

Identification of Critical Success Factors & Criteria's for the Employment of Six Sigma in Manufacturing Industries

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Abstract:- Six-Sigma Is A Philosophy Of Management Prepared And Developed By Motorola Company Which Aims At Setting The Topmost Goals, Collecting Data, And Analyzing The Results Efficiently As A Way To Decrease Defects In Services And Products. The Sigma (Greek) Letter Is Sometimes Used To Indicate Differences From The Norm. The Philosophy Or Principle Behind Sixsigma Is That If You Identify And Measure How Many Errors Are In The Process, You Can Find Out How To Eliminate Them As Systematically And As Equal To Perfection As May Possible. For A Company To Get Six Sigma, It Cannot Generate Greater Than 3.4 Defects Pm I.E. (Per Million) Opportunities, Whereas The Term Opportunity Is Defined As An Inconsistency. Index Terms – Six-Sigma, Csf (Critical Success Factors)

I. INTRODUCTION

Now a whole day the industry worldwide is facing intense competition in the market place. The only way to stay stable in the market is to provide the best quality product according to the requirements of the customers. There is a lot of competition in all markets which means in domestic and international, every industry wants to improve the quality of its product. The mathematical tool is the key to improving quality actions because this provides both analytical and descriptive ways to deal with visual data changes. Six-Sigma is one of the widely used tools in process development. This approach was initially ignored by many industries due to its ethical nature and difficulties in its implementation. Computer use has made it more precise. This method is used in many companies to eliminate product and process defects some examples of companies such as General Electric's and Motorola. And this is also used in various industrial areas to improve the quality, production, lead time, management and operations of the organization

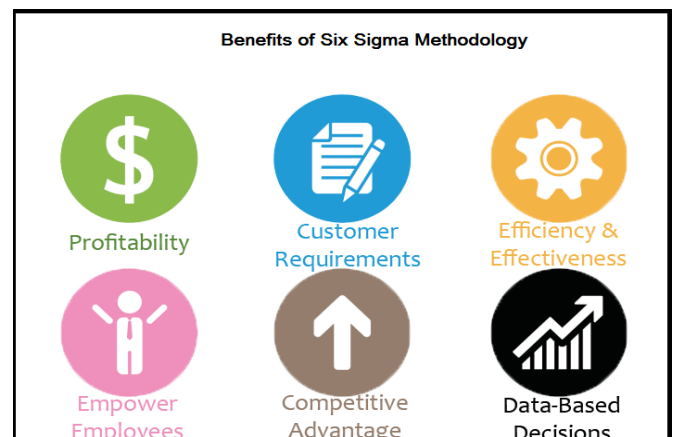


Fig.1 Benefits of Six Sigma

II. WHY SIX SIGMA

To be the leaders in field of Six Sigma, and to find the answer to the question, "What is Six Sigma?", it was a good thing, and that is in order to survive. Motorola has created the so-called Six-Sigma, as it were, as a rule, and the battles are in the market for third-party companies, which may result in a greater level of service and high-quality service at a competitive price. Today, Motorola is known around the world as well as the quality of the early pioneers, and to the benefit of the coordinator. After winning the Malcolm Baldrige National Quality Award by Motorola in 1988, is the secret of their success is the manifestation of the knowledge of the so-called Six-Sigma, and it was on. In the first place, the idea, the implement of Six Sigma at Motorola, the reduction of the quality, cost, i.e. the cost of not doing the correct things for the first time, the cost of non-compliance with the requirements of the customer and requirement, and so on.

There are few benefits of Six Sigma such as:

- The quality of the item and the productivity of the organization enhanced to a great extent.
- The number of conceivable defects per million opportunities reduces. Consequently the nature of the item enhances further.
- The benefit level of the organization increments and along these lines gives a development in the corporate area.

- Rather than receiving the regular cost cutting technique , it lean towards evacuating costs that give no value to the customers.
- The net production cost incurred while manufacturing an item diminishes.
- The need and the desires of the customers are met by giving them a similar item with a superior quality.

