



Concept of Six Sigma and its Application in Banking

KEYWORDS

Six Sigma, Quality control, six sigma and banking, Quality control and banking, perfection in banking, importance of minimum defects

ADITI SHARMA

Ph.D. Scholar, NIMS UNIVERSITY, JAIPUR, INDIA

Dr. SUDHINDER SINGH CHOWHAN

Vice Principal, Institute of Management & Computer Science, NIMS University, Jaipur

ABSTRACT

Concept of six sigma is extremely important for any business as well as in banks to sustain in a highly volatile and competitive market. Six sigma is a system that uses data and statistics for measuring quality in an industry. Its application promises a perfection level to the tune of 99.9%. The Six Sigma methodology can help to reduce the amount of wasted time and resources as well as the cycle time to complete a process. Result is lower maintenance, reduction in delay and costs at various stages, thereby resulting greater profitability and much better customer satisfaction. Consequently the organisation shall be in a better shape to withstand the storm of growing competition.

The concept of six sigma is extremely important for any business as it relates to rule out or eliminate mistakes and errors and thereby attaining perfection. It is believed that the application of this concept has produced startling results and it is noticed that a perfection level to the tune of 99.9% can be achieved. Its importance can also be looked into from the fact that the perfection in a business helps in minimising losses and the losses so eliminated are nothing but profit for a business. Six Sigma proves to be perfectly suited to the needs of the service industry. The banking sector has found the benefits to be reduced cycle times, better cash management, reductions in complaints due to defects and overall customer satisfaction from improved performance.

When I joined the classes as a management student I was taken aback to know as to how a term of mathematics like Sigma could have its application in a business. But later on it completely washed off my impression and I was enlightened to have a knowledge that elimination of mistakes to mathematical precision by using a sound concept of six sigma, an organisation can add a great deal to its profits and sometimes to the tune of even 200% as claimed by Sheila Shaffie, a renowned exponent of this concept.

The word "sigma" is a Greek letter which represents standard deviation, the term that describes how much distant or different the variable is from the mean. Six sigma is a process of continuous improvement (Kaizen) of business practices and efficiencies. Six sigma is thus a system that uses data and statistics for measuring quality, traditionally in an industry. The Six Sigma methodology can help to reduce the amount of wasted time and resources as well as it reduces cycle time to complete a process. Result is lower maintenance, reduction in delay and costs at various stages and most importantly the cost of rework. Sometimes, it is perceived that six sigma is a device used for head-rolling or reducing manpower. But in real terms this concept is and should be applied for enhancing and enabling the human resources and to supplement and add to their capacity and capability.

"Six Sigma is a statistical term used to measure process variations, i.e., how far a given process deviates from perfection, which causes defects. Six Sigma works to systematically manage variation and eliminate defects--or to get them as close to zero as possible" (Harrison, 2006).

Six Sigma concepts adopt and work on **DMADV** and **DMAIC** methodology for efforts, design/redesign and improvement of processes.

DMADV methodology consists of the following five steps:

- **Define** the goals of the design activity that are consistent with customer demands and enterprise strategy.
- **Measure** and identify CTQs (critical to qualities), product capabilities, production process capability, and risk assessments.
- **Analyze** to develop and design alternatives, create high-level design and evaluate design capability to select the best design.
- **Design** details, optimize the design, and plan for design verification. This phase may require simulations.
- **Verify** the design, set up pilot runs, implement production process and handover to process owners.

Table depiction of DMAIC module for analysis and improvement of processes:

Phase	Improvement of Process	Design/ redesign of process
D E F I N E	- To identify - To determine requests - To set planned result	- To identify specific or general problems - To define planned result/ apply vision - Explain scope and requests of customers
M E A S U R E	- To confirm a problem / process - To purify the problem / planned result - To measure key steps / entrances	- To measure performances according to requests - To gather data on process efficiency
A N A L Y Z E	- To develop hypothesis on samples - To identify "vital minority" of cause root - To confirm hypothesis	- To identify "the best practice" - To evaluate process design, Adding / not adding values, - Bottlenecks / interruptions/find - Alternative ways - To purify requests what interviewer wants to hear.
I M P R O V E	- To develop ideas for removing the root of cause - To test solutions - To standardize solution / measure results	- To design new process - To check assumptions - To apply creativity Principles of work flow - To implement new process, structures, systems

CONTROL	<ul style="list-style-type: none"> - To establish standard measuring for performance & maintenance - To correct problems when needed 	<ul style="list-style-type: none"> - To establish measurements and re-investigate in order to maintain performances - To correct problems when needed
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Table 1

Six sigma process, also casts responsibilities upon the officers and thus identifies several key roles for the executives for its successful implementation. The word belt refers to the level or the position, of a person in an organization at the time of performing a work or at the time of implementation of a project. **Champions** are business leaders who lead the six sigma methodology at the time of sponsoring projects. It is their responsibility to select the projects and then to find out the goals to be obtained out of the project. For the attainment of these goals, the champions select and mentor six sigma project leaders, who is known as the **"Belt"**. Six Sigma green belt operators are given training to operate in the support or under the supervision of a six sigma black belt. Through this certification the person is trained to analyze and solve quality problems. This results in the quality improvement projects. The candidate who had undergone six sigma black belt certification is a professional who is capable in the explanation of six sigma philosophies and the principles. The professionals who had undergone the master black belt certification are considered as six sigma quality experts and they are responsible for the strategic implementations within an organization. Six Sigma Yellow Belt certification provides with the attendees an overall insight to the use age of the six sigma techniques. The training is also given in the field of six sigma metrics and the basic improvement methodologies. Lean six sigma certification provides the professionals with techniques of improving quality both in services and manufacturing in industries. It facilitates the industry to move fast in order to meet competition in the industry, to eliminate non profitable items and to add new valuations in the company, to achieve total accomplishment and stable continuous improvement.

