Selecting Six Sigma Projects*

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Abstract

The quality improvement methodology Six Sigma gained enormous international popularity in the past few years, mainly due to its successful implementation at General Electric. Six Sigma is now commonly understood not only as a statistical measure for process performance (6σ stands for 3.4 defects per million opportunities) to improve product quality but it has also become a strategic initiative undertaken by many organisations to improve management quality. In the centre of the Six Sigma methodology is the improvement project, often referred to as Black Belt or Green Belt project. Although every business is different and business priorities differ from company to company, however all businesses face the same problem when it comes to Six Sigma projects: How to choose the right project? This article intends to provide some answers to this and other frequently asked questions about Six Sigma projects.

Key words: Six Sigma, Project selection, DFSS

1. Introduction

Since its birth at Motorola in the late 1980s, Six Sigma has become one of the integral aspects of manufacturing as well as non-manufacturing businesses worldwide. Presently, we can identify three major stages of this evolution process. In the late 1980s and early 1990s, Six Sigma was used by American multinationals and predominantly in the manufacturing environment to reduce defects and improve productivity. In the late 1990s, Six Sigma gained enormous popularity mainly due to the way it was

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implemented at GE. Jack Welch, former chairman and CEO of General Electric Co., has become the most quoted Six Sigma leader in the world. In the past few years, not only the number of international Six Sigma applications has increased but it was also applied to almost every business function including research and development (commonly referred to as Design For Six Sigma, DFSS), customer service (Service Six Sigma), and IT services (Software Six Sigma).

Regardless of whether applied to factory floor or transactional and service environments, Six Sigma success relies heavily on the so-called Six Sigma projects conducted by a special army of employees trained as *Black Belts* and *Green Belts*. A typical Six Sigma project has five stages; *Define, Measure, Analyse, Improve and Control,* commonly referred to as the DMAIC methodology (Figure 1).

