

Six-sigma – a faster path to profitability

DR. RAVI.T.S

ASST. PROFESSOR & HEAD, POST GRADUATE & RESEARCH DEPARTMENT OF
COMMERCE, DRBCCC HINDU COLLEGE – PATTABIRAM, CHENNAI – 600 072

ABSTRACT

Six-Sigma is a highly structured process for increasing profitability by improving the quality of products and services. Six Sigma's benefits include reduced costs increased profits, better customer retention, and improved efficiency. Six Sigma directly addresses several pain points confronting today's management such as competitive pressures for cost reduction and efficiencies resolution of quality issues that can erode profits, customer confidence, and time to market long-term value creation built upon quality and efficiency Six Sigma takes a handful of proven methods and trains a small cadre of in-house technical leaders, known as Six Sigma Black Belts, to a high level of proficiency in the application of these techniques. To be sure, some of the methods used by Black Belts are highly advanced, including the use of up-to-date computer technology. This paper attempts to highlight the application of Six-Sigma in improving business profitability.

Keywords: Process, defects, process-variation, sigma (Standard deviation), quality

1.0. INTRODUCTION

Sigma (σ) is a letter in the Greek alphabet that has become the statistical symbol and metric of process variation. The sigma scale of measure is perfectly correlated to such characteristics as defects-per-unit, parts-per-million defectives, and the probability of a failure. Six is the number of sigma measured in a process, when the variation around the target is such that only 3.4 outputs out of one million are defects under the assumption that the process average may drift over the long term by as much as 1.5 standard deviations. Six-Sigma may be defined in several ways. **Tomkins (1997)** defines Six Sigma to be –a program aimed at the near-elimination of defects from every product, process and transaction. **Harry (1998)** defines Six Sigma to be –a strategic initiative to boost profitability, increase market share and improve customer satisfaction through statistical tools that can lead to breakthrough quantum gains in quality. **Six Sigma** was launched by Motorola in 1987. It was the result of a series of changes in the quality area starting in the late 1970s, with ambitious ten-fold improvement drives. The top-level management along with CEO Robert Galvin developed a concept called Six Sigma. After some internal pilot implementations, Galvin, in 1987, formulated the goal of –achieving Six-Sigma capability by 1992^{||} in a memo to all Motorola employees (**Bhote1989**). The results in terms of reduction in process variation were on-track and cost savings totalled US\$13 billion and improvement in labour productivity achieved 204% increase over the period 1987–1997 (**Losianowycz1999**). In the wake of successes at Motorola, some leading electronic companies such as IBM, DEC, and Texas Instruments launched Six Sigma initiatives in early 1990s. However, it was not until 1995 when GE and Allied Signal launched Six Sigma as strategic initiatives that a rapid dissemination took place in non-electronic industries all over the world (**Hendricks and Kelbaugh1998**). In early 1997, the Samsung and LG Groups in Korea began to introduce Six Sigma within their

companies. The results were amazingly good in those companies. For instance, Samsung SDI, which is a company under the Samsung Group, reported that the cost savings by Six Sigma projects totalled US\$150 million (Samsung SDI, 2000a). At the present time, the number of large companies applying Six Sigma in Korea is growing exponentially, with a strong vertical deployment into many small-and medium-size enterprises as well. As a result of consulting experiences with Six Sigma in Korea, the author (**Park et. al., 1999**) believes that Six Sigma is a –new strategic paradigm of management innovation for company survival in this 21st century, which implies three things: statistical measurement, management strategy and quality culture. It tells us how good our products, services and processes really are through statistical measurement of quality level. It is a new management strategy under leadership of top-level management to create quality innovation and total customer satisfaction. It is also a quality culture. It provides a means of doing things right the first time and to work smarter by using data information. It also provides an atmosphere for solving many CTQ (critical-to-quality) problems through team efforts. CTQ could be a critical process/product result characteristic to quality, or a critical reason to quality characteristic.

