CHAPTER - I
INTRODUCTION

1.1 Background

ERP stands for Enterprise Resource Planning that offers Information System-based system for overall organizational control and management. In today's aggressive business environment it is essential to be prepared to face a vast and competitive world. In this time of diminishing Nepal and global economic situation, the most worried sectors are the Small and Midsize Enterprises (SMEs). They are challenged by the requirement of the customer and compliance mandates, effective management of supplier, costs control and finding new customers to grow the business. ERP offers solution that enables firm to compete in the prevailing market atmosphere. ERP has the capacity of both finite and infinite planning capabilities which assist managers to develop original schedule for managing supply process. ERP also transforms the supply process to achieve production plan with sales plan, manufacturing, finance and customers.

ERP minimizes distribution cost and increases of resource utilization, cuts down distribution bottlenecks, facilitates on-time delivery performance and makes operational control transparent. ERP is designed for manufacturing excellence. With visibility throughout the operation and embedded support for a wide variety of Material Requirements Planning (MRP) processes including make-to-stock, make-to-order, configure-to-order, engineer-to-order , Just-In-Time (JIT) distribution and materials control, and lean operations.

1.2 Focus of the Study

The thesis effort is to study the implementation of the Enterprise resource planning (ERP) and application of ERP system mainly on Material Requirements Planning (MRP) process of the Subha Industries. As the ERP, by name covers overall the aspects of the enterprise and as enterprise has various sectors basically this thesis will emphasize on the

study of the ERP system on Material Requirements Planning (MRP) process. Since, the evolution as well as the well application of the ERP system can be studied from Material Requirements Planning (MRP) process.

ERP is changing the competitive landscape for SME manufacturers like Subha Industries. With ERP, small to midsize industries benefit from a fully integrated, on-demand ERP solution designed to reduce costs, improve customer service, increase margins and generate new revenue streams. Further, SME industries can improve business performance with a deeply functional, yet easily affordable, Web-based ERP solution.

1.3 Statement of the Problems

Enterprise resource planning (ERP) is the important task to implement MIS in organizations which realize the efficient production process. The ERP in Nepal is not so applied in process of Material Requirements Planning. People still need to spend effort in managing procurement and distribution procedures through use of ERP. In other words the important of ERP is not understood so much by concerned people. Few companies using effective ERP can be counted in fingers. In Nepal many private organizations has entered into the computerize system. They are using different application software to manage Material Requirements Planning. Enterprise resources planning for most of the companies in Nepal are odd or unheard name till yet. The implementation of MIS highly depends upon the effective utilization Enterprise Resource Planning in an organization. This thesis summarizes the use of enterprise software to manage Material Requirements Planning (MRP) system and also provide solution for the bullwhip effect in manufacturing process by ERP system in Subha Industries. Furthermore ERP problem in Subha Industries can be summarized as follows:

i.   Lack of information flow in the ERP system

ii. No access for dealers and wholesalers in ERP system

iii. Problem of bullwhip effect in the distribution process

iv. Lack of integration in delivery and stock with production

v.   Problem in timely supply

1.4 Objectives of the Study

The objective of this thesis is to study and evaluate the implementation of Enterprise resource planning (ERP) adopted by Subha Industries. Moreover this thesis will explore the following matter:

i.   To decide when, how much and what to supply

ii.   To understand rapid communicate orders

iii. Knowing how the system track the status of orders

iv.   To check inventory availability and monitor inventory levels

v.   To reduce inventory stock, transportation, and warehousing costs

vi.   To plan production based on actual customer demand

vii. To understand the Rapid communicate about changes in product design

1.5 Rational of the Study

Enterprise resource planning (ERP) systems enable firms to streamline both their internal and external ordering processes and provide management with more accurate information about when, how much and what to produce. By implementing a networked and integrated ERP system, companies can match supply to demand, reduce inventory levels, and improve delivery service, speed product time to market, and use assets more effectively. Companies that excel in ERP have been found to produce higher rates of growth in their market value than the average for their industries. Effective ERP systems enhance organizational performance in the following areas:

i. Improved customer service and responsiveness

If a product is not available when a customer wants it, that customer will likely try to purchase it from someone else. Producing the right product at the right place at the right time will increase sales.

ii. Cost reduction

ERP helps companies contain, and often reduce, some or all of the costs associated with manufacturing the products. These costs include product designing to

material acquisition, inventory carrying, transportation, and planning costs. Total manufacturing costs represent the majority of prime expenses for many businesses and in some industries approach 75 percent of the total production budget. Reducing manufacturing costs can thus have a major impact on firm profitability.

iii. Cash utilization

The sooner a company manufacture and supply the product as per the orders, the sooner that company will get paid. Companies leading in ERP efficiency have cash available two to three months faster than companies that do not have this capability.

1.6 Limitations of the Study

As much as possible this thesis tries to cover the overall ERP of Subha Industries. But in broad sense it is limited by date availability, budget and time. There is no comparative study with any other organization. This project only sketch about the ERP of Subha Industries.

It is hard to get complete data so it serves the limited area. This thesis only summarized the ERP application in the Material Requirements Planning (MRP) process of Subha Industries but not in detail.

Moreover, this thesis is derived by the self effort. So it may lack expertise.

1.7 Organization of the Study

The study will be organized on the following standardized pattern of usual sequence of topics.

Chapter – I: Introduction

This chapter includes Background, Focus of the Study, Statement of the Problem, Objectives of the study, Rational of the Study, Limitation of the Study and Organization of the Study.

Chapter – II: Review of Literature

This chapter includes Conceptual Reviews, Review of Thesis, and Review of articles and Research Gap.

Chapter-III: Research Methodology

This chapter includes Research design (Population and Sample), Data and Information gathering Techniques (Primary data and Secondary data); and Analytical Tools and Technology.

Chapter-IV: System Analysis, Design and Data Presentation

This chapter includes Organizational Structures, System of Subha Industries, DFD of Existing System, Analysis of Existing Technology, Limitation of Existing System , Major Findings of the Existing System, Concept of Modifying the System, Comparisons between New and Existing System, ERP Application Modeling, E-R Diagram, Class Responsibility Collaborator (CRC), Physical Database Design (Data Dictionary), Entity-Relationship Diagram, Flowchart, Data flow Diagram (DFD) of New System and Cost benefit Analysis and Feasibility Analysis of New System.

Chapter – V: Summary, Conclusion and Recommendations

This chapter includes Summary, Conclusion and Recommendations.

 After the end of the chapters Bibliography and Appendices have been presented.

CHAPTER - II

REVIEW OF LITERATURE

2.1 Conceptual Reviews

Today's enterprises require more information and communication in order to reduce costs under the current scarce resources, to shorten delivery time, to increase quality and product variety, in other words, are obligated to develop "an integrated information system". Material requirements planning (MRP) is a production planning and inventory control system used to manage manufacturing processes.

An MRP system is intended to simultaneously to ensure materials are available for production and products are available for delivery to customers, to maintain the lowest possible material and product levels in store and to plan manufacturing activities, delivery schedules and purchasing activities. Enterprise Resource Planning (ERP) systems help allows the true potential of companies by integrating business and management processes for effective material management. ERP materials management helps to efficiently manage material resources and inventory transactions, it avails to access real-time inventory information, track part identification information, automate transactions with wireless barcode technology, manage inventory in multiple dimensions, and more. The Materials Management is component of the ERP that addresses a broad range of issues around the inventory: products, price lists, inventory receipts, shipments, movements, and counts within a company, its organizations, as well as to and from suppliers and customers. The ERP tools for materials management include:

• Inventory Control
Identify and track information on each standard part so managers can make the best possible inventory management decisions.

• Tracking Material Lots
Automatically track raw materials, sub-assemblies and final assemblies to their origins.

• Shop Floor Data Collection

Automate the entry and enhance the accuracy of the daily labor, inventory transactions, and shipping and receiving with wireless bar coding technologies.

• Physical Inventory

Collect, reconcile and post count quantities against on-hand inventory balances and generate general ledger transactions.

• Returned Material

Quickly address and resolve common customer satisfaction issues.

The Materials Management component of the ERP system is mainly concerned with Product, Product Catalog, Price Lists, Bill of Materials, Distribution and Multi-Warehouse Control, Material Receipts and Replacement, Costing of Product and Services:

i. Product

A 'Product' in the ERP system is something that can be sold and/or purchased, or something that can be stored and it has to have a Price. Products in the ERP's inventory management system are Items, Services and Resources. One of the attributes of a product is its storage location as defined by warehouses and locators. The warehouse is the point of service. A warehouse may have more than one locator. Each Locator has up to five user-defined dimensions such as aisle, bin, rack, level, bay, etc. Another attribute for Products in the ERP system is the 'Product Category.' Product Categories enable users to group products with similar characteristics, pricing structures, accounting rules and reporting. For example, all products in that category inherit the revised discount structure.

ii. Product Catalog

The Product Catalog organizes all of the products for simplified searching based on product attributes. For example, user may use the Product Catalog to search for all

products that are "herbs," "yellow" and "good-fragrance." The Product Catalog optionally details product bills of material and substitutes.

iii. Price Lists

ERP system supports multiple Price Lists for all purchased and sold items. For this, ERP system has a Purchase Price List functionality, which allows simple control of discounts from suppliers. The system provides general and customer specific sales price lists. Price Lists are date controlled to allow special sales initiatives.

iv. Bill of Materials

A Bill of Materials (BOM) is a product structure that lists the parts and components that constitute the product in the context of an assembly, kit, or model. It contains one or more Products, Services, or BOMs. The number of components a Bill of Materials may contain is unlimited. A Bill of Materials has to be "cycle-free", which means that a BOM cannot refer to itself or parts for example found in recipes in the chemical industry.

v. Distribution and Multi-Warehouse Control

ERP system supports multiple warehouses with user-defined locations within each warehouse for recording stock locations in shelves and bays i.e. Bin Locations. With the ERP inventory management system, a physical warehouse can be broken into multiple logical warehouses such as receiving, quality assurance and testing, bulk storage and picking. Priorities can be set to ensure that picking takes place from bin locations in a prescribed sequence. Movements between warehouses can be configured to produce appropriate shipping documentation, and manage 'in transit' stock. Inventory counts and Inventory valuation adjustments are managed by recording the difference between the book stock quantity and the count quantity. Stock used for internal purposes can be written-off to record the stock decrement and related adjustments in the General Ledger.

vi. Material Receipts and Replacement

Using the ERP system, shipment documentation can be created in batches, or individually

on a per order basis. Goods received from vendors can be compared directly with the purchase order or the vendor invoice. The inventory management system shows 'available for delivery', after considering reserved inventory for future customer shipments and expected vendor receipts. Material Replacement lists are created based on inventory replacement rules, past sales, or targeted inventory levels. Requisitions or Purchase Orders can also be automatically generated from the Material Replacement report. Optionally, user can also replace a warehouse from another warehouse.

vii. Costing of Product and Services

The Costing functionality in the ERP system is flexible and comprehensive. Users can customize it to meet their unique business needs, such as specifying the level of detail to track. Users can have multiple parallel costing methods. These can include Standard and Actual costs. Product costs may be composed of both Material and non-Material costs.

ERP system maintains the information for the following costing methods:
• Standard Costing
• Actual Costing (Last PO, Last Invoice, LIFO, FIFO)
• Average (PO, Invoice)

Costs can be recorded at three levels: Company, Organization, or Batch/Lot. Users can also specify a different costing method or level for a Product Category. This allows the maximum flexibility for financial analysis. Users may switch the costing method used any time. The information is very valuable to compare trends. Costs are maintained in the accounting currency. Using different costing methods (Standard, Actual, or Average) can result in different financial results. The ERP supports more than one costing method, e.g. for legal accounting and business decision-making different costing methods are required. The costing method of decision making also differs from the managerial views while the legal accounting is bound by the statutory law of the country.

2.1.1 Management Information System (MIS)

MIS (Management Information System) can be defined as an integrated, user-machine system for providing information to support managerial, operational, and decision-making functions in an organization. MIS provides managers with the tools to organize evaluate and efficiently manage departments within an organization. In order to provide past, present and prediction information, an MIS can include software that helps in decision making, data resources such as databases, the hardware resources of a system, decision support systems, people management and project management applications, and any computerized processes that enable the department to run efficiently. Management information systems are distinct from other information systems because it is commonly used to evaluate, design, implement, manage, and utilize systems to generate information to improve efficiency and effectiveness of decision making, including systems termed decision support systems, expert systems, and executive information systems. Figure 2.1 below illustrates the application of MIS on various organizational levels:

Figure: 2.1

Application of MIS on various Organizational Levels
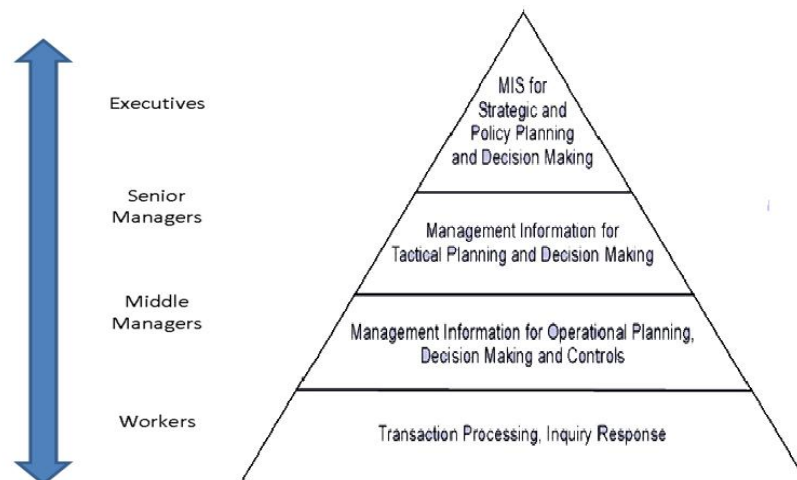
Some notable definitions for MIS have been given below:

"Management Information System is a system consisting of people, machines, procedures, databases and data models, as its elements". *(Goyal 2007: 12)*

"Management Information Systems are concerned with providing management with useful information to take effective action in planning, organizing, directing, and controlling the resources used in the general conduct of a business enterprise." *(Thierauf 1982: 58)*

Management information system gives the business managers the information that they need to make decisions. Management information systems provide a variety of information products to managers. Periodic Scheduled Reports are a traditional form of providing information to managers via a specified format designed to provide managers with information on a regular basis. Exception Reports are produced only when exceptional conditions occur. Exception reporting reduces information overload instead of overwhelming decision makers with periodic detailed reports of business activity. Demand Reports and Responses are available when the managers require immediate access to vital information. Web browsers, Database Management System (DBMS) query languages, and report generators enable managers to get this information and not force them to wait for periodic detailed reports of business activity. Push Reporting is information that is pushed directly to the manager's respective networked workstation. Webcasting software is being more frequently utilized to broadcast selective reports and other vital information.