In the DEFINE stage, the improvement area (process) is identified and project

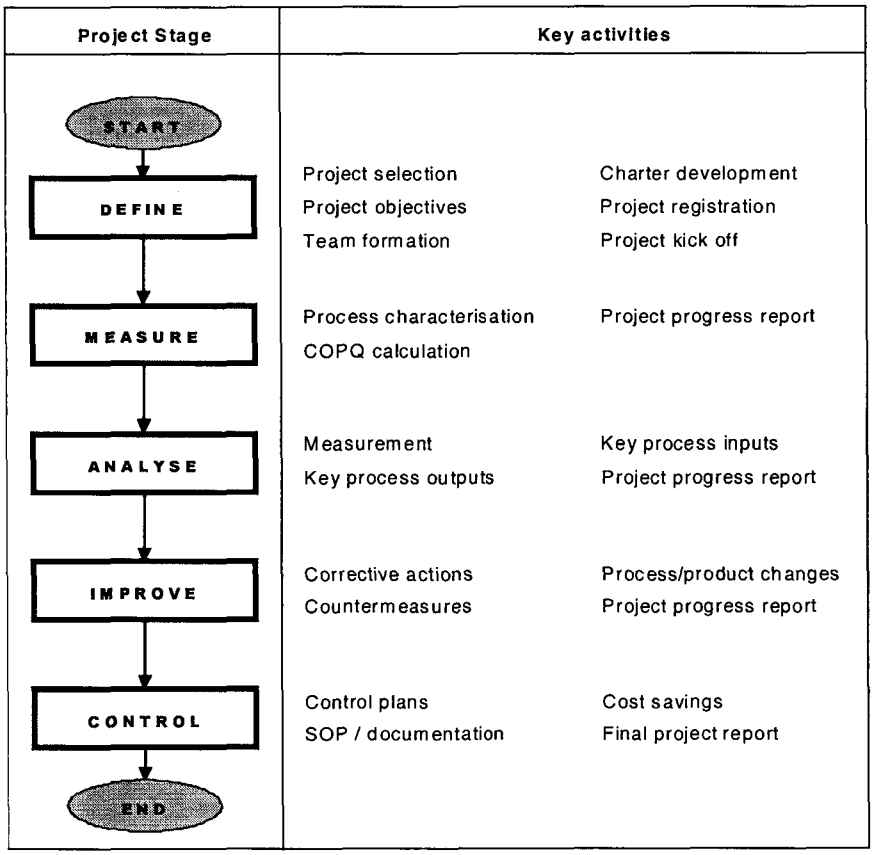

Figure 1. Six Sigma project flow chart

requirements such as the project time frame, team membership, necessary resources, etc. are defined. In the MEASURE and ANALYSE stages, data is collected and analysed to specify the changes to be made in the process in order to achieve the desired outcome. These changes are then implemented in the IMPROVE stage while in the final stage CONTROL actions are taken to ensure that process changes are stable and the process is not returning to the original conditions.

2. Project Selection

Project selection is perhaps the most critical part of a Six Sigma project. It can have a major impact on the outcome of the project. There are many questions to be answered when selecting Six Sigma projects. Here are some examples of the frequently asked questions

What is the duration of a typical Six Sigma project?
How do we link Six Sigma projects to organisational goals and objectives?
What criteria should be applied when selecting a Six Sigma project?
How do we calculate Six Sigma project gains and savings?
How often do we review Six Sigma projects?
How large is a typical Six Sigma project team?
What is the difference between a Six Sigma project and other improvement projects?

After reviewing these questions it appears that some questions refer to the fundamental aspects of a typical project management methodology while others are more specific about the Six Sigma concept. In this article the authors intend to provide some answers to these specific questions which are referring to the Six Sigma projects.

There is a potential risk associated with the project selection process. Projects may not be completed within the scheduled project time frame or take up more resources than planned. It is also likely that a project does not have the predicted impact on business results or achieves only little improvement. If a project is not realistic, it will lead to frustration for everyone involved and declining motivation for the Black Belts and Green Belts. Projects selected on the basis of experience, feeling or courage usually have a higher risk than a project carefully chosen on the basis of data analysis.

Selecting a wrong project may result in financial losses and employee and/or customer dissatisfaction. If the right project is selected, everyone will benefit-shareholders, employees and customers.

Project selection starts with the identification of the need for improvement. When searching for improvement areas in manufacturing or service and transactional

environments, it is advisable to analyse organisational performance in the possible areas and functions, including:

- Market share
- Sales performance
- Customer complaints
- Invoicing time and accuracy
- Repair turnaround time
- Cycle times
- Response times
- Staff turnover
- Employee complaints

As part of the project selection process preliminary data must be collected and analysed to identify the improvement area. Data doesn't always have to be numeric values but it should have the form of specific and quantifiable information. Most organisations collect sufficient data in some form about their customers, markets, products, employees and suppliers. This information might be not readily available as it is usually collected by different divisions and stored at different locations. However, the information is usually there. The point to be made here is that this information needs to be analysed in order to identify which area or process requires an urgent improvement. Whether in manufacturing or non-manufacturing industries, some of the most frequently used sources of information are the *Trend Analysis, Pareto chart and Histogram.*

Once the areas of improvement have been identified, the next step in the DEFINE stage is to prioritise the potential projects. In the Six Sigma terminology, the potential projects are called CTQ (Critical-To-Quality). One of the commonly used tools when prioritizing Six Sigma projects is the QFD (Quality-Function Deployment) chart. The QFD is usually known as "The House-of-Quality" and used for translation of customer requirements into product, service or process design requirements. However, QFD can also be used for prioritization of Six Sigma projects, as shown in Figure 2.

Potential projects are entered in the top part of the QFD while the selection criteria are listed on the left. It is obvious that the definition of the selection criteria and their importance rating play a crucial role in the correct use of the QFD chart. Using the Six Sigma jargon, it is highly recommended to consider the *Voice-of-the-Customer* (VOC) as well as the *Voice-of-the-Business* (VOB). As the final step, CTQs will be prioritised according to their scoring values.

