

The Contribution of Six Sigma towards the Improvement of People's Equity—A Case Study of Manufacturing Industry at Mysore

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Abstract

Six Sigma framework has been traditionally applied to areas related to operations, design or manufacturing either for improvement of existing processes or design of new products thereby enhancing operational performance by focusing on reduction of process variations and bringing it within predetermined limits based on specified requirements, specifically keeping the end users or customer in focus. Various researches have shown that Six Sigma has also been implemented successfully in service industries, as Six Sigma offers a disciplined approach to improve service effectiveness as well as service efficiency. Irrespective of the fact that Six Sigma has been a success formula for the present day world; we need to understand that the core of the success is through a dedicated workforce. Most of the studies which highlighted the critical success factors validate that the involvement of the entire work force is also responsible for the success. Now the question arises in what way the implementation of Six Sigma has benefited the workforce? In reality very few efforts have been made to understand the contribution of Six Sigma on improving the people's equity (working conditions, morale and motivation level, promotion, increment, attrition rate, pride in work, etc.). In this paper an effort has been made to study whether Six Sigma has really contributed in improving the people's equity. This paper puts emphasis on the benefits gained by the work force mainly due to the implementation of Six Sigma. The expert opinions collected on various issues have been discussed in the context of present scenario to provide the readers an insight into the gains due to implementation of Six Sigma in terms of people's equity.

Key words: Six Sigma, People's equity, benefits.

Introduction

Any nation is strongly built on its natural resources. But the same is not true if there are lacunae in utilization of the same. The industries play a vital role in this regard as they make the back-bone of any nation's economy. Gone is the time during which the customers were dependant on industries for their products. This is the era of customers being treated as kings for the survival of the industries. As customers and users become more knowledgeable, better informed and has high expectations, the only way a business can develop and prosper is by implementing a commitment to quality. Hence many concepts like the ISO 9000 quality management system certifications, Total Quality Management (TQM), Just-In-Time (JIT) production system; Six Sigma, Manufacturing Resource Planning (MRPII), Benchmarking, etc. have been practiced and have played an important role in deciding the future of the industries all over the world (Gupta, 2002).

Quality management consists of three important components which are quality control, quality assurance and quality improvement. Its focus should not only be on product quality, but also on the means of achieving it. Therefore, it is carried out by using quality assurance and control of processes in addition to the products to attain more consistent quality. Businesses are constantly on the lookout for ways to improve the overall quality of their goods and services to better serve their customers and improve the value of the company. To help them achieve this growth, companies have a burden of choosing the most effective quality improvement technique (Henderson, 2000).

The concept of Six Sigma lays emphasis on cost cutting, micromanaging, incremental, continuous improvement and a more proactive approach to maximize value to the customer and improve the organization's competitive position. This concept provides the means of achieving the objectives ordained by ISO 9000 quality management system certifications. Motorola started using this methodology in its manufacturing division, where all its parts are using the same process repeatedly. In time, Six Sigma developed and is able to be applied to other non manufacturing processes also. Today, Six Sigma can be applied to many fields such as Services, Insurance Procedures, Medical and even Call Centers. It constantly improves any existing business process by reviewing and re-tuning the process (Henderson, 2000).

The concept Six Sigma provides the tools and methodology to implement change in an organization. Six Sigma Projects are selected and sponsored by management to achieve strategic objectives. While some of these objectives may be discovered through analysis of ISO 9000 Corrective Action data, Six Sigma organizations often take a more proactive approach to maximize value to the customer and improve the organization's competitive position. These projects are assigned to teams consisting of process personnel who are stakeholders in the change, and led by a trained Six Sigma Black Belt. This management oversight ensures teams have the resources and authority to make necessary changes to achieve their planned objectives (Campbell, 2003).

The master Black Belt who is an expert in Six Sigma tools and methods leads the team through the DMAIC methodology, (Define the projects goals, Measure the process baseline, Analyze the potential sources of variation, deploy the means to Improve the process, then finally establish a Control plan to standardize on the new process) and ensure it remains at the improved level of performance. He is well supported by black belts and green belts. The whole team is monitored and motivated by a champion who has the business responsibility. This rigorous methodology ensures that a complete analysis has been done to prevent the sub-optimization that occurs when critical factors have been neglected. The Control stage provides a means to measure the longer-term project results, and prevent the process

personnel from returning to previous methods, especially when coupled with document control system (Campbell, 2003).