Calculation of Six Sigma

The concept of Six Sigma is useful to eliminate defects/variations in processes with respect to customer requirement. Achieving a six-sigma level quality means that processes produce only 3.4 defects per million opportunities (DPMO). Six-Sigma in addition to being a methodology for improving process capability is also viewed as a philosophy that leads to perfection on a continuous basis. The capability index, DPMO and the implied performance at select levels are given below for ready reference.

CAPABILITY INDEX	DPMO	IMPLIED PERFORMANCE
6 sigma	3.4	World Class
5 sigma	233	
4 sigma	6210	Average
3 sigma	66807	
2 sigma	308537	Non Competitive
1 sigma	691462	

Table 2

DPMO =

$$\frac{\text{Number of Defects} \times 1,000,000}{\text{No. of opportunities/Unit} \times \text{No. of units}}$$

(Number of units signify the units tested during the process viz; the sample size, Number of Opportunities signify number of checks undertaken per unit).

The Six Sigma Curve

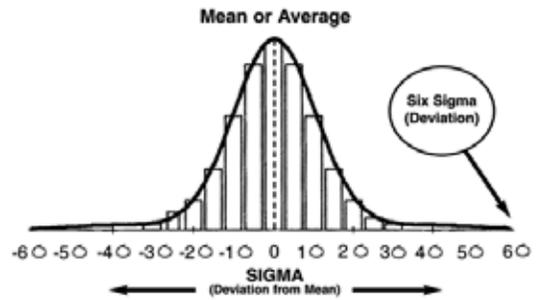


fig:1

The Population Standard Deviation:

$$\sigma = \sqrt{\frac{1}{N} \sum_{i=1}^N (x_i - \mu)^2}$$

fig:2

The Sample Standard Deviation:

$$s = \sqrt{\frac{1}{N - 1} \sum_{i=1}^N (x_i - \bar{x})^2}$$

fig:3

N denotes population size in fig:2 and sample size in Fig: 3, while the value under square root is the value obtained by adding all the deviations calculated from the mean.

The dotted line at '0' is the mean which is calculated by adding the values of each sample and dividing the result by sample size. Statistically, 68.2% of a normally distributed sample falls within plus or minus one sigma of the mean. By adding another sigma, almost 95.44% is achieved. At 3sigma 99.73% of the sample population is covered. However, by the time we reach six sigma, 99.99966% of the units/observations of the sample population shall exhaust.

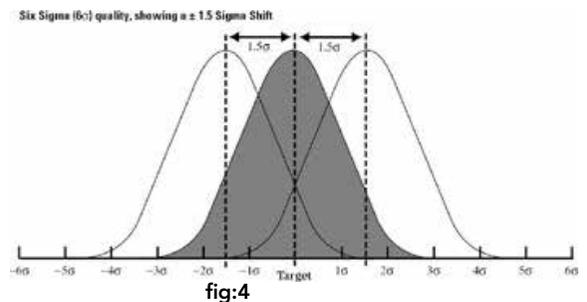


fig:4

Fig: 4 :- Motorola introduced +/-1.5 sigma shift in the mean. This was required for estimate of the long term performance variability. By offsetting normal distribution by a 1.5 standard deviation on either side, the adjustment takes into account what happens to every process over many cycles of manufacturing. The 1.5 sigma shift on either side results in the generally accepted six sigma value of 3.4 defects per million opportunities. Ignoring, the shift results in a six sigma value of 2 defects per million opportunities.

Application of Six Sigma in Banking Industry

The 1997 Committee on exchange rate management around Real Effective Exchange Rate (REER) recommended that:

"the RBI should have Monitoring Exchange Rate Band of +/- 5.0 percent around the neutral REER. The RBI should ordinarily intervene as and when the REER is outside the band. The

RBI should not intervene when the REER is within the band. The RBI could, however, use its judgment to intervene even within the band to obviate speculative forces and unwarranted volatility. The committee further recommends that the RBI should undertake a periodic review of the neutral REER which could be changed as warranted by fundamentals."

Six sigma in banking is necessary to improve quality of services rendered by the bank. By using DMAIC module banking professionals **define** the objectives and boundaries of a particular business process in the bank, in consultation with the employees and senior management. Customer satisfaction is of utmost importance for any bank and it makes necessary to define all processes that involve customer interactions. Some of such processes which require interaction with customers include address change requests, account opening, window transactions, ATM operational aspects etc.

