Critical Success factors for six sigma Implementation

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ABSTRACT

In present strong competitive era companies are focusing on quality implementation with the help of their strong s/w and R&D departments .Among these tools six sigma is an emerging strong quality tool for all global organizations. One of the most critical and costly adapting process, but all major corporates of software and manufacturing companies are adapting to improve product quality and improve customer satisfaction to retain more world class companies as their clients, especially in the field of banking, services and production. There are number of methods to adopt six sigma and all the methods are successful only if the success factors are determined before implementation of the process, unless they do this basic thing their huge investment of time and money along with their intellectual assets would go into vain. Depending on the nature of the organization, products and services the companies adapting new quality change process where they must need to identify the key success factors for easy implementation of six sigma. In this paper we discuss about six sigma definitions, success factors in six sigma departments wise and functions wise of an organization and how they are contributing to the success rate of quality and what are the interrelations between these factors.

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Introduction

These are the most frequent questions being asked by the potential Six Sigma followers. But, there is no easy answer to each one of them. Simply because driving a business toward Six Sigma is not a one-time effort; it is about producing products and services that continue to meet customer and market requirements. This requires organizational agility and constant vigilance to changes in the marketplace. Thus, the real challenge with Six Sigma is getting to the point where one can meaningfully measure a business' current performance against dynamic customer requirements while developing the internal organizational abilities to response to changing marketplace conditions. Doing this well means aligning organizational components inside the company (leadership, strategy, people, and technology) to give Six Sigma efforts the momentum and staying power they need to succeed.

Objectives of the study

1) To know the most critical success factor for six-sigma implementation.

2) Find out the importance of various factors in quality implementation.

3) To know the contribution of various departments for six sigma implementation.

Research Methodology

Data collection made through electronically (Through E-mails) by a short questionnaire. After collecting the primary data, the interpretation done by using SPSS 17.0, relevant statistical tools are used to check the efficiency of the results.

Period of the study

The study conducted in October-December 2009 at six sigma completed/ implemented organizations in Hyderabad city.

Sample & Sample size

Sample Respondents are the belt holders (black belt, Green belt, Yellow belt) in six sigma form various industries in Hyderabad & Secunderabad city. Questionnaires distributed 60(52 Received) for above said respondents with in time period of 60 days.

The Study

This paper is an outcome of an analysis of responses received from 52 respondents who include 24 black belts, 10 green belts and 18 yellow belt working in different industries in Hyderabad & Secunderabad.

They express their views about concept of six sigma, success factors such as the leadership of the top management, commitment to high quality, well-developed strategic planning system, training

systems, voice of the customer and overall customer satisfaction etc in six sigma department-wise and function-wise of an organization. Among the issues that have been focused include how these are contributing to the success rate of quality and the interrelationships among these factors.

Literature Review of six sigma

Motorola's Bill Smith initiated Six Sigma almost two and a half decades ago building on the philosophy, Principles, and methods of Deming's Total Quality Management (TQM). Since then, thousands of organizations have become 'Six Sigma companies' by adopting specific training and project management practices. With Six Sigma's industry-based origins, it becomes important to assess the state of the related *academic* contributions now that the associated field of study is maturing.

Definition

'Six Sigma is an organized and systematic method for strategic process improvement and new

Product and service development that relies on statistical methods and the scientific method to

make dramatic reductions in customer defined defect rates.' OR

Those authors further described that 'the name Six Sigma suggests a goal' of less than 3.4 defects per million opportunities (DPMO) for every process. However, they did not include this principle in the definition because, 'Six Sigma advocates establishing goals based on customer requirements'.

Methodology

Six Sigma has two key methodologies: DMAIC and DMADV both inspired by Deming's[2] Plan-Do-Check-Act Cycle. DMAIC is used to improve an existing business process; DMADV is used to create new product or process designs.

DMAIC

D*efine* process improvement goals that are consistent with customer demands and the enterprise strategy. ***M****easure* key aspects of the current process and collect relevant data. ***A****nalyze* the data to verify cause-and-effect relationships. Determine what the relationships are, and attempt to ensure that all factors have been considered. ***I****mprove* or optimize the process based upon data analysis using techniques like Experiments. **C**ontrol to ensure that any deviations from target are corrected before they result in defects. Set up pilot runs to establish process capability, move on to production, set up control mechanisms and continuously monitor the process.**Executive Leadership** includes the CEO and other members of top management. They are responsible for setting up a vision for Six Sigma

implementation. They also empower the other role holders with the freedom and resources to explore new ideas for breakthrough improvements.

