LESSON: 1

INTRODUCTION TO ERP-AN OVERVIEW

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STRUCTURE

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1.0 OBJECTIVES

After going through this lesson, you will be able to:

- Learn about basic concepts of ERP concept
- Define ERP evolution its benefits and scope
- Describe the importance of integrated information system in organization

1.1 INTRODUCTION

In the manufacturing industry, MRP (Material requirements planning) became the fundamental concept of production management and control in the mid 1970s. At this stage BOM (Bill of Materials), which is purchase order management that utilizes parts list management and parts development, was in the mainstream. And this concept (MRP) unfolded from order inventory management of materials to plant and personnel planning and distribution planning, which in turn became MRP-II (Manufacturing Resource Planning). This incorporated financial accounting, human resource management functions, distribution management functions and management accounting functions. It came to globally cover all areas of enterprise mainly business and eventually came to be called ERP.

1.2 ERP CONCEPT

An Enterprise is a group of people with a common goal, which has certain resources at its disposal to achieve that goal. The group has some key functions to perform in order to achieve its goal. Resources included are money, manpower, materials, and all the other things that are required to run the enterprise. Planning is done to ensure that nothing goes wrong. Planning is putting necessary functions in place and more importantly, putting them together. Therefore, Enterprise Resource Planning or ERP is a method of effective planning of all the resources in an organization.

Success of the companies depends largely upon the reliable process of information gathering and acting accordingly: In this era of cut throat competition, that too, in a hi-

tech environment where success of a company largely depends upon the reliability of the processes used for information management & taking action accordingly:

- To respond to the clients needs
- To asses and avail the market opportunities
- To coordinate & interact with the supply chain of the company.
- To improve the quality
- To insure timely delivery of products
- To achieve a high level of satisfaction among customers
- To utilize the gathered information for a competitive advantageous situation.

Here comes the role of ERP, which provides the infrastructure support for providing information across all the functions and locations in an organization.

> ***ERP is the acronym for enterprise resource planning which provides infrastructure support for integration management of businesses and function through various tools and techniques and concepts aimed at optimum utilization of organizational resources.***
>
> ***ERP is primarily an enterprise wide system which encompasses corporate vision, objectives, attitudes beliefs, values, operating style and people who make the organization.***
>
> ***ERP is a computerized environment with a holistic view of the enterprise, aimed at seamless flow of information across the departmental barriers where by optimal planning and management of the resources is possible in the most efficient manner.***

Enterprise Resource Planning (ERP) covers the techniques and concepts employed for the integrated management of businesses as a whole, from the viewpoint of the effective use of management resources, to improve the efficiency of an enterprise.

ERP packages are integrated (covering all business functions) software packages that support the above ERP concepts.

Originally, ERP packages were targeted at the manufacturing industry and consisted mainly of functions for planning and managing core businesses such as sales management, production management, accounting and financial affairs, etc. However, in recent years, adaptation not only to the manufacturing industry, but also to diverse types of industry has become possible and the expansion of implementation and use has been progressing on a global level.

ERP software is designed to model and automate many of the basic processes of a company, from finance to the shop floor, with the goal of integrating information across the company and eliminating complex, expensive links between computer systems that were never meant to talk to each other.

ERP software is a mirror image of the major business processes of an organization, such as customer order fulfillment and manufacturing. Its success depends upon reach - a circumscribed ERP system isn't much better than the legacy system it replaces. In many cases, it is worse, because the old code at least was written specifically for the company and the task. ERP systems' set of generic processes, produce the dramatic improvements that they are capable of only, when used to connect parts of an organization and integrate its various process seamlessly.

