Six Sigma and its Application to your Management System

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So, your processes are performing well, but their efficiency and quality of output are not meeting your high expectations. You wish to be 'World Class'? The most well-known way of doing so is to use Six Sigma, but what is it and what does it entail?

Origins

What we now know as Six Sigma was conceived by Motorola in the 1970s, out of a need to resolve poor quality and high production costs. Quality had always been seen as a cost-overhead, but studies demonstrated good quality actually drove down overall production costs. The methodology which emerged was formulated and published as Six Sigma in 1986.

The term 'Six Sigma' has its origins in the statistical foundation of the methodology. It relates to the concept of 'process capability'; a process that operates at six sigma will produce no more than 3.4 defective parts per million (that's a yield of 99.99966%), although this will degrade over time to around a 99.5% yield. To put this in context, most companies will operate at around 1 to 2 sigma (that's a yield of between 31% and 69%).

Although Six Sigma developed in the manufacturing sector and focuses on the reduction of process variation and design, it has been applied to many other industries and services.

Reflecting its manufacturing background, Six Sigma is often coupled with the Lean Manufacturing methodology, creating a hybrid known as Lean Six Sigma. Lean compliments Six Sigma by adding a focus on process flow and waste elimination.

An additional variation is that of Design for Six Sigma (DFSS). Whereas Six Sigma is used to improve the performance of existing processes, DFSS is used to design high performance directly into new processes or products.

People

Six Sigma should not be viewed as a stand-alone methodology, but as part of an overall business Strategy or Philosophy. Without this commitment from Senior Management, process performance gains will be sub-optimised and the return-on-investment greatly reduced.

The business need for Six Sigma will have to be communicated and reinforced at every possible opportunity until it becomes part of the way people think and act. Senior Management must be willing to make and sustain this commitment.

Six Sigma comes with a series of roles that need to be put in place:

- **Executive Leadership**
  This includes the CEO and other members of senior management. They are responsible for setting up a vision for Six Sigma implementation, whilst additionally demonstrating their commitment by provid ing the other role holders with the freedom and resources to explore new ideas for breakthrough improvements.

- **Champions**
  These are drawn from the senior management and take responsibility for the promotion and integration of Six Sigma implementation across the organisation.

- **Master Black Belts**
  These assist champions and mentor Black Belts and Green Belts. They may be external consultants initially brought in to establish the Six Sigma programme. If internal, they will be 100% committed to the role, ensuring that Six Sigma techniques are applied consistently and correctly.

- **Black Belts**
  These operate under the guidance of a Master Black Belt, delivering the Six Sigma projects. They devote 100% of their time to the task, and are trained in the majority of the Six Sigma tools. They often train and mentor the green belts. They may be external contractors until an internal resource is trained and experienced.

- **Green Belts**
  These are the employees who take up Six Sigma implementation along with their other job responsibilities, operating under the guidance of Black Belts as part of the Six Sigma project. They are trained in most of the tools outside of advanced statistical techniques.

- **Yellow Belts**
  Not always designated, but if so, these are employees within the target areas used to implement, monitor and control the improved processes. Training in basic Six Sigma awareness and specific tools is provided by Green or Black Belts.

Overview

Six Sigma consists of three key elements: **People, Process and Technology.**

Process

The Six Sigma lifecycle is based on Deming's PDCA model (Plan, Do, Check, Act) and consists of five stages:

• Define
• Measure
• Analyse
• Improve
• Control

It is given the acronym DMAIC, pronounced "duh-may-ick".

DFSS is less proscribed and there are a number of differing lifecycles which can be applied, the most common of which is DMADV (Design, Measure, Analyse, Design, Verify), pronounced "duh-mad-vee".

Define
This stage is where the Six Sigma team reach an agreement with the Stakeholders as to the goal, scope, financial and performance targets of the project. It is important to do this stage correctly, as it sets the foundations for the rest of the project. It involves project start-up, customer requirement gathering and communications.

Measure
This is where the process and its design and performance are captured and understood in order to expose the underlying cause of the problem to be solved. Activities include process mapping and performance data collection.

