ABSTRACT

During the recent years, Six Sigma has created significant excitements among both researchers and practitioners. Researchers admire the capability of Six Sigma in achieving near zero defect manufacturing. Practitioners are enlightened to witness enormous profit generated as a result of implementing Six Sigma projects. One of the strongest foundations of Six Sigma concept is fulfilling the customer satisfaction. In order to satisfy the customers, their languages need to be gathered and converted into technically understandable languages. In the field of TQM, both researchers and practitioners have been advocating the use of the Quality Function Deployment (QFD) technique for carrying out this task.

Like Six Sigma, QFD has found wide application. In Six Sigma field also, the use of QFD is recommended to some extent. Though the objectives of both QFD and Six Sigma concept closely coincide with each other, their integration is not prominent in literature arena. This situation favours the pursuance of an application oriented research to develop a model that would twin QFD and Six Sigma concepts. Before initiating any research on twining QFD and Six Sigma concepts, it is worthy to note the researches that have pointed out the deficiencies of QFD. These researches have recommended the removal of these deficiencies by evolving extended versions of QFD. This trend indicates that Six Sigma has to be twinned with an extended version of QFD, which will aid in strengthening the pillars of Six
Sigma. In this context, during this research, the Total Quality Function Deployment (TQFD) technique was adopted to twin it with Six Sigma to evolve a technique named as Total Six Sigma Function Deployment (TSSFD).

The TSSFD technique was designed by tactically integrating TQFD with Six Sigma’s DMAIC (stands for Define, Measure, Analyze, Improve and Control) improvement methodology and training infrastructure. TSSFD begins with the development of customer requirement matrix. The contents of this matrix are used to define the problem. This definition is used to develop cross-functional matrix. During the development of this matrix, the responsibility of the personnel and functions to deal with the TSSFD project being considered are listed. Then the current practices are measured. In order to achieve the six sigma level, the targets in terms of measurable values are arrived at. These targets are used to develop the product deployment matrix. Followed by that, the product deployment matrix is analyzed. The result of this analysis is used to improve the quality in totality and on continual pace.

The components identified in product deployment matrix are deployed using the target values. Then, the tasks to be carried out to achieve their target values are set. Followed by that, the process planning and control chart is prepared. Subsequently the control devises are installed to ensure that TSSFD project does not slip from its progress and revert back to its originating state. Finally, the work instructions which enable the percolation of the customer voice into the field of application which will lead to the achievement of six sigma level of quality are developed.
After designing TSSFD, its implementation studies were conducted in three companies in succession. The first company is involved in manufacturing pumps. In the second company, the welding electrodes are manufactured. In the third company, switch gears are manufactured. In these three companies, after studying the background of the products manufactured, the practical implications of applying TSSFD technique were explored. The results of these implementation studies indicated that TSSFD is practically compatible in translating customer languages to achieve six sigma level quality.

Although TSSFD was found to be practically compatible, it was discernable that an electronic knowledge supporting device would ease its implementation. In order to fulfil this need, a Decision Support System named as DeSTOSSD (stands for Decision Support System for Total Six Sigma Function Deployment) was developed during the last phase of this research.

On the whole, the results of this research indicated that TSSFD technique and DeSTOSSD are practically applicable techniques for achieving six sigma level quality through the translation of customer languages. Yet it is suggested that more implementation studies shall be conducted by the future researchers and the practical compatibility of both TSSFD and DeSTOSSD shall be further strengthened.