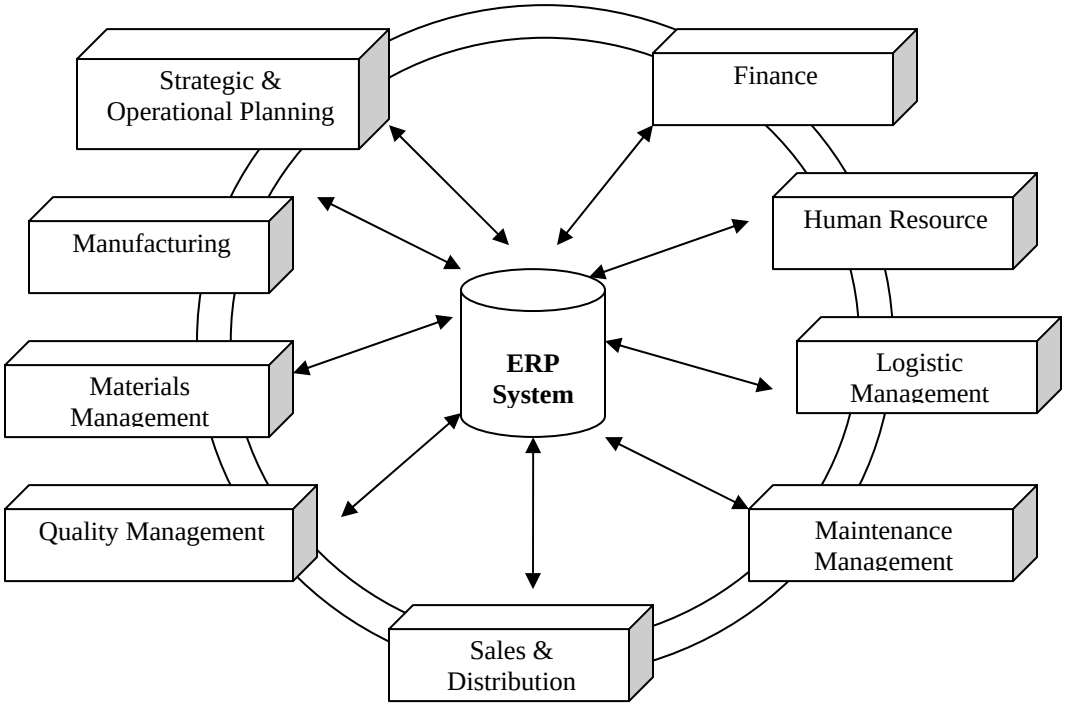

Figure 1.1: Information Integration through ERP System

1.3 BUSINESS NEEDS OF ERP

The question most often raised by various organizations is, "Do we need an ER" However, the most relevant question to be asked is "Where we are, where we want to be and, in order to get there, what is the best enabler or solution?" There is hardly any choice. While each organization has the freedom to decide on coordination of its existence in the domain of space and time, the ground reality is that all organizations have to confront to the fact that the old ways of doing business simply don't work any more in today's highly competitive and ever changing environment.

More to the point three forces, separately and in combination, are driving today's companies deeper and deeper into a territory that most of their executives and managers find frighteningly unfamiliar. We call these forces the three Cs: Customers, Competition and Change. Their names are hardly new but the characteristics of the three Cs are remarkable different from what they were in the past.

These forces can be explained as:

Customer: Since the early 1980s, in all the developed countries, the dominant force in the seller customer relationship has shifted. Sellers no longer have the upper hand; whereas customers do. Customers now tell suppliers what they want, when they want it, how they want it and what they will pay. This new situation is unsettling to companies that have known life only in the mass market.

Competition: The second C is competition. Earlier it used to be so simple for the companies to get to the market with an acceptable product or service, at the best price of sale. Now, not only does more competition exist, it is of many different kinds.

Change: Change is the third C. We already know that customers and competition have changed but so has the nature of change itself. Foremost, change has become both pervasive and persistent. It is treated as normal.

Most of the organizations are having a consequence /divergence of the three C's leading to another C i.e. conflicts. The management of conflict is essential for developing any business strategy.

The point is that, not only have product and service life cycles have diminished but so has the time available to develop new products and introduce them. Today, companies must move fast or they won't be moving at all.

1.4 EVOLUTION OF ERP

1.41 The roots

In its first avatar, ERP and associated applications focused largely on automation. They were designed as high performance transactional engines that drove operational efficiencies. Since they were built for efficiency around a tightly integrated set of functions (say finance), they often did not have a clear distinction between user interface,

business logic and data. Modifying these systems to support the addition of new channel partners, products or services, or to target new customer segments, resulted in higher costs and complexity.

In the mid 1990s these constraints gave rise to EAI, which attempted to stitch together business scenarios using specific application to application interfaces designed for performance and reliability. But EAI has not produced an integration architecture that is cost effective in the long run and it has proven to have its own problems. More recently, Web services have held out great promise, but their true power remains to be tapped.

While EAI tools can successfully link individual applications, they require programmers to understand the inner workings of both sides which create a tightly coupled integration. Programmers then have to maintain these links over the useful life of the applications. Creating and maintaining these hardwired links is expensive and resource intensive. Every process change triggers expensive and complex programming and testing. Creating a scalable, robust and flexible architecture that facilitates agility and responsiveness calls for new answers.