2.1.2 Introduction to Organization and Thesis Topic

Subha Industries is centrally controlled by the Head Office located at Kathmandu where its processing and packing industries are also located. It collects raw material mainly from the Nepal's western region indigenous collectors. It has been producing and marketing wild herbal products since long times, particularly medicinal herbs. All of its products are free of chemicals and additives. The products are collected and

manufactured by local people. It exports both semi-refined and raw forms of medicinal and aromatic herbs from the capital mostly via airways. While dealing in herbal products. It is well aware of its environment impact. Therefore, for environmental concern, it is affiliated with local NGOs such as Humla conservation and Development Association (HCDA), which has long experience in community, based natural resource management system in Humla. HCDA's non timber forest products (NTFPs) development strategy combines sustainable harvesting to preserve unique environments and enhance the economic well being of thousands of small scale collectors. The economic value of well-managed forests creates incentives to conserve habitats. In this way Subha Industries also guaranties that all of its natural products are of environmental friendly.

Initially, Subha Industries has been established by Mr. Sudip Ghimire in 2066 B.S. At the time of the commencement he and his spouse Mrs. Devika Ghimire own 100% share with the authorized capital of ten lakhs only and on Fiscal Year 2069/70 Subha Industries has authorized capital of fifty lakhs and has fixed asset of about sixty seven lakhs. At present, Mr. Ghimire owns 58% share and rest portion is owned by Mrs. Shila Thapa who is the Executive Director of the firm. Subha Industries has been setup with the vision to develop and promote herbal industry in Nepal. It is focused in the field of Non-Timber Forest Product (NTFP) by establishing an exportable Medicinal and Aromatic Plant based Processing Industry to uplift the less privileged community in Nepal. Herbal Products Line of the Subha Industries includes Himalayan Honey, Medicinal Herbs, Dried Morel Mushroom, Cordyceps Sinensis (Yarcha Gumba), Essential Oils, Himalayan Smudge Stick, Herbal & Ayurvedic Teas, Ayurvedic Incense and Natural Herbal Soaps.

As this thesis is related to raising herbal industry, the scenario of the herbal industries in Nepal and the further plans of the related organization are presented here for acquaintance in brief. Export earnings from medicinal herbs are on an upward trend due to promotion of organic products, growing attraction for commercial farming and a stronger dollar. There has been a sharp rise in demand in the international market for

medicinal herbs, which have been placed high on the list of exportable goods. Customers in over 80 countries buy over seven million worth of Nepali herbs each year. Out of the 1,600 medicinal herbs found in Nepal, 162 are exported in half-processed forms to various countries. According to the Government of Nepal-Commerce and Supplies Ministry exports of medicinal herbs almost doubled during the first seven months of fiscal year 2070/71 to Rs 989.79 million. Exports during all of the last fiscal year 2069/70 amounted to Rs 805.37 million, but these figures could have been much higher. Since Nepal lacks laboratory facilities, herbs like yarsagumba, nettles, jasmine, mint, cinnamon have to be sent abroad for processing. As a result, only herbs that are well-known to foreigners find a market. Among cash crops, tea, cardamom, and ginger reign supreme. Tea ranks among the top twelve crops of high-value exported to third countries, and Nepali tea has even overtaken Darjeeling tea. Nepal is currently the largest exporter of black cardamom used for medicinal and cosmetic purposes in the west. Ginger from Salyan and Pyuthan reaches the Gulf countries through India. In this scenario, Subha Industries has following Plans and strategies:

i. Organic and Trade Fairs

Subha Industries is fully committed to organic production and to promote Non Timber Forest Products (NTFP) in Nepal. Throughout it milestones it has been focusing on the collection of the naturally grown herbs but further it has been focusing and researching on organic agriculture of herbs while for market growth it has planned to participate in new organic and trade fairs. It is also looking forward to develop not only foreign but also domestic market as well. For India, Subha Industries is hiring distributors to extent its market especially medical companies.

ii. Criteria and Environmental principles

Subha Industries fosters a more equitable and sustainable system of production and trade that benefits people and their communities. Subha Industries plans to utilize fair trade fund judiciously by the community to achieve Empowering women, Education for Next

Generation, Emergency Assistance.

iii. Partnership for Development

The integrated medicinal and aromatic end products derived from the natural herbs available in Nepal have good promises to bring the country on the international map of aromatherapy and herbal products prominence. The social and economic development and upliftment of the down-trodden society of Nepal by using the gift of natural resources could crystallize. It will encourage not only the foreign exchange and enhance employment of the people of Nepal but also channelize the energy of the rural people towards positive financial and social betterments than indulging into unproductive tasks in the society and causing more harm than good. Against this backdrop Subha Industries will be more than happy to enter into a strategic alliance for developing herbal based products and other phyto-therapeutics related business with the companies/ institutions/ universities.

iv. Enhancing Livelihood Opportunities for Rural Communities of Nepal

Subha Industries provides fair wages and good employment opportunities to economically disadvantaged artisans and farmers. Subha Industries not only believe in supporting living wages and safe & healthy conditions for workers but also adheres to social. Subha Industries will encourage not only the foreign exchange and enhance employment of the people of Nepal but also channelize the energy of the rural people towards positive financial and social betterments than indulging into unproductive tasks in the society and causing more harm than good.

The organization structure of Subha Industries is presented in Appendix 1.

2.1.3 Enterprise Resource Planning (ERP)

ERP is an acronym for Enterprise Resource Planning. ERP is short form for Enterprise Resource Planning and contains the meaning and objective in its own term.

- Enterprise is a business entity which encompasses corporations; Small & Medium sized industries, Non-Profit Organizations, & Government Bodies. The word enterprise is commonly used for larger organizations.

- A resource is any physical or virtual entity that has utility and value and exists with limited availability. A resource is used to provide service and produce new goods. An enterprise's goal is to utilize its resources to maximum and to get maximum output and with minimum cost.

- Planning includes the planning of organizational process and maintaining it. It also includes defining the goals and thinking of future performance of organization. Planning in an organization also includes deciding the tasks and resources to achieve the defined goals.

So, ERP integrates all the basic functions of an enterprise such as production, sales, purchase, human resources, customer care, and inventory. ERP supports data warehousing while integrating the data from all business process. ERP gives the basis for complex reporting and analysis of business trends. ERP system gives the granularity of data providing high-level details to the transactional view of data. With ERP systems, since all business processes are unified, they have increase coordination among themselves. ERP systems has integrated database with data having same meaning across multiple functions while standalone systems have non-integrated databases. It is difficult to maintain multiple standalone systems. In case of ERP system, it is a unified system and can be maintained easily. In ERP system a single change affects multiple functions. Researchers have showed that companies spend a lot of time reentering data over multiple places in the standalone systems and there is a high chance of error in this case and redundancy is created. ERP systems have client/server architecture and designed with the aim in mind to make it scalable, and reliable. Some definitions of the ERP are noted below:

"Enterprise Resource Planning (ERP) is a process that integrates the information processing of all routine activities inside an organization (e.g. ordering, billing, production scheduling, budgeting, staffing) and among business partners". *(Turban and Aronson 2001: 877)*

"Enterprise Resource Planning is a cross-functional enterprise system
• An integrated suite of software modules
• Supports basic internal business processes
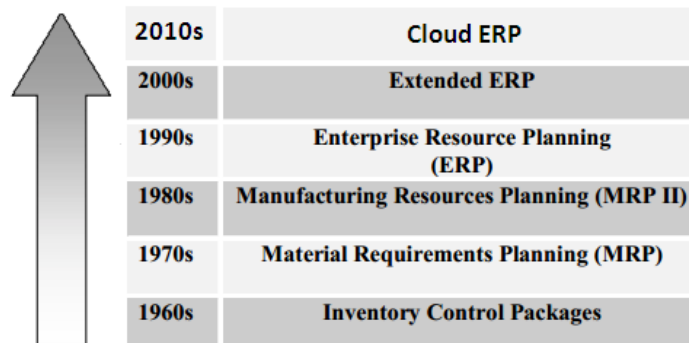•Facilitates business, supplier, and customer information flows". *(Adhikary 2010: 416)*

The central feature of all ERP systems is a shared database that supports multiple functions used by different business units. In practice, this means that employees in different divisions—for example, accounting and sales—can rely on the same information for their specific needs. ERP facilitates synchronized reporting and automation instead of forcing employees to maintain separate databases and spreadsheets that have to be manually merged to generate reports. Some ERP systems allow staff to pull reports from another system for instance, with sales orders automatically flowing into the financial system without any manual re-keying, the order management department can process orders more quickly and accurately, and the finance department can close the books faster. Other common ERP features include a portal or dashboard to enable employees to quickly understand the business' performance on key metrics. The information made available through an ERP system provides visibility for Key Performance Indicators (KPIs) required for meeting corporate objectives. Typically, an ERP system uses or is integrated with a relational database system. In fact, one ERP implementation can vary widely from the next. These differences, however, underscore the flexibility that can make ERP such a powerful business tool.

i. A Brief History of ERP

Enterprise Resource Planning (ERP) has evolved from Material Requirements Planning

(MRP) as a means for covering all of the basic functions of an enterprise, in addition to production and inventory. The term ERP was coined in 1990 by Gartner which is the world's leading information technology research and advisory company and delivers the technology related insight to its clients to make the right decisions. The roots of ERP date to the 1960s but the evolution of the systems dates back to the year 1960 as per ERP history. The Earlier systems were designed to assist the manufacturing process. The first software developed in this process happens to be MRP (Material Resources Planning) in the year 1975 which was followed by another advanced version namely MRP2 which stands for Manufacturing Resource Planning 2. It is observed that none of them fully yielded the benefit of ERP. The stages of the development history of the ERP are shown in the figure 2.2 below:

Figure: 2.2

Evolution of ERP

2010s	Cloud ERP
2000s	Extended ERP
1990s	Enterprise Resource Planning (ERP)
1980s	Manufacturing Resources Planning (MRP II)
1970s	Material Requirements Planning (MRP)
1960s	Inventory Control Packages

a. Inventory Management & Control

Inventory Management and control is the combination of information technology and business processes of maintaining the appropriate level of stock in a warehouse.

b. Material Requirement Planning (MRP)

Materials Requirement Planning (MRP) utilizes software applications for scheduling production processes. MRP generates schedules for the operations and raw material

purchases based on the production requirements of finished goods, the structure of the production system, the current inventories levels and the lot sizing procedure for each operation.

c. Manufacturing Requirements Planning (MRP II)

Manufacturing Requirements Planning or MRP utilizes software applications for coordinating manufacturing processes, from product planning, parts purchasing, inventory control to product distribution.

d. Enterprise Resource Planning (ERP)

Enterprise Resource Planning or ERP uses multi-module application software for improving the performance of the internal business processes. An ERP system often integrates business activities across functional departments, from product planning, parts purchasing, inventory control, product distribution, fulfillment, to order tracking.

e. Cloud ERP

Cloud ERP is Enterprise Resource Planning system that is hosted in a platform over the Internet. The use of the term "Cloud" includes a broad set of applications and software deployment models, namely Software-as-a-Service (SaaS). SaaS is a software delivery method that provides access to software and its functions remotely as a Web-based service. Instead of installing and maintaining software, SaaS can be simply accessed via the Internet, freeing users from complex software and hardware management.

ii. Major components/modules of ERP

ERP systems have multiple modules that can interact with one another. These modules deal with manufacturing, financials, supply chain, customer relations, and human relations. Generally ERP system contains the following common functional areas as its components as shown in figure 2.3 below. In many ERP systems these are called as ERP modules.

Figure: 2.3

Components/Modules of ERP

a. **Manufacturing Module**

The Manufacturing module supports manufacturing-related activities such as plant engineering, scheduling production and materials requirements, , engineering, Bills of Material, scheduling, capacity, Workflow Management, Quality Control, cost control and management, manufacturing process, Manufacturing Projects, Manufacturing Flow, Material & Production Planning (MPP), Shop Floor Control, Routings, Capacity Planning & Scheduling, Purchasing, Lot/Serial Control, Inventory, Workflow Forecasting, product life cycle management etc.

b. **Supply Chain Module**

The Supply Chain module is concerned with ensuring timely supplies of acceptable quality materials by improving inventory control and purchasing functions, supplier performance monitoring, Demand Planning, Supply Chain Planning, Inventory, Purchasing, Order Entry, Product Configuration, Claim Processing, Supplier Scheduling, Supplier Management, Material Management, Purchasing to Jobs/Projects etc.

Manufacturing and Supply Chain modules streamline inventory, supply, and demand information to provide a quick snapshot of current stock, future needs, and past trends. It is also used to view details on labor, equipment, existing orders, satisfied jobs, and shipments.

c. Customer Relationship Management (CRM) Module

The Customer Relationship Management (CRM) module lets employees track customer calls, emails, and other service-oriented contact. Over time, this improves customer service because employees have access to all customer transactions, and management can analyze the qualitative data for trends, making improvements in weak areas. CRM module facilitates such marketing-related activities as sales, Marketing and distribution functions, commission calculations, and customer support and service, customer contact and call center support, Sales Force Automation, Quoting & Estimating, Order Entry etc.

d. Human resources module

When HR functions are maintained into an ERP system, employees can access documents, paperwork, vacation calendars, and other information through the ERP interface. This allows human resources employees to manage the information quickly and effectively, while giving employees easy access to job functions. This module facilitates on Human Resource Recruiting, training, payroll, benefits, diversity management, retirement, separation etc.

e. Financial module

The Financial module aggregates financial reports, business accounts, accounts payable, accounts receivable, cash book, and general ledgers. Financial reporting and business analytics capabilities allow users to run reports and drill down to the level of granularity requires. The Financials module attends to the traditional accounting and cash flow management functions, including accounts receivable, Cash Management, Asset Management, Time and Expense, Financial Reporting, financial consolidation, projects

Costing, Accounts Receivable (AR), Accounts Payable (AP), General Ledger (GL) etc.

f. Sales and Inventory module

Like manufacturing, the sales and inventory module provide insight into the demand for products. View recent and past sales data, see which orders are still outstanding, manage wait lists for out-of-stock inventory, and analyze sales by client, product, and other factors.

ERP system can have other modules as well for functions like Human Resources Management (including payroll), Project Management, and Data Warehousing.

iii. Benefits of ERP

The fundamental advantage of ERP is that integrating many businesses processes saves time and expense. Management can make decisions faster and with fewer errors. Data becomes visible across the organization.   In addition to that ERP system helps to eliminate redundant processes and systems, dramatically lowering the cost of doing business overall. More specifically, an ERP solution gives a global, real-time view of data that can enable companies to address concerns proactively and drive improvements. It improves financial compliance with regulatory standards and reduces risk. ERP also automates core business operations such as lead-to-cash, order-to-fulfillment, and procure-to-pay processes. ERP enhances customer service by providing one source for billing and relationship tracking.

