ANNALS OF EDUCATION

Vol. 4(4), December 2018: 48-52
Journal's URL: http://www.crsdindia.com/aoe.html
Email: crsdindia@gmail.com
Published By: Council of Research & Sustainable Development

e-ISSN: 2455-6726

Journal Impact Factor (ISRA): 1.117

RESEARCH PAPER

New Approach of Gaussion Distribution for Achieving Business Excellence

Sumit Chandra
Department of Commerce, Govt. Degree College, Maant, Mathura
Email: khandelwalsy2k@gmail.com

Received: 4th October 2018, Revised: 30th October 2018, Accepted: 10th November 2018

ABSTRACT

In the present study, we have considered certain new situation in the entire value chain of business where the concept of Six-sigma can be implemented. After the study of feasibility of these situations, we have established and developed certain new approach of six sigma appropriate for the study of these new business dimensions and established the profitability enhancement after implementation. The problem and solution were considered and reviewed in different conditions and situations in various phases especially in the Indian environment of Industry where most of the Industries are running at one sigma level and incurring more than 40% of total sales value as cost of poor quality. Data of real situation was analyzed for the improvement bottom line (Profitability of any business house).

Key words: *New Approach, Gaussion Distribution, Achieving Business Excellence, Six Sigma*

INTRODUCTION

Although statistical reforms are in its, early stages, the need of change is pressing. If anything, the problem is worse in statistics than it ever was in Mathematics. Each year about half a million students are required to take one or two courses in statistics (This is the same number of students who are taking Business Administration or engineering). Very little has changed in statistical courses in the last four decades. Though the teachers and researchers are doing continuous work towards the reorganization of this subject but the results are not as per the expectation. Till now the examination of statistics textbook reveals that neither topics nor pedagogy have changed very much over the post war era. Typical coverage includes descriptive statistics, probability theory, discrete distribution, continuous distribution, estimation, testing of hypothesis, design of experiment, regression and time series. Students are not getting concrete about how to use the statistical tools and techniques in our daily life and how can use the concept of statistics for achieving the business excellence.

In the modern era of business when the competition is tough and certain new philosophy are required to make the presence in the market effectively. Competition has become typical in terms-of cost, quality & services. Not even this, culture of working in the office also, needs reforms in tune of today's environment. In many business environment, the six sigma culture is becoming a way of life through a systematic efforts to introduce a uniform approach and set of techniques for continuous qualify improvements (Harry and Schraeder, 2000). The main benefit of six-sigma approach is the elimination of subjectivity in decision making in any business process (Manufacturing or Sales) by creating a System where everyone in the organization collects, analyze and displays data in a consistent way. Six-sigma is a direct extension of total quality management (Persico, 1992) which in turn, is based on the principals and teaching of W. Edwards Deming (1900 1003). ID a sense, as a result of the popularity of Six Sigma, the Deming philosophy of management is undergoing a positive revival. Typically Deming's 14 points of management and his seven deadly diseases of management are used to illustrate Deming's guiding principles (Demings 1986, Walton 1986). An important focus on Deming's management philosophy involves a movement from systems that rely on understanding the random behavior of the processes that generate a company's product or service. In many cases, Deming's philosophy is introduced in management statistics course as part of the introductory chapter that motivates the need for statistics and statistical thinking in business management. Unfortunately, the material included in many

textbooks does not provided a clear mechanism for the application of Demings principles throughout the course. One may not be exposed to techniques that may be useful in characterizing the behavior of dynamic processes. While many' textbooks do include a chapter on statistical quality control (SQC), this chapter will be found at the end of the text. Typically, the coverage in this chapter will be focused on issues related to the conformance of manufacturing parts to specifications. It can be argued that a statistics course for management and business administration should start with the Deming philosophy of management and should include the basic elements of the philosophy throughout the course. Deming Philosophy of management and should include the basic elements of the philosophy throughout the course. While some authors have used the phrase Statistical thinking to describe this type of coverage (Hoerl and Shee, 2001, Shee, 1998) the term process thinking is used in this article. The later term more closely describes the essence of the coverage (Kaminsky et at, 1992). While other authors have suggested enhancement to statistical education (Shee, 1993, chan et at, 2000, Nolan and Speed, 1999) it will be argued that it is possible to incorporate process thinking with evolutionary changes, rather than revolutionary changes in the way subject is taught. The advent of control charts 'provided tools for improving process for better quality results. That was the United States' Competitive edge in the 40's and 50's. In the 1960's "Made in the USA" was considered a quality benchmark worldwide. In the 70's due to International Competition, "Design for manufacturing" tools were widely used, raising and quality bar to new heights, in the early 80's under pressure from international companies, U.S. Companies looked for ways to achieve better quality. They benchmarked best-in-class companies, products and processes. Motorola for example benchmarked manufacturing processes and products to identify opportunities for improvement.