The business environment has changed more in the last five years than it did over the previous five decades. The pace of change continues to accelerate and corporation around the world seek to revitalize, reinvent and resize in an effort to position themselves for success in the 21st century. The ability to respond to new customer needs and seize market opportunities as they arise is crucial. Successful companies today recognize that a high level of interaction and coordination along the supply chain will be a key ingredient of their continued success. Enterprises are continuously striving to improve themselves in the areas of quality, time to market, customer satisfaction, performance and profitability. Tomorrow’s winners will be those businesses that can most effectively gather, and quickly act upon crucial information. Making informed business decisions in this manner would enabler organizations to accomplish their business growth and at the same time enable them to utilize the information to competitive advantage.

To make it possible for the companies to execute this vision, there is a need for an infrastructure that will provide inf6rmation across all functions and locations with in the organization. The Enterprise Resource Planning (ERP) software fulfils these needs.

The evolution of ERP solutions has a long history. Earlier packages used to come in different forms and in a non-integrated fashion. But slowly the need was felt to integrate various segments of an enterprise and go beyond back office and front office. With the growth of business- to-business requirements and large databases, and the rise of concepts like supply chain management, just-in-time arid to-order manufacture, ERP has bec0me a compulsory addition. In short, new dynamics of business have forced the corporate to employ ERP solutions. Shrinking geographical borders, integration of currencies, ever decreasing product life cycles, reduced profit margins and the need to raise productivity, each of these problems is addressed by ERP solutions. The physical, inventory, financial, market and human resources are to be properly pooled and maintained and ERP solution does just that.

Earlier, only global organizations, multinational companies (MNCs) and large corporations with multi-country operations considered that ERP solutions were necessary for them. But even a small company, if it is looking at the global market, has to implement ERP solutions. And now, with liberalization and international market integration, any company can target the global market and expand beyond its national frontiers.

The cost of implementation of ERP used to be high, but it is gradually coming down and now even medium and small companies can go for it. In fact: some providers are developing cheaper ERP solutions aimed at smaller companies. Some of them have also brought out ready-made templates to be used by smaller corporations.

The experience in other countries shows that the productivity levels have gone up three-fold with the implementation of ERP solutions. However, in India, we are still in the early stages of implementation and do not have information on the rise in productivity. But it will certainly help in the Indian context as well when the results start coming in shortly.

1.42 Beyond Automation

Automation was the magic word in the beginning. The focus then shifted to computers and the trend was, to run an efficient organization, throw in hardware and replace human-power with microprocessor power, pink slip the employee and hopefully the costs and the faults will come down. Not that there was much that was wrong with that approach. From then to the mid-eighties, automation was considered the panacea for all ills of business. Then the bottom simply fell out. Far too much information technology was loaded onto inefficient processes and throwing it at a mess doubly compounded the confusion.

There was an urgent need to reconfigure the existing processes and reinvent the organization, as it were. The basis of automation was that manual processes needed to be made more efficient. Manufacturing resources planning (MRP II) was the Ultimate application for enterprise wide automation, wherein the entire organization, starting from the sales process to the shop floor, was sought to be put online. MRP II assumes a static nature of the enterprise and fits the systems to it. As a result, MRP II automates the existing processes based on the existing workflow in the enterprise. The real benefit of MRP II is that it also enables a high degree of integration with other automated processes in the organization. To that extent, MRP II is heavily dependent upon the available hardware and software platforms in the company. Thus, if a company is already standardized on Unix it would be logical to implement an MRP II solution under Unix environment only because MRP II will integrate the other applications and will run on top of the existing platform. The second problem with MRP II is that it is an automation solution and in many cases, may not turn out to be a business solution.

Enterprise Resource Planning, on the other hand, is a business solution. The fundamental difference is that ERP will run (in most cases) in tandem with a fresh look at the existing business processes in an organization and in that sense, ERP runs in close association with business process reengineering (BPR) of the company. BPR will initially question the value-added potential of the particular process and then go on to put some systems and procedures in place. ERP, hence, functions as the key enabler in any BPR. But it is more applicable in those organizations which have highly developed information systems and a high degree of value adding at every stage of the process. The key factor is that every company that implements ERP has to reengineer its processes in one form or the other. ERP is essentially an activity that encompasses the entire organization, irrespective of its size, number of plants and locations. Another significance of ERP is that it does not blindly automate and so if a certain function is not automated it may not exist. ERP takes into account not only the company internal issues, but also factors in the external imperatives in terms of competition time-to-market and soon, as a result ERP transcends the classical automation models and is considered to be the next generation of post-automation solutions.