 One of the most important benefits of using an ERP system is to streamline business process. ERP helps the manufacturing process flow more smoothly, and it improves visibility of the order fulfillment process inside the company. That can lead to reduced inventories of the raw materials used to make products (work-in-progress inventory), and it can help users better plan deliveries to customers, reducing the finished goods inventory at the warehouses and distribution points. By providing workflows,

notifications, update and reflect change at related area, an ERP system organizes the business processes. The business operations such as Production, Sales and Marketing, Procurement are tightly integrated and regular communication needs for binding them with each other. For example, one can track the 3-way match between the Purchase Order, Inventory receipts and Costing. In brief, the benefits of ERP systems are: customer satisfaction, better information, productivity, increased quality and decreases in time to market, product cost, delivery time, inventory levels.

iv. ERP System Application

Once, ERP (Enterprise Resource Planning) Systems were only used in large-scale manufacturing companies and big businesses. These days, with the accessibility of quality software in moderate price and increasing computer literacy, an ERP software system is beneficial at all levels of business in terms of increasing productivity, streamlining the work-flow process and standardizing operating procedures across the business. Moreover, many companies realize that increasing market share requires that they be sensitive to marketing changes and make appropriate adjustments. Lots of information processing applications could meet these requirements, and ERP covers almost every essential functional unit of a firm's operations—including accounting, financing, procurement, distribution, marketing, and sales. This information processing tool becomes the bridge that helps different isolated functional units share and update their data immediately, so managers can continually revise strategies based on data from all departments. ERP system can be applied and implemented by following process:

a. Analyze Business Processes
Implementing ERP mainly requires changes in existing business processes. Poor understanding of needed business processes is the main reason for whole ERP system failure. So, it is therefore crucial that organizations thoroughly analyze business processes before they implement ERP system. Analysis can identify opportunities for

process modernization. It also enables an assessment of the alignment of current processes with those provided by the ERP system. With analyzing business process linking current processes to the organization's strategy, analyzing the effectiveness of each process and understanding existing automated solutions also helps for choosing right ERP system to meet Business needs. The ERP application process has been shown in figure 2.4 below:

Figure: 2.4

ERP Application Process
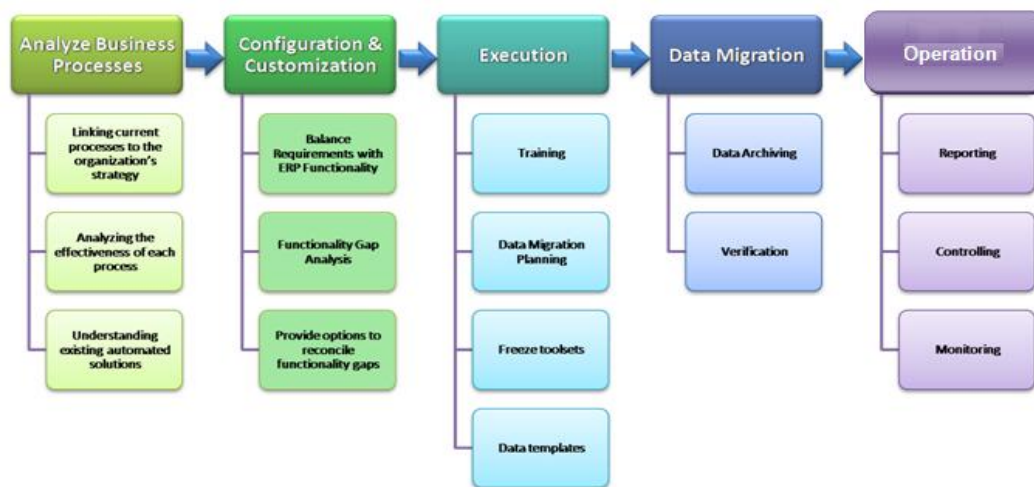
b. Configuration & Customization

One of the best features of ERP system is that it allows custom integration for the business. This means that business-owners can decide which processes work best for their operations and establish best practices specific to their business. Customization is always optional, whereas the software must always be configured before use for example setting up cost/profit center structures, organizational trees, purchase approval rules, etc. Configuring an ERP system is largely a matter of balancing the way the organization wants the system to work with the way it was designed to work. ERP systems typically include many settings that modify system operation. For example, an organization can

select the type of inventory accounting FIFO or LIFO to use; whether to recognize revenue by geographical unit, product line, or distribution channel; and whether to pay for shipping costs on customer returns. ERP systems are theoretically based on industry best practices. ERP offers configuration options that let organizations incorporate their own business rules.

In addition to this, ERP systems can be extended with third–party software. Extensions offer features such as archiving, reporting, republishing, capturing transactional data, e.g., using scanners, Radio-frequency identification (RFID), access to specialized data and capabilities, such as syndicated marketing data and associated trend analytics, Advanced Planning and Scheduling (APS) and managing resources, facilities, and transmission in real-time.

c. Execution

One of the things that business owners can do to smooth the transition in the workplace to a new ERP system is to plan its implementation. Training across the board on how to successfully use the system is essential, as the more familiar human resource will be with the ERP system; the easier it will be to increase productivity and efficiency. While there may be a few difficulties at first, once staff are comfortable with using the system the benefits will become evident.

ERP's scope usually implies significant changes to staff work processes and practices. Generally, three types of services are available to help implement such changes— consulting, customization, and support. Implementation time depends on business size, number of modules, customization, the scope of process changes, and the readiness of the customer to take ownership for the project. Modular ERP systems can be implemented in stages. The typical project for a large enterprise takes about 14 months and requires around 150 consultants. Small projects can require months; multinational and other large implementations can take years. Customization can substantially increase implementation

times.

d. Data migration

Data migration is the process of moving, copying, and restructuring data from an existing system to the ERP system. Migration is critical to implementation success and requires significant planning. During migration phase first of all data to migrate identified, migration timing is determined, data templates are generated, the toolset are set, migration-related setups are decided and data archiving policies and procedures are defined.

e. Operation

For operating ERP, a final to operate checklist is developed and the solution is evaluated. In the checklist whether physical inventory process is completed or not is confirmed. Then, the beginning balance entry procedures are developed for all modules. Any transition issues are addressed. Documents & modifications are tested thoroughly. Executives and departments' heads are fully trained. In addition, a post-implementation audit should be performed after the system has been set up and running for the first week for reconciliation purposes and three to six months following to test whether or not the anticipated Return on Investment (ROI) and business benefits are being realized. Comparing actual numbers with previously established benchmarks will reveal if the ERP system tool does what it is intended to do that is to add value to the business. It is important to periodically review the system's performance to maximize ROI.

While ERP system was established primarily as a tool for the manufacturing and distribution industries, its benefits are so widespread that it has now become common place across the board as an accepted method of coordinating entire organizations. While on the typical type of Nepalese business as of Subha Industries the application of ERP is still to be developed greatly and to reflect benefits of the ERP in Nepalese Industries is long way basically due to developing IT phase in Nepal as well.

2.1.4 Centralized and Decentralized Organization Structures

An organizational structure is the outline of a company's framework and guidelines for managing business operations. Small business owners are usually responsible for creating their companies' organizational structure, which is usually an extension of the owner's personality, management style and characteristics. Two types of organizational structures are found in the business environment: centralized and decentralized.

In Centralized organization, all decisions and processes are handled strictly at the top or the executive level. In a centralized organization, even those decisions regarding everyday operations and processes are generally decided upon by upper level executives or the business owner. Small businesses often use this structure since the owner is responsible for the company's business operations. The main benefit of the centralized organizational structure is that there are only little chances of error in operations. Centralized organizations can suffer from the negative effects of several layers of bureaucracy which can result in sluggish business operations.

In decentralized organization, executives or business owners assign tasks to management and employees and maintain a very open communication. The benefits to a decentralized organizational structure are more flexible and open to change. There is room for innovation and individual thought processes that could benefit the company as a whole or even one simple task. A major benefit of a decentralized structure is that local leaders have more ability to adapt quickly to changes in the local market. A primary disadvantage of the company operating with a much decentralized approach is that the top managers have to relinquish control and put significant faith in the hands of other leaders. Another common disadvantage associated with decentralization is that decision-making is more spread out. Companies with a wide geographical reach can be benefited from a decentralized structure.

The degree of centralization and decentralization will depend upon the amount of

authority delegated to the lowest level. According to Allen, "Everything that increasing the role of subordinates is decentralization and that decreases the role is centralization".

i. Structure in the Procurement Function

The main question is whether the purchasing function in a company should be centralized or decentralized. Centralized purchase gives several advantages such as: larger volumes, which further result in better negotiation position and better prices. Furthermore it is possible to utilize specialized purchasers in a centralized function and it is also easier to coordinate the activities between the company and the suppliers when having a centralized organization. One disadvantage with centralized purchasing function is that it removes responsibility from the different decentralized business units to the central unit. Often the business units are convinced that they can reach better conditions and lower prices on their own without centralized purchase also. The advantage with decentralized purchase is the nearness between the purchase and the end user of the products. If purchasing is an integrated function with the production it is severely difficult to control fully when purchasing is centralized.

There are advantages with both options; therefore the choice of purchase organization will mostly be a mix of both structures. For example, the centralized purchasing function could be combined with purchasers that are localized at the production plant handling the purchase of critical components which has a close connection to the core production processes. On the other hand a decentralized organization could be combined with corporate agreements where the aggregated volume is negotiated and that means that the scale of the purchase is achieved with corporate bargains. In Subha Industries, centralized purchase could only be reasonable if the need of supplies is extremely high or if the manufacturer produce and supply that temporarily or seasonally as in the case of some valuable herbs.

ii. Centralized Warehouse

The modern information technology has enabled the possibility to manage and structure a huge amount of data. This facilitates that different organizations could exchange information without any delay. This has enabled a new distribution structure. The new distribution structure is based on a centralization of both the warehouses and the administrative operations. The previously most common structure was a vertical organization of the warehouses, containing central warehouses and regionally controlled regional warehouses. However, there are several cases such as listed below in which the centralized warehouse lead to decreased costs and furthermore also increased service levels:

- Whole Product Range availability

- Reduction in Safety Stock

- Economies of scale:

- Reduction of the Bullwhip Effect

- Less Non-Value Adding Activities

iii. Structure for Material Management in ERP

Enterprise Resource Planning (ERP) system integrates both internal and external information flows used by the organization within a single, comprehensive solution for material management. An ERP solution incorporates the practical systems used by organizations to manage the basic commercial functions of their business, such as: product planning, inventory/materials management, purchasing, manufacturing, marketing and sales, by-product and scrap management or disposal etc. ERP solutions run on a variety of computer hardware and network configurations, including client/ server or hosted i.e. "cloud-based" or Software as a Service. Regardless of the configuration, typically ERP solutions use a common database to hold information from the various business functions that's accessible in some form or another by various users. The use of an integrated database to manage the solution's multi-module application framework within a common information system is one of the primary ERP benefits.

ERP solutions standardize the use of one application to run an entire business. This not only increases efficiencies, but also decreases the overall Total Cost of Ownership (TCO), thereby reducing operational costs and improving the company's profitability. This support for streamlined sourcing and procurement processes drive alignment to customer demands, and also deliver a centralized buying model to reduce unauthorized and unnecessary expenses.

The information system that should be used to manage the centralized warehouse should be linked directly to customer needs. When the customers place an order, the order should immediately be transferred to a replenishment order at the central warehouse. The speed of the information system enables production and replenishment to be based on point of sales data combined with forecasts. As a result the administrative lead-time should be close to zero and all information gathered at all the different markets should immediately be available to the distribution administration. The management of a supply must reflect the product characteristics. A functional product with stable demand suffers a hard price competition. Therefore, it is crucial to optimize such a supply in terms of optimal order quantities and minimized inventory levels. This could be achieved when the forecast is accurate, which facilitates better production planning.

2.2 Review of Articles

On the review of articles, some the related notable literatures on more perspectives and scopes of the ERP for Material Requirements Planning (MRP) are reviewed. The generation of the approach for the new system on this thesis are guided and based on these review of articles, so these are significant in the research of this thesis.

Moon (2007) published an article on *" Enterprise Resource Planning (ERP): A Review of the Literature"* explaining the Enterprise Resource Planning (ERP) system is an enterprise information system designed to integrate and optimize the business processes and transactions in a corporation. The ERP is an industry-driven concepts and systems,

and is universally accepted by the industry as a practical solution to achieve integrated enterprise information systems. The concept of ERP seems to be growing and expanding, how the companies using the ERP system perceive the trends how they will cope with the changes, what tools, methodologies, models are useful in their expansion efforts.

Rajathi, Kathiravan and Jacob (2011) published as article on *"Managing Enterprise Resource Planning (ERP) - Enabled Change for Future Perspective"* highlighting ERP market has grown and will continue to grow in future. They opines that ERP had its genesis in manufacturing; users form a range of other industry sectors are taking advantage of ERP benefits, resulting in an expected compounded annual growth rate of 4.8% over the next five years. Historically and traditionally, ERP was exclusive to manufacturing, going back to its roots in MRP (Manufacturing Resource Planning). There has always been a need for integrated solutions, Integration has been difficult, but Service-oriented Architecture (SOA) provides value to the enterprise by freeing key pieces of business functionally from individual systems and making them available for integration with other applications. Most ERP vendors are incorporating the other enterprise applications-Customer Relationship Management (CRM), Enterprise Asset Management (EAM), Product Lifecycle Management (PLM), Supply Chain Management (SCM), and Supplier Relationship Management (SRM) and offering them under the ERP umbrella.

Jangra (2009) published an article on *"An Organization Can't Survive without ERP"* focusing the benefits from the ERP on the organization. ERP Systems are the backbones of the modern day industries .These are a set of applications combining key functions like finance, production. Sales, logistics, statutory compliance, human resources etc., in an integrated fashion. In a manner these combine Enterprise Resource Planning system with extended enterprise needs like employees, customers and vendors. He highlighted five points that ERP will fix in business, they are as follows:

- Integrate financial information

- Integrate customer order information
- Standardize and speed up manufacturing processes
- Reduce inventory
- Standardize HR information

He further mentions what does ERP really cost. For that he presents one study that Meta Group recently conducted. The study looks at the total cost of ownership (TCO) of ERP, including hardware, software, professional services and internal staff costs. The TCO numbers include getting the software installed and the two years afterward, which is when the real costs of maintaining, upgrading and optimizing the system for your business are felt. Among the 63 company's surveyed-including small, medium and large companies in a range of industries – the average TCO was \$15 million (the highest was \$300 million and lowest was\$400,000). While it's hard to draw a solid number from that kind of range of companies and ERP efforts, Meta came up with one statistics that proves that ERP is expensive no matter what kind of company is using it .The TCO for a "heads-down" user over that period was a staggering\$53,320.

Hahn (1989) published an article on *"Material Requirements Planning and Purchasing"* explaining Material Requirements Planning is an information processing system that seeks to develop and maintain a set of orders that support the production plan, while simultaneously "minimizing" the inventory levels within the production system. Orders within an MRP system fall into two categories:

 i. Open orders which have been released but have not yet arrived
ii. Planned orders which are developed in anticipation of future releases.

Each category can contain both purchase orders and shop orders. Regardless of type, MRP monitors each order to maintain the proper timing and sizing to insure adequate control of inventory levels. Clearly, the purchasing function's goal (providing the right quantity of the right material at the right time) is consistent with MRP's maintenance of

order timing and sizing. MRP differs from traditional inventory planning approaches in several ways. For one, traditional methods use a historical approach to forecast future demand for individual items. This approach assumes that past data is representative of future demand, a doubtful assumption, in today's dynamic business environment. Instead, MRP actually calculates future requirements for each item rather than relying on forecasts. This process allows MRP to anticipate requirements based on the current production plan of the firm.