Motorola's quality journey started in 1981, when a goal to improve quality ten times in five years was established. In reviewing performance about five years later, the company recognized a need to establish more aggressive goals to maintain a leading position within the industry. Motorola recognized there was a need for a higher rate of improvement. Based on the customer feedback, market analysis and benchmarking studies, a new quality benchmark was established. The Six-sigma was born, and a new meaning of to quality was defined. Based on the reality of manufacturing, use of control charts, and application of "Central limit theorem", the six-sigma corresponded to 3.4 parts per million. It is slightly, more than "Zero Defects", however it is close to perfection. So, the six-sigma is not perfection, but it is virtual perfection- an almost perfect work.

The general reference on six-sigrna are Cook J. (1999), Zlotin B. (1999), Stan Kaplan, S. Vishepolshi, B. Zlotin, A.Zusman (1999), Tennant G. (2003) have been added the theory of tools of classical theory of Inventive problem solving in terms very similar to those used by charles Delott and Praveen Gupta (1990), Sam Thomas (1991), Jim Smith and Mark Oliver (1992), Wesley R. Iverson (1993), Michal C. Lancaster (1992). Harry M. (1988), Niemes, Jim (1999) and Blakeslee, Jerome (1999) also worked on the implementation of Six-Sigma practices for achieving the goal of business excellence.

HISTORY OF SIX-SIGMA

Motorola started the movement towards excellence in manufacturing in the mid 1980's (Ficalora, 1997) when they adopted a new philosophy of zero defects. Motorola worked towards this by thoroughly reviewing their customer needs, analyzing their processes and the abilities of their suppliers. By doing this they were able to produce a product that was reliable and allowed them to meet the needs of the customer. The philosophy, measure and methodology of Six-Sigma form a frame work that helps an organization to focus on reducing defects while improving their processes and reducing business costs.

A number of companies have since adopted the philosophy of Six-Sigma. They discovered that designing and manufacturing a product without defects was not only possible, but also essential to remain viable in the highly competitive marketplace. Removals of defects in any process eliminate rework and reduce cycle time thereby reducing the cost of doing business. Texas Instruments adopted the Six sigma methodology in 1991 (Ficalora, 1997) and discovered not only a manufacturing application, but a universal application in all their processes. They provide the six-

sigma concept was applicable anywhere you could collect and analyze customer satisfaction process and supplier data.

DESCRIPTION OF SIX SIGMA

Six sigma is a structured methodology used on any repetitive process, procedure or transaction. Statisticians at Motorola developed this methodology in 1980s. The Basic premise of sixsigma is that there is a cost of poor quality, because poor quality causes lost sales and lost business opportunities. Improving quality through the reduction of defects lead, to greater customer satisfaction, Reduction of defects leads to reduce costs, and increased customer satisfaction lead to increase revenue. So the primary goal of six-sigma is to improve customer satisfaction, and thereby profitability by reducing defects and increasing 'The degree of quality'. The degree of quality can be measured from one or more critical outcomes from a business process; everything that the customer are interested and comes as a product. Defects may be related to any aspect of customer satisfaction, high product quality, schedule adherence, cost minimization and etc. In other words every process, procedure or product has an opportunity to be executed correctly, any opportunity that occurs which does not meet customer requirements is called 'defects'.