Analyse
Here the knowledge gathered about the process is used to determine the key variables and relate them to the improvement goals. This is the stage where Statistical Analysis tools are employed to identify significant causes of variation. If using Lean techniques, significant causes of waste will also be determined. Some approaches to Six Sigma will also implement 'obvious' improvements to capitalise on early gains.

Improve
Now the exciting bit: determining the solution or solutions. Ideas based on the Analysis Stage are generated, selected and verified, often through the use of pilots. They are then implemented across the site, using Change Management techniques to increase their chance of sticking.

Control
This stage might be considered as 'institutionalisation'. It is where the change becomes part of the organisation's normal behaviour patterns through monitoring and controlling. After a period of time, the process will be embedded and the true improvement in performance will be seen. It is important to capture this and ensure that the objectives have truly been met. Any Return on Investment (ROI) is calculated at the end of this stage.

Technology

Six Sigma adopted a large number of pre-existing tools to support the Statistical Analysis aspect. There are too many to list in a short article of this nature, but they can be grouped into the following categories:

- Customer Requirements
- Process Analysis
- Data Collection
- Data Display
- Variation Analysis
- Cause Identification & Verification
- Reduction of Waste
- Process Complexity Analysis
- Ideas Generation
- Selection and Testing of Solutions

A successful Six Sigma practitioner will know which tools to use and when.

Software tools can be purchased to assist a six Sigma project, particularly for advanced Statistical Analysis (the most commonly used of which is Minitab) and Process Simulation.

How an existing AgilityBMS supports Six Sigma:

The AgilityBMS is a process mapping tool, and is designed to support the employees working at the coal face through the provision of easily understood and easily accessible procedures, guidelines and templates; it is a repository of knowledge that can be easily retrieved. It is not a process modelling tool designed specifically for use within a Six Sigma environment.

Having said that, it can be used to give considerable support to a Six Sigma project in the following ways:

Project Definition: agility can be used to define the Six Sigma Lifecycle the same way as any other process. The DMAIC structure, complete with procedures, tool and technique guidelines and templates can be documented and held in an accessible and consistent format.

Project Management: Projects can be set up within agility and the basic process tailored for their specific instance of use. Project documentation can be stared in and accessed from agility's Internal Documentation Management System without recourse to any other software.

Project Execution: Within the Define stage, there is a requirement to map the process in question. This will have already been undertaken within agility, and although you may wish to model the information differently (maybe as a SIPOC chart or within a Process Flow Simulation application), the hard work will have already been done. Activities, tasks, Inputs, Outputs and roles will be easy to identify and utilise.

Project Implementation: agility allows for the piloting of solutions (by restricting access to only those that are trialling the new process) and the easy deployment of new or changed processes.

Project Control: The use of process maps makes compliance auditing simple, and the statistics reports generated out of AgilityBMS allows process map usage to be monitored. User feedback on the processes is captured within AgilityBMS, and can be used to review process quality and performance.

Is the AgilityBMS for You?

Very few companies aspire to be genuinely World Class: however there are some who need highly repeatable processes with high quality end products and these are the companies that should definitely embark on the Six Sigma journey.

Having said that, you don't need to aspire to World Class performance to use Six Sigma; you could use the techniques to reach a Three Sigma performance (around a 93% quality yield) which would be an enormous improvement for many processes.

But, for whatever reason you use Six Sigma, you must be aware that this is a strategic commitment, with a great deal of investment in training people and changing culture. You need to be aware that, although radical process performance changes will be the final outcome, projects take time and benefits will not be instantaneous. Your senior management will need to understand the need for Six Sigma, the changes in behaviour needed to embed it in the organisation and their involvement in promoting it through thick and thin.

If you can do this, then you are ready to reap the rewards of a Six Sigma revolution. If you're considering introducing Six Sigma to improve your business processes, then we have trained Six Sigma specialists to assist you in any process improvement project.

The Author is a member of BusniessPort's Process Improvement Team and deploys these principles into corporate clients on a global stage.