Dr. Hasan (2013) published an article on *"A study on Material Requirement Planning System for Small Scale Industries"* giving the standard DFD for MRP system which is given in figure 2.5 below.

Figure: 2.5

The standard DFD for MRP system
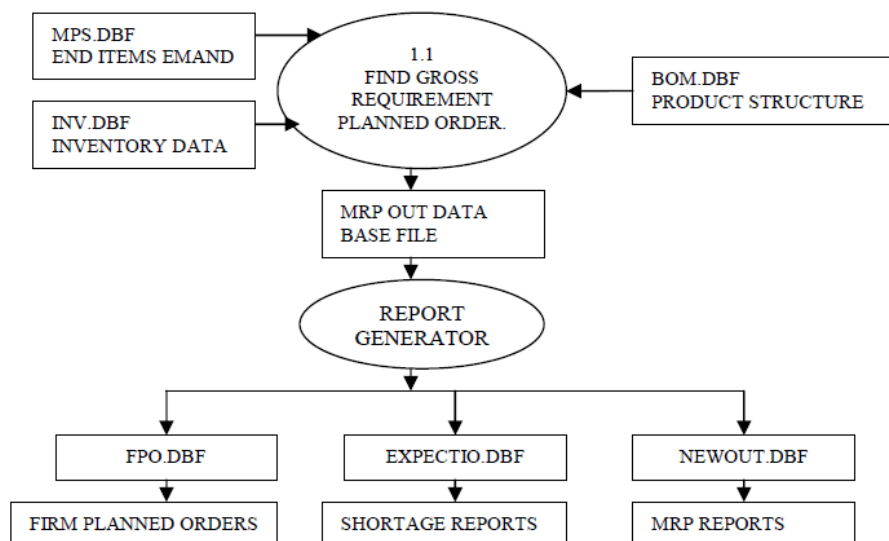
His MRP software design for Small Scale Industries has been designed, developed and tested by him while he has carried out study at Triveni Engineering Works Ltd, Naini, Allahabad, India on 2011-2013. He suggested that the given methodology for developing MRP System is particularly helpful for small scale industries. He also presented the

standard menu for the MRP software which is given in the figure 2.6 below.

Figure: 2.6

The standard menu for the MRP
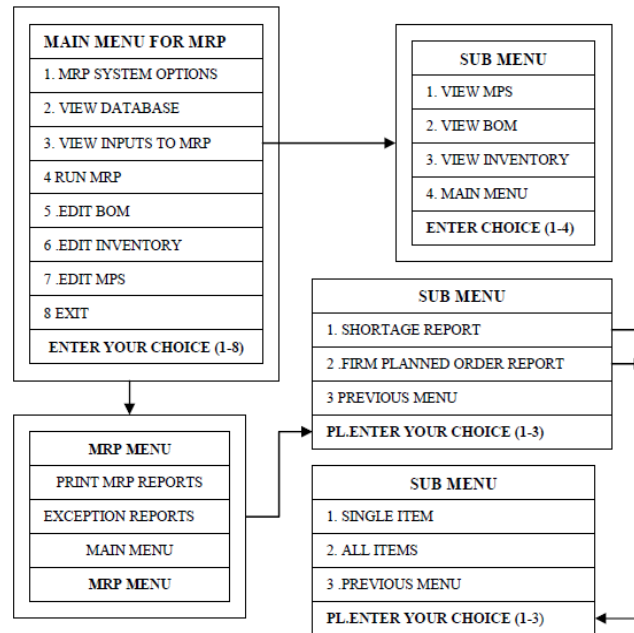
Ptak and Smith (2012) published an article on *"Demand-Driven Material Requirements Planning"* explaining that DDMRP is flow of agility from a fundamental break from the antiquated rules, tools, and ad hoc systems characterized by traditional material requirements planning (MRP) and distribution requirements planning (DRP) implementations is needed. DDMRP is a no-compromise fusion of relevant MRP and DRP tactics, combined with the pull-based approaches and signals of lean and the theory of constraints. The solution includes planning and execution innovations for better lead time compression and execution visibility.In DDMRP, demand and supply signals are synchronized that make capacity scheduling simpler, more realistic, and less stressful. Thus flow and agility are achieved, and the global landscape can more effectively manage the current capacity challenges so many companies are facing.

Scavo (2011) published an article on *"Embracing and Extending MRP and JIT"* explains about Demand Driven MRP (DDMRP) as MRP is only a planning tool and JIT is only an execution tool, whereas DDMRP is both a planning tool in the modeling and planning stages and an execution tool, in the execution stage. In DDMRP, demand is driven entirely or largely by actual customer demand typically sales orders. He further explain Just-In-Time (JIT) Technique was a simplification in material planning and it took inspiration from the quality management movement and Toyota Production System in Japan. JIT is essentially a "pull system"--relying upon simple demand signals, such as Kanbans, from customers to suppliers up and down the supply chain, often with little or no computerized support. Unlike MRP, which viewed inventory as an asset, JIT viewed inventory as a "waste" and sought to minimize it wherever possible by minimizing variation in supply and demand, and reducing setup times to enable smaller lot sizes. But its emphasis on inventory reduction, lack of a system-wide view of inventory, and incomplete planning equation created brittle supply chains, subject to disruptions. DDMRP seeks to align efforts and resources as close as possible to actual demand while at the same time, like MRP, provide "visibility to the total requirements and status picture across the enterprise.

Fransoo and Wouters (2000) published an article *"Measuring the bullwhip effect"* explaining bullwhip effect. He mentions that the bullwhip effect is the increased demand variability in MRP mechanism. The practical measurement of this effect that have to do with the aggregation of data, incompleteness of data, the isolation of demand data for defined MRP process that are part of a greater order and supply web. Inefficiencies in the MRP, such as parts shortages, underutilized plant capacity, excessive finished goods inventory, or runaway transportation costs, are caused by inaccurate or untimely information. These MRP inefficiencies can cost as much as 25 percent of a company's operating costs. If a manufacturer had perfect information about exactly how many units of product customers order, when they demand them, and when they could be

produced, it would be possible to implement a highly efficient JIT strategy. Components would arrive exactly at the moment they were needed and finished goods would be shipped as they left the assembly line. In the MRP, however, uncertainties arise because many events cannot be foreseen such as uncertain product demand, late shipments from suppliers, defective parts or raw material, or production process breakdowns.

2.3 Review of Thesis

Shrestha (2004) conducted a research study on *"Role of MIS in Franchising Network"*. His study is completely based on the specific module/component of integrated MIS like MIS for Sales (For Marketing Department), MIS for franchising networks (For Franchising Department), MIS for Inventory (For Warehouse), MIS for Payroll (For HR and Admin Department) and MIS for Finance. All modules are integrated are capable of cross functioning, querying, retrieving information, and generating information as and when required.

Some specific objectives of researcher's study:
- To analyze and study the current Information System for Franchised Network.
- To analyze the software and hardware environment of current Information System.
- To evaluate appropriateness and effectiveness of current Information System.
- To analyze the effectiveness of the MIS in monitoring and evaluation of franchising network.

Shrestha concluded that this system has proved to be a reliable source of information, to all the personnel of the franchising department. Personnel at various levels are acquiring required information from the system and implementing it in their daily operation. This system thus is successful to some extent to enhance the productivity and efficiency of personnel and is aiding to make quality decision, which in turn is helping the organization to achieve its ultimate goal.

Acharya (2002) conducted a research study on "*Implementation of MIS in RNAC- A case study in marketing department*" with following objectives:

- To present and analyze existing IS of Marketing Department of RNAC
- To examine the flow of information to co-ordinate and communicate different divisions and units of marketing information.
- To provide recommendations on the basis of major findings that has been drawn out in the research study.

The study was carried out by using following methodology:

- Data was collected from both primary and secondary sources. Observation, questionnaire, interview were the tools used to collect data from the primary sources while data of different department of RNAC, Journals, News letters were the secondary sources of information.
- Tables and figures, system approach, data flow diagram, flow chart were used to present the data in the study. Data collected from primary sources are displayed in table format and the data have been analyzed using percentage method.

Finally, Acharya concluded with the following:

- The implementation of MIS is necessary for the effectiveness of the department.
- The department needs network based computerized information system to eliminate the drawback generated by paper based information system and traditional way of centralizing the information and authority.
- Need for proper infrastructure for the implementation of MIS in the department.

Bhattarai (2003) conducted a research study on *"Performance of MIS in Kumari Bank"* with the following objectives:

- To identify factors affecting performance of MIS.
- To examine the existing situation of software personnel of the bank.
- To study the relation of training of end-users in the bank for improvement of the

performance of MIS.

- To provide suggestions on the basis of the findings.

The study was carried out by using following methodology:

- Data was collected from both primary sources. Observation, direct communication and questionnaire are used to collect data.
- Data collected from primary sources are displayed in tabular format and the data have been analyzed using percentage method.
- Tables and figures, system approach, data flow diagram, flow chart were used to present the data in the study.

Bhattarai concluded that banks have installed the latest MIS software to manage their information needs, consolidation and streamlining in the software in taking place even years the initial purchase thus reducing the benefits to certain extent. The various factors like training to software personnel, training to end-users, good communication channels were identified which has a direct bearing on the performance of MIS.

Khadka (2004) conducted a research study on *"MIS and its Application in HMG/DANIDA"*. His study is mainly focus on the management information system of HMG-N/DANIDA, Natural Resource Management Assistance Programme (NRAMSAP)- a system which handle the database, provides computing facilities to the end-users and gives a variety of decision making supportive tools to the endures of the system is focused on MIS in present context. The thesis has put an effort to go into the root of the problem of providing information, management of information, purposeful use of information, and correctness of the information. He has also attempted to provide an effective information collection system and recommended some areas where the management should address with help of available information.

The specific objectives mentioned in his study are:

- To study and examine the present practice and effectiveness of MIS in DANIDA.

- To identify need and importance of MIS in DANIDA.
- To provide recommendations for the betterment of MIS if it is needed.

His major findings are as follows:

- The information system in DANIDA is based on both manual as well as computer based information system.
- There is effective use of computer in each and every organization function as well as departments.
- Almost all the department in DANIDA uses computer and information system based on computer. The use of computer is for decision making, statistical analysis, and clerical work, accounting and forecasting, information generation based on the information provided by computer.
- All the departments have been keeping detail information about their transaction and performance.

Anu (2005) conducted a research study on "*Information System of C-MODE Inc.*" His study explains MIS is not new; only its computerization is new. Before computers, MIS techniques existed to supply managers with the information that would permit them to plan and control operations. The computer has added one or more dimensions, such as speed, accuracy, and increased volumes of data, which permit the consideration of more alternatives in a decision. He used specially websites such as www.c-mode.biz and www.nmepbiz.com for primary source of data and direct/indirect personal investigation through observation, participatory observation were the secondary source of data to achieve the objective of this study. His research study is also exploratory and descriptive in nature. The objectives of his study are as follows:

- To study the existing information system in C-MODE Incorporation and its co-company www.nepbiz.com.
- To investigate, analysis and evaluate computer information system efficiency for

administration in C-MODE Inc.

- To indentify the gaps/problems and to assess the impact of computer information system in C-MODE Inc.

- To provide recommendation, based on the analysis.

He concluded noting the following drawbacks in the information system of C-MODE:

- Case of double charge for customer credit card due to invalid inputs to the system.

- No hard and fast rule regarding money transfer.

- Error on modification of the system.

Raghuvanshi (2006) conducted a research study on *"MIS in Cable Television organization"*. His study explains Subscriber Information System (SIS) as a part of Management Information System (MIS) play vital role to provide subscriber information to user as on organizational need. Subscriber information, which is properly managed, helps to achieve organizational effectiveness through effective managerial actions and processes by right managerial decisions. Subscriber information helps to combine revenue, turnover and cost effectively to attain objectives of maximization of profit. Subscriber information is vital, not only to planning but also for controlling organizational activities. The objectives of his study are as follows:

- To study existing performances and evaluate effectiveness of Subscriber Information System

- To examine the software and hardware environment of Subscriber Information System.

- To provide useful suggestions and recommendation to the firm on its Subscriber information system and management on the basis of the findings.

Raghuvanshi has concluded that the organizations establish the information system once and don't take care of it till it gets late. Time to time modification and adoption of information system according to situation is necessary. The benefit from the information

system is limited due to underutilization of the system.

Research Gaps

A brief review of above mentioned thesis, it is seen that Acharya, has conducted a research study on the implementation of MIS and its necessity for the effectiveness of the RNAC department. The complex organizational structure and multidivisional structure of the marketing department is ambiguous, it is necessary to made clear. Bhattarai A.P. has tried to identify factors affecting performance of MIS. He has explained the existing situation of software personnel and studied the relation of training of end-users for improvement of the performance of MIS. Shrestha, Satya Narayan tried to analyze and study of the current Information System. He has also analyzed the software and hardware environment of current Information System and analyzed the effectiveness of the MIS in monitoring and evaluation. Khadka, Ashis has tried to examine the present practice and prevalence of management information system and analyzed effectiveness of MIS. Anu, Sunil has defines MIS is not new; only its computerization is new. Before computers, MIS techniques existed to supply managers with the information that would permit them to plan and control operations Like wise, Raghuvanshi, Keshav has also to tried to examine Subscriber Information System (SIS) as a part of Management Information System (MIS) play vital role to provide subscriber information to user as on organizational need.

Above-mentioned reviews show that most of the studies have only highlighted the study of the existing system, study of hardware and software environment, existing situation of personnel, effectiveness of MIS and general type recommendation. In this thesis, I have tried out to eliminate most of the drawbacks that were found in earlier researches. I have tried to explain the significant of Enterprise Resource Planning (ERP) in MRP, which probably might be the new field for the study as I could not find the thesis done before on ERP. For making the research, more specific and appropriate I have demonstrated the

real time ERP environment that users and management encounters while carrying out ERP based operations. Moreover, I have tried my best to avoid ambiguous data collection method in the research and I have carried out this research in pure practical perspective, which definitely would be a new type of research breed as compared to earlier researches.

CHAPTER-III

RESEARCH METHODOLOGY

This thesis aims at the summarized presentation of the Enterprises Resource Planning related to the Material Requirements Planning (MRP) process of Subha Industries. So, the methodology used here are purposeful to meet the requirement of analyzing the ERP in the Material department of the company. The materials department is responsible with releasing materials to supply to the customers, ensuring that the materials are delivered on time to the company using the correct carrier. The methodology describes the research design used, data and information gathering techniques, selected tools and procedures used in the analysis. Further more, it is shown in figure 3.1 and described below:

Figure: 3.1

Working Procedure for Research
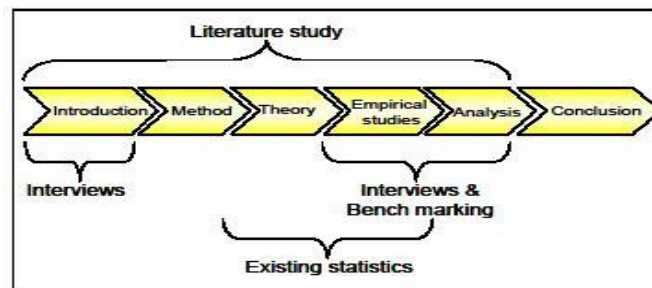
3.1 Research Design

Though the thesis focused on the MRP process, first of all it was important to be familiar with the works, objectives and the procedures of the company so, necessary data related with Subha Industries were gathered. For the collection of data, I have visited to Subha Industries, Head Office which is located Rabibhawan and processing and packing industries located at the Kapan, Kathmandu and met the Head and assistants of Material Department, IT department, Godowns and marketing personnel also. Collection of data consists of filtering the data that is useful for the study of the thesis. Then, I made a thorough study of all the data collected. After this, the necessary data were sorted and analyzed in a systematic manner. Personal interviews and observation were also conducted as per the requirement. Thus, after the collection of primary and secondary

data, the final thesis was prepared. This thesis is designed in such a manner that it describes the overall MRP process of the company. The table 3.1 below presents a sample of different techniques available for the Research Design. Consequently, this thesis work is based on the Survey data, secondary data, statistical analysis and the case studies. Data has been gathered for analysis from the real world, i.e. empirical data. Both qualitative and quantitative methods have been used. The followed techniques for this thesis work has been circled for the convenience in the below table 3.1.

