

# Review on Implementation and Barriers Affecting Six Sigma Methodologies

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**Abstract** - From last decade, six sigma is a predominant statistical tool for process improvement and also quality improving techniques. There are some obstacles which make some difficulties in implementing six sigma. The work aim is to study the six sigma DMAIC method and the barriers affecting its implementation

**Keywords**-Six Sigma; Lean; Productivity.

## I. INTRODUCTION

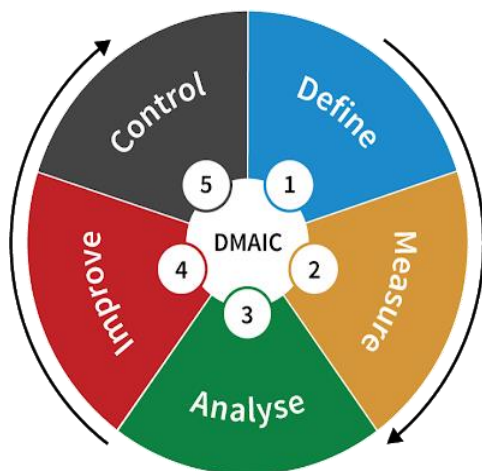
Six sigma tool is used in companies, factories or industries for achieving profitability and productivity by reducing waste.

SIX SIGMA DMAIC methods:

- Define
- Measure
- Analysis
- Improve
- control

The five steps for implementation of six sigma. The operational efficiency team reduces the defects in an industry using six sigma. The work aim is to review previous studies about six sigma implementation and barriers for implementation in an organization.

## II. INTERPRETING THE CONCEPT



### A. Define Phase:

The first step in six sigma improvement process is DEFINE phase. In this step process map is created and customer needs are identified. Sequential to that problem statement and goal are identified. It helps to define the project boundaries and also the requirements and expectations of the customers. Further tools like SIPOC diagram, Swim lane map, Stack holder analysis are done in phase.

### B. Measure Phase:

The second phase of six sigma approach is the MEASURE phase. In this phase the current performance of the process is determined and a plan to collect data is created. Process Capability is determined along with tools such as check sheet operational definition and project characters. The most important criteria for measure phase is to gather the base line data.

### C. Analyse Phase:

This is the third phase of six sigma approach. The cause of the problem is identified in this phase. The root cause for the problem is brainstormed in this phase. The data given are graphically defined for analysing. The problem must be examined accurately for further analysis. Followed by that 5why's, fishbone diagram, value added flow analysis, box plots are used in analysis phase.

### D. Improve Phase:

A structured improvement is provided by determining the root cause solutions. Brainstorm (or) practical solutions might fix problem which ensure the improvement phase. Brainstorm solutions, pilot process changes, implement solution and lastly collects data to confirm there is measurable improvement. Process map is developed based on different types of solutions found that may lead to improvement. Further tools such as Plan-Do-Check-Act, To-Be-Map, IEM are used in improve phase

### E. Control Phase:

This is the fifth phase in six sigma process. The improvements made are implemented in the process and should be noted that there is no dip in the current performance. The measurements of the improvements in the plan should

be monitored and should focus on developing a responsible plan . Further tools such as control charts, documentation , walks, control plan are used in these phase

### III. IMPLEMENTATION OF SIX SIGMA

If an organization is ready for a change without any resistance under a leader who brings the best result can follow these steps to implement six sigma in there organization

#### A. Reason for Implementing Six Sigma:

There should be some reasons for implementing six sigma project without creating a burning platform we cannot implement it. Every level of management in an organization should be familiar with the burning platform and they should also know how six sigma can solve the problem in the burning platform.

#### B . Resources In Place:

The implementing factors first needs the commitment from the top level management and also the involvement from the leader with initiative and innovative mind along with the participation from the lower level management .This totally says that right resources at right place.

#### C. Giving priority to tasks:

After allocating resources and completing employee training, many option may show up in the organization. Most important thing is giving priority to the opportunities occurred in the organization. First importance should be given to the voice of the customers ,then next priority should be given to the quality assurance after that it should be verified that weather all the effort are linked with the business goals. Because it is necessary to acquire knowledge about what to overlook and risk priority

#### D. Responsibility:

One who initiate's the six sigma project must appoint a team member who is responsible for the entire team and the six sigma project, he must have all relevant data's and statistical information about the project

#### E. Knowledge about Six Sigma:

The foremost step of every organization is to teach the knowledge about six sigma to all levels of management and they should also train their subordinates to get certified in yellow ,green and black belts so that the organization can motivate their employee toward achieving the goal of completing six sigma projects.

#### F. Execute:

The next step in implementation of six sigma project is execute it should be a continuous process. The documented plan by the six sigma team members is checked and send to the black belt to execute it. Black belt follow the steps in the documentation and plan for execution, he should take responsibility for specific aspects.

