CHAPTER 1

INTRODUCTION

1.1 MOTIVATION

In 21st century, there is a rapid change in political, economic, social, technological and legislative aspects everywhere in the world. An individual, finding himself in an alien environment needs to adapt and change. Organizations also must take steps to change in order to survive and thrive in the ever-changing scenario.

The problems facing any organization are the need to change or not to change, what can be changed, the barrage of strategies and approaches to change, the barriers to change and whether the organization has a true vision of future. 'A new industrial revolution is taking place, a combination of the ongoing technological explosion and social revolution. It requires reinventing of an effective organization structure and decision making procedure.

Business is undergoing a major paradigm shift, moving from traditional management into a world of agile organizations and processes. Ideally, all relevant information should be brought together before a judgment is exercised. However obtaining pertinent, consistent and up-to-date information across a large company is a complex and time-consuming process. Hence organizations have been seeking to adopt and develop a number of latest
information systems to assist in various aspects of the management of their business processes. Such systems aim to improve the way information is gathered, managed, distributed and presented to people in key business functions and operations. It provides mechanisms through groupware for coordinating work and creating a decision support system. It makes possible for the organization to capture the data and provide access to it throughout the organization and contribute to the productivity.

1.2 BUSINESS PROCESS REENGINEERING

Business Process Reengineering (BPR) is the fundamental rethinking of organizational structure and radical redesign of business process to achieve dramatic improvements in critical contemporary measures of performance such as cost, quality, service and speed (Hammer and Champy 1993). BPR employs a broader approach to radically transform fundamental process. It is process-oriented in that it attempts to improve efficiency and effectiveness by integrating the tasks and information flows that are required to complete a process. It needs to automate existing system, redesign business procedures, re-engineering organization wide value streams and rethinking the scope of the organization. The strategies for reengineering process are

- Creating case managers role using team approach to solve needs and providing rule based information systems to support generalists.
- Introducing fast feedback of errors to cut need for reworking.
- Reducing elapsed time by executing process on parallel basis for current engineering.
- Eliminating redundant inputs.
- Reducing the constraints due to paper work.
1.3 INFORMATION TECHNOLOGY

Information Technology (IT) is the enabler of BPR. What this means is that organizations are able to rethink their process because of the functionality provided by IT. IT should be used to exploit the business process transformation. BPR is a strategic approach to develop new system to support new ways of doing business. The Table 1.1 compares old and new methods in which IT can help an organization to transform its process.

Table 1.1 Comparative of old and new rules of decision making process

<table>
<thead>
<tr>
<th>Old Rule</th>
<th>Technology</th>
<th>New Rule</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information must be processed sequentially because a document can appear in only one location at one time</td>
<td>Shared database</td>
<td>Information can be processed instantly/ concurrently electronic documents can appear simultaneously in as many places as they are needed</td>
</tr>
<tr>
<td>Only experts can perform complex work</td>
<td>Decision Support System</td>
<td>A generalist can do the work.</td>
</tr>
<tr>
<td>Only managers have access to information so they must make all decisions.</td>
<td>Decision Support Tools</td>
<td>Information and tools to manipulate, are provided to whoever needs them. Making decisions is part of everyone’s job.</td>
</tr>
</tbody>
</table>

BPR plays an important role to system developer because it represents one of the most avid campaigns to align organization's objectives and information systems in applications. It also changes the system professional role in system development; thus it needs to understand the tenets of BPR.
A process is a set of interrelated work activities that are characterized by a set of specific inputs and value added tasks that produce a set of specific outputs. A process can be contained within a functional organization or can span several functional organizations. A process is series of definable and measurable tasks leading to a useful result for an internal or external customer. A business process can be viewed as inputs leading to tasks leading to outputs.

It requires identifying the 'value stream'. A value stream is a logical collection of people, skills, tools and tasks that interact to promote customer satisfaction and thus provide value to the business. The customer is at the beginning and the end of the value stream. Value stream crosses the functional lines. Business re-engineering tasks are, positioning business engineering, assessing current value stream and re-engineering the value stream. IT system development facilities re-development that entails reinventing the value stream in a manner which both meets customer-needs and improves enterprises operation. It explores breakthrough in new process and assessing the total impact on the organization.