Table: 3.1
Different Research Designs

Case studies has been studied on as many aspects as the topic can cover whereas in a survey many observations are made but regarding only a few aspects which relates to the Material Requirement Planning (MRP) process and the ERP application on it. Concerning the problem analysis, a survey approach was not suitable as many factors of a complex system i.e. ERP needed to be covered and therefore a case study as a preferable method to follow.

3.2 Population and Sample

In research, the term "Population" universe means all the number of any well defined class of people, events or objects. In this thesis, research population has been taken as all departments, employees as well as concerned external all suppliers and parties of the Subha industries.

Population study means study of the large sector but the sample means the selected study of the population. In this study, sample means the study of the Material Requirements Planning (MRP) of the Inventory Division of the Subha Industries.

3.3 Nature and Sources of Data

Once the purpose of statistical investigation has been defined, the next step is to collect the data, which are relevant for analysis in a meaningful manner. Thus, the collection of data is considered as an integral part of the research activity. The sources of information are generally classified as primary and secondary.

a. Primary data

Primary data are generally used in those cases where the secondary data do not provide an adequate basis for analysis. In certain cases both data may be employed.

i. Direct Personal Investigation (Or Observation)

The data for this project are collected directly through personal observations of the selected company. Primary data used in this thesis have been mainly collected by personal visit and the direct conversation with the personnel to know about the working procedures using the ERP software and the effectiveness upgraded in the supply process.

ii. Indirect Oral Investigation (Personal Interviews)

Detailed interviews of some Material department, Marketing department, Godowns, Finance and IT department personnel are conducted to collect primary data. As the data are specific in nature to the information technology, I met to the IT department head to have the direct information. The priority is given to the importance of the question according to the thesis work while taking interviews.

b. Secondary Data

The reason why secondary data are being increasingly used is that published data are now available covering diverse fields so that the researchers find required data readily available to him/her in many cases. Besides these, the availability of finance and time are also taken into consideration. The data collected secondarily are the annual report of Subha Industries, Government of Nepal-Commerce and Supplies Ministry website, published official documents, magazine and published reports/statements.

3.4 Data Collection Procedures

Data collected by the researcher or through agent for the first time from related field and possessing original character are known as primary source data. Primary data are also called field source. On the other hand, data collected by others, used already and are made available to others in the form of published statistics are known as secondary data. Once primary data have been used, it loses its primary characteristics and becomes secondary data. Keeping in the view of explorative nature of the study, primary source is the main source of information and data. Primary data enhances the accuracy of the information but for the purpose of the comparison overlook relying only on the primary data will not be effective so much as its take too much time and effort also on the accomplishment there can be risk of being information outdated by such tendency. So, the effective research should comprise both primary and secondary data in the required proportion. Keeping this in mind, data required for this project is acquired from both primary and secondary sources. The primary data are collected by self effort and the secondary data used in this project is from the magazine, annual reports of the Government of Nepal-Commerce and Supplies Ministry, web page, etc.

Data which are used in this project is collected both primarily and secondarily. The choice between the two sources viz. primary and secondary data depends on:

- Nature, scope and object of inquiry/study.
- Availability of financial resources and time.
- Degree of accuracy desired.
- The status of the investigator.

3.5 Analytical Tools and Technology

The following tools are used in this project to represent the data that provide meaningful information for the reader.
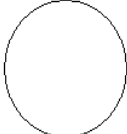
3.5.1 Graph and Table

Various graphs and tables are used to present the data and information of the Subha Industries. Since the visual presentation of data is much better than that of data only. The

reader can quickly gain the knowledge through the analysis of graph and table.

3.5.2 Data Flow Diagram

For the graphical representation of data flow process in the organization the data flow diagram is used. Data flow diagram is a picture of the movement of data between external entities and the processes and data stores within a system. Data flow diagrams (DFD) can be used data flow diagram to represent both physical and logical information systems. There are different standard sets of data flow diagram symbols, but all sets consist of four symbols that represent the same things: data flows, data stores, processes, and sources/sinks (or external entities). The set of symbols used in this thesis work in this project was devised by DeMarco and Yourdon. The symbols and their indicated objects have been described and shown in figure 3.2 below:

Figure: 3.2

Data Flow Diagram Symbols

Object	DeMarco & Yourdon symbols
External Entity (rectangle)	
Data Flow (arrow)	
Data Store/ Database (Two parallel lines)	
Process (Circle)	

i. Data Flow
A data flow can be best understood as data in motion, moving from one place in system to another. A data flow could represent the results of a query to a database, the contents of a printed report, or data on a data entry computer display form. A data flow is data that move together. Thus, a data flow can be composed of many individual pieces of data that

are generated at the same time and flow together to common destinations.

ii. Data Store

A data store is also known as database. Data store is data at kept in storage location. A data store may represent one of many different physical locations for data, for example, a file folder, one or more computer based file, or a notebook. A data store might contain data about customers, students, customer orders, or supplier invoices.

iii. Process

A process is the work or actions performed on data so that they are transformed, stored, or distributed. When modeling the data processing of a system it doesn't matter whether a process is performed manually or by a computer.

iv. External Entity

Finally, an External Entity or source/sink is the origin and/or destination of the data. Source/sinks are sometimes referred to as external entities because they are outside the system. Once processed, data or information leave the system and to some other place.

3.5.3 Flowchart

Flowchart is diagrammatic presentation i.e. graphical map of the program and has been used in this report for same purpose. Figure3.3 shows the standard symbols of the flowchart that has been used in this thesis:

Figure: 3.3

Symbols of the Flowchart
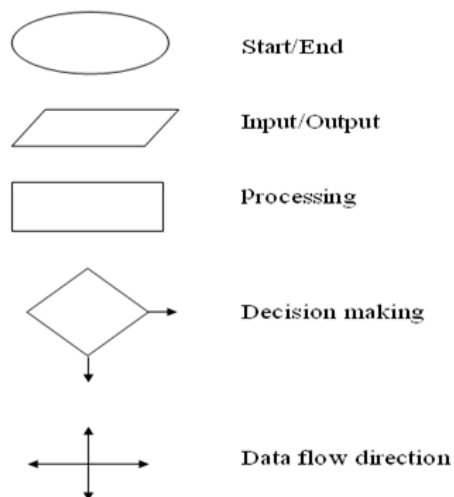
3.5.4 Entity Relationship Diagram (E-R Diagram)

E-R diagram is graphical representation of different entities and their relationship. It is a tool for relational database management. For what we are collecting the data is called entity. This may be the things, place, person etc. In another term we can define the term entity as the collection of attributes. To design the database structure, we have to analyze the entity and create the database structure. For example: customer is an entity which is described by various attributes like customer ID, Customer Name, Address. Characteristics of the entity are called attributes. For e.g.: attributes of the customers are customer ID, Customer name, Address etc. To construct the database structure we have to integrate different entity to form an entity set. To establish the relation and perform the integrated work on database structure, we have to show the relationship between the table and Entity. Figure 3.4 shows the standard symbols of the E-R Diagram that has been used in this thesis:

Figure: 3.4

Symbols of E-R Diagram (Entity-Relationship Diagram)
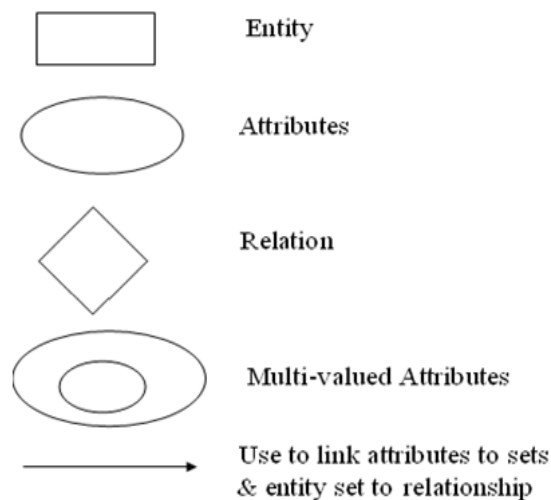
There are three types of relationship which are given below:

- One to One relation
- One to Many relation
- Many to Many relation

3.5.5 Class Responsibility Collaborator (CRC)

A Class Responsibility Collaborator (CRC) model is a collection of standard index cards that have been divided into three sections. A class represents a collection of similar objects, a responsibility is something that a class knows or does, and a collaborator is another class that a class interacts with to fulfill its responsibilities. Table 3.2 is the sample of the CRC.

Table: 3.2
Class Responsibility Collaborator (CRC)

Class Name	
Responsibilities	Collaborators

3.5.6 Physical Database Design (Data Dictionary)

The data dictionary system is an encyclopedia of information concerning each data element. It describes the data and its characteristics such as location, size and data type. It also identifies the origin, use, ownership file, special software is necessary to create it, maintain it and make it good using. Data dictionary would ensure consistent definitions of data across different databases. If data need to changed, it would also identify the entire database affected by the change.

A data dictionary or data repository is a central store house of information about the system's data. An analyst uses the data dictionary document and organizes specific facts about the system, including contents of data flows, data stores, external entities, and process. The database consists of a number of tables that store information regarding the entities. The tables of the system have been designed in such a way that all appropriate information about the different system elements can be stored and used as required by the system. The data dictionary table should have the following sections:

- Table Name: This section has the name of the table that is used to identify it in the database.

- Table Description: This section contains a brief description of the table. It describes

the element about which the table contains information.

- S.No: Each field within a table is assigned a serial number for the ease of referencing it in the document.

- Field Name: This section contains the name of the fields in the database.

- Data type: This section contains the data type of the field. The data type indicates the type of data that the filed contains.

- Length: This section contains the maximum length of data that the field can contain.

- Constraints: This section lists out any constraints on the field. They are:

  i. Primary Key (PK): This indicates that the field is a unique identifier or a part of the combination of fields that act as the unique identifier.

  ii. Unique (U): This indicates that the value of this field should be unique for each separate record in the table.

  iii. Not Null   (NN): This indicates that this field cannot contain Null (blank) values for any of the records in the table.

  iv. Foreign Key (FK): This indicates that this field references another field in another table.

A sample of Data Dictionary related with payment information is given below:

Table: 3.3
Sample of Data Dictionary

Table Name   : PAYMENT
Table Description :
This table stores the Payment Identification Code, Type, Amount, Date and other attributes of the payment made by the customers.

S.No.	Field Name	Data Type	Length	Constraint
1	PYID	Int	10	PK
2	Type	Varchar	60	NN
3	Date	DateTime		NN
4	Amount	Money		NN
5	Order	Int	10	FK
6	Customer	Int	10	FK

CHAPTER-IV
SYSTEM ANALYSIS, DESIGN AND DATA PRESENTATION

The goal of ERP system in Material Requirements Planning (MRP) is to provide an unbroken chain of components for production to manufacture goods on time for the customer base. The materials department is charged with releasing materials to a supply base, ensuring that the materials are delivered on time to the company using the correct carrier. Effectiveness of ERP system with respect to the materials is generally measured by its support for accomplishing on time delivery to the customer, on time delivery from the supply base, attaining a freight budget, inventory shrink management, and inventory accuracy. The ERP on materials department is also expected greatly for playing key role of managing new launches.

ERP for materials management is also used with the procurement of materials by establishing and managing a supply base. In the purchasing activity it is then responsible for the calculation and records of purchased price variances from the supply base. In some companies ERP is used to keep track of the customer changes as well. This logistics related module of ERP ensures that the launch materials are procured for production and then transfers the responsibility to the plant materials management

4.1 System of Subha Industries

The ERP (Enterprise Resource Planning) can help the organization in every aspect with agile control. Material Requirements Planning (MRP) is also easy by adopting the ERP system. With respect to this the Subha Industries is using Tally.ERP 9, its growing software in terms of ERP solutions which has added features than in its previous versions for better Material Requirements Planning of the company.

i. Tally.ERP 9 Overview

Tally.ERP 9 is the world's fastest and most powerful concurrent Multi-lingual business

Accounting and Inventory Management software. Tally.ERP 9, designed exclusively to meet the needs of small and medium businesses, is a fully integrated, affordable and highly reliable software. Tally.ERP 9 is easy to buy, quick to install, and easy to learn and use. Tally.ERP 9 is designed to automate and integrate all the business operations, such as sales, finance, purchasing, inventory, and manufacturing. With Tally.ERP 9, accurate, up to-date business information is available anywhere. The powerful new features and blazing speed and power of Tally.ERP 9 combined with enhanced MIS, Multi-lingual, Data Synchronization and Remote capabilities helps to simplify all the business processes easily and cost-effectively. The brief introduction of the Tally.ERP 9 developing company is given in Appendix II: Tally Solutions Pvt. Ltd.

ii. Key Features of Tally.ERP 9

Tally has many notable features some features related to this research are listed below:

- **Complete business solution**

  Tally.ERP 9 provides a comprehensive solution to the accounting and inventory needs of a business. The package comprises financial accounting, book-keeping and inventory accounting. It also has various tools to extract, interpret and present data.

- **Integrated/ Non-integrated accounting and inventory**

  With Tally.ERP 9, the user is able to choose between accounting and accounting with inventory. If accounting with inventory is opted for, the user can choose whether it should be integrated or not.

- **Flexible and easy to use**

  Tally.ERP 9 is very flexible. It mimics the human thought process, which means that Tally.ERP 9 can adapt to any business need. Tally.ERP 9 users need not change the way their business is run to adapt to the package. Tally.ERP 9 provides flexibility to generate instant reports for any given period (month/year) or at any point of time besides providing the facility to toggle between Accounting & Inventory reports of the same company or between companies.

- **Unlimited multi-user support**

  A multi-user version of Tally.ERP 9 can be installed on a network, having any number of computers with different operating systems such as Win 95, 98, NT, 2000, XP and Linux.

- **Internal backup/ restore**

  Tally.ERP 9 has an in-built, user-friendly 'backup and restore' option. It helps the user to take a backup of one or more companies or all companies, in a single directory, in the local hard disk, or in any external media.