Potential benefits of Six Sigma (Galloway, 2008)

- Improved cross-functional teamwork across the entire organization;
- Transformation of organizational culture from fire-fighting mode to fire-prevention mode;
- Increased employee morale;
- Reduced number of non-value added steps in critical business processes through systematic elimination, leading to faster delivery of service;
- Reduced cost of poor quality (COPQ) (costs associated with late delivery, customer complaints, costs associated with misdirected problem solving, etc.);
- Increased awareness of various problem solving tools and techniques, leading to greater job satisfaction for employees;
- Improved consistency level of service through systematic reduction of variability in processes;

Literature Review

Alex (2007), in their study, “Deployment of Six Sigma in SME’s”, intended to study the benefits of Six Sigma in SME’s. After the study, he emphasized the importance of Six Sigma for small and medium sized companies. He suggests that the cost of quality will reduce to a level of just 1% to 2% of the revenue of the company, when the company moves from Three Sigma to Six Sigma.

Galloway (2008), in her research on implications of Six Sigma in industries has tried to identify the outcome of Six Sigma implementation. In this research she has shown that Six Sigma yields financial benefits.

Schroeder (2008), in their research have tried to identify the underlying theory behind Six Sigma that includes the concepts of ambidextrous organizations, parallel-meso organization, structural control and structural exploration.

Rachele et.al. (2008), in their study “The impact of employee satisfaction on quality and profitability in high-contact service industries of quality management systems”, indicate that the service quality and customer satisfaction could be easily impaired by human factors, holding back overall performance. Employee satisfaction is essential for improved quality and profitability.

Shrivastava and Tushar (2008), in their study of a manufacturing enterprise reveal that there are many benefits of Six Sigma implementation like cost savings, reduced time to market, improved processes, etc.

Liu (2009), in his research “Effect of ISO/TS16949 on Six Sigma: the empirical case of Taiwanese automobile and related industries”, surveyed companies that included automobile, semiconductor and other related industries that had implemented ISO/TS 16949 in Taiwan, and studied the effect of implementing ISO/TS 16949 on Six Sigma reported that Six Sigma is an useful tool for improving the

performance of automobile, semiconductor and other related industries in Taiwan, which have already implemented the ISO/TS 16949.

Anand et al. (2009), in their research have come out with conceptual results for continuous improvement. They conclude that the role of employees is very critical for achieving continuous improvement.

Anand et al. (2010), in their research to find the role of tacit and explicit knowledge for the success of Six Sigma projects, have observed that, in addition to capably putting together a cohesive team and motivating members of the team to work well together, these leaders must be proficient in techniques for capturing tacit knowledge of team members.

Kull and Wacker (2010), in their study of Asian industries that have implemented Six Sigma find that specific country cultural values impact how effective QM investments are. They feel that Uncertainty avoidance (UA) has a positive influence on QM effectiveness. This suggests that employees in cultures desiring predictability and law-like understanding will be motivated to frequently apply QM's systematic approaches, as in Six Sigma's improvement heuristics.

Nair et al. (2011), in their investigation of Six Sigma projects, have observed that it is important to maintain a balance between the adoption of structured methods and the creation of an environment of psychological safety. This asserts that the effectiveness of an organization is contingent on the congruence between structural and environmental variables.

Kim et al. (2012), have tried to examine the associations among different quality management (QM) practices and investigate which QM practices directly or indirectly relate to five types of innovation: radical product, radical process, incremental product, incremental process, and administrative innovation. The analysis shows that QM practices are associated with innovation directly or indirectly and that the importance of individual QM practices is tied to other practices.

Jacobs and Morgan (2012), in their study of firms that have adopted Six Sigma have found that there is a growth for the companies that have implemented Six Sigma with regard to sales, profitability. They also observed that managers can tap the potential of their subordinates in a better way after implementing Six Sigma.

Need for the Study

After carrying out the literature review it has been observed that there are several benefits due to implementation of Six Sigma. Most of the studies have highlighted the implications of Six Sigma on tangible factors like, financial benefits, reduction of cost, improvement of sales, reduced defect rate etc. However we need to understand that Six Sigma has to be implemented by the work force. Such implementations will be encouraged only when there are benefits to the work force. In this regard not many researches are done to study the benefits for the workforce, who actually implements the Six Sigma quality management system. Benefits to employees include tangible benefits like promotion, increment, remuneration, etc. and intangible benefits like improved worker morale, pride in work, better work environment, etc. Hence it was found necessary to take up this study titled, "The contribution of Six Sigma towards the improvement of people's equity—a case study of manufacturing industry at Mysore".

Objectives of the Study

The objectives of this paper are;

- To investigate whether Six Sigma has contributed to the improvement of people's equity like working conditions, morale and motivation level, promotion, increments, attrition rate, pride in work, etc.
- To study whether managers and workers differ in their opinions towards implementation of Six Sigma.

Hypotheses of the Study

The following hypotheses were drawn to study the impact of Six Sigma implementation on people's equity.

H1. People's equity gets improved through existing practices of Six Sigma.

H2. Managers and employees differ significantly in their opinion on implementing Six Sigma.

Sample

Sample Population consisted of only 30 employees who were involved in Six Sigma implementation. The respondents included both managers and workers who were trained in Six Sigma implementation. Out of 30 employees 20 belonged to worker level and 10 belonged to managerial level.