#### G. Evaluate:

This is the final step in the implementation, after the pilot project an analysis should be made over the implementation. In the analysis document, what all worked well and the problem arouse should be listed. The black belt holder should perform second round execution to solve the problem and evaluate the whole system, after the successful implementation a periodic evaluation should be carried in the organization and submit to the top level management

There are some barriers while implementing six sigma and these barriers are due to top level management organizational culture, lack of knowledge on six sigma and so on

### IV. BARRIERS IN IMPLEMENTING SIX SIGMA

#### A. Lack of Resources

For implementing six sigma more resources like human resources, financial resources, time are needed and also the company requires a experienced operational efficiency team for implementing six sigma resources in that company .The team leader must be a black belt holder and the team members must be green belt holders .Implementations of six sigma in the company would consume lot of time so it would affect their current product.

#### B. Lack of Leadership

Leadership plays a important role because a leader with initiative and innovative idea will lead to a better organization. If there is a poor leadership and lack of commitment from top level management will be a barrier for implementation of six sigma. So leader of any organization won't give any excuses on deploying six sigma in their organization .

#### C. Lack of Knowledge about Six Sigma

Due to lack of knowledge about six sigma will affect the organization's quality improving techniques and also there "Juran Trilogy" (i.e.) Juran Trilogy means planning, controlling and improving factors of organization. The six sigma which includes five phases (define, measure, analyse, improve, control) if these phases are followed in an entire organization level they will achieve there expected results.

#### D. Internal Resistance or Resistance to change

An organisation should adopt them to changes if they are not adopting it. It will result in certain amount of resistance and scepticism. Six sigma has five phases. In that one phase is about Improving. While improving an organization changes are made if they are resistance to it six sigma cannot be developed in that organization.

#### E. Poor Training & coaching

Every organization should always think about training and coaching sessions that are provided to every level of management. If there is lack of coaching and training to their subordinate will affect the organization because Six Sigma is not only about statics improving it is also about Statistical thinking.

#### F. Cultural Barriers

Every organization requires some changes in their organizational culture. If the organizational leader is acting according to the customers, requirements and also a motivator. That organization will possess a better culture. This will improve the organizational standard and it also helps to achieve goals.

#### G. Lacunae in data collection

This is one of the greatest barriers in implementing six sigma because data collection should be relevant to the six sigma project if not it will be a time waste process. Data collection is considered as one of the trickiest precarious work. It is also one of the phases in DMAIC method.

#### H. Poor six sigma project selection

The most important factor for implementing six sigma is selecting six sigma projects in an organization. Selecting the project is based on keeping some impact on stakeholders like employees, customers and shareholders which will lead to some positive results.

#### V. CONCLUSION:

The survey implies that there are barriers in implementation of six sigma. The important barriers for implementation of Six Sigma is lack of resources and poor training and coaching. The main factor for implementing six sigma is proper training. Six sigma is implemented in an organization to reduce variation. Implementation of six sigma becomes easier when their barriers are found and removed.

#### REFERENCE

- [1] "Impact of Six-Sigma DMAIC approach on Manufacturing Industries" - Satish Kumar
- [2] "Implementation of Six Sigma in a Manufacturing Process" - Adan Valles1, Jaime Sanchez1, Salvador Noriega2, and Berenice Gómez Nuñez1
- [3] "Lean Six Sigma Implementation: An Analytic Hierarchy Process Approach" - Sanjay Kumara, Sunil Luthrab, Abid Haleem and Dixit Gargd
- [4] "Six Sigma: The role of goals in improvement teams" - Kevin Linderman
- [5] "Exploring the six sigma phenomenon using multiple case study evidence" - Preeprem Nonthaleerak
- [6] "The evolution of lean Six Sigma" M.P.J. Pepper
- [7] "Similarities and differences between TQM, six sigma and lean" - Roy Andersson, Henrik Eriksson and Hans Torstensson
- [8] "Applying Lean Six Sigma for Waste Reduction in a Manufacturing Environment" - Mohamed K. Hassan
- [9] "The challenges of six sigma in improving service quality" - Behnam Nakhai
- [10] "Six Sigma in the UK service organisations results" from a pilot survey Jiju Antony
- [11] "A Review On Issues For Implementation Of Six Sigma By Small And Medium Enterprises" - Dharmendra Tyagi
- [12] "Quality Improvement Methodologies" - PDCA Cycle, RADAR Matrix, DMAIC and DFSS M. Sokovic
- [13] "Lean Six Sigma Approach for Quality and Business Performance" - Man Mohan Siddh
- [14] "Critical success factors of Lean Six Sigma for the Malaysian automotive industry" - Nurul Fadly Habidin
- [15] "Barriers for implementation of Six Sigma by Small and Medium Enterprises" - Raghunath A
- [16] "Six sigma in small- and medium-sized UK manufacturing enterprises" - Jiju Antony and Maneesh Kumar
- [17] "Implementation and assessment of lean management tools in Indian pharmaceutical industry", Aruba Zubedi, Dr. Rahela Tabassum.
- [18] "A basic framework for successful implementation of lean tools in Indian MSME", K. Ravi Kumar