1960s: The focus of manufacturing systems in this era was on inventory control. Software packages were designed to handle stocks based on traditional inventory concepts.

1970s: Material Requirement planning (MRP) systems emerged in this era. With timelines for the finished goods as the starting point, this system worked out when and how much of which sub-assemblies, components and raw materials world be needed.

1980s: The concept of MRP III evolved which was an extension of MRP to shop floor and distribution management activities.

1990s: The concept of MRP II was extended to cover areas like engineering finance, human resource and project management and thus ERP was born.

2000s: ERP gets modular with several applications such as data warehousing, business intelligence, CRM and SCM getting added. Internet enablement of ERP and all the associated applications begins in true

1.43 Traditional Enterprise Approach of ERP

Traditionally companies developed computer applications for each of the functional areas like general ledger, purchasing, inventory and planning. Systems have always been developed as islands of information where the focus was on functions. Data was redundant and/or inconsistent and consolidation was not' possible. The decision makers of the organization did not have access to information that could help them take timely decisions and hence managerial control was difficult. Any change in the business had to be taken care of by modifying the systems that took enormous time and effort. Thus, reaction to change in the constantly changing business environment was difficult.

A need was felt for an integrated system that could address these requirements. Companies started investing in an integrated system to derive competitive advantage in the marketplace.

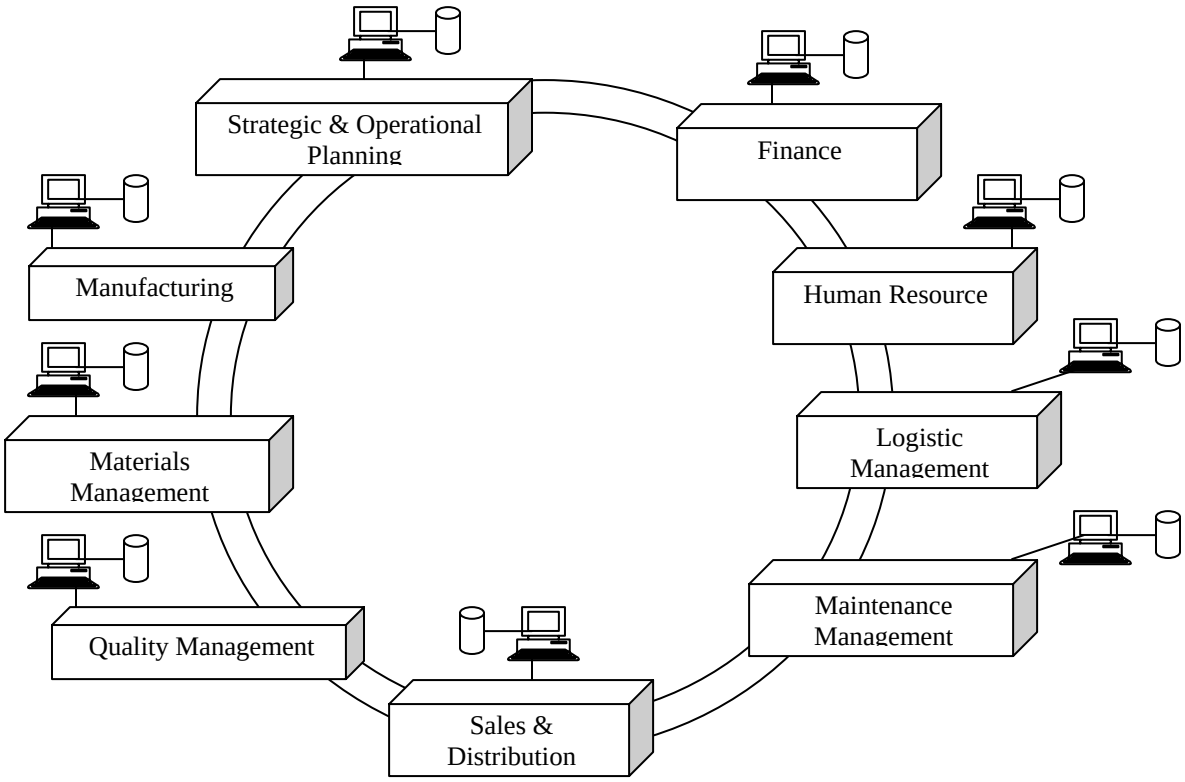

Figure 1.2: Traditional Approach-Isolated information system

While the MRP and MRP n packages addressed primarily the requirements of a manufacturing setup, ERP addressed the information requirements of the entire enterprise. The focus of ERP has not only been on addressing the current requirements of an organization but also on providing the opportunity for continually improving and refining business processes. Since the system was totally integrated, elimination of redundant and inconsistent data followed.

