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A Roadmap from Total Quality Management to Six Sigma implementation in a manufacturing Industry

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Abstract: The main aim of this research paper is to develop a framework which can be used as an organizational readiness assessment tool before actually implementing six sigma which bridges the gap between the current Quality management practices adopted and the six sigma implementation process. The methodologies adopted are, extensive literature survey & content analysis, personal interviews, structured Questionnaire to perceive the preparedness for six sigma implementation, employee attitude & the effects of such integration on organizational performance.

Keywords: Quality Management System, Relationship Management, Product management, Innovation & Performance

I. Introduction

Different quality improvement programs including total quality management and six sigma are commonly widespread among various organizations. To maintain considerable effort for improving the efficiency and effectiveness of work processes such approaches need to be integrated with the organization system. These programs consist of combinations of practices that aim to encourage and enable the participation of frontline personnel in process improvement. Due to the emergence of the new improving quality program different combination of the work practices are determined or established continuously. Six Sigma is a common approach that has attracted various types of organizations. This study is made to determine the rationale for implementing the six sigma approach in the manufacturing sector by integrating with current practices of TQM.

II. Research Problem

Constantly evolving quality developmental program's like Six Sigma and total quality management (TQM) are widespread in various organizations. The major objective of these practices is to boost the effectiveness and competence in the work course. These programs targets at the involvement of the front lead in the process modification and it consists of an envelope of practices. Various developmental programs are instituted from the beginning for the continuous improvement of total quality management practices. Six Sigma is an uninterrupted quality improvement program that has attracted several organizations. The main objective of this current research is to analyze the implementation of Six Sigma and its outcomes in the manufacturing industries. According to Miller et al., Six Sigma has been wrongly quoted as an unwanted academic and practicing interest because of the development and the selling of the TQM programs by many budding consultancies. There are administrative and technological innovations that evolve over a certain time period developing quality improvement programs which provides a better platform for the achievement of the purpose. At the same time frame, the purpose of these programs has been modified with the changes in the corporation environment.

III. Research Question

The research lists out few questions which are used to analyse and comprehend the problems. The questions are formulated on the common issues and finding a suitable solution is the primary goal. Once the common grounds are established the effective solution for the current problems are laid out. The focus of the research is to find a better solution to the problem, "How can the execution of an integrated total quality management program with Six Sigma influence the performance and culture of organizations in the manufacturing sector?"

The following fact finding questions were developed based on the central research question:

What are the benefits associated with the implementation and integration of Six Sigma with current practices of quality management?

What are the barriers associated with the implementation and integration of Six Sigma with current practices of

quality management?

