

Can Six Sigma Effective in Service Sector?

Akash Singel¹, Walter Kruz²

¹MBA Scholar, MIS Department, Lincoln University, Oakland, California, USA

²Professor and Chairman, MIS Department, Lincoln University, Oakland, California, USA

Introduction

During the past half of the century, more than 69 quality related initiatives have come into existence. Statistical Process Control (SPC), Quality Circles (QC), Total Quality Management (TQM), Bench Marking, Quality Management Systems (QMS), ISO 9000 Quality Management System (QMS) Standard and other such initiatives have created a visible impact in the business world. Quality professionals have perpetuated the 'Keep it Simple' formula for performance measurement over the past 70 years in an effort to have the greatest impact on businesses. The classic tools and metrics have been applied differently in a competitive environment. Six Sigma is both a philosophy and a methodology that improves quality by analyzing data with statistics to find the root cause of quality problems and to implement controls. Although Six Sigma is typically first implemented to improve manufacturing, the method can also be used in other business processes, such as product design and supply chain management. Although Six Sigma has its roots in large corporations, it can be used in small to medium-sized companies as well. Small companies are typically more agile and may have an easier time getting management team commitment, but they may have more difficulty with committing employee time and funds for training. So in present work, a case study has been selected where an attempt has been made to implement the Six Sigma strategy to small scale

sector in India and remove the fault that raises the cost of product and reduces capacity utilization.

DMAIC: A Six Sigma Tool

The discipline of six sigma views every business activity as a process, that once optimized and controlled, reduces cost. Hence, Six Sigma itself is a process that is often briefly described by the acronym DMAIC, which stands for define, measure, analyze, improve, and control. First, the stability testing process, or process issue, needs to be defined. Second, since stability testing itself is a measuring process, its capability needs to be measured. Third, the capability of the process needs to be analyzed in order to determine if it is delivering what is required (accurate stability predictions or estimates), and if not, improve. Finally, control the stability testing process by insuring that the improvements that have been implemented are maintained through time. DMAIC is a process for continued improvement. It is systematic, scientific and fact based. This closed-loop process eliminates unproductive steps, often focuses on new measurements, and applies technology for improvement.



Figure 1 Five Phases of DMAIC

DMAIC refers to a data-driven improvement cycle used for improving, optimizing and stabilizing business processes and designs. The DMAIC improvement cycle is the core process used to drive Six Sigma projects. DMAIC is not

exclusive to Six Sigma and can be used as the framework for other improvement applications. It implements the idea of continuous process improvements. Processes are constantly monitored for possible improvement possibilities.

Steps	Key Processes
Define	<ul style="list-style-type: none"> Define the requirements and expectations of the customer Define the project boundaries Define the process by mapping the business flow
Measure	<ul style="list-style-type: none"> Measure the process to satisfy customer's needs Develop a data collection plan Collect and compare data to determine issues and shortfalls
Analyze	<ul style="list-style-type: none"> Analyze the causes of defects and sources of variation Determine the variations in the process Prioritize opportunities for future improvement
Inspection	<ul style="list-style-type: none"> Improve the process to eliminate variations Develop creative alternatives and implement enhanced plan
Control	<ul style="list-style-type: none"> Control process variations to meet customer requirements Develop a strategy to monitor and control the improved process Implement the improvements of systems and structures

Table 1 Key Steps of DMAIC Processes

The main benefit of DMAIC is that it contributes to the creation of a conceptual framework for consistent performance measurement, improvement, and control. DMAIC is an abbreviation for these five phases of the DMAIC project methodology.

Six Sigma: Evolution of Concept

Some researchers have claimed that Six Sigma quality initiative was started in the mid-1960s. Historically, the roots of Sigma as a measurement standard can be traced to Carl Fredrick Gauss (1777-1855), who introduced the concept of normal curve. Walter She wart introduced 'three sigma' as a measurement of output variation in 1922 and stated that process intervention was needed when the output went beyond this limit. The 'three sigma' concept is related to a process yield of 99.973% and represents a defect rate of 2,600 per million which was adequate for most manufacturing organizations until the early 1980s

(Raisinghani, 2005). Henderson and Evans (2000) have found that Motorola first embarked on its Six Sigma quality initiative in the mid-1960s and the concept of implementing Six Sigma processes was pioneered at Motorola in the 1980s. In addition, Dedhia (2005) and Park (2002) have claimed that Bill Smith at Motorola, during the late 1970s developed the Six Sigma approach with an objective to control defects at parts per million levels instead of percentage. Harry and Schroeder (2000) state that Six Sigma had its birth at Motorola in 1979, when executive Art Sundry stood up at a management meeting and proclaimed, "The real problem at Motorola is that our quality stinks!". Sundry's proclamation sparked a new era with in Motorola and led to the discovery of the crucial correlation between higher quality and lower development costs in manufacturing products of all kinds.