The next important step in the DEFINE stage is definition of the project objectives and deliverables. It should also include the project scope, project time frame and resources needed to complete the project. Typical Six Sigma projects are completed within 3-5 months. A project which takes 12 months is too large and should be broken into two or three single projects. Smaller projects are less difficult to control.

Selection Criteria \ Potential Projects	Importance Rating	CTQ 1	CTQ 2	CTQ 3	CTQ 4	CTQ 5		
Urgency of improvement	5	●	△	●	△	□		
Resources availability	4	□	□	△	●	△		
Impact on customers	5	●	●	□	□	●		
Process ownership	2	△	□	△	●	□		
Data availability	2	●	△	□	△	●		
Bottom-line impact	4	△	□	△	□	△		
Absolute Score		126	82	76	88	92		
Priority		1	4	5	3	2		

Relationship
○ strong (9)
□ medium (3)
△ weak (1)

Figure 2. Project prioritization with QFD chart

Many projects may require inputs from different department within the organisation which make a project difficult to run. Therefore, it is crucial to define the authority and responsibilities of the project teams. Another important factor to be considered for Six Sigma projects is the selection of the team members. Like with any other project, a team charter is required to prevent some of the typical problems within the team.

Often during the Six Sigma roll-out phase, projects have a fail start due to wrong orientation of the teams. Before a project starts, it is highly recommended to prepare a project plan. A typical one-page project plan, as shown in Figure 3, not only includes the project scope, objectives, benefits and project milestones, but it could also be used for project registration. One of the characteristics of the Six Sigma projects conducted at GE and Sony is that every project has a financial analysis attached to it. This way, it can be avoided that no project is selected just for the sake of quality improvement.

3. Conclusion

Six Sigma has come a long way and is now gaining international popularity, particularly in South East Asia. In this paper, it was discussed that Six Sigma has evolved over the past few years and has now become a strategic initiative undertaken by many organisations not only to improve quality of products and services but also to improve quality of management. It was shown that project selection is one of the

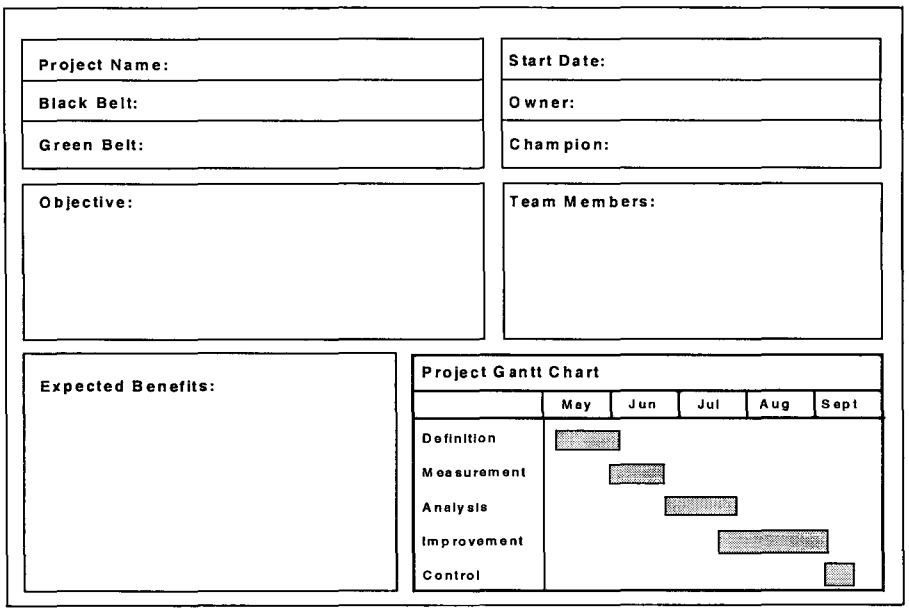

Figure 3. Six Sigma Project plan

most critical elements of a successful six sigma implementation. Some useful project selection tools were also introduced and discussed.

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