

Six Sigma Process Improvement in a Nutshell

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Six Sigma Process Improvement is a rigorous approach to improving business processes by addressing the underlying causes of variation that lead to poor performance as experienced by the 'customer', who is the recipient of the outputs. The early exponents were Motorola and GE in the 1980s. Since then, many organisations ranging from manufacturing to service in all sectors, have successfully deployed Six Sigma to deliver measurable cost, quality and time based improvements.

What are the key features of Six Sigma Process Improvement?

Process Focus

Most things we do in business, and in life, are processes. Good processes deliver consistent, quality outputs in a timely, efficient and effective manner. The outputs are only a result of the activities in the process (*what we do*) and the inputs (*the information, materials and services we use*). Variation in the output (*measured as cost, quality and time*) is directly related to the cumulative variation of the elements of the process. Six Sigma concentrates on understanding the relationships between the inputs, the activities in the process and the outputs, so that we can change the important variables to deliver the 'best' result to the 'customer'.

Customer Focus

Understanding what customers really care about is fundamental to Six Sigma, because our processes have to perform at a measurable level that consistently meets the customer's needs. Customer expectations and requirements are often unspoken and vague so we need to translate these into a measurable output. The 'customer' of a process is the person (*or group*) who receive the output. This could be the business customer, a user, or the next process down the supply chain.

Project Based

When our processes fail to give customers what they expect in a consistent manner we have 'defects' or 'errors'. Six Sigma projects are generated to resolve these problems, often by reducing variation, eliminating defects, reducing waste and compressing cycle time in the processes. A Six Sigma project seeks to improve the process performance by getting to the root cause and fixing it permanently, rather than applying quick fixes that often only address the symptoms. Projects typically last four to six months and deliver real customer and bottom line improvements. However, initial 'learning' projects or those where data is difficult to collect could take longer.

Rigorous Project Methodology

Six Sigma Process Improvement projects use a rigorous, phase gated methodology with the following phases:

- **Define** – to scope, establish the process and its inputs and outputs, set up the team and plan the project.
- **Measure** – to gather data to baseline the current 'as is' state and identify the possible causes of variation and waste.
- **Analyse** – to understand the relationship between the inputs and the outputs of the process under review so that the 'vital few' causes of variation and waste can be identified.
- **Improve** – to identify potential solutions, select the best one and design the new process incorporating the improvements.
- **Control** – to put in place the controls and monitors that will sustain the improvements over time.
- **Transfer** – to apply the learning gained on this project to other areas in the business, multiplying the benefits many times over.

This methodology is there to ensure that deep understanding of the process and evidence of the factors that affect it are gained before improvement action is taken. Project Champions (senior managers) oversee project progress through phase gate reviews, unblocking organisational issues and providing coaching and encouragement to the teams.

Team Based

Process knowledge often resides with the people involved in the activities in the process and any changes to the process will affect them directly. Six Sigma teams aim to get many perspectives on the problem under review by involving different disciplines, suppliers, customers and 'process owners'. Core teams are often around five to seven in number with other relevant inputs at appropriate times as required. All team members should be familiar with the language of Six Sigma. The team leaders (or belts) will have been trained in the tools and techniques of the methodology.

Data Driven

Experience and judgement are helpful in pointing the way to potential causes of problems and to solutions. However, Six Sigma requires data-based evidence to underpin the analysis and decisions. Only by measuring and quantifying the relationships between input variables and outputs, can we be sure which are the important inputs to change and also be able to predict the effect that a change will have on the outputs. Often Six Sigma will result in a mindset change from measuring and controlling outputs (called 'y') to focusing on inputs (called 'x') in the knowledge that if we can control the significant inputs we can guarantee outputs with high levels of confidence.

Variation Reduction

All processes have variation; it is a natural outcome of mechanical and human behaviour. Customer dissatisfaction is created when variation in a process causes the spread of outputs (*the voice of the process*) to exceed that which the customer expects and is prepared to tolerate (*the voice of the customer*). The Six Sigma project aims to reduce variation (*as measured by standard deviation termed σ*) so that the probability is very low that an output will fall outside the customer requirement. The more consistent and 'on target' the process, the more satisfied customers will be.

To put a scale on the sigma levels – most processes operate at around three sigma or 67,000 defects per million opportunities for a defect to be counted (*e.g. one misspelled word every other line of text*). A Six Sigma process would operate at around three defects per million opportunities (*e.g. one misspelled word in a 450 page book*).

Tools and Techniques

The Six Sigma tool kit has a number of tools and techniques that help teams work through the methodology. Tools range from very simple but effective scoping documents through to quite complex statistical analysis that will usually be undertaken by trained Black Belts. Our tools fall into four classes:

- **Process management tools** – e.g. process mapping, waste identification, bottleneck reduction
- **Project management tools** – e.g. Gantt charts, project plans, resource plans
- **Data management tools** – e.g. Pareto charts, regression, correlation, control charts, hypothesis testing, designed experimentation, using Minitab software
- **Change management tools** – e.g. brainstorming, stakeholder management, communication planning

Roles

In a mature Six Sigma organisation most people will play a part in the delivery of continuous improvement through the application of Six Sigma principles. It will have become 'the way we do things around here'. There are, however, some formally recognised roles in any Six Sigma deployment as follows:

- **Champion** – a senior manager who will oversee a number of projects and be the custodian of the rigour in the methodology.
- **Master Black Belt** – a highly experienced and trained Black Belt who will coach and mentor other belts on complex and technical issues and assist Champions with the deployment. Master Black Belts often train others to Green Belt and Black Belt level.
- **Black Belt** – a full time project leader who has undertaken full training.
- **Green Belt** – a part time project leader who has undertaken Green Belt training.
- **Team Member or Yellow Belt** – someone who works on projects as part of their line role.
- **Deployment Champion** – a person who manages and co-ordinates the Six Sigma programme within an organisation. This will involve managing belt resource and training, project selection and managing the project 'hopper', programme communication, benefits tracking etc.

Programme Infrastructure

In order to create the right environment for Six Sigma projects to succeed and deliver benefits within an organisation, there has to be a managed infrastructure. This will involve issues such as career planning for belts, senior management commitment through monitoring progress and rewarding success, ensuring that resources are freed to work on the high priority projects, putting in place appropriate knowledge management systems, providing consistent data management processes and tracking project benefits. A soundly designed supporting infrastructure will maximise the success of Six Sigma Process Improvement.