



# Productivity methodologies, tools, and techniques

## Part I: Understanding Six Sigma and DMAIC methodology—Kabir Ahmad Mohd. Jamil

**P**ioneered by Bill Smith in 1986 while employed by Motorola, Six Sigma was originally defined as a metric for measuring defects and enhancing quality. It was originally developed for production processes, but has subsequently been applied in banks, insurance companies, restaurants, hospitals, schools, and many other types of service organization around the world.

Six Sigma is far more than simply another novel concept and can be regarded as a major innovation in terms of the management of quality throughout an organization. As a comprehensive methodology for process improvement, Six Sigma provides organizations with a roadmap for long-term success through enhancement of the quality of services and customer satisfaction. The International Organization for Standardization defines Six Sigma as “a statistical business-improvement approach that seeks to find and eliminate defects and their causes from an organization’s processes, focusing on outputs of critical importance to customers.”

For a Six Sigma program to produce the expected results, organizational roles and responsibilities must be clearly defined and aligned. If training is limited and focused on only a few people in the organization, the probability of success decreases to virtually nil. It is also extremely important to have a buy-in from upper management and employees on all levels. If any of these levels is not enthusiastic about using the Six Sigma methodology, it can ultimately lead to failure. It is also important to keep in mind that the successful implementation of Six Sigma requires perseverance from the top.

The statistical representation of Six Sigma describes quantitatively how a process is performing. To achieve Six Sigma quality, a process must not produce more than 3.4 defects per million opportunities. In Six Sigma, a defect is defined as anything that does not comply with customer specifications.

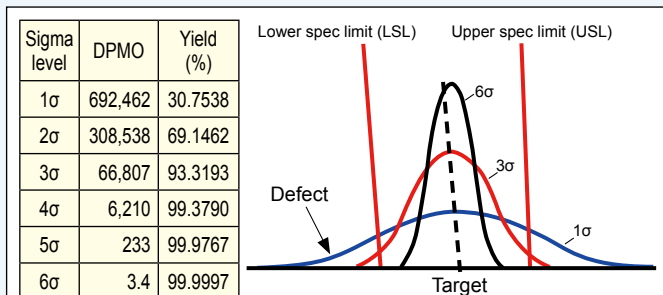


Figure 1. Six Sigma limits and defects per million opportunities (DPMO).

The tabular section is from Sheehy P., Navarro N., Silvers R., Keyes V., and Dixon D., The Black Belt Memory Jogger: A Pocket Guide for Six Sigma Success, Salem, New Hampshire: Goal/QPC, 2002.

### Six Sigma and process variation

It is generally observed that customers judge a product or service based on the benefits they derive from using that particular product or service. Therefore it can be safely said that overall customer satisfaction rests heavily on the consistency of the product or service offered. To achieve this

consistency, there must be a combination of improved process capability and reduced process variation. The more variability in a process, the greater the probability that a defect will occur. A key element in achieving operational excellence is to identify sources of variation which affect a process, product, or service. Once identified, the key sources can then be earmarked for attention.

### DMAIC methodology

The earmarking of key sources of variation is accomplished through the use of the Six Sigma define, measure, analyze, improve, and control (DMAIC) methodology. The Six Sigma DMAIC methodology differs from conventional problem solving in one significant way. There is a requirement for proof of a cause and effect relationship before any improvement action is taken. If the true cause(s) of a problem can be discovered, then by controlling or removing the cause(s), the problem can be reduced or removed. Thus, discovering the root cause scientifically is at the core of the Six Sigma DMAIC methodology. In general, there are five steps in the methodology, as listed in Figure 2.

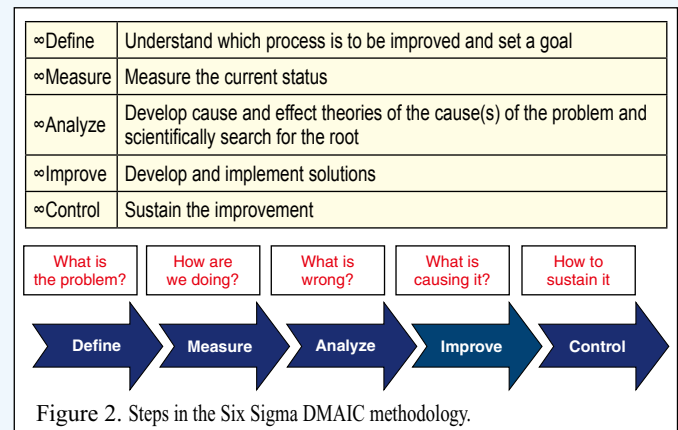


Figure 2. Steps in the Six Sigma DMAIC methodology.

(This article will continue in the July issue of the APO News, with details of each step in the DMAIC methodology.)



Contributed by Senior Manager of the Malaysia Productivity Corporation Kabir Ahmad Mohd. Jamil, resource speaker for the APO training course on the Development of Productivity Practitioners: Advanced Program. Kabir has extensive experience in the field of operation and process improvement, particularly in the manufacturing and service sectors.

### p-Glossary



To provide easy reference to productivity-related terms including methodologies, tools, and techniques, the APO developed the p-Glossary, available on its Web site ([www.apo-tokyo.org](http://www.apo-tokyo.org)). Definitions and explanations of Six Sigma are given in the p-Glossary.