### 1.3.1 Integrated Management System

The purpose of IMS is to raise managing from the level of piecemeal information, initiative guess work and isolated problem solving to the level of system insights, systems information, sophisticated data processing and problem solving. Managers always have sources of information but IMS provides a 'system' of information that aids in solving problems and making decisions. The Information needs of any company are as follows:
• Accounting control.
• Plans and Budgets
• Salaries and Wages
• Inventories of materials, in-process and finished goods.
• Sales details for each product, customers, zone, state
• Distribution
• Production details of product, cost, backlog etc.
• Energy Management
• Plant Maintenance

1.3.2 Data Warehouse

Data Warehouse is defined as a collection of databases that support decision-making and come into use when scaling databases in the gigabyte range, supporting unrestricted adhoc queries and complex analysis. Data Warehouse is designed to overcome problems encountered when an organization attempts to perform strategic analysis using the same database that is used for Online Transaction Processing (OLTP). OLTP systems typically:

• Support large numbers of concurrent users actively adding and modifying data.
• Represent the constantly changing state of an organization but don’t save its history.
• Contain large amounts of data, including extensive data used for verifying transactions.
• Have complex structures.
• Are tuned to be responsive to transaction activity.
• Provide the technology infrastructure to support the day-to-day operations of an organization.

Difficulties often encountered when using OLTP databases are

• Analysts do not have the technical expertise required to create adhoc queries against the complex data structure.
• Analytical queries that summarize large volumes of data adversely affect the ability of the system to respond to online transactions.
• System performance when responding to complex analysis queries can be slow or unpredictable, providing inadequate support to online analytical users.
• Constantly changing data interferes with the consistency of analytical information.
• Security becomes more complicated when online analysis is combined with online transaction processing.

Data Warehousing provides one of the keys to solving these problems, organizing data for the purpose of analysis, Figure 1.1. Data warehouses:

• Can combine data from heterogeneous data sources into a single homogenous structure.
• Organize data in simplified structures for efficiency of analytical queries rather than for transaction processing.
- Contain transformed data that is valid, consistent, consolidated and formatted for analysis.
- Provide stable data that represents business history.
- Are updated periodically with additional data rather than frequent transactions.
- Simplify security requirements.
- Provide a database organized for Online Analytical Processing (OLAP).
1.3.3 OLAP

OLAP technology enables Data Warehouses to be used effectively for online analysis, providing rapid responses to iterative complex analytical queries. OLAP’s multidimensional data model, Figure 1.2 and data aggregation techniques organize and summarize large amounts of data and therefore can be evaluated quickly using online analysis and graphical tools. The answer to a query into historical data often leads to subsequent queries as the analyst searches for answers or explores possibilities. OLAP systems provide speed and flexibility to support the analyst in real time.

![Figure 1.2 Multidimensional Data Analysis](image)

1.3.4 Data Warehousing and OLAP

In many organizations data are stored in multiple heterogeneous database systems. Reporting is more difficult because data is not only stored in different places, but in different formats. Data Warehousing and OLAP provide solutions to these problems. Data Warehousing is an approach to storing data in which heterogeneous data sources (typically from multiple OLTP databases)
are migrated to a separate homogenous data store. Data Warehouses provide these benefits to analytical users:

- Data is organized to facilitate analytical queries rather than transaction processing.
- Differences among data structures across multiple heterogeneous databases can be resolved.
- Data transformation rules can be applied to validate and consolidate data when data is moved from the OLTP database into the data warehouse.
- Security and performance issues can be resolved without requiring changes in the production systems.

Organizations maintain smaller, more topic-oriented data stores called marts. In contrast to a Data Warehouse, which typically encapsulates all of an enterprise's analytical data, a Data Mart is typically a subset of the enterprise data targeted at a smaller set of users or business functions. Whereas Data Warehouse or Data Marts are the data stores for analytical data, OLAP is the technology that enables client application to efficiently access the data. OLAP provides these benefits to analytical users:

- Pre-aggregation of frequency queried data, enabling a very fast response time to adhoc queries.
- An intuitive multidimensional data model that makes it easy to select, navigate, and explore the data.
- A powerful tool for creating new views of data based upon a rich array of adhoc calculation functions.
Technology to manage security, client/server query management, data caching and facilities to optimize system performance based upon user needs.

OLAP enables analysts, managers and executives to gain insight into data through fast, consistent, interactive access to a wide variety of possible views of information that has been transformed from raw data to reflect the real dimensionality of the enterprise as understood by the user.