2.0. NEED FOR THE STUDY

Six-Sigma has become very popular throughout the whole world. There are several reasons for this popularity. First, it is regarded as a fresh quality management strategy which can replace TQC, TQM and others. Six Sigma is viewed as a systematic, scientific, statistical and smarter (4S) approach for management innovation which is quite suitable for use in a knowledge-based information society. The essence of Six Sigma is the integration of four elements (customer, process, manpower and strategy) to provide management innovation. Six Sigma provides a scientific and statistical basis for quality assessment for all processes through measurement of quality levels. The Six Sigma method allows us to draw comparisons among all processes, and tells how good a process is. Through this information, top-level management learns what path to follow to achieve process innovation and customer satisfaction. Second, Six Sigma provides efficient manpower cultivation and utilization. It employs a –belt system in which the levels of mastery are classified as green belt, black belt, master black belt and champion. As a person in a company when he obtains certain training, he acquires a belt. Usually, a black belt is the leader of a project team and several green belts work together for the project team. Third, there are many success stories of Six Sigma application in well-known world-class companies. As mentioned earlier, Six Sigma was pioneered by Motorola and launched as a strategic initiative in 1987. Since then, and particularly from 1995, an exponentially growing number of prestigious global firms have launched a Six Sigma program. It has been noted that many globally leading companies run Six Sigma programs, and it has been well known that Motorola, GE, Allied Signal, IBM, DEC, Texas Instruments, Sony, Kodak, Nokia, and Philips Electronics among others have been quite successful in Six Sigma. In Korea, the Samsung, LG, Hyundai groups and Korea Heavy Industries & Construction Company have been quite successful with Six Sigma. Lastly, Six Sigma provides flexibility in the new millennium of 3Cs, which are:

- Change: Changing society
- Customer: Power is shifted to customer and customer demand is high
- Competition: Competition in quality and productivity

The pace of change during the last decade has been unprecedented, and the speed of change in this new millennium is perhaps faster than ever before. Most notably, the power has shifted from producer to customer. The producer-oriented industrial society is over, and the customer-oriented information society has arrived. The customer has all the rights to order,

select and buy goods and services. Especially, in e-business, the customer has all-mighty power. Competition in quality and productivity has been ever-increasing. Second-rate quality goods cannot survive anymore in the market. Six-Sigma with its 4S (systematic, scientific, statistical and smarter) approaches provide flexibility in managing a business unit. Hence, the need for the study

3. 0. OBJECTIVES OF THE STUDY

This study has the following objectives:

- To observe the nature six-sigma concept
- To understand the overall picture of Six Sigma Process
- To exhibit the modus-operandi of six-sigma

4.0 NATURE OF SIX-SIGMA

In a Tennis Tournament, if a player has an eye only on the scoreboard instead of the ball, he or she cannot win the game. The player must focus on the ball. Likewise, if a company has an eye only on the bottom line instead of the customer, it can neither attain market leadership nor can improve its corporate profit substantially. The company is the tennis player, the customer is the ball, and the bottom line (corporate profit) is the scoreboard. This is the cardinal principle of Six Sigma. Six-Sigma is emphatic about the importance of achieving a quantum jump in profits by meticulously and sincerely implementing everything from the customers' viewpoint. The interesting difference in this tennis tournament is that one player is playing with many opponents and is trying to win the game. The many opponents mentioned here are the competitors in the marketplace. Thus Six Sigma is indeed a corporate strategy that aims to achieve and sustain market leadership through excellence in quality. All decisions in the Six Sigma environment are based on data, facts, and information and not on intuition or guess work. Benchmarking key activities using well-defined metrics against the best in class is at the heart of Six Sigma process.

