ABSTRACT

A business can successfully compete and thrive in a high volatile dynamic environment by adopting appropriate continuous improvement projects suiting to its needs. Six Sigma has been reported to be the most successful business improvement initiative in the last 50 years. Although Six Sigma has been practiced for more than two decades, research on Six Sigma is unsystematic and many important issues are not carefully examined. That apart, empirical studies pertaining to the implementation of Six Sigma have been reported by researchers mostly from developed countries. An attempt has been made to carry out an empirical study on deployment of Six Sigma and find out factors that influence its implementation.

The thesis presents an investigation into important aspects of deployment of Six Sigma in three successive phases. First and foremost, a Delphi study has been carried out by conducting an expert opinion survey among selected group experts. The experts are drawn from leading manufacturing and service sectors, reputed consultants working in the domain of Six Sigma, and academicians. Literature on Six Sigma as well as the findings of the Delphi study is quite consistent regarding the argument that one of the critical success factors (CSFs) for the successful implementation of Six Sigma is selection of right sets of projects. Due to limited resources and market risk, this kind of selection is quite challenging for organizations. Hence, in the second phase, a model has been proposed for selecting the portfolio of projects. The model consists of (i) Making real option analysis for evaluating the value of the project in presence of managerial flexibility. (ii) Developing zero –one integer linear programming model for scheduling an optimal project portfolio, based on organisation's objective and constraints. The third phase presents the application of the above proposed model in an Indian petrochemical firm.

Our contribution in this paper is threefold. First, few unique factors influencing successful implementation of Six Sigma projects in India have been identified through the Delphi Study. Second, the thesis introduces a novel framework for evaluation and selection of Six Sigma projects. This will be helpful in creating an improvement system for managing all the improvement efforts in an organization. The thesis demonstrates, for the first time the use of real option theory and optimisation, to the economic justification of process improvement investments like Six Sigma.

Keywords: Six Sigma Deployment, Six Sigma Project Portfolio Selection, Real Option, Delhi Study, Critical Success Factors