- **Data reliability**

  Tally.ERP 9 offers reliable data. It uses a flexi-field, flexi-length, self-indexed, weighted file structure for an extremely compact and fast database. Tally.ERP 9 is robust and even if there is a power failure or the computer is incorrectly shut down, data is not lost. Tally.ERP 9 uses signaling quality data integrity checks, at regular levels, to ensure the complete reliability of data.

- **User-defined security levels**

  Tally.ERP 9 offers high levels of security. Users can define multiple levels of security according to their requirements. Every authorized user in the company can have an individual password, with rights to use specific features only. The user with the administrator level password will have full access and can set controls for other users.

- **Data security**

  Tally.ERP 9's data integrity checks ensure that there are no external changes to the data. Tally.ERP 9 also uses a binary encoding format of storage to prevent devious grouping of information.

- **Graphical analysis of data**

  Tally.ERP 9 provides graphical analysis of data which helps the user to perform deeper analysis. The user can generate graphical analysis reports such as Sales register, Purchase register, Ledgers, Funds flow, Cash flow, Stock Item registers and

so on. This helps the management to quickly judge performance and be better pre-pared for difficult times.

- **Speed**

  Tally.ERP 9 provides the capability to generate instant and accurate reports, which assists the management to take timely and correct decisions for the overall productivity and growth of the company.

- **Real time processing**

  Immediate posting & updating of books of accounts as soon as the transactions are entered, thereby facilitating instant statements & Reports. It also facilities real-time multi-user environment.

- **Versatility**

  Tally.ERP 9 is suitable for a range of organizations, from small grocery stores to large corporations with international locations and operations.

The notable new features of Tally 9.ERP related with the ERP system is given in Appendix III: New Features of Tally 9.ERP.

iii. Inventory Features of Tally.ERP 9

Tally.ERP 9 provides business the capability to record inventory transactions without changing the way which matches the business nature. It provides numerous predefined Inventory vouchers to suit the business requirements and flexibility to create unlimited stock items, use simple to complex conversion units and generate invoices with the required information and dimensions. Tally. ERP 9 has many features related to the inventory management for Material Requirement Planning with the ERP perspectives. Tally. ERP 9 inventory features has been broadly categorized in basic and advance inventory features. The Table 4.1 below shows the inventory key features of Tally.ERP 9 at the glance:

Table: 4.1

Inventory Features available on Tally.ERP 9

BASIC INVENTORY	ADVANCED INVENTORY
Stock categories	Stock items classified as raw materials, work-in-process, finished goods
Stock query by stock group, or stock category	Bill of Material with auto-adjustment of stocks
Multiple godowns	Job-working concepts, including sub-contracting
Stock transfers to godowns and branches	Additional cost of manufacturing with notional value and percentage
Multiple stock valuation methods	CENVAT support
Batch-wise/ Lot-wise, including expiry date handling	Reorder levels
Alternate units of measure and tail units.	Stock ageing analysis
Tracking through receipt notes/ delivery notes/ rejections inwards/ rejections outwards	Batch related stock reports
Additional costs incurred on purchase	Point of Sale (POS)
Movement/ Profitability analysis Party-wise/ Item-wise/ Stock Group-wise	Excise/ VAT/ Central Sales Tax (CST)/ Tax Collected at Source (TCS) related Inventory transactions and reports
Customisable sales invoices using price lists with multiple prices	
Sales and purchase order processing	

4.1.1 DFD of Existing System

The Data flow Diagram (DFD) of exiting system of the Subha Industries is shown in figure 4.1 below. The figure 4.1 also shows the DFD with external entities (source/sink) of existing Material Requirements Planning (MRP) of Subha Industries. The brief descriptions of the flow of data are also given below:

Entities

- **Supplier**

  Suppliers provide goods, price lists and advice notes. The company gets necessary goods and technology through the domestic and international supplier. MRP system defines the economic order quantity to be ordered. Similarly the supplier provide invoice to the system for payment.

- **Primary Manufacturing Department**

  MRP system provides necessary raw materials to the primary manufacturing department and receives semi-finished goods from it. The department orders the necessary raw materials and report about the work in progress.
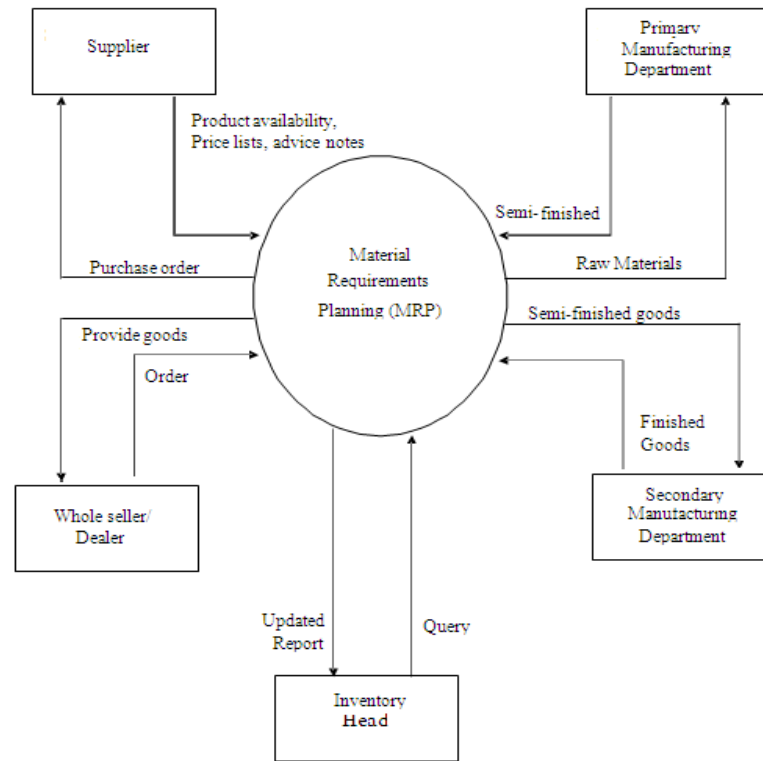
- **Secondary Manufacturing Department**

  MRP system transfers the semi-finished goods to the secondary manufacturing department and receives finished goods from it. Necessary order are being made by

the department and its report its work in progress to the MRP system

Figure: 4.1

DFD of Existing Material Requirements Planning (MRP)

- **Wholesaler/Dealer**

  In domestic markets, wholesaler receives goods from the MRP system in bulk and distribute to retailers and secondary wholesaler. Secondary wholesaler too transfers goods to retailers. Finally the goods are made available to the customer by retailers. The MRP system provides goods to the dealer and record the report. In international market, Subha Industries generally distribute to wholesaler or sometimes to the bulk purchasing customer.

- **Stock/Inventory Head**

  In existing system of the Subha Industries there is no manager level for inventory management. A Stock Head along with his assistants observes and controls the inventory stock level, procurement and delivery issues. Head is liable for planning and controlling the whole MRP system effectively. Manager receives necessary

information as report as he queries the ERP system to the overall flow of goods.

4.1.2 Analysis of Existing Technology

Subha Industry is using popular software in India and Nepal i.e. Tally ERP.9 of which performance is proven and technology is being developed to world class. For the overall management of the company activities ERP software Tally ERP.9 is performing in full fledge mode. It serves all the functional areas of the company including material department. All the technologies existing in the company is as per the requirement of its ERP i.e. Tally ERP.9. Short description of the technologies used in the existing system is as follows:

- **Cellular SMS information**

  Tally ERP.9 has this new features added which makes Tally ERP.9 more useful for ERP than its earlier versions. In the MRP system after accomplishment of the every transaction the information is updated in the system through SMS. It is an easy and fast communication device which enhances quick reporting and decision making.

- **ERP**

  Enterprise system is that which can look after overall activities of the company and provide prompt decision making tools. In Subha Industries the MRP system is handle by the ERP called Tally ERP.9. Each and every data related to MRP is updated to the MRP system in Tally ERP.9 immediately. This enhances better performance of the overall company.

- **Additional Softwares**

  Besides of the Tally ERP.9 , the company is using various incentive software's for better performance. It has been using various data entry software too. Which, finally support the Tally ERP.9.

- **Computer/Intranet/ VSAT**

  Subha Industries has intranet to make regular communications with collection points of raw material, factory and the Head Office. For this network it has paid VSAT

service from Vianet. The data and information transfer so seamlessly from factory to corporate house and vice-versa.

4.1.3 Limitations of Existing System

In general, the ERP package an organization selects should be based on four factors: functional capabilities, technical attributes, partnership and cost. Other considerations are to observe functional fit with the organization's business practices, degree of integration among components of the ERP system, flexibility and scalability, user friendliness, quick implementation, ability to support multisite planning and control, technology--Client-server capabilities, database independence, security, availability of regular upgrades, amount of customization required, local support infrastructure and costs--License, training, implementation, maintenance, customization, hardware requirements.

Along the time, all firms need to radically rethink the application architectures, delivery, and supporting business models from technology providers, consumers, and services firms that connect the dots to deliver complete applications to manufacturing companies to support operations excellence across integrated manufacturing operations. The urgency is to support that growing demand for manufacturing systems that enable demand-driven manufacturing. The global manufacturing community needs to recognize that force-fitting gigantic applications into manufacturing operations is costly, risky, and ultimately creates systems that hinder agility, defeating the original intent. While adopting ERP the company has to change its structure according to the requirement of the ERP. Tally ERP.9 is introduced in 2009 and Subha Industries upgraded from Tally 7.2 version to Tally ERP.9 for ERP but due to its developing phase it has some limitations also.

The shortcoming of the existing ERP system of Subha Industries found during the course of this research has been listed below:

- **Inflexibility**

  Inflexible ERP business processes don't mesh with the realities of detail manufacturing operations. Customization of Tally in Nepal is very difficult due to

lack of experts and if hired from India that will be very costly.

- **Matching Manufacturing Methods**

  ERP has functional inadequacies when faced with varieties of product ranges of the company with multiple manufacturing styles with their own characteristic data models. Also, adapting ERP to manufacturing requires domain knowledge that corporate IT business groups don't have.

- **Lack of IT services**

  Subha Industries has its resources collection points mainly in Nepal's western region. Some of the region lacks the Internet service provider (ISP) and IT technicians. This challenges the whole organization being connected in the single ERP network.

- **Lack of Skill Manpower**

  Subha Industries lack the manpower having the significant knowledge in ERP system also it does not have managerial level in inventory management separately. Deployment of ERP applications in Material Requirements Planning (MRP) requires significant IT skills along with inventory management skills.

- **Uncertain ROI**

  The complexity and cost of ERP deployments and traditional hard-wired automation approaches have created an automation threshold, and it's been difficult to justify the ROI for manufacturing software investments below it.

Despite the sufficient features of Tally ERP.9 for the Subha Industries for giving information by extranets, the company is not allowing its distributors to access information through its intranet. Because of this the distributors are unable to get updated information about the product and the Material Requirements Planning (MRP). So there are the greater chances of the bullwhip effect

4.2 Major Findings of the Existing System

Enterprise systems promise to integrate diverse internal business processes of a firm into single information architecture, and that integration can have a very large payback if firms install and use enterprise software correctly. Enterprise systems can produce value

both by increasing organizational efficiency and by providing firm wide information to help managers make better decisions. Finding of existing system Tally ERP.9 are discussed below:

i. **A more uniform Organization**

Company can use enterprise systems to support organizational structures that were not previously possible or to create a more disciplined organizational culture. For example, they might use enterprise systems to integrate the corporation across geographic or business unit boundaries as well as with business partners to create a more uniform organizational culture in which everyone uses similar processes and information. An enterprise-enabled organization does business the same way worldwide.

ii. **More efficient Operations and Customer-driven Business Processes**

Enterprise systems can help create the foundation for a more customer-driven organization. By integrating discrete business processes in sales, production, finance, and logistics, the entire organization more efficiently respond to customer requests for products or information, forecast new products, and build and deliver them as demand requires. Manufacturing is better informed about producing only what customers have ordered, procuring exactly the right amount of components or raw materials to fill actual orders.

iii. **Firm Wide Information for Improved Decision Making**

In addition to monitoring operational activities such as tracking the status of orders and inventory levels, enterprise systems also improve organization-wide reporting and decision making. Senior management can more easily find out at any moment how a particular organizational unit is performing. For example, an enterprise system might help management immediately determine which products are most or least profitable. Enterprise software includes analytical tools for using data captured by the system to evaluate overall organizational performance. Tally ERP.9's enterprise software includes analytics for profitability management, product and service

cost management, overhead cost management, risk management, balanced scorecard, value-based management investment planning, and other tools for giving managers a comprehensive view of firm performance.

4.3 Concept of Modifying the System

Besides the company is running performance proven software Tally ERP.9, it has to improve in its utilization. The company is using the ERP for its internal entities only; it must expand the use of the ERP to the external entities too i.e. for the distributors. The company is also growing its market within Nepal as well as abroad. It doesn't mean that it has to stop enhancing the system. While distributors get limited information about the supply system there is the problem of bullwhip effect. So to remove this problem the company system must include distributors too or must let its distributors to access some limited data from the supply system.

Accurate data about the demand from the customer and the availability of the product in certain time help the company to reduce its operating costs. When there is the close system the distributors can't know about the availability of the product and the company itself doesn't know when and what quantities of product are necessary to meet the customer demand. This might cause the bullwhip effect such as distributors ask for more products suspecting that the price will go up or the demand will be high, this effect the company production and the company has to increase its production for the abstract demand which really doesn't exist. So, for the effective Material Requirement Planning (MRP) system the information must be shared by all entities.

4.4 Comparisons between New and Existing System

The new system is all about improving the existing system i.e. maximizing the utilization of current ERP system i.e. Tally ERP.9. Currently ERP is only been used in intranet and the new system try to expand its use in extranet too i.e. distributors. In the new system some limited information about the stock, production and demand for the product are make available to the distributors to minimize the problem of bullwhip effect. The distributors get regular information about the availability of product and they maintain

their stock and order rationally.

i. Impact of Bullwhip Effect

The variability that results from Bullwhip effect can cause numerous problems for the manufacturers such as:

- Excessive inventory investments
- Poor customer service levels
- Lost Revenues
- Reduced Productivity
- More difficult decision making
- Sub-Optimal transportation
- Sub-Optimal production

ii. Cracking the Bullwhip Effect

The most effective process for smoothing out the oscillations of the Bullwhip Effect will be customers and suppliers understanding what drives demand and supply patterns and then, collaboratively working to improve information quality and compressing cycle times throughout the entire process. The firm can follow some measures stated below to minimize the Bullwhip Effect:

- Minimize the cycle time in receiving projected and actual demand information.
- Establish the monitoring of actual demand for product to as near a real time basis as possible.
- Understand product demand patterns at each stage of the material management.
- Increase the frequency and quality of collaboration through shared demand information.
- Offer the products at consistently good prices to minimize buying rushes brought on by temporary promotional discounts.
- Identify, and preferably, eliminate the cause of customer order reductions or cancellations.

Even the most modern of ERP systems for Material Requirements Planning (MRP), with all the bells and whistles, cannot automatically stop the Bullwhip Effect. It's a demand management process problem with very broad implications because it often encompasses policies, measurements systems, practices and, in some cases, the very core of an organization's value and belief system. However, the degree of negative effect it can have on sales, market share, cost and profits can be enormous. Bullwhip Effect is certainly a tough but very necessary problem to solve.