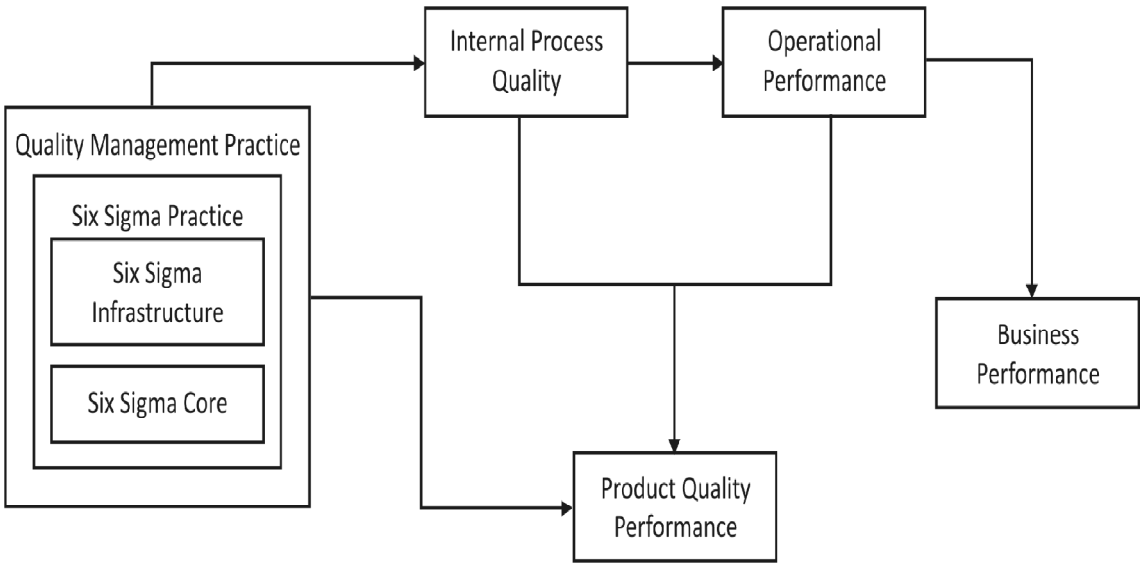
Champions are responsible for Six Sigma implementation across the organization in an integrated manner. The Executive Leadership draws them from upper management. Champions also act as mentors to Black Belts.

Green Belts are the employees who take up Six Sigma implementation along with their other job responsibilities. They operate under the guidance of Black Belts.

Black Belts operate under Master Black Belts to apply Six Sigma methodology to specific projects. They devote 100% of their time to Six Sigma. They primarily focus on Six Sigma project execution, whereas Champions and Master Black Belts focus on identifying projects/functions for Six Sigma.

Master Black Belts, identified by champions, act as in-house coaches on Six Sigma. They devote 100% of their time to Six Sigma. They assist champions and guide Black Belts and Green Belts. Apart from statistical tasks, their time is spent on ensuring consistent application of Six Sigma across various functions and departments.

Figure 1: Extended quality performance model by Garvin in 2003



There is limited literature to reveal the success factors for Six Sigma implementation. However, one doctoral candidate, Tsung-Ling Chang, performed a research survey which identifies ten Critical Success Factors for implementing a Six Sigma quality system. Based on Chang's research findings, Process Quality Associates has developed a Six Sigma implementation framework by Gravin.

The above figure indicate that performance improvement starts with internal quality process which includes production quality, process quality etc., which all these leads organization performance improvement.

Statistical Analysis of the study

Leadership & work culture of top Management.

Inference: The obtain chi-square value is equals 12.063 at 4 degrees of freedom, the significance value is less than 0.05suggest that there is significant importance for Leadership & work culture of top Management while implementing six sigma.