Research Design

To start the study, the data was collected using questionnaire method. Questionnaire was designed around people's equity. After several drafts of the questionnaire (five), it was pilot-tested twice. The first test involved 2 professors and practitioners in Six Sigma, and the second one four black-belts working on Six Sigma projects at industries. The objective was to evaluate and validate the survey's questions and provide suggestions for improving the survey in both form and contents. The findings from the pilot study were evaluated and used to improve the questionnaire. Finally the questionnaire included 27 questions that defined people's equity. Five point Likert scale (strongly disagree to strongly agree) was used to collect responses in an objective manner.

The responses obtained were analyzed at two levels such as considering both employees and managers together, then analyzing their responses separately to study their opinion. Statistical tool like SPSS V16 was used to analyze the opinions of the respondents.

Testing Of Hypotheses

H1. People's equity gets improved through existing practices of Six Sigma.

The improvement of people's equity through existing practices of Six Sigma was measured on a 5 point rating scale which revealed the following: The percentage of people who strongly dis-agreed were 0.49%, who disagreed were 15.72%, who could not say definitely were 23.09%, who agreed were 52.21% and finally those who strongly agreed were 8.47%. These results have been tabulated below.

Table 1: Result of the survey

	TOTAL	
	Count	Percentage
Strongly disagree	4	0.49
Disagree	128	15.72
Can't say	188	23.09
Agree	425	52.21
Strongly agree	69	8.47

From the table it was evident that more than 50 percent (60.68%) of the respondents have accepted the fact that the current practices of Six Sigma improves people's equity. After analyzing the opinions of the respondents regarding the influence of Six Sigma on people's equity, we could understand that our hypothesis is proved, i.e. People's equity gets improved through existing practices of Six Sigma.

H2. Managers and employees differ significantly in their opinion on implementing Six Sigma.

After understanding the interrelationship between Six Sigma and people's equity, and proving that people's equity and Six Sigma implementation are dependent on each other, tests were conducted to investigate whether a difference exists between opinions of workers with that of opinions of managers. T test of was conducted to test the above hypothesis.

The following table gives the details of values of means of two groups' viz. managers and workers.

Table2: Comparison of Mean, for the group containing Managers and workers.

T test - Group Statistics

	Designation of respondent	n	Mean	Std. Deviation	Std. Error Mean
TT	WORKER	20	95.5000	5.84448	1.30686
	MANAGERS	10	94.8000	2.09762	.66332
Value of t		1.22	Significance level of .01 for two tailed test		

From the table we can find that the calculated value of mean for two groups is almost same. This indicates that there is no much difference of opinion between the groups. This disproves our second hypothesis. Managers and employees do not differ significantly in their opinion on implementing Six Sigma. Hence we can say that both managers and workers not only feel that people's equity can be improved with the implementation of Six Sigma as a whole but also as individual group.

Discussions And Conclusions

Six Sigma system is one of the quality management system which the organizations irrespective of their nature wish to implement to reap the benefits thereafter. But most of the studies look into the tangible factors like financial benefits, improved productivity, reduced defect rate, etc, that has been improved

due to implementation of Six Sigma. But it is very important that the employees must be studied in order to obtain their opinion about implementation of Six Sigma. The overall productivity and quality of the products are directly linked to human factors (Rachele 2008). A motivated team can achieve lot more than an unmotivated team (Anand, 2010). If the culture of the people at work is taken care, then uncertainty could be avoided (Kull, 2010). The case study was taken to understand the implication of Six Sigma in the organization on people's equity. The management insisted that more light should be thrown on human factor and the benefits thereafter than the tangible factors measured in terms of rupees.

In the first stage the implication of Six Sigma on people's equity was studied, which revealed that people's equity as a group is proved to be improved with implementation of Six Sigma. In one view it is good for the organization that Six Sigma implementation improves people's equity. In the second stage the point of view of workers and managers were compared and it was proved that their view points on Six Sigma implementation do not differ significantly. Both workers and managers not only want the Six Sigma to be implemented as a whole but also as individual groups.

Implications for the Management

On one hand the management should be happy that employees welcome the Six Sigma implementation. People's equity is assessed using 27 parameters. To obtain a better result, the management should take steps to study each and every parameter of people's equity. This will certainly help the management to understand the implications in a better way and throw light on those parameters that are not contributing to people's equity. Further, the management can take steps to find out the reasons why those parameters are not contributing to people's equity and take corrective measures.

Scope for Future Study

In this study an effort has been made to study the implementation of Six Sigma on 30 employees who are actually involved in implementation of Six Sigma. However it has been opined that the result could be better if more number of employees are studied. More number of employees will get the training on Six Sigma implementation when the company decides to bring more number of projects under the purview of Six Sigma. Thus it is very important for the organization to conduct the survey once again after one or two years. Similar survey should be conducted in other manufacturing industries also to study the impact of Six Sigma on people's equity.

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