SIX SIGMA STATISTICS

According to the Gaussian distribution, most of the events in nature are randomly (normally) distributed. When plotted, the distribution of these events tends to approach a bell shaped distribution (normal distribution). The significance of normal distribution is that most of the events in nature can be characterized using the normal distribution statistic. For example, if we plot a distribution of the height of students in a class, a bell shaped distribution may emerge - each person has an equal chance to achieve height independent of other students in the class. If we estimate the average and standard deviation, we can use the normal distribution statistics to learn more about the height of students in the class or the population on which the class is a part.

By using the normal distribution statistic, one can estimate certain aspects of population beyond or within specified limit. Typically, these limits are process control limits that are correlated to the product specifications or the customer requirements. This is a important piece of information that can be used to predict the process behavior and initiate appropriate remedial action.

Using the standard normal distribution, there are know probabilities of having an incidence beyond a certain value or within certain values. For a process whose upper and lower specifications limits are +1-3 sigma from the process mean. The number of occurrences outs.de the specifications limits will be 2700 ppm. If the process means shifts upto 1.5 sigma, the probability of occurrence will be 99,810 ppm. These probabilities are documented in statistical tables.

Table 1: Probabilities for certain limits

Limits (in sigmas around the mean)	Probability of having a product outside the limits (centered distribution)	Probability of having a product outside the limits (Distribution shifted by 1.5 Sigma)
3 Sigma	2700 ppm	66810 ppm
4 Sigma	63.4 ppm	62 10 ppm
5 Sigma	0.34 ppm	233 ppm
6 Sigma	2ppb	3.4 ppm

Ppm - parts per million, ppb - parts per billion

Shift of1.5 sigma is utilised to accommodate a normal variation in process mean.

The term "Sigma" refers to measure a variation. Specifically, sigma is a statistical measurement of the capability of a process, procedure to meet customer 'requirement.

For a normally distributed bell shaped curve approximately 69% of the data points will fall with in one standard deviation or one sigma, of the mean; 95% with two sigma; 99.73% within three sigma; 99.9937% within four sigma; and 99.9999998% within Six sigma. These calculations are determined using a process that does not shift. Unfortunately, shift does occur in a process. In

manufacturing, as we use a machine in a process, its accuracy changes as a result of wear and tear. The accuracy of humans who work in the process also changes.

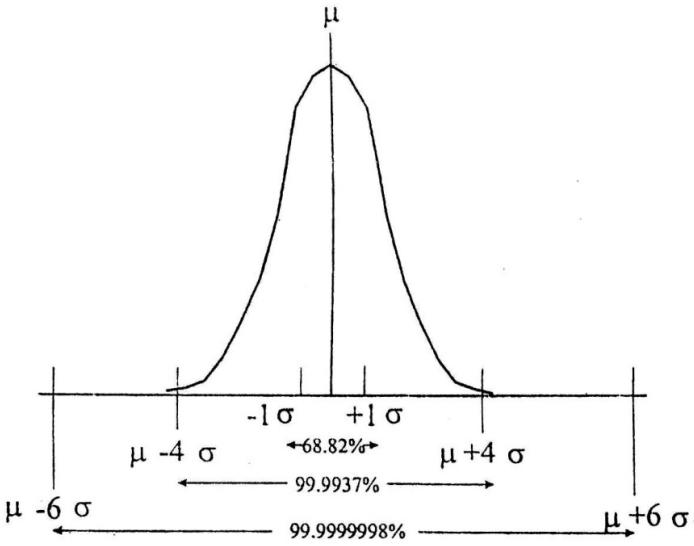

Fig. 1: showing distribution bell shaped curve of one, two, three, four and six sigma

External factors like temperature; pressure to finish the job or health changes their capability to prefer a consistent repetitive task.

Motorola's research has shown that a process can shift by a much as 1.5 sigma from the mean over time (Harry, 1988). When a process shifts, areas that were within tolerance at +/- 4 sigma, how see many defects. What was performing at the six sigma level still will have 99.9996 % of the data points within six sigma.

