured, identify the source of data and data plan, collect data, calculate the current yield and calculate the current cost of quality.

Analysis Phase: Improvement process starts with the identification of defects and know exactly how well the sigma level of the existing process (Jaglan, Khanduja, & Kaushik, 2013). During this process, using brainstorming sessions, special causes of the variation/problem in performance have been identified and also recognize the solution to improve them. Analysis phase starts with the come up with the collected data, Identify the special

causes, Recording and Prioritize the probable causes, Setting up VSM (Value Stream Mapping), Brainstorming the revised process, Try-out run the revised process and at last confirm action plan.

Improve Phase: This phase is one of the core and important section to identify the optimized solutions and reduce the variation. During this phase, the improved sigma level of the process is calculated and compared with the prior sigma level of the process before implementing improvement steps (P. Kaushik & Khanduja, 2010). Various tools can be used in this phase like Multi Voting, Suitability matrix, Linear correlation, Failure mode and effect analysis and Design of experiment.

Control Phase: After doing so hard work, now it is required to control the initiated so that the process does not go back to its old stage. The basic idea behind this phase is to generate a set of structures which are stout and uphold the process in place. Control phase is a set of four steps closed loop with each other. These are Planning, Documentation, Process control, System review. More than achieving the Six Sigma show, watching the performance and making sure that there are no letups are essential. Management has to make shop floor managers accountable for congregation the metrics time after time.

Six Sigma methodology arrangement of two different methodology for different type of problems. These are DMAIC (Define, Measure, Analysis, Improve and Control) methodology and DMADV (Define, Measure, Analyze, Design and Verify) methodology. If the root cause of the problem is within the process then DMAIC methodology will be used as it is best suited for that kind of problem and if the root cause of the problem is related to design of the process/product then the DMADV methodology is best suited for that. The first three phases of both the methodologies are same i.e. Define, Measure and Analyze. The outcome of the analyze phase determines root cause of the problem and ultimately the demand for a right countermeasure arises. Which methodology has to follow is justified with the demand of countermeasure. Started a problem using DMAIC methodology and after analyze phase if it is found that the root cause of the problem is within the process then stay with the DMAIC methodology. But if it is found that after analysis phases that root cause of the problem is related with the change in design or redesign the process parameter then it become necessary to switch over to DMADV methodology. In this it is not redo the first three phases as these are common in both the methodology. The link between the DMAIC and DMADC methodologies is as shown in figure 2.

5. CONCLUSION

The Six Sigma methodology helps an organization to develop a quality culture in its premises. Application of Six Sigma seems to have a practical approach whereas the other quality improvement approaches seems to be theoretical. Statistical thinking of Six Sigma approach makes it more real and practical. The employee feels motivated and strive to work better for the progress of organization. There are various other intangible benefits of Six Sigma as well which include personnel development of employees, increase in brand value, customer delight etc.

This paper shows the way towards implementing the Six Sigma project to every type of industries.

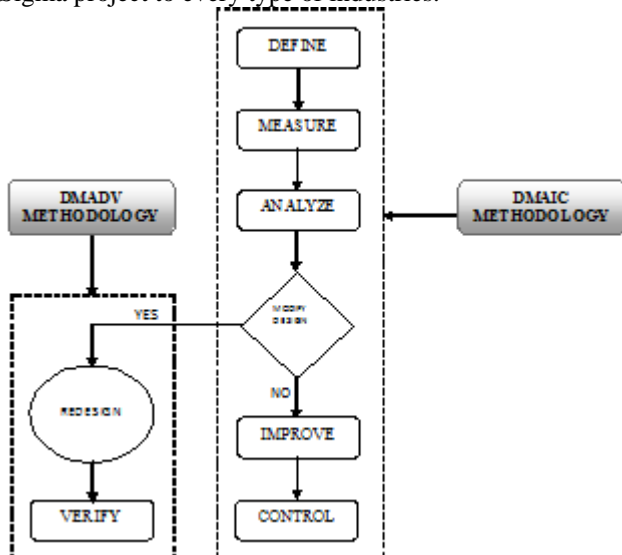


Figure 2: Link between DMAIC and DMADV Methodologies.

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