Implementation of Effective process management system

Inference: The obtain chi-square value is equals 11.750 at 4 degrees of freedom, the significance value is less than 0.05suggest that there is significant **importance for Effective process management system is one of the success factor for six sigma.**

Well-developed strategic planning system

Inference: The obtain chi-square value is equals 11.43 at 4 degrees of freedom, the significance value is less than 0.05suggest that there is significant important for **strategic planning system is one of the success factor for six sigma.**

Importance of statistical tools Training of Employees

Inference: The obtain chi-square value is equals 7.37 at 4 degrees of freedom, the significance value is greater than 0.05suggest that there is **no significant important for statistical training to employees and six sigma success rate.**

Overall customer Satisfaction

Inference: The obtain chi-square value is equals27.06 at 4 degrees of freedom, the significance value is greater than 0.05suggest that there is a significant relation that customer satisfaction is one of the major success factor for six sigma.

Implementation of correct VOC

Inference: The obtain chi-square value is equals37.06 at 4 degrees of freedom, the significance value is less than 0.05suggest that

there is a significant relation that implementation of correct VOC is an absolute success factor for six sigma.

Fully integrated with HR department where HR directly/indirectly related with Six sigma

Inference: The obtain chi-square value is equals 14.250 at 3 degrees of freedom, the significance value is greater than 0.05suggest that there is a significant relation that HR department is must fully integrate with six sigma process is one major success factor.

Factor Analysis

Inference: Analysis by factor wise factor analysis the observation indicate that most successful factors for six sigma implementation is Strategic planning before quality implementation, Leadership Commitment and work culture, Implementation of correct VoC (Voice of the Customer) , Effective process are most important factors from among 7 tested factors in the study.

Gap Analysis

The gap analysis (Table 9) indiacate that all factors from leadership to customer satisfaction infuencing same range but correct VoC and HR integration indicating they are least prefered which is comes into picture after all high rated factors work most efficiently.

Overall Study Analysis

These are the most frequent questions being asked by the potential Six Sigma followers. But, there is no easy answer to each one of them. Simply because driving a business toward Six Sigma is not a one-time effort; it is about producing products and services that continue to meet customer and market requirements. This requires organizational agility and constant vigilance to changes in the marketplace. Thus, the real challenge with Six Sigma is getting to the point where one can meaningfully measure a business' current performance against dynamic customer requirements while developing the internal organizational abilities to response to changing marketplace conditions

Top management should act as key driver in continuous improvements, communicate to employees about organizational goals, and establish an environment for supporting organizational & employee learning.

Processes need to be established in order to monitor customer satisfaction levels, to receive customer feedback, and to resolve customer concerns.

The education and training system should provide continuous courses to employees for equipping them with quality-related knowledge and problem-solving skills.

A well-developed strategic planning system must translate into executable action plans with related performance measurements. The necessary human & financial resources must be allocated to support the implementation of business action plans.

Effective human resource management system has a positive impact on Six Sigma QMS success. A job advancement system is important to human resource development. Various methods are developed to facilitate the communication between the organization and its employees. To promptly improve performance, employees need to receive their performance feedback from their supervisors.

Discussion of Results

- Leadership and work culture is one of the success factor for six sigma until the organization not follow better leadership tactics and not inviting changes in work culture every new initiation goes into vain. Another success factor is effective process management system in all aspects like, operations process, customer feedback collection process, employee suggestion regarding new system pros & cons should consider for success of any process in the organizations.
- Most important factor for six sigma success which is identified by factor analysis is strategic planning of the process which is in the form of well developed and strategically balanced the results of any tough process obviously success.
- Customer satisfaction in the view of six sigma success play a vital role where feedback for new quality change leads success side or not and in\implementation of correct VoC (voice of the customer) which leads high customer satisfaction rate.
- In the part of Statistical tool training to the employees for successful implementation of six sigma is not necessary for all, the study revealed that the training will be depend on the educational background and analytical skills of various employee Where if they are form technical background they need little bit of guidance where people from social sciences background need full fledged training about statistical tools.
- The department wise performance should measured independently where we consider the epicenter for all departments HR which is played a major role to integrate all these sub factors into one major success factor by contributing intellectual assets for any success in the organization.