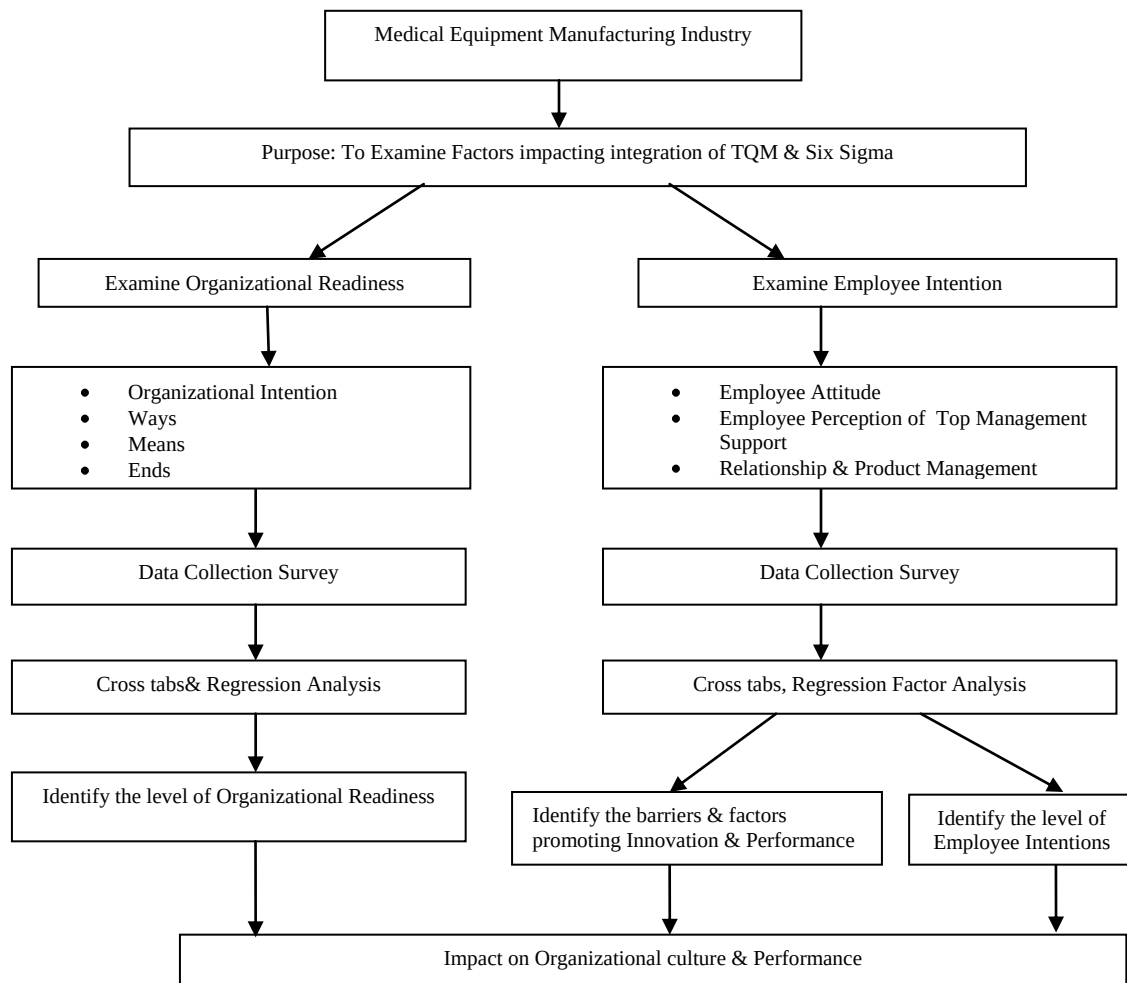
What are the determinants which influence the integration of Six Sigma with TQM?

What is the influence of such integration on organizational culture and organizational performance?

IV. Research Methodology

It is observed that the research purpose adopted in this research is explanatory. The explanatory research purpose adopted helps in arriving at a solution to the proposed problem by trying to obtain an explanation for the complex web of interrelated variables which are identified and followed directly from a central research question or a hypothesis. In this study the researcher attempts to identify the factors which not only affect the process of six sigma implementation and integration with the total quality management but also identifies the effect such integration may have on the organization. It is not possible to classify this study as either positivistic/realistic or interpretive. It could be argued that the study can be classified best as more interpretive because no theories have been found to describe the precise study characteristic. While there are studies which examine the different sections of the proposed study, a combined analysis of the same has not been proposed earlier in this study. Therefore, studying the process of implementation and integration of six sigma with TQM as a real, certain and precise phenomenon, and collecting data that are factual, truthful and unambiguous is difficult. Six sigma development related to performance arts is still a relatively young discipline and there is a lack of general agreement on methods to measurement of its success or the different factors impacting the same. Few organizations collect quantitative data on their projects (McConnell 2002). On the other hand, the study aims to collect facts and causes of behaviour, being more characteristics of a positivistic research philosophy. The Framework of Analysis is shown in Figure I.

Figure I: Framework of analysis



V. Discussion of Research Model

Our study provides solid support for the hypothesis that Six Sigma adoption tends to produce significant abnormal benefits to firm profitability. These benefits appear to be persistent over the time horizon we studied due to aspects relating to product, relationship and performance. These findings hint at potential differences in how Six Sigma programs are possibly being applied in manufacturing industries. In addition, our findings identify some important contextual factors. In general, our findings hint that Six Sigma methods may be most beneficial when applied to labour-intensive, repeatable processes. However, the results suggest that less labour-intensive, quality experienced, manufacturing firms will not experience the profit impact from Six Sigma adoption that others will. On the other hand, service firms contemplating Six Sigma adoption should pay close attention to how their current performance can be leveraged to maximize Six Sigma's potential. Managers in these firms would do well to identify and exploit either resource-based or motivational advantages that come from positive or negative prior financial performance, respectively. It is important to understand how the existing culture within an organization would support any quality management programs. However it is also important to acknowledge the reverse effect that quality management can have on the organizational culture. Continuous quality improvement programs can change the employees attitude and beliefs and their practices within the working environment. All this will lead to a change in the culture within the organization. This framework shown in figure II can be used as an organizational readiness assessment tool before actually implementing six sigma, thereby reducing chances of six sigma implementation failure. It is observed that the following roadmap can be followed in order to identify the methods to be followed in order to integrate Six Sigma into the current framework of quality management:

Identify the organizational readiness to implement Six Sigma: This is carried out by identifying the organizational ways of six sigma implementation, their means and resources and the ultimate end or gain they aim to attain from the process. Following this the organizational readiness to spend money and their intention towards implementing the six sigma process also needs to be identified. From this relationship the readiness of the organization is identified. This has a direct bearing on the intention to integrate Six Sigma with TQM practices.

Identify the employee attitude and their perceived top management support: Following identification of organizational readiness there is a need to identify the level employee perception of Six Sigma in terms of their attitude and their perceived support of the top management.

Identify the relationship and product management principles: Following this there is a need to identify the level employee perception of customer relationship, workforce relationship, supplier relationship, information and process management.

Identify the perception of benefits and barriers to Six Sigma implementation: Employees may have their own views in terms of probable benefits and barriers faced. These need to be properly identified and examined to overcome any feasibility issues.

Identify impact on innovation and performance: Identify the impact of the above attributes on innovation and performance as this refers to the overall performance of the company.

Identify the change in organizational culture: To promote effective quality management it is vital to arrive at a modified organizational culture.

VI. Framework for Implementation of Six Sigma

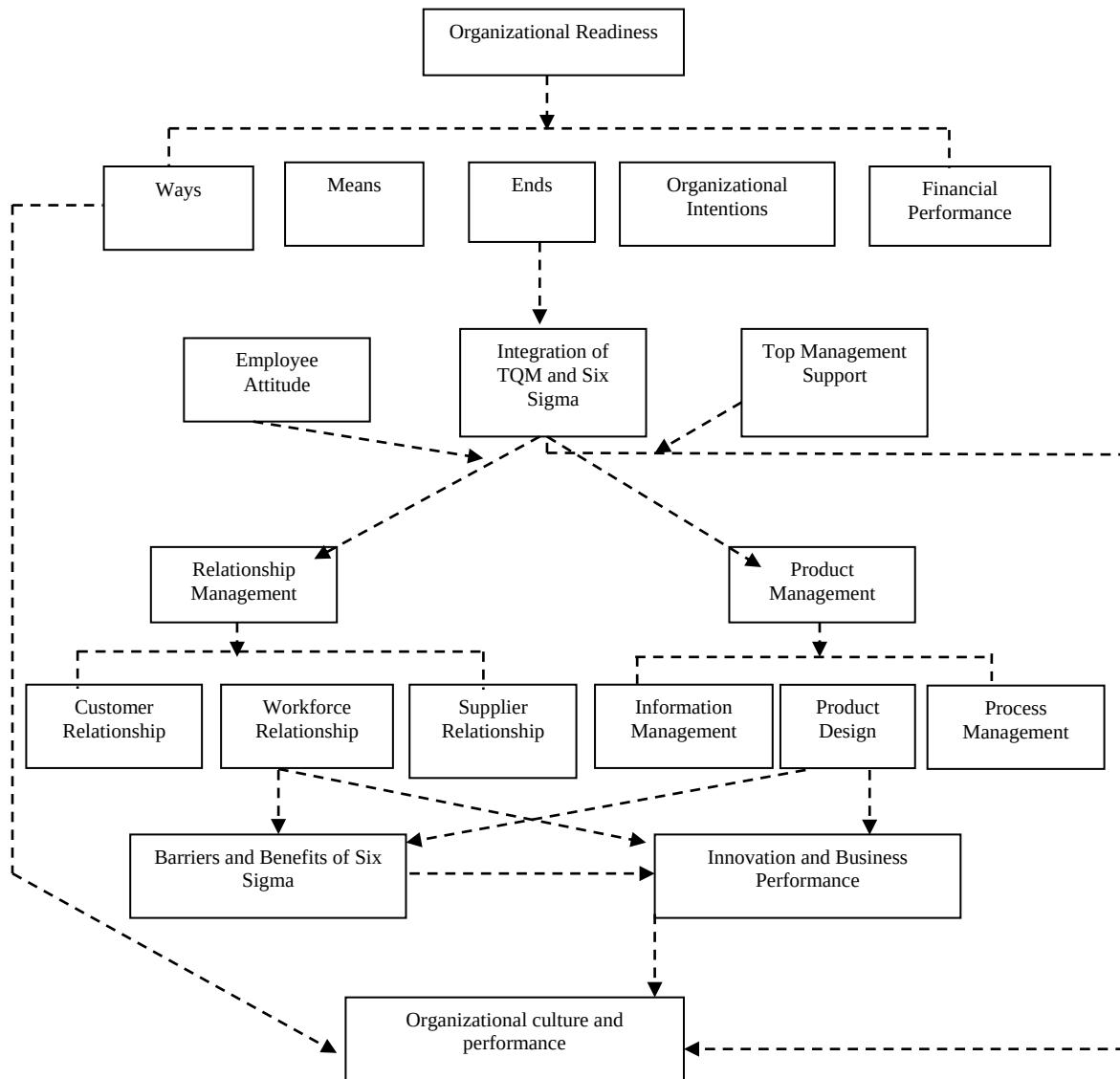
The execution of the project is the responsibility of everyone in the establishment. They offer guidance to Black Belts. The campaigners recognize persons to perform as Master Black Belts who take on the role of in-house trainers on the Six Sigma procedure. The Master Black Belts support the others and are the chief persons to steer their corresponding persons who are Green Belts and Black Belts too. The concept is basically team-based, wherein all the members are aware of their work and accountability and understand what has to be done to be successful. At the same time, in a team-based set up it is necessary that each and every one working for the company, right from the top executive to the workers in the lower rung, to comprehend and believe in the Six Sigma Method and all that it represents so that the establishment as a whole can benefit for it.