III. IDENTIFICATION OF DIFFERENT CRITERIA'S

Identification of Various criteria's necessary for the successful implementation of Six-Sigma in manufacturing sector has been done after literature-reviews.

A. These criteria's are defined as follows;

- 1. Quality:** In manufacturing, a measure of excellence or a state of being free from defects, deficiencies and significant variations.
- 2. Waste reduction:** It's a process of elimination that involves reducing the amount of waste that is generated in your organization, and help in eliminating the harmful and persistent wastes, supporting the efforts to achieve a more sustainable organization.
- 3. Cycle time:** The cycle time is the total time from the beginning until end of the process, which is determined by you and your customers. Cycle time, process time, during which a unit is to be addressed in order to bring it closer to an output, and delay time, during which a unit of work is spent waiting to take the next step.
- 4. Organizational performance:** Achievement of adopted quality management initiatives, organizations want to measure the performance of their goals

References	Criteria
de Feo and Bar-El, 2002,Jiju Antony, 2009	Quality
Jiju Antony, 2009, Weiner, 2004	Waste Reduction
Antony and Banuelas, 200, Jiju Antony, 2009	Process Time
Jiju Antony, 2009	Organizational Performance

Table 2.1: Benefit Criteria for CSFs for successful implementation of Six-Sigma collected from Literature-Review

IV. IDENTIFICATION OF CRITICAL SUCCESS FACTORS

Identification of Critical Success Factors necessary for the successful implementation of Six-Sigma in manufacturing sector has been done after literature-reviews.

B. These critical success factors are defined as follows;

i. Management involvement and participation

It is a social concept based on organizing, planning, directing, coordinating, staffing and policy management. It aims to help individuals and individuals to establish their own organizations and purpose projects to achieve their goals in an efficient and effective manner, be it process or program or ethics. It applied to people, things, minds, and any work or activity.

ii. Understanding the Six-Sigma methodology.

The Six-Sigma problem-solving methodology i.e. DMAIC (define, measure, analyze, improve, control) and tool i.e. process improvement tool and techniques, leadership tool and team tool.

iii. Linking Six-Sigma to business strategy

The advancement of an appropriate strategy for an organization, it is very important to the performance of the proposed approach, in the same way, it is also a matter of high priority, which means that organizations have to consider what are the appropriate tools to support the implementation of the strategies that have been developed, and to allow for adjustment when it is, therefore, necessary to access to the main features or advancements in the achievement of business goals and objectives

iv. Linking Six-Sigma to the customer

A customer is a person who receives a product from a particular process. The one who buys or evaluates our product (according to the requirements), and gives the final decision accordingly. This also serves as a hidden response that can be used thus improving all process management parameters

v. Project prioritization and selection

A decision found on the basis of project, which can serve as a building block for a sound and successful implementation of a Six-Sigma project. The process and method of selecting the correct right team, processes, performance measures, and the education and training of the employees is the key lock to the management of the component for the proper implementation of Six-Sigma projects in process to demonstrate the effectiveness of the so known Six-Sigma.

vi. Linking Six-Sigma to suppliers

Companies can define their goals by sharing with their respective partners, achieving those goals in real time, even if they are their respective partners. Companies can increase communication and collaboration with business partners, and eliminate costly production delays caused by incomplete, lost, or old product info. The decision will be made promptly, and based on current information everyone can work on it simultaneously

vii. Cultural change

It may be believed to standards and norms and values and shared values and beliefs. Cultures contain at least three things: what people think, secondly what they do, and the materials and products they offer. Thus, it includes mental processes, skills, values, beliefs, and different parts of the world. (Harry & Schroeder, 2000)

viii. Leadership

A distinctive role is also being played by leadership in Six Sigma implementation. The leadership of one's organization is a good thing, as it will provide them with a rewarding result, Leaders always help themselves is the right work to do. Leadership is about finding out where you need to flow in process to "win" as a pro team or a leading organization; and it is dynamo, inspiring and exciting.

