SIX SIGMA BASICS – ARTICLE

The **traditional way** of looking at quality has been that "quality cannot be measured", and "error in work is inevitable".

At the end of the second world war, the quality of products manufactured in Japan was atrocious. At this juncture, the Japanese decided to change this scenario. They visited many industries in USA to study their approach to quality. They also invited experts like Dr. Deming and Dr. Juran to help them. These experts focused on enlightening the top management about their responsibility in respect of quality and training engineers on tools like statistical process control and design of experiments. Their efforts resulted in spectacular improvements and **by 1980 even the American citizens preferred to buy Japanese products** due to better quality offered by them at a more competitive price.

By 1985, survival became a major issue for many American organizations against the onslaught of Japanese competition. One such organization which was at great risk was Motorola. **In an effort for survival, Motorola evolved and implemented the six sigma management system for the first time in the world.**

This system of management included lessons learnt from the successes achieved by Dr. Deming and Dr. Juran in Japan as also a **methodology of quantifying quality**. Till such time, quality was considered as "unmeasureable" and only talked of in terms of "excellent", "world-class", etc. The six sigma management system makes it possible to calculate quality of each and every process in the organization. It is believed that if you want to improve any process we should first know its present level of quality. Six Sigma methodology makes this possible.

Key Themes in Six Sigma:

Every functional area (department) is viewed as a supplier to another department whose requirements must be satisfied. So, if we want to improve any process, our starting point is to find who is the customer for our process and what are his requirements from the process. This could be an internal customer for an HR process or an external customer for a logistics process.

For example, one of the internal customers for an HR Manager is the Production Manager or the Operations Manager. A critical requirement of this internal customer is that vacancies must be filled within, say, 45 days from time of placing the request. Another requirement would be that induction-training of new employees results in their settling fast on the job. If the HR Manager has identified these requirements of his internal customers, then he is more likely to fulfill them.

Each and **every activity in the organization is viewed as a process** represented by the function Y = f(X1, X2, X3,……Xn), where Y is the output (result) to be achieved from that activity. The X1, X2, X3 ……Xn are viewed as inputs to the process. In six sigma, we use statistical methods to find out what would be the optimum values of the inputs X1, X2, X3, ……. Xn which would help us to achieve the most effective result. By

repeating these values for the inputs, we can be assured of the same (consistent) output from the process. In the above example, building a data bank would be an important X1 as input to the recruitment process.

In today's environment of fierce competition, an external customer needs to be satisfied on various counts which include: providing the required specifications, giving prompt support before and after the sale, pricing the product competitively and meeting the timelines specified by the customer. All these outputs are possible only if a **boundary-less cooperation** exists between the different departments. Thus, six sigma lays very heavy emphasis on cross-functional cooperation without which it is very difficult to deliver value to customer.

Six Sigma methodology stresses the need **to improve consistency in performance of our processes** thereby reducing the defects / mistakes. This is achieved by working in a proactive manner and visualizing "what are the defects / mistakes that occur in this process"? What preventions can we build in our process so that the defects / mistakes do not occur?

"**Lean management**" which was developed by Toyota is now considered as a part of six sigma methodologies. It requires employees to question existing practices and ways of doing tasks, with the idea of reducing the idle-time and other wastes in the processes. Due to this, the terminology "Lean Six Sigma" has been evolved.

In short Six Sigma methodologies help us to reduce the defects / mistakes so that our process becomes more effective. Lean management helps us to reduce waste so that our process becomes more efficient.

Six sigma implementation is **always carried out in teams** who work on projects with unknown solutions. Typically, the senior management selects areas of pain for the organization and these are taken up as projects by teams consisting of a Champion, a Black Belt and a number of Green Belts. (Reportedly, these titles were coined by a Motorola improvement expert with a passion for karate).

Every project must result in reduction of errors / defects, or elimination of waste, or increase of customer satisfaction **ultimately ending in profit-improvement for the organization.**

Six Sigma methodology relies on a number of tools and technique like flow-charts, process-maps, pareto analysis, root-cause analysis, risk-assessment, risk reduction, hypothesis-testing, building prevention in processes, and establishing co-relation for a better understanding of the organization's processes.

It uses **DMAIC as a proven-framework** for problem-solving and process-improvement:

Define:

- The problem statement,
- The goal statement,
- The scope of the process-improvement project,
- Form the project team,
- Finalize date-wise plan for the process-improvement project.

Measure:

You cannot improve anything that you cannot measure. To know where we want to go, we must know where we are today. So, this phase involves:

- Decide how you will measure current performance,
- Calibrate the measurement system,
- Measure current performance.

Analyze:

In this phase, we analyze the data related to current performance of the process, such as:

- Root causes that lead to occurrence of defects / mistakes,
- Causes of variation in the process – why we are not being able to achieve consistency,
- Causes that lead to waste and re-work in the process,
- Likely solutions that would help us to remove the above causes.

Improve:

This phase involves:

- Brainstorming, to arrive at the best solution,
- Risk-assessment & risk-reduction in respect of the chosen solution, before implementation,
- Implementing the chosen solution,
- Verifying and validating for the improvement.

Control:

Greatest challenge after an improvement is to sustain the improvement. Control phase is to ensure sustenance of the improvement achieved. It involves aspects like:

- Documenting the changes made in the process
- Training people on the changes
- Using Control Charts to monitor the process performance on an on-going basis.

Most six sigma projects end in profit improvement and this is one of the measurements of process-improvement because whenever we reduce defects / re-work or wastage, it should result in savings / contribution to profit-improvement.

In recent years, adoption of Six Sigma Management System has increased phenomenally. **Today 53 % of Fortune-500 companies are using Six Sigma --and that figure rises to 82 % when you look at just the Fortune-100.**

It is seen that if an organization invests time and money on six sigma training and implementation, it **usually ends up in achieving savings which would be 20 to 50 times of the investment made.** Moreover, with reduction of defects the frustration of internal stakeholders drops and satisfaction of external customers improves drastically.

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