THESIS OVERVIEW

CHAPTER 1

A brief introduction is given about the competitive business world in which the present industries have to operate. The external forces namely customers, competition and technology are driving the companies into the territory of change. It is emphasized that the change is inevitable and they should aim at a total change instead of a fragmented approach.

CHAPTER 2

The definition of Business Process Re-engineering (BPR), its need, and the stages of BPR are stated in this chapter. The stages of BPR are explained on the following aspects namely Team and its Constitution to re-engineer the processes, Overcoming Resistance for change, Training the leader & employees, Business Process Mapping, Process Diagnosis, Benchmarking and Gap Analysis to locate the core process to re-engineer, Documentation, and Process Redesigning using Information technology.

CHAPTER 3

Through a collection of more than 900 papers from more than 30 journals, a review of about 250 papers was made and is presented in a tabulated form in this chapter.

CHAPTER 4

The major literature survey of 33 papers that are most relevant to the different stages of BPR which has led the analysis towards formulating the problem as to find out a methodology for finding the rigorousness of the Small and Medium Enterprises’ approach towards re-engineering.
CHAPTER 5

This chapter briefly explains the status quo of the Small-Medium Enterprises (SMEs). The major comments and contributions of researchers in this field are given. The list of industries of both small and medium in nature and also of different kind either in type of production or products that carried out re-engineering is given in which the study has been conducted.

CHAPTER 6

This chapter deals in detail the analysis of the industry, which is a medium, size enterprise manufacturing similar products (electric motors) in batches. This industry taken for study had found unsatisfactory materials management, unsatisfactory levels of productivity and low inventory turn over ratio advocating to re-engineer its processes. Training in BPR for senior executives were conducted to prepare vision statement Training to the employees was not given. First constituted project team identified the processes to draw the Business Process Map. A process constraint analysis was conducted and was found that the Order Fulfillment Process and Vendor Development & Upgradation Process (VD&UP) were the most suffering processes for Redesigning.

Project team for Vendor Development & Upgradation Process was constituted and redesign workshop was conducted to the team members. Secondly the strength and weaknesses of all the departments were analysed and found the stores and accounts departments were ready for re-engineering. The Benchmarking and Gap analysis revealed problems exist in the materials movement, reworking, rejection rate, non schedule adherence. The analysis revealed that the parts / materials that arrive from the stores were not of correct specification, raised the organization to re-engineer the codification of the materials. An earnest effort was made to cover all groups of material classified under BIS and other commonly used international specifications that are exclusively used by the company and measures of performance confirms the improvement. Software has been developed to be available live in network users. The team further identified value added, non-value-added and waste activities of each process of the Vendor Development Processes by preparing workflow of all the processes. The team suggested various conceptual changes to be incorporated in VD&UP.
The project team for Order Fulfillment Process (OFP) diagnosed the plant layout, workflow of the batch production. The team prepared the current workflow for all the batches of production to find out the value added (VA), non-value added (NVA) and waste activities. A process constraint analysis was made. The benchmarking / gap analysis revealed that the major problems lie in the employee workmanship both in quality & productivity against cost reduction, schedule adherence and inventory turn over ratio. The company at this stage was facing the problem of employee resistance towards re-engineering. The methodologies to remove the employee resistance towards re-engineering are given in a more elaborate way. In the concluding section the opinion of the other surveyors is consolidated that the missing link in an industry, that is undergoing re-engineering, is its human resource development. Efforts should have been made to build opinion, remove compliance and install confidence before effecting change. The motor unit of this industry is far from its readiness to change its existing culture and style of operation. However the industry should have been more rigorous towards re-engineering.

CHAPTER 7

This chapter deals with the industry, which is a small enterprise that undertakes plastic moulding jobs and makes them in batches. The survival problem of this company was not very much under question but the production methodologies were little primitive that it has decided to redesign the production processes by forming Information Technology Team. The team redesigned moulds by conducting brainstorming sessions and made proto-types for testing. Different types were tried and finally two methodologies were arrived namely Single Minute Exchange of Dies (SMED) and Hot Runner with Chilling type. Using activity chart analysis, the percentage improvement in process timings before and after SMED was calculated for certain selected jobs. Taking process time before SMED in the X-axis and the percentage improvements in the Y-axis could graphically represent the variation for which a mathematical model has been arrived. Similar studies were conducted for the Hot Runner with Chilling mould system and a graphical representation is made to arrive at another mathematical model. The variations in the two systems have been analysed to decide that the industry was not rigorous in its approach towards BPR and whatsoever done was only a fragmented BPR.
CHAPTER 8