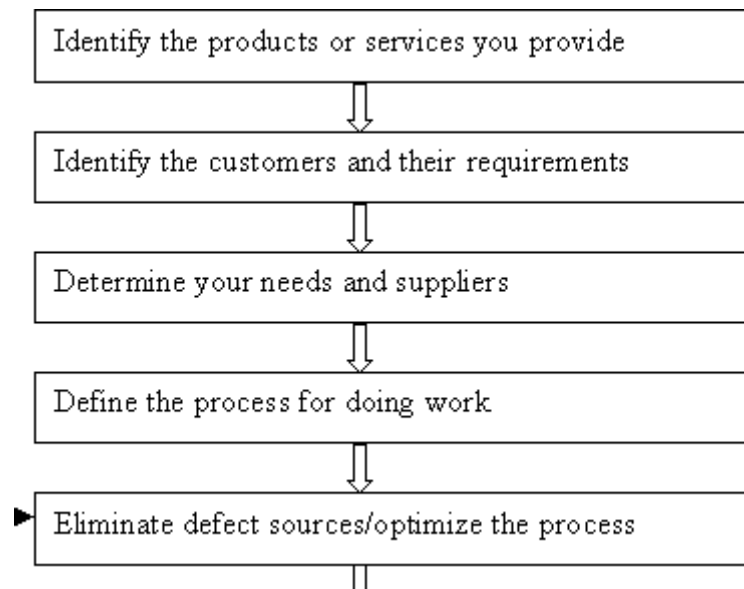
5.0 SIX-SIGMA PROCESS

When the organization over a period of time builds a better and robust process, it is in a position to eliminate opportunities for defects before they actually occur. Outcomes or end results are determined by what happens during the process Six Sigma simplifies systems, improves process capability, and in the end finds a way to optimize rather than automate the systems and processes so that defects and failures are eliminated and the concerned organization achieves the milestone of 3.4 Defects Per Million Opportunities (DPMO) ensuring sustainability of Six Sigma level (3.4DPMO) on a long-term time horizon.

5.1 DMAIC

DMAIC is an adapted Deming's *PDCA* cycle. PDCA stands for Plan-Do-Check-Act. **Define** the goals of the improvement activity in a verifiable manner is part of *Plan* in the Deming's cycle. **Measure** the systems' parameters using rigorous statistical formats amount to *Do* in the Deming's cycle. **Analyze** the system using statistical tools extensively to eliminate gaps between actual performance and the desired goal is nothing but *Check* in the Deming's cycle. Likewise, **Improve** and **control** the system is nothing but *Act* in the Deming's cycle. **Define** the goals of the improvement activity. **Measure** the existing system. **Analyze** the system to identify ways to eliminate the gap between the current performance of the system or process and the desired goal. **Improve** the system. **Control** the new system. This acronym stands for

The following diagram captures the six steps involved in the process



For an organization engaged in multi-products, the application of 80-20 rule (Pareto Analysis) that will help to identify key products. These key products will produce 80% of the profits, For each of these key products/services, identify the customers and their expectations/requirements, determine the entrepreneurs' needs and suppliers, define the process that will consist of individual operations, eliminate defect sources and optimize the process. Improving the Six Sigma level is the last step envisaging a feedback mechanism to take back to the previous step of defect elimination and optimization until the Six-Sigma level is attained. For successful implementation of Six Sigma it is imperative to have Top-down-commitment and involvement of management all through the Six Sigma Process. Professional managers can set the example by actively participating in the various stages of the process. The organization must have a strong measurement and monitoring system to keep a tag on the progress made. The measurement system will have to do both within and outside the organization. It would include for example, a comprehensive marketing research and information system to track customer preferences and expectations. Within the enterprise, a strong information system should be in place to review and take actions when required on the process. In this regard, a host of techniques that would include SQC, SPC, Design of Experiments, Supply Chain Optimization, hypothesis testing shall be used with an applied orientation. Tough and ambitious goals must be set on various critical to quality characteristics that impact the customer expectation and satisfaction. The company must take its people out of the comfort zone. Benchmarking process must be an integral part of the goal setting process wherein the targets on key dimensions are set based on what is being achieved by the best in class.