VII. Results & Discussion

The results of the study conducted to determine the attitude towards the present total quality management system adopted and the possible benefits of implementation of the principles of six sigma is elaborated in this chapter. These results are based on the quantitative analysis that was carried out by circulation of questionnaires specially designed for this purpose. Any implementation of soft technologies demands involvement at all levels, and it is often found that failure of soft technologies is due to not integrating all the levels before implementation. This was envisaged from more than 70% failures of soft technologies from the literature review of more than a decade. Hence, to overcome this, it was decided to have all employees being taken into account. The first section comprises

of the responses obtained from mid managers on their readiness to implement six sigma. The second section consists of the responses of the lower level employees on their attitude towards six sigma implementation. The third section consists of the responses from upper level managers which were obtained from an interview conducted to identify their views on the impact of six sigma on organizational culture. The results of the study which were obtained from the responses of the participants are illustrated in the form of tables and graphical representations to facilitate easy understanding. The perspective of the respondents was compared to the data available in the literature in order to test the validity of the hypothesis statements introduces in this study.

Figure II: Model researched in the study



VIII. Conclusion

The research has confirmed that previous quality adoptions, top management involvement, the training, and skills of the Black Belts, and the Statistical quality tools used are critical success factors when implementing Six Sigma. In addition, top managers stressed that the application of Lean manufacturing methods in conjunction with Six Sigma lead to fast and more efficient results. The previous adoption of quality procedures and control techniques no doubt assisted in creating a culture of quality consciousness thus making it easier for Six Sigma to be adopted and embraced within the organization. The initiation of Six Sigma movement by the top management sends the message that the company is serious about wanting it implemented. The continued support and involvement by top

management at the next stage of implementation, indicates that top management is still interested in having a successful implementation of the project. After this display by top management most subordinates will fall in line doing whatever it takes to achieve a successful implementation. Since those designated as Black Belt are expected to champion the implementation of the project by providing the leadership and the training of the staff who work on the project will succeed. The training of the other belts, such as the Green Belts, and the workers especially in Statistical Quality Control methods also contribute to the success of the work of implementation. In this way, this research establishes a Roadmap from Quality Management practices currently adapted to Six Sigma implementation by using methodologies like; Extensive literature survey & content analysis, personal interviews, structured Questionnaire to perceive the preparedness for six sigma implementation, employee attitude & the effects of such integration on organizational performance as depicted in the figure I.

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