4.5 ERP Application Modeling

Material Requirements Planning (MRP) is viewed as a network consisting of suppliers, manufacturers, distributors, retailers, and customers. At the operational level, this network supports three types of flows that require careful planning and close co-ordination:

- **Material flows**

  This represents physical product flows from suppliers to customers as well as the reverse flows for product returns, servicing, and recycling.

- **Information flows**

  This represents order transmission and order tracking, and which coordinate the physical flows.

- **Financial flows**

  This represents credit terms, payment schedules, and consignment and title ownership arrangements.

Moreover, the Material Requirements Planning ERP is supported by Three Pillars which are as follows:

- **Processes**

  These embed the firm's capabilities in logistics, new product development, and knowledge management.

- **Organizational Structures**

  These encompass a range of relationships from total vertical integration to networked companies as well as management approaches, and performance measurement and reward schemes.

- **Enabling Technologies**

  These include both process and information technologies.

i. An Integrated Model of the MRP

Material Management perform two principal functions: the physical function of transformation, storage and transportation, and the market mediation function of matching demand and supply. While the physical function has been extensively studied within the production control and inventory management literature with a view to locally minimize cost, innovative approaches to the market mediation function were suggested only recently. Material Requirements Planning (MRP) design is concerned not only with the specification of customer zones, selection of manufacturing and distribution facilities, and allocation of product families to these sites, but also with the prioritization of the capabilities to be developed and retained internally, and the forging of new partnerships with other entities along a supply network.

MRP design ought to be thought of as a dynamic process of assembling chains of capabilities and not just collaborating organizations. This view is particularly important in a fast-evolving world where new products and emerging distribution channels necessitate a continuous review of MRP design decisions. ERP software providers will refer to the rate of change in products, processes, technologies, and organizational structures within an industry as that industry's clock speed. Just like product design has an enormous impact on manufacturing performance, superior MRP design offers significant payoffs in managing and coordinating material management activities. This dynamic view may necessitate different perspectives or mappings for MRP design. These perspectives include: organizational MRP, capability MRP, and technological MRP. An organizational map shows all the entities in a company's extended MRP and

illustrates all value-adding activities performed by each organization along the MRP system. A focus on technology, on the other hand, traces the lines of dependency upstream to the suppliers and downstream to the customers, who provide and use, respectively, key technologies along the MRP system. Finally, a focus on capability aims at identifying the key business process capabilities, which currently exist as well as which are desirable, along the MRP system.

ii. Matching Demand and Supply in ERP

ERP coordination is concerned with the coordination of the three types of flows once the MRP design is finalized. Effective MRP strategies (as shown in figure 4.2 below) combine a range of approaches from operational flexibility such as the make-to-order (MTO) or postponement capability, channel alignment (e.g., vendor-managed inventories, VMI), and joint decision making through information deployment (e.g., collaborative planning, forecasting and replenishment, CPFR). These approaches, in turn, typically lead to new forms of organizational structures (e.g., process orientation) and new forms of inter-organizational collaboration (e.g., outsourcing via third-party service providers or contract manufacturers). This transformation has coincided with the emergence of information and communication technologies facilitating closer collaboration and promoting MRP transparency.

Technological breakthroughs, particularly in information technology, can significantly enhance both the efficiency of the network operations and the effectiveness of customer service on a global basis. From this perspective, MRP solutions can, at best, be temporary as well. In other words, MRP is a dynamic challenge that requires a series of solutions in the face of changing industry requirements. The validity of a particular MRP solution is therefore determined by the clock speed of the industry, which reflects the rate of change in products, processes, technologies, and organizational structures in that industry.

Figure: 4.2

An Integrated Model of the MRP
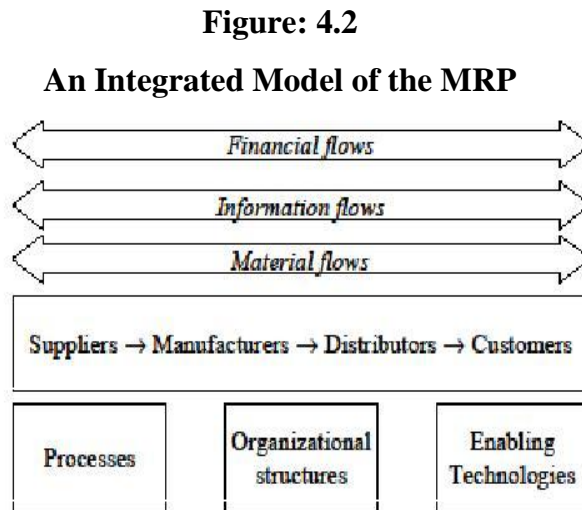
4.6 Class Responsibility Collaborator (CRC)

CRC Chart regarding the Product in Material Requirements Planning (MRP) system for Subha Industries is given in the Table 4.2 and its detail data dictionary is given in Table 4.3 below:

Table: 4.2

CRC for Product in MRP system for Subha Industries

Product	
Item Code	Inventory Division
Item Name	
Unit of Measurement	
Product Category	
Supplier I.D.	
Price	

4.7 Physical Database Design (Data Dictionary)

In Data Dictionary of Subha Industries, various MRP related information is maintained which is presented in the table 4.3 showing Data Dictionary for Product Information, table 4.4 showing Data Dictionary for Product Category Information, table 4.5showing Data Dictionary for Suppliers Information and table 4.6 showing Data Dictionary for Product Order Information. These tables are given below:

Table: 4.3

Data Dictionary for Product Information of Subha Industries

Table Name : PRODUCT
Table Description :
This table stores the Product Identification Code, Name, Description, Category,
Producer, Price and other attributes associated with the Product that MIS

S.No.	Field Name	Data Type	Length	Constraint
1	PID	Int	10	PK
2	Name	Varchar	100	NN
3	Description	Text		
4	Price	Money		NN
5	Producer	Int	10	FK
6	Category	Int	10	FK

Table: 4.4

Data Dictionary for Product Category Information of Subha Industries

Table Name : CATEGORY
Table Description :
This table stores the Category Identification Code, Category Name and Parent Category
ID. The category table groups the products

S.No.	Field Name	Data Type	Length	Constraint
1	CATID	Int	10	PK
2	Name	Varchar	60	NN
3	Parent Category	Int	10	

Table: 4.5

Data Dictionary for Suppliers Information of Subha Industries

Table Name : SUPPLIER
Table Description :
This table stores the Producer Identification Code, Name, Address and other attributes
associated with the Producer that supplies the product

S.No.	Field Name	Data Type	Length	Constraint
1	PRID	Int	10	PK
2	Name	Varchar	60	NN
3	Address	Varchar	120	NN
4	Telephone	Char	10	
5	E-Mail	Varchar	50	U, NN
6	Products	Varchar	200	NN

Table: 4.6

**Data Dictionary for Product Order Information of Subha Industries**

Table Name : ORDER
Table Description :
This table stores the Order Identification Code, Customer, Order Date, Order Status and
other attributes associated with the Order that the customers

S.No.	Field Name	Data Type	Length	Constraint
1	OID	Int	10	PK
2	Customer	Int	10	FK
3	Product	Int	10	FK
4	Payment	Int	10	FK
5	Orderdate	DateTime		NN
6	Orderstatus	Varchar	20	NN
7	OrderQuantity	Int	10	NN

4.8 Entity-Relationship Diagram

There are various sorts of entities and relationship in the Subha Industries, here being related to the thesis topic products orders related internal process of the Subha Industries is presented in figure 4.3 below:
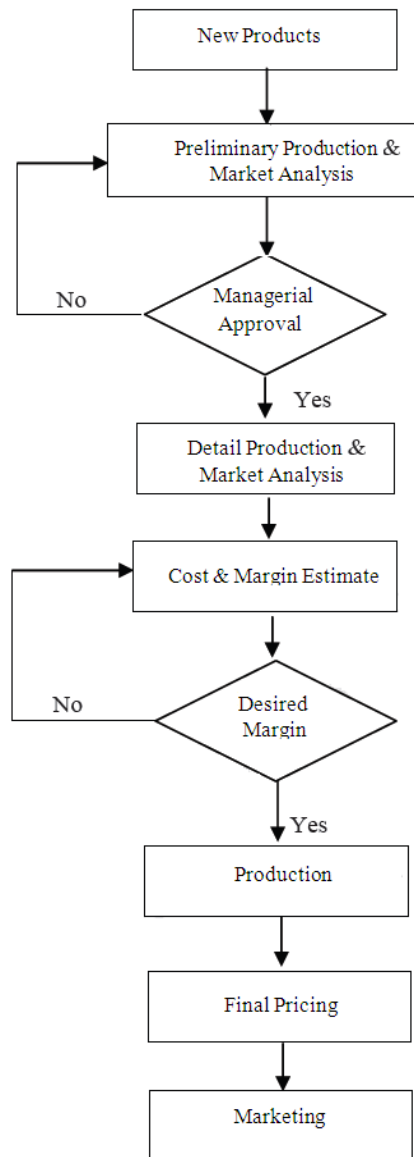
Figure: 4.3

E -R Diagram of the Ordering Internal Process of the Subha Industries
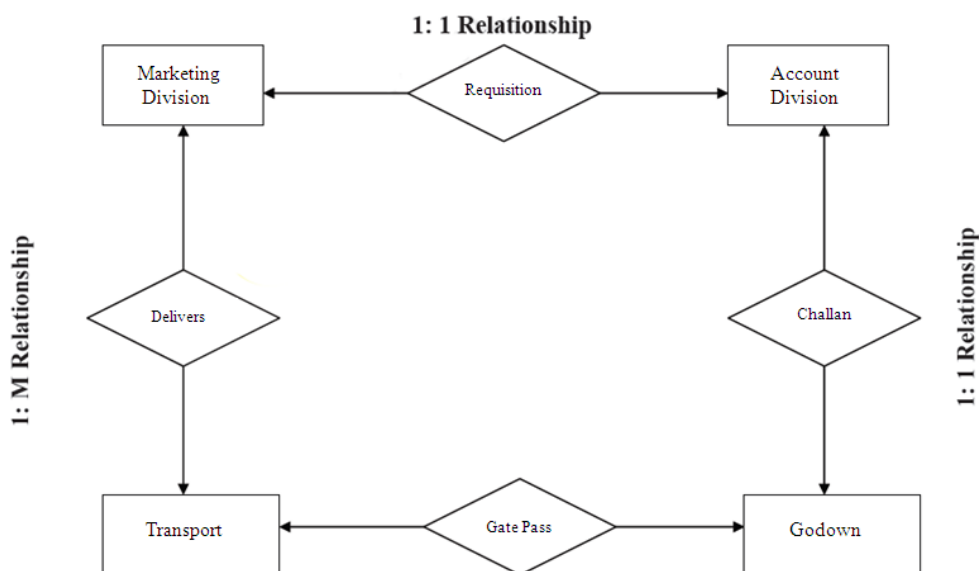
4.9 Flowchart

Subha Industries as raising company, it seeks to produce the new products. Many customers especially for Medicinal products, incense sticks etc demands new mixes. Thus, the flowchart representing the process of new product in the Subha Industries is presented below in figure 4.4. The customers' taste and the preferences for the different product is the key for the new product conception in herbal sector while in the context of Nepal all the design are not producible not only by the financial limitations but also by the lack of raw materials in every seasons, lack of skill manpower in the country and the in some cases due to the many statutory requirements that has to fulfilled before, during and after production and marketing. But since every herbal industries has been developed with new products Subha Industries also develops or copies the new product designs.

Figure: 4.4
**Flowchart for the process of New Product in the Subha Industries**

4.10 Data flow Diagram (DFD) of New System

The Data flow Diagram (DFD) of new system for the Subha Industries is shown in figure 4.5 below. The DFD shows the extranet establishment with external entities (source/sink) and the role of Inventory Manager that could play in Subha Industries for better Material Requirements Planning (MRP).

Figure: 4.5

Data flow Diagram (DFD) of New System
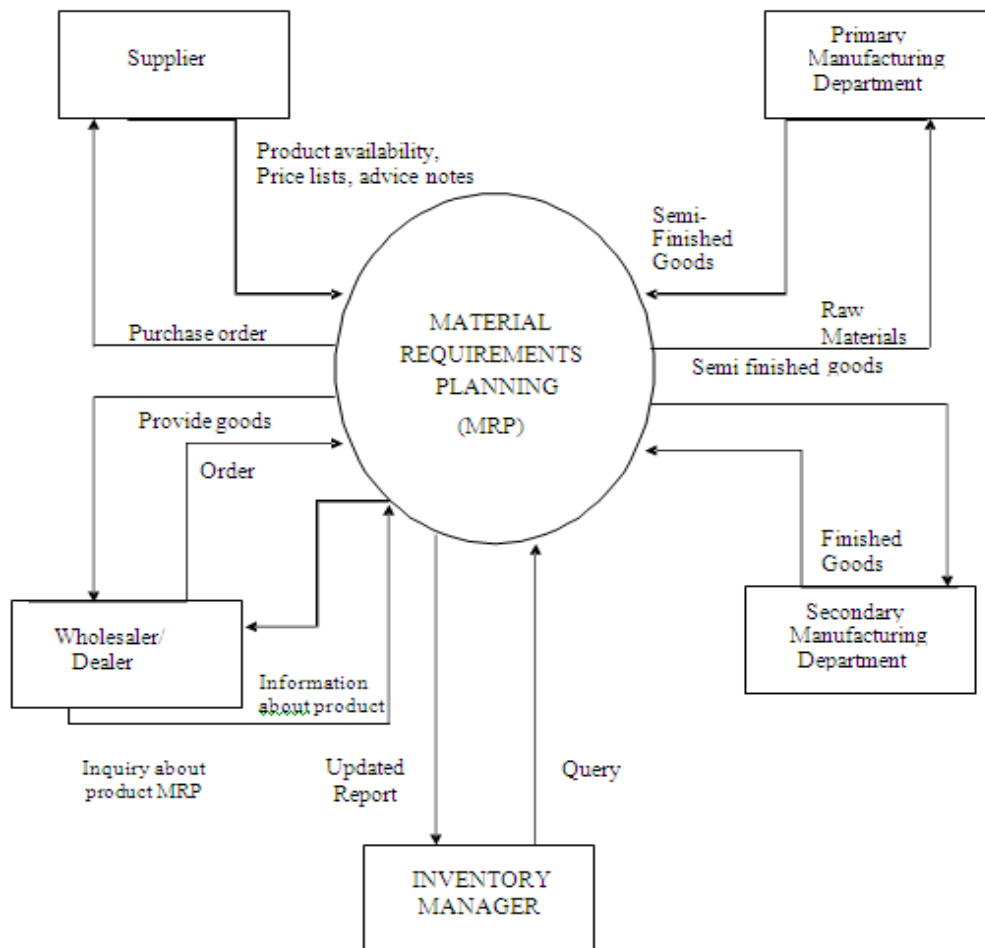
Since the new system is all about eliminating the bullwhip effect in Material Requirements Planning (MRP) system, effort is made here to enhance the use of system to its dealers. In new system the dealers can enquiry about the product MRP such as availability of the product, total production, production processes or stages and the system provides these information in return. The role of Inventory Manager is introduced in new system to ensure the smooth running of products and effective as well as profitable Material Requirements Planning. There will be no over stock or safety stock will be reduced to greater quantity as the dealer and the company also get exact information about the demand and reduce operation cost.