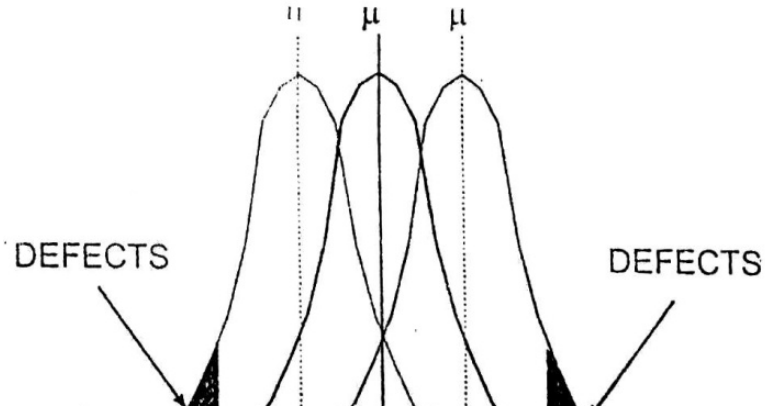

Fig. 2: showing six sigma to be defect free work

With Six sigma, defects will occur only 3.4 times in one million opportunities. For our processes, we consider six sigma to be defect free work.

RESULT

Organizations find that Six sigma proves best suited for process based environment, such as operations. But in proposed study we may think, the application of Six-sigma concepts to other area of business.

Despite the benefits of implementing Six-Sigma, companies frequently fail to apply six- sigma to the sales organization. The control challenge of applying six sigma to sales is the inability of companies to measure current performance against dynamic customer requirements while also developing the necessary internal organization components (leadership strategy, staff and technology) Besides

the above some other situations can be explore where cost can be cut and quality of product as well as service can be improved through the six-sigma.

REFERENCES

1. Blakeslee Jerome (1999): Implementing the Six Sigma Solution. Quality Progress (1 July 1999).
2. Charles Delott and Praveen Gupta (1990): Characterization of Copper Plating Process for Ceramic Substates, Quality Engineering, 2 (3).
3. Cook J. (1999): Six sigma of separation: Comparing Business Improvement Practices. Value World, 22(1): 1999.
4. Deming W.E. (1986): Out of Crisis, MIT Center for Advance Engineering Study, Cambridge, M.A.
5. Ficalora P. (1997): Texas Instruments Six sigma briefing to Air Combat Command Commander.
6. Harry M. (1988): The nature of Six Sigma Quality, Rolling Meadous, IL: Motorola University Press.
7. Harry M.J. and Schroeder R. (2000): Six sigma: The Breakthrough Management Strategy Revolutionizing the world's Top Corporations, Doubleday, New York, NY.
8. Hoerl R. and Shee R.D. (2001): Statistical thinking: Improving Business Performance, Duxbury Press, Pacific Grove, CA.
9. Jim Smith and Mark Oliver (1992): Six Sigma; Realistic Goal or PR Play, Machine Design, September 1992.
10. Michael C. Lancaster (1992): Six Sigma in contract manufacturing, Circuits Assembly, December 1992.
11. Niemes Jim (999): Taking Sales success to new heights with Six Sigma. National Productivity Review (Autumn 1999).
12. Persico J. (Ed) (1992): The TQM Transformation: A Model for organizational change, quality resources, white plains, New York, NY.
13. Sam Thomas (1991): Six Sigma: Motorola's Quest for Zero Defects, APICS- The performance Advantage, July 1991.
14. Snee R.D. (1993): What's missing in statistical education. The American Statistician, 47: 149-54.
15. Snee R.D. (1998): Non-Statistical skills that can help statistician be more effective. Total Quality Management, 9(8): 711-22.
16. Stan Kaplan, Visnepolshi S., Zlotin B. and Zusman A. (1999): New Tools for failure & Risk Analysis". An Introduction to Anticipatory Failure Determination (AFD) and the theory of Scenario Structuring. Ideation International Inc.
17. Tennant G.: TRIZ for Six Sigma. E-Book, Mulbury Six Sigma.
18. Walton M. (1986): The Deming Management Model, Dodd, Mead and Co., New York, NY.
19. Wesley R. (1993): Iverson: The six sigma Shootout, Assembly, June 1993.
20. Zbtin B., Zusman A., Atshuller G. and Philator V. (1888): Tools of Classical TRIZ. Indeation International Inc.

How to cite this article:
Chandra S. (2018): New Approach of Gaussion Distribution for Achieving Business Excellence. Annals of Education, Vol. 4[4]: December, 2018: 48-52.