Few authors are of the opinion that Six Sigma was started in the 1980s without being specific about the year of inception (Poole, 2000; Wyper and

Harrison, 2000; Hammer and Goding, 2001; Banuelas and Antony, 2002 and Baetke *et al.*, 2002). According to Kumar (2002) and Antony (2006) Bill Smith, a senior engineer and scientist at Motorola’s communication division, introduced the concept of Six Sigma in 1986. Antony (2007) claimed that the first generation of Six Sigma lasted for a period of 8 years (1987-1994) and the focus was on reduction of defects. Motorola was a great example of a successful first generation company. The second generation of Six Sigma spanned the period from 1994 to 2000 and the focus was on cost reduction. General Electric, Du Pont and Honeywell are good examples of successful second generation companies. A majority of the authors mentioned that Six Sigma emerged as a distinct approach to TQM in 1987 at Motorola (Klefsjö *et al.*, 2001; Caulcutt, 2001; Wiklund and Wiklund, 2002; Dasgupta, 2003; Pande *et al.*, 2003; Black and Revere, 2006; Schroeder *et al.*, 2008; Hekmatpanah *et al.*, 2008;

Prabhushankar, 2008). Motwani *et al.* (2004) has stated that the Six Sigma approach was first introduced and developed at Motorola in the early 1990s. According to Dahlgaard and Dahlgaard-Park (2006), the Six Sigma methodology was first introduced in the USA in 1985 at Florida Power and Light (FPL), when the company decided to apply for the Deming Prize whereas Gutierrez *et al.* (2009) and Abdelhamid (2003) have stated that the concept of Six sigma originated in Motorola in the USA around 1985. This shows that there is no consensus on even the place of origin of Six Sigma.

Implementing Six Sigma in Service Sector

Six Sigma has already emerged as one of the most effective business strategies for quality improvement in large organizations, worldwide. Small industries are inherently capable of adopting Six Sigma as breakthrough strategy but they need to be shown the roadmap.

Challenges	Advantages
<ul style="list-style-type: none"> • Lack of time and resources for implementing the drive. • Ignorance about the strategic gains of Six Sigma as one of the most effective improvement methodologies. • Misconception that Six Sigma involves lots of statistics which is beyond the range of common industrialists and it is a sort of luxury, which is being sold by the Management Consultants at very hefty fees. • Comfortable with tradition of resorting to quick-fix solutions and curing the problems as and when encounter. That means, usually indifferent about investing time and money in the long term, permanent and strategic solutions. 	<ul style="list-style-type: none"> • Complete involvement of top management in the implementation drive. • Ease of locating and arriving at the consensus for the most problematic area for initial trial of Six Sigma improvement drive. • Convenience of keeping a close watch on the processes and experimenting with variables. • Easier and faster response to change management program in the context of Six Sigma implementation. The benefits small size brings are speed, leanness and flexibility in responding to change. • Ease of keeping close to the customers and locating the vital few Critical to Quality (CTQs), which matter most or can most easily be improved

Table 2 Challenges and Advantages on Six Sigma Implementation

The multiple gains achieved by this initial effort of Six Sigma on one of the problems of the

company are attractive enough for them to deploy Six Sigma company-wide. Project by project application of Six Sigma in SSI sectors can strengthen their understanding about this strategy

along with consolidating on the gains from it. Six Sigma among the small industries is a much-awaited movement, which can strengthen their bottom lines and contributes in uplifting global economy. As an improvement drive, the major advantage of Six Sigma is to introduce a common metric of customer perceived quality, which should be applicable to any size and any type of organization. Table 2 illustrates challenges and advantages of the Indian SSI sector in taking up the Six Sigma drive for improvements compared to large organizations.

Conclusion

For service sector to be competitive globally, operational excellence is the basic success mantra. They should strive for customer delight rather than satisfying them, they should now drop the slogan of satisfying customers. At the same time, overall economics also need to be kept under constant watch. For global competitiveness, many techniques, such as Quality Circles, TQM, ISO Certifications, etc. are being tried. But still, the focus remains on specific problem solving. The need of the hour is to strike global optima and not to waste time, money and energy in finding local optima. This sectors need a breakthrough strategy, which can have multidirectional benefits in shorter duration. In the present work, an initiative has been taken to apply Six Sigma to a small scale manufacturing firm. Six Sigma has a high potential of improving productivity and quality at very high level and achieving customer delight for small scale industries which are always threatened by large scale industries.

Six Sigma has already emerged as one of the most effective business strategies in the large organizations, worldwide. Small industries are inherently capable of adopting Six Sigma as breakthrough strategy but they need to show the roadmap. Literature review has also yielded little evidence of any such implementation in a small or medium scale industry. It can be concluded that

Six Sigma is not only a strategic tool, but it can be used as a process improvement tool as well.

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