4.11 Cost benefit Analysis and Feasibility Analysis of New System

Adopting the new system cost is equal to zero as its benefits are more than investment for that. In other hand the new system will reduce the operation cost of the company and smooth flow of the products. The system enhances the company to manage the real demand and stop over production and under production too. This too increase the operation cost for the company. Eliminating the bullwhip effect will also ensure dealers for the availability of the product and reduce their stock cost. Production will be just equal to the demand of the product. This will benefit entire organization. For ensuring the effective Material Requirements Planning (MRP) the role of the Inventory Manager is greater. Since, Subha Industries trend of processing herbs and producing new products from the collected raw material is raising than the direct selling of the herbs in raw form, the company must recruit the Inventory Manager. The new system is highly feasible as it is all about enhancing the use of the ERP system in Tally ERP.9 which the company is using already. In the new system the dealer can also access the concerned information about Material Requirements Planning (MRP).

CHAPTER - V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

Subha Industries is one of the raising companies in Nepal and international arena regarding its product line: raw and processed herbs as well as herbal products. While in matter of using Information and communications technology (ICT) in manufacturing and management it is growing to ERP functionality. Since, its top management being desirous for having IT controlled company so that they can address more demands of international market promptly, it has standardized system. No doubt that the company has leading ERP software i.e. Tally.ERP 9 but that's not sufficient for the overall material management of MIS. So, there are lot more things to do for effective Material Requirements Planning (MRP). Every single data need to be entered into the ERP and so that related information can be accessed by the concerned entities.

In some segments and products like smudge stick, incense, soaps, tea, some medicinal herbs and essential oils etc. the company usually produces somehow large number of goods and at the end of season and it has to clear its stock by offering discount in international market while in domestic market it has to offer the scheme like buy 1 and get 1 free or buy 2 and get one free. The company produces the products with the knowledge that there is the large demand for the product and by the end of season it realized the problem of over production. The information flow over the MRP is exaggerated that's why there is the problem of over production. In real, the demands turn to be smaller from the customer and while the information flow from bottom to company it has been exaggerated. This is the effect of bullwhip in exiting Material Requirements Planning (MRP) and the existing ERP system need to be improved to address this effect.

Though, the MRP system is also being managed by Tally.ERP 9, there is the lack of full utilization of it. The information for the external entities (wholesalers and retailers) is lacking. External entities can't access to the MRP data. That's why they don't know

about the finished goods, production capacity, goods in production process and the stock of semi and finished good. Because of this initially they demand more being afraid that they will not get enough goods despite the small demand from customer, which results over production. So, to eliminate this problem (bullwhip) the company must use its ERP fully for effective Material Requirements Planning (MRP) with giving appropriate information access for its external entities too.

Subha Industries also should have an Inventory Manager who is clearly responsible for managing over and under stock problems as well as who does the material requirement planning, production planning, distribution scheduling and godown management. As the company is trending to produce and market more processed herbal products than to directly supply raw herbs as it used to do in its earlier days, it's the time for Subha Industries to reconstruct its organization chart to address the need of present and near future business scenario.

5.2 Conclusion

Several management and academic writers have recently asserted that the advent of the network economy is fundamentally changing prevailing business models in general and Material Requirements Planning (MRP) in particular. The relevant entity for analyzing potential business success is no longer bounded in the individual firm, but in the network of delivering and supplying organizations; the individual firm is only a single part of this network. This greatly increases the importance of ERP on Material Requirements Planning for corporate survival. Today, ERP systems have become an organizational standard in business management because they replace isolated systems to complete umbrella system. Once ERP is installed, there exists a process-oriented enterprise transaction backbone that can support within a single firm developments in many business areas, including Material Requirements Planning. But ERP systems were never designed just to support MRP. The rapid development of more open, modular, and flexible IT solutions has been encouraging. The emergence of the Internet and its communication protocol along with voluntary industry-specific standards will certainly facilitate interfacing the individual ERP implementations. Moreover, these technologies

and concepts aid significantly in creating plug and play IT infrastructures for ERP systems so that the users is not restricted to the workspace or any device. Also the ERP in which specific solutions for specific problems can easily be added to an existing ERP environment can be developed. This would enable the creation of a flawless Material Requirements Planning and the realization of tangible benefits from the significant IT investments of the past decade.

The concept of this thesis is to crack the bullwhip effect which in return minimize operation cost and maintain smooth flow of the products. For make-to-stock production systems, which are included in different Material Requirements Planning, the production plans and activities are based on demand forecasting. The orders are supplied by stock inventory, in which policy emphasizes the immediate delivery of the order, good quality reasonable price, and the standard products. Delays in the order delivery to the customers are inexcusable, so the supplier must maintain sufficient stock. It has been recognized that demand forecasting and ordering policies are two of the key causes of the Bullwhip Effect. The Bullwhip effect is a wasteful phenomenon that occurs due to lack of information across the MRP mechanism. Basically the Bullwhip effect is the safety stock for the safety stock; because dealers hold extra stock for their customers the same way retailers hold extra stock for their customers. Wholesalers need safety stock for the safety stock. Situations where information is not shared between the manufacturer and the wholesalers may cause a heavier burden on the safety stock or a greater expenditure in shortage cost. The negative effect on business performance is often found in excess stocks, quality problems, higher raw material costs, overtime expenses and shipping costs. In the worst case scenario, customer service goes down lead time lengthen, sales are lost, costs go up and capacity is adjusted. An important element to operating a smooth flowing Material Requirements Planning (MRP) is to reduce and preferably eliminate the Bullwhip effect.

5.3 Recommendations

The ERP software i.e. Tally.ERP 9 of Subha Industries is fine for now and its near-future of up to five years after that if the company needs more features probably the Tally

Solutions develop new versions of Tally ERP version and as the Subha Industries upgrade its previous Tally 7.2 version to Tally.ERP 9, it can go on upgrading the system. So, the effort is made here to improve the current Material Requirements Planning (MRP) of the company by customizing the software and by other measures. Discussion is made here in three aspects: Customization, standardization and global IT/ERP systems.

i. Customization

Customization involves the steps of the ERP application development .Customization is basically done to meet the specific needs of management mainly intended for production cost reduction. Many times, mass customization combines the advantages of mass production. Such as: customizing the medicinal herbs segment with different product range. Customization is also required to fit the production system of the other segments like smudge stick, incense, soaps, tea and essential oils. ERP supports mass customization only if customers can configure their products as a combination of a number of predefined options. The emergence need of the herbal business to have ecosystem friendly ERP system as per international trade criteria should also be the work while mass customization. Moreover, the features of current ERP systems makes it possible to construct catalogues containing a large number of standard finished products as well as enter the multiple range of the price lists. The Subha Industries has the vision to rise as the best-of-breed so, with any type of customized functionality; it needs available top ERP solutions.

ii. Standardization

Here, standardization is considered from two different points of view: the enterprise-internal perspective and the whole Material Requirements Planning (MRP) system perspective. Starting with the former, an enterprise wide ERP system does have a huge impact on standardization of both processes and data. ERP allows for efficient processing of, for example, technical changes in bills of material or updates in customer data. Regarding standardization of processes, ERP almost enforces processes through its use of best-practice templates. It facilitates consistent behavior among all material

management partners by having harmonized processes and by providing access to a single source of data. In addition, by standardizing data and processes, ERP technically enables consistent performance measurement for their own enterprise as well as for monitoring their partners' performance. Seen from the MRP perspective, some ERP vendors have set a genuine standard in certain industries (e.g. Pumori in Banking sector; Abacus in Air Ticketing, FACT in trading business) similarly; Tally ERP.9 has wide scope in manufacturing industries as its previous versions. This helps in the standardization of business processes and data models across entire sectors.

iii. Global IT/ERP System

Globalization of businesses requires worldwide ERP implementations. The main issue with global ERP implementations is having Information Technology that allows for accessing an ERP system from any location in the world. Moreover, as ERP systems are increasingly web-enabled, the company should have its webpage so the technical limitations for better ERP diminish even further. In Globalized form, ERP provides significant benefits: some of them lie in their technical architecture (client/server computing), others stem from their functional (multi-lingual, multicurrency and time-zone capabilities). Before globalizing, some organizational decisions have to be made prior to technology deployment, these includes: to what extent does a global company really need or want harmonized processes? Where does one draw the line between local and global processes? Should the company standardize systems or interfaces? There is option to enforce similar processes on a global scale or to allow local-for-local processes. If one truly believes in the networked economy, the local-for-local processes also connected to the global is the preferred one, as it supports dynamic Material Requirements Planning (MRP) design. Having a gigantic global ERP system gives prompt and agile information to facilitate one of the tough works of any manufacturing company i.e. Material Requirements Planning (MRP) in better ways to add up Return in Investment (ROI).

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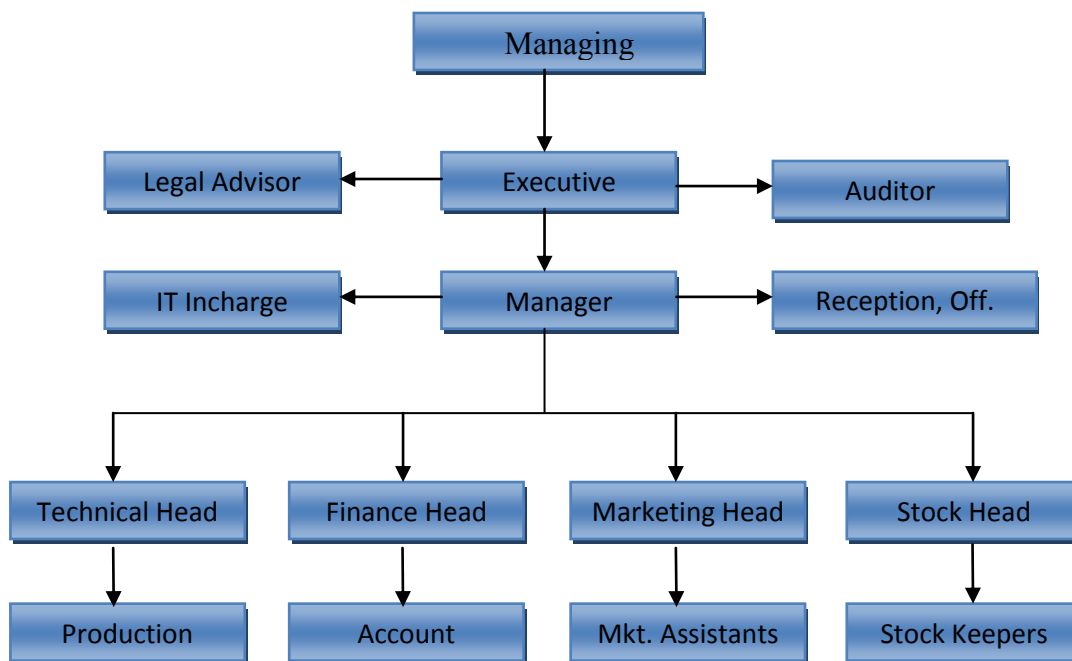
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APPENDICES

Appendix I: Organization Structure of Subha Industries

The Subha Industries is running in mix of centralized and decentralized organization structure. The Subha Industries need to run more in decentralized structure for the successful ERP system regarding material management and planning. The Subha Industries need to revise the organization structure as per suggested in this thesis as introduced the Inventory Manager who will be responsible for managing stock related issues and for material requirement planning, production planning, distribution scheduling and godown management. As the company is trending to produce and market more processed herbal products than to directly supply raw herbs as it used to do in its earlier days, it's the time for Subha Industries to reconstruct its organization chart to address the need of present and near future business scenario. The organization structure of the Subha Industries at the beginning of F.Y. 2070/71 has been presented below:

```
                              Managing
                                 |
        Legal Advisor <---- Executive ----> Auditor
                                 |
        IT Incharge  <----  Manager  ----> Reception, Off.
                                 |
      ┌──────────────┬──────────┴──────────┬──────────────┐
 Technical Head   Finance Head      Marketing Head     Stock Head
      |              |                    |                 |
  Production      Account          Mkt. Assistants     Stock Keepers
```

(Source: Manager, Subha Industries, Head Office, Rabibhawan, Kathmandu Bhadra, 2070)

Appendix II: Tally Solutions Pvt. Ltd.

Tally Solutions Pvt. Ltd. is a reputed software products company with its headquarters in Bangalore, India. Tally Solutions Pvt. Ltd. has been a pioneer in the business software products arena and has witnessed immense growth since its inception in 1986. Its flagship product Tally is by far the most preferred accounting software for small and medium size businesses in India. According to International Data Corporation (India) Tally's market share is larger than all other accounting software brands in India combined. Tally has extensive geographical coverage of India with regional offices located in all major cities. These offices are supplemented by Tally Authorized Service Centers (TASC) in 86 cities. Tally is now expanding globally and has established offices in London, Singapore and Dubai to better service customers world-wide. It is one of the fastest growing software companies in India according to Data Quest July 2012 report. Tally has manpower strength of around 800 employees spread across the country. The company currently sells into more than 100 countries beyond its native India, including the United Kingdom, SAARC nations and the Middle East. Tally's software is mainly used for vouchers, financial statements, and taxation in many industries, and has specialized packages for retail businesses. More advanced capabilities are found in its Enterprise resource planning package.

Tally Software is developed with a core proprietary engine with a Software Development Kit (SDK) wrapper. Most of Tally's Interaction Forms and Reports are developed using Tally Definition Language (TDL).Tally.ERP 9 has advanced integration capabilities in the form of Application programming interfaces to make the software extensible. Tally interacts with Software application using Extensible Markup Language (XML), Open Database Connectivity (ODBC) and Dynamic Link Library (DLL) technologies.

Appendix III: New Features of Tally 9.ERP

Some new features added on Tally.ERP 9 makes it more effective for ERP than its previous versions. Such features are:

- **Access Information on the fly via SMS**

  The availability of business information from anywhere enables the business owner in taking the right decision at right time, staying ahead of the competitors. Using a mobile device, the business owner communicates with simple English via SMS (Short Message Service) to the company connected to Tally.NET. The system extracts the required information and sends it back to the requestor's mobile device.

- **Work Universally - The Complete Remote Solution**

  Tally.ERP 9 provides remote capabilities to access the data from any-where and anytime. Suppliers, Consultants, Auditors, Customers and manpower involved can now access, create or modify data and view reports from anywhere. The Complete Remote solution enables the authorized users to Create/Alter Masters and Transactions, and view Reports without any barriers, intrusions or interference over the Trusted Remote, while people involved with the business are physically away from the business location.

- **New Inventory Features**

  Price List feature has been enhanced and a separate menu is provided. Now the user can create Price List belonging to the Stock Group or Stock Category.

- **Online Help**

  The Tally.ERP 9 Online Help provides instant assistance on basic and advanced features or any other relevant topics of Tally.ERP 9.

- **Tally.NET**

  It is an enabling framework which establishes a connection through which the remote user can access the Client's data without copying / transferring the data.