Thereafter the six sigma experts in banks **analyze** the data so collected in accordance with the parameters set for improvement in line with customer's satisfaction. e.g.- A cheque encashment transaction involves the customer coming to the teller window, the teller receiving the customer's request and the teller seeking a manager's approval for processing the request. Instead of these three different phases, each single transactions needs to be analyzed individually to ascertain which one has the maximum impact on the overall transaction time.

In the **measure** phase of DMAIC, bank professionals collect statistical data in consultation with the business managers. The statistical data is then used for measuring the impact of the various business processes on customer satisfaction. Different processes have different impact on customer satisfaction. The measurement of impact of the individual processes helps the banks to concentrate on improving the processes that have the maximum impact on customer satisfaction. In the banking industry, wait times are said to have the maximum impact on customer satisfaction. Banks can employ observers at its different branches to measure the average wait time, under different work conditions.

Improve phase of DMAIC, identifies corrective measures to improve processes that cause problems in consultation with the bank staff and the branch manager. All improvement measures are based on facts and statistics. Advanced simulation tools can also be employed to study the impact of the proposed improvement initiative on business processes.

In the **control** phase of DMAIC, control systems are put in place to monitor the impact of the improvement initiatives. If a business process is still not performing in accordance to the desired Six Sigma levels, the process is referred back to the 'define' phase. However, if a small problem is affecting the performance, then corrective measures are taken and the whole process is not referred back.

Common Six Sigma benefits identified in banking industry are listed below

1. Reducing documentation errors
2. Improving the reconciliation processes.
3. Reducing response delays.
4. Reducing or eliminating invoicing errors
5. Eliminating the possibility of erroneous data entry
6. Reducing audit non conformities.
7. Reduce electronic financial transaction costs.
8. Reducing complaints.
9. Enhancing (internal or external) customer satisfaction
10. Improving customer feedback and response processes

On the Asset Side

1. Reducing the cycle time to Process a Loan Application (both Mortgage & Personal loans)
2. Improving the Customer Information gathering process

es

3. Improving the Credit Evaluation Process
4. Improving Productivity of loan processing agents

Account Opening

1. Reducing the time to open an account
2. Reducing errors in account opening process.
3. Reducing rework in processing customer applications

Other Projects in Retail Banking

1. Reducing the Credit Card Delivery time.
2. Reducing Bank Statements Processing & Delivery time.
3. Reducing the errors in money transfer
4. Improving accuracy, timeliness and completeness of customer communication.
Developing new products (timeliness, business potential)
5. Improving Market Share of existing banking products.
6. Improving the Branch Banking Processes
7. Fixed Deposit Mobilization

Citibank has been pioneer amongst the banks to apply six sigma concepts in banking business. JP Morgan Chase and Co., the second largest bank in US, has generated wonderful results through expense reduction, revenue increase and enhanced customer satisfaction.

American Express began with Six Sigma in 1998. It has benefited with billions of dollars of benefits since then. Bank of America started with Six Sigma in 2001 and has announced huge savings through increased savings, increased revenue and enhanced customer satisfaction.

State Bank of India initiated a campaign for business reengineering and employed six sigma concepts for the same in 2004. Likewise ICICI Bank, IDBI Bank, HSBC, ABN Amro, Cholamandalam Financial Services, Metlife, Max New York and HDFC Bank etc. also employed the six sigma modules in its operation. Use of six sigma modules by these banks not only reduced time cycle for sorting out processes but also resulted in vast improvements in customer's satisfaction as well as witnessed tremendous growth rate in business and the profitability of the bank itself. With the opening up of economy, the use of six sigma by banks is absolutely unavoidable and imperative to meet the growing competition and customer's expectations.

Inference

Six Sigma is a management strategy for improving product and process quality. John Young of Hewlett Packard says, "In order to compete in the global economy, our products, systems and services must be of higher quality than the competition". In the regime of free market economy where customers have huge number of options for the same product and high expectations of service, if the specifications and quality of the product or service does not satisfy customer requirements, it will be difficult for the company to sustain in the highly volatile and competitive environment. Therefore, organisations are adopting various tools for quality analysis and quality control. Six Sigma is an effective quality control tool started by manufacturing industry and accepted by service sector. Some of the Indian banks have readily adopted this tool in response to the growing competition specially post-liberalisation. Tools like "Single Window Operations" by banks like HDFC, SBI, Citibank etc. has added a great deal to the bank culture and customer satisfaction in recent times.

Suggestions

Now in India, various institutions provide training to individuals in six sigma. After receiving such training, individuals achieve various 'belts' certification and also lean six sigma certification. The banks/companies should send its employees for such type of training so that they become equipped to implement the process in their working and help other colleagues and employees under them to work with high level

of precisions. This practise shall facilitate an improved work environment and culture of the organisation. Banks with the help of trained staff can achieve maximum possible perfection in its product or service specification and quality which shall enable it to sustain and excel in the highly competitive market and ever changing demands of the customer. Six sigma though is a virtual perfection but if a bank tries and works towards the achievement of such a level of error-free performance, it can reach that level of excellence where its profits, its loyal customers far exceed its competition.

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