Conclusion

The entire study conclude that the success factors for six sigma is like all general management success factors excluding some important areas like metrics and tools for training because of the Implementation of six sigma is somewhat tough process to achieve desired results in time.

Leadership & work culture of top Management

Table 1. Descriptive Statistics

N	Mean	Std. Deviation	Minimum	Maximum
52	3.13	1.314	1	5

Table 1a. Chi-Square Test

Leadership commitment	Value	df	Asymp.Sig (2- sided)
Pearson Chi-square	12.603	4	0.03

Implementation of Effective process management system

N	Mean	Std. Deviation	Minimum	Maximum
52	3.34	7.405	1	4

Table 2.a Test Statistics

Effective process Management	Value	df	Asymp.Sig (2- sided)
Chi-square	11.750	4	0.19

Well-developed strategic planning system

Table 3 Descriptive Statistics

N	Mean	Std. Deviation	Minimum	Maximum
52	3.34	1.125	1	5

Table 3.a Chi-Square Test

Strategic Planning	
Chi-Square	11.438[a]
df	4
Asymp. Sig.	.002

Importance of statistical tools Training of Employees

Table 4 Descriptive Statistics

N	Mean	Std. Deviation	Minimum	Maximum
52	3.34	1.405	1	5

Table 4.a Test Statistics

Statistics training	Value	df	Asymp.Sig (2- sided)
Pearson Chi-square	7.375	4	.117

Overall customer Satisfaction

Table 5. Descriptive Statistics

N	Mean	Std. Deviation	Minimum	Maximum
52	3.25	1.244	1	5

Table 5a. Test Statistics

Overall customer satisfaction	Value	df	Asymp.Sig (2- sided)
Pearson Chi-square	27.062	4	.000

Implementation of correct VOC

Table 6. Descriptive Statistics

N	Mean	Std. Deviation	Minimum	Maximum
52	3.53	.983	1	5

Table 6a. Chi-Square Test

Correct VoC	Value	df	Asymp.Sig (2- sided)
Pearson Chi-square	37.063	4	.000

Fully integrated with HR department where HR directly/indirectly related with Six sigma

Table 7. Descriptive Statistics

N	Mean	Std. Deviation	Minimum	Maximum
Q10	52 3.16	1.081	1	4

Table 7a. Chi-Square Test

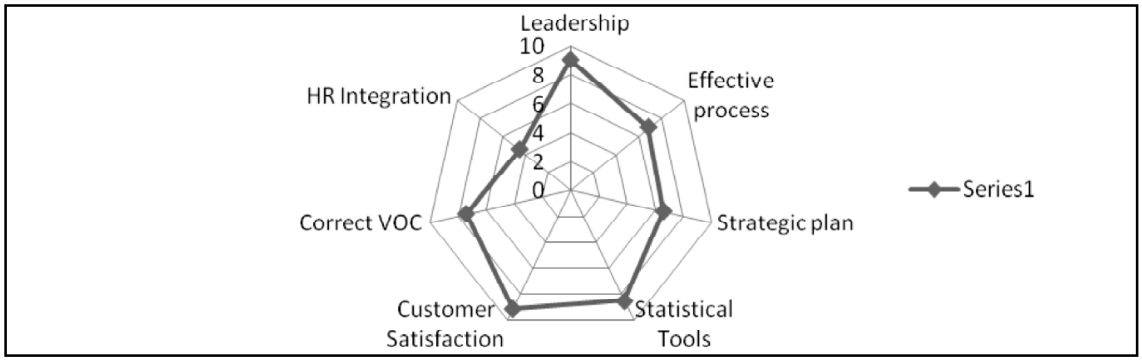
Integration with HR	Value	df	Asymp.Sig (2- sided)
Pearson Chi-square	14.250	3	.003

Table 8. Factor Analysis of the study

Rotated Component Matrix

Factor	Component			
	1	2	3	4
Leadership	**.179**	**.679**	**.179**	**.179**
Effective process	.476	-.596	.571	.576
Strategic plan	.711	.411	.519	.111
Statistical Tools	.-287	.-487	.183	.478
Customer Satisfaction	-.358	-.651	-.586	-.258
Correct VOC	-.115	-.143	.635	-.435
HR Integration	.467	.348	.521	.147

Table 9. Factors Gap Analysis



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