Providing appropriate education and training twill pave the way for attaining goals in the Six Sigma environment. The training modules will envisage a strong background in advanced statistical methods, resource optimization models, and analytical problem solving skills. The Six Sigma agents Master Black Belts, Black Belts, and Green Belts should be the champions and inspiring leaders in the entire gamut of the education and training programs to employees, communicating throughout the organization, the success stories that may take

place in certain projects. They may reveal reduction in defects, increase in profits, and productivity. In the initial stages, the improvements witnessed may not be very substantial. But, it points to the fact that the enterprise is positively progressing in the Six Sigma process and spreading success stories will create a winning attitude throughout the organization. This in turn, will lay a strong foundation upon which the company will maximize customer satisfaction. Deployment process must focus on empowerment, accountability for quality improvement, and reward and recognition for good performance.

7.0. CONCLUSION

No organization should become too intoxicated with winning the metrics game. Just by applying a few out of the assorted Six Sigma methods, a company cannot be classified as a Six Sigma company. Likewise, a professionally managed company with a high degree of commitment and passion for quality may be classified as a Six Sigma company even if it has not achieved 3.4 DPMO! It is only important to realize that a cultural change required to transform an organization into a full-fledged Six Sigma organization is much more important than the mere metrics game. Customers' priorities are paramount in Six Sigma. At no point in time, should a company become complacent and lose sight of the preferences and priorities of the customer. This is also the cardinal principle of marketing that is focused on the central theme –Customer is the Foundation of Business. Organizations who are adopting Six Sigma will have to be careful in not allowing them to become supercilious once they reach the target. By benchmarking process and continuous improvement strategies, competitors can overtake if the business owners remain status quo. This is also profoundly true in TQM practices. It should be clearly understood that if reaching the top is difficult, it is even more difficult to remain on top for a longer time horizon. So, the principle is that continuous improvement to **eliminate defects**, to **optimize process**, and to **improve profits** substantially is a never-ending process. Six-Sigma focuses emphatically on all these three aspects. Just like TQM, Six Sigma is a long journey towards excellence in quality. It is not realistic to expect fantastic results within a very short time. Motorola took about 11 years to achieve Six Sigma level from scratch. Unlike other traditional quality tools, if the start of the journey of Six Sigma with passion, involvement, and commitment, even in the short run say within three years there can be a reasonable jump in profits and there after, year after year there will be seen a phenomenal improvements in corporate profits. All factors considered, Six Sigma is not a mere mantra but an effective action plan that can pave the way for enhancing significantly the corporate profitability if implemented with total commitment. The results of Six Sigma practices will be far superior to other Quality Practices including TQM because of its focus on a breakthrough strategy that is highly radical in nature. Six-Sigma strategy incorporates rigorous statistical measurement systems and powerful benchmarking metrics that are truly responsible for substantial improvements in performance in the twin elements of quality and profits. Six-Sigma chases perfection and in the process catches excellence in all dimensions of quality and hence **SIX-SIGMA – A FASTER PATH TO PROFITABILITY.**

REFERENCE

1. BHOTE, K.R. (1989). Motorola's long march to the Malcolm BALDRIGE National Quality Award, *National Productivity Review*, 8 (4), pp.365-376
2. Harry, M.J. (1998). *The Vision of Six Sigma*, 8 volumes, Phoenix, Arizona, Tri Star Publishing
3. HENDRICKS C.A. AND KELBAUGH, R.L. (1998) Implementing Six-Sigma at GE, *Association for Quality & Participation*, 21(4), pp. 48-53
4. LOSIANOWYCZ, G. (1999). Six Sigma Quality: A Driver to Cultural Change & Improvement, an invited lecture by Korean Standards Association at Seoul. (Ms. LOSIANOWYCZ is a senior lecturer at Motorola University.)
5. PARK, S.H. AND VINING, G.G. (2000). *Statistical Process Monitoring and Optimization* Marcel Dekker, New York.
6. Tomkins, R. (1997). GE beats expected 13% rise, *Financial Times*, (10 October), p.22