1.4 PROBLEM OF THE RESEARCH

Most of the organizations implemented reengineering on managerial judgment (Edosomwan 1996) without proper guidelines and tried to measure the performance on profit and loss of the operations only. These systems were developed to suit the financial accounting that relies the overall income and expenses to monitor the manufacturing activities. Manufacturing unit’s critical elements which contribute to the performance are plant operation, inventory, maintenance and energy which need to be measured and controlled continuously. It requires a model for continuous process assessment and an organized use of information to improve the productivity. This research highlights the model for successful implementation of reengineering in manufacturing industries with focus on the following areas:

- Capacity utilization
- Improvement in product quality
- Increase in production efficiency
- Reduction in inventory cost
- Wastage reduction
1.5 OBJECTIVES OF THE PRESENT INVESTIGATION

Integrating the business knowledge into a model which supports the process reengineering function by exploring alternative processes, activities, organization structures and behaviour. The processes of explorations are design, analysis and redesign, where the model not only provides a comparative analysis of organization design alternatives and also provides guidance to the management. In this research, an attempt has been made to design and develop a generalized model for implementation of Reengineering in a manufacturing unit, “M/s Balaji Distilleries Limited, Chennai, India”, to improve the performance. The main objectives of the research are:

- To study the present performance of the manufacturing unit for a period of past five years (1997 to 2002) in all its aspects.
- To identify the critical parameters that contribute to improve the manufacturing effectiveness.
- To implement process reengineering in those identified areas to improve the manufacturing effectiveness.
- To monitor and control the continuous process improvement to improve the plant performance.
- To generalize the model for BPR implementation in manufacturing industries based on the findings and results.
The result of the research work is implemented for an evaluation in the manufacturing unit. The primary advantage of the approach taken in the project is that the methodology that are designed for a wide range of applications.

1.6 RESEARCH METHODOLOGY

Daily transaction data are stored in any organization. The accurate and timely data collection and analysis by using fitting tools is having bearing on decisions. Hence, research methodology plays a major role in any research. The data required are collected from the internal sources. The computerized IMS is developed and implemented with actual data available in coordination with Production, Engineering, Stores, Purchase, Personnel, Accounts and Finance departments.

The methodology followed in this research are shown in Figure 1.3.

Phase 1

Objective 1 : To study the present performance of the manufacturing unit operation.
Task 1 : Study all the recorded data from existing database.

Phase 2

Objective 2 : To understand the need for BPR to improve the plant performance.
Task 2 : Reviewing literature on BPR towards finding a suitable approach for successful implementation.

Phase 3

Objective 3 : To develop Manufacturing Effectiveness and Process Improvement Model (MEPIM) to take decision and monitoring continuously.

Task 3 : Developing Integrated Management System (IMS) for the manufacturing unit and accessing the relevant information through Data warehousing and OLAP for implementation of BPR.

Phase 4

Objective 4 : To analyze and compare the improvement of plant performance.


Phase 5

Objective 5 : To test the model after implementation of reengineering.

Task 5 : Improvements in reengineered process are tested for a period of 12 months and are analyzed using Pivotal Table and Chart and Conclusion
Work on Business Process

Literature review on
1. Evaluation of Information System
2. IT infrastructure Development
3. Data Warehousing
4. Re-Engineering
5. Analysis on Business Process

Need for technique to BPR

Development of
1. Integrated Management System for Manufacturing
2. Acceptance, Implementation and Testing

Design & Development of MEPIM using Data Warehousing to Support BPR Decisions

Experimentation with New Model: A Case Study

Comparison

Conclusion

Figure 1.3 Phases of the Research Work
1.7 ORGANIZATION OF THE THESIS

The thesis is organized into seven chapters as stated below:

Chapter 1 deals with the motivation for the study, problem of the research, objectives of the investigation, data collection, data sources and research methodology used.

Chapter 2 discusses about literature review like variety of BPR implementation approaches have been developed and where about lacking in integrative framework for successful implementation.

Chapter 3 gives an insight into the Business Process Reengineering and identification of the implication for implementing reengineering in manufacturing unit.

Chapter 4 explains the development of MEPIM with integrated management system for manufacturing unit and application of on-line analytical processing & Data warehousing for data analysis to take decisions.

Chapter 5 discusses implementation of reengineering and analysis of the study by using Pivotal Table and Chart as a tool.

Chapter 6 is discusses about the benefits to the company and organizational changes after reengineering.

Chapter 7 is the concluding chapter of the thesis with further scope of the work.