Although if those leaders are in that direction, but they also have to use the skills to help guide people to the right direction, in a smooth and efficient manner.

ix. Organization infrastructure

An Infrastructure is a major technical system, consisting of immovable structures and delivering essential or independent public services for the storage, conversion and / or movement of certain assets. Infrastructure includes those components and sub-system required for the primary maintenance, delivery and / or conversion and support systems (George), (2003).

x. Training

Training is defined as the process of providing and making right work available, and placing or registering a job, in a planned, modified and integrated program, course, curriculum, course, program, or academic or academic, scientific, technical, technical, mechanical, commercial, secretarial, financial, administrative, or other areas that will improve the performance of the individual and even the

organization and help in achieving the aims and functions of the agency (Montgomery & Runger, 1999).

xi. Linking Six-Sigma to employees

It is of small importance in comparison with that of the above-mentioned critical factors for the success of the Employees, who need to be taken in process to promote the desired behaviours and outcome

xii. Project management skills

Project management is the process of planning and directing project from starting to the finish. As per the Project Management Institute, processes are governed by five stages: initiation, planning, execution, control and closure. Project management can be used for almost every method of projects and is mostly used to maintain the complex processes of software advancement projects.

All the above identified Critical Success Factors are identified by taking into account all the literature surveys that had been conducted till now.

Table 2.2: Critical Success factors collected from Literature-Review

Key CSF's	References
Management involvement and participation	Coronado and Antony, 2002; Byrne, 2003; Calcutta, 2001
Understanding of Six-Sigma methodology	Understanding tools and techniques within Six-Sigma (Coronado and Antony, 2002)
Linking Six-Sigma to business strategy	Coronado and Antony, 2002
Linking Six-Sigma to customer	Coronado and Antony, 2002
Project selection & prioritization	Project prioritization and selection, Project management skills (Coronado and Antony, 2002); Identify scope of project (Lynch et al., 2003)
Linking Six-Sigma to suppliers	Coronado and Antony, 2002
Cultural Change	Coronado and Antony, 2002; Organization culture (Brewer and Bagranoff, 2004)
Leadership	Suresh et al. (2011), Mohamed Gamal Aboelimged, 2009
Organization Infrastructure	IT infrastructure (Kendall and Fulenwider, 2000); Coronado and Antony, 2002; Zu et al., 2010
Training	Coronado and Antony, 2002; Education and Training (Kwak and Anbari, 2006)
Linking Six-Sigma to employee	Coronado and Antony, 2002; Wyper and Harrison, 2000
Project management skills	(Coronado and Antony, 2002); Identify scope of project (Lynch et al., 2003)

Authors	Critical success factors								
	C1	C2	C3	C4	C5	C6	C7	C8	C9
TritosLaosirihongthong(2006)	*	*	*	*	*	*			
Kim Kreisler Buch et al (2006)	*							*	
Kumar et al. (2006)	*	*	*	*	*		*		
George Byrne et al. (2007)	*							*	*
Maneesh Kumar (2007)	*	*	*	*	*	*	*		*
Karen J. Fryer et al. (2007)	*			*	*	*			*
Mohamed Gamal Aboelimged (2009)	*	*	*		*		*		*
Darshak A. Desai et al (2009)	*	*	*	*	*	*	*	*	*
Sujendra Swami .P et al. (2010)	*							*	
Alessandro Brun (2010)	*	*	*	*	*	*	*		*
Suresh et al. (2011)								*	
Tack-Wei Leong et al	*						*		*

V. CONCLUSION

Various Criteria's and Critical Success Factors(CSF's) have been identified by going through a deep literature survey. These Critical Success Factors and Criteria's are the key factors on which implementation of Six-Sigma depends in any manufacturing industry. These Critical Success Factors can further be ranked or systematized on the basis of various methods and techniques available in market and in textbooks.

Identification of these Criteria's and Critical Success Factors will reduce the time and fatigue of other researchers so that they proceed further directly from here on.

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