The studies made in this industry, which is a small company manufacturing and assembling two for one twister (TFO), a machine for drafting mechanism for textile industries, is given in this chapter. The technology, building space, human resource and material handling systems alarmed the necessity of change, as it has to face a greater number of competitors and quality expectations. The team decided to redesign its assembly line. Objectives of the layout design has been defined by the team and prepared the layout before Re-engineering. The team’s primary tools of analysis were the flow diagram and flow process charts. The team studied the flow of work in the assembly and analysed for improvements. The flow process charts and flow diagrams for key jobs among the different TFO sub assemblies were prepared before re-engineering. The weaknesses of the present layout were listed down and a modified layout was redesigned. Flow process charts were drawn for the respective sub assemblies after re-engineering. The percentage improvements in assembling time were calculated and a graph was plotted taking assembling time before re-engineering in the X-axis and the percentage improvement in the assembling time in the Y-axis. Similarly the percentage improvement in rejection rate was calculated and a graph was plotted against the assembling time before re-engineering. It was found that in both the cases the shape of the curve was found to be similar that a general mathematical model governing them was arrived. An analysis was made to conclude that the radical redesign or complete re-engineering was not achieved. It was arbitrarily decided to re-engineer the assembly line alone and hence it is concluded that this industry was not rigorous in its approach towards BPR.

CHAPTER 9

This chapter is concerned with the study made in a sugar industry. It produces 3,000 bags of sugar per day at present and also produces sprit from the molasses of the sugar cane as a byproduct. It has its own machine shop for plant maintenance and also a laboratory for its research purposes. The industry under study was with a production loss and a study was conducted on this aspect and reported that the reason being the leakage of cane extract in 125 pumps in the production line. A mechanical seal was designed to
arrest the same and a cost analysis was made to find the performance improvement for various types of seals over the conventional rope & gland technique. A mathematical model was arrived for the curve plotted for percentage improvement in performance. Various factors are discussed to decide the rigorousness of the industry towards re-engineering.

CHAPTER 10

This chapter deals with the study of a small enterprise manufacturing about 50 different types of top rollers to suit the original machine specification for lap formers, comber and draw frame machine for many makes such as Rieter, Ingolstadt, Lakshmi Rieter, Trutzschler, Zxinser, Vouk, Toyoda, Cherry, Hara, Howa, Padmatex, Texmaco-Howa, Plats Sarco Lowell, etc. The importance of machining top rollers without eccentricity to produce the sliver of good quality is also emphasized in this chapter. In the process diagnosis, the industry has felt the following factors namely too long a machining time, skilled labour for simple operations, and high rejection rate and inadequate order fulfillment were the reasons for BPR. These top rollers were machined by the existing method and detailed process charts were prepared. The break-even point was also calculated for the existing machine. As a result of redesigning this process, an indigenous machine was made that could be operated by a semi skilled operator for the preparatory machining operations. The skilled operator would operate a copy turning attachment fixed to the existing lathe with improvised cutting tools. 1000 pieces in each type of top roller selected for study purposes were machined. Process charts were drawn for the two machines. Production / cost analysis and break-even analysis for the additional investments for the two machines were made.

The performance improvement for various attributes namely percentage improvement in machining time, labour cost, machining cost, and the break even point for the additional investment were calculated and curves were plotted for the above attributes against machining time per piece. It was found that in all the cases the shape of the curves was found to be similar and a general mathematical model was given that would govern them. It was argued and derived that the business processes have to be
considered in totality as against fragmented pieces of activities. This industry worked towards only a fragmented BPR to solve a technical problem or to get an immediate solution.

CHAPTER 11

In this chapter, the results of the studies made in industries that have undertaken re-engineering were compiled and discussed to arrive at a common consensus. The rigorousness of their approach towards re-engineering is concluded and compared.

CHAPTER 12

The scope for further study in continuation of this work is discussed.

CHAPTER 13

List of about 250 papers, which were reviewed in chapter 3, is given in this chapter as reference material.

CHAPTER 14

This chapter contains the descriptive list of about 900 papers published out of 30 journals as bibliography.

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