1.44 Modern Enterprise Paradigm

Enterprise resource planning is a development of an enterprise-wide management system, which was also termed as MRP-I, the modem version of the manufacturing resource planning system. What both these models purport to do is to integrate all the processes of the organization with the customer satisfaction side of the marketing equation. Simply put, ERP is the planning of the four Ms of an enterprise's resources, Man, Money,

Materials, and Machines to their best synergistic values. While earlier on, the manufacturing activities of the organization had the most to gain by implementing these tenets of MRP I, today, the whole gamut has expanded to include non-manufacturing type of industries also. So, now we have aerospace, software and hardware organizations, manufacturing, and pharmaceuticals, all trying hard to hook up to customer-oriented domains. Businesses are realizing that customers focus means better products and services delivered fast-so fast that the customer and the market get what they need. So, for the businesses that are in the process of getting all this done there is lot happening all around. And that is the call of ERP which basically helps an organization address needs like reduced cycle time, customer focus, and sharing information seamlessly across the enterprise globally.

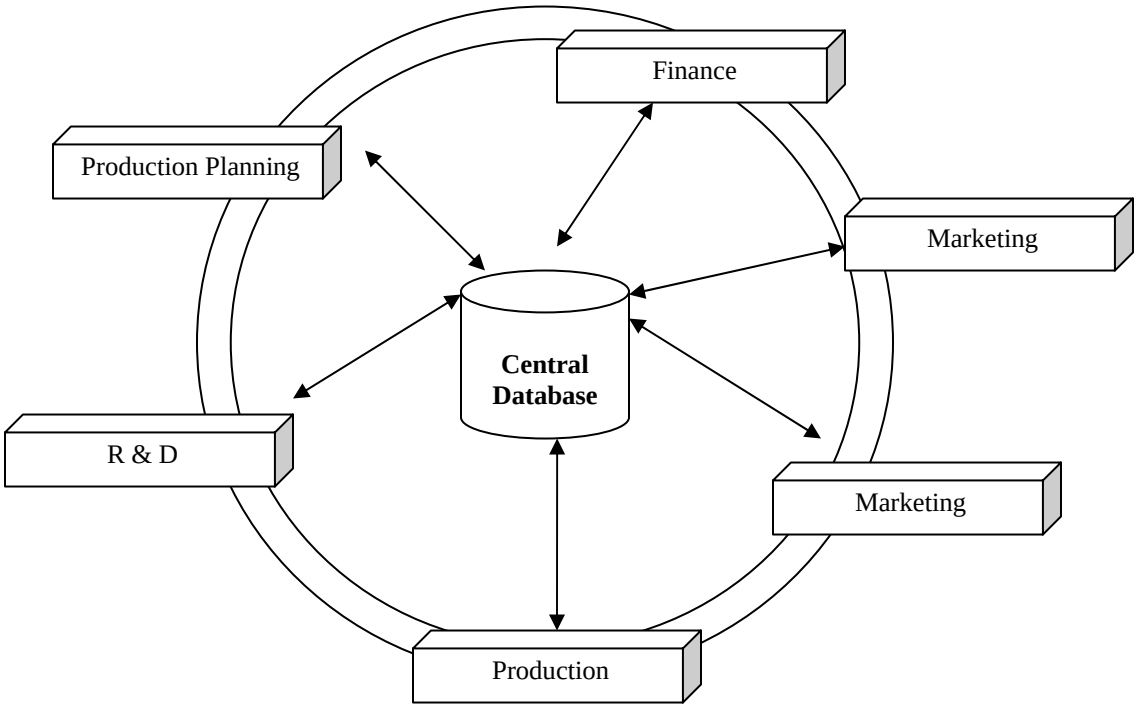

Figure 1.3: Modern Enterprise

1.5 ERP MODEL OF INTEGRATED MANAGEMENT INFORMATION

Today's users require flexible reporting tools to extract the information as and when they need it without depending on an information systems department to produce the report.

And they also need electronic data interchange (EDI) to electronically accept customer information like purchase orders, schedule amendments or cash and electronically send data such as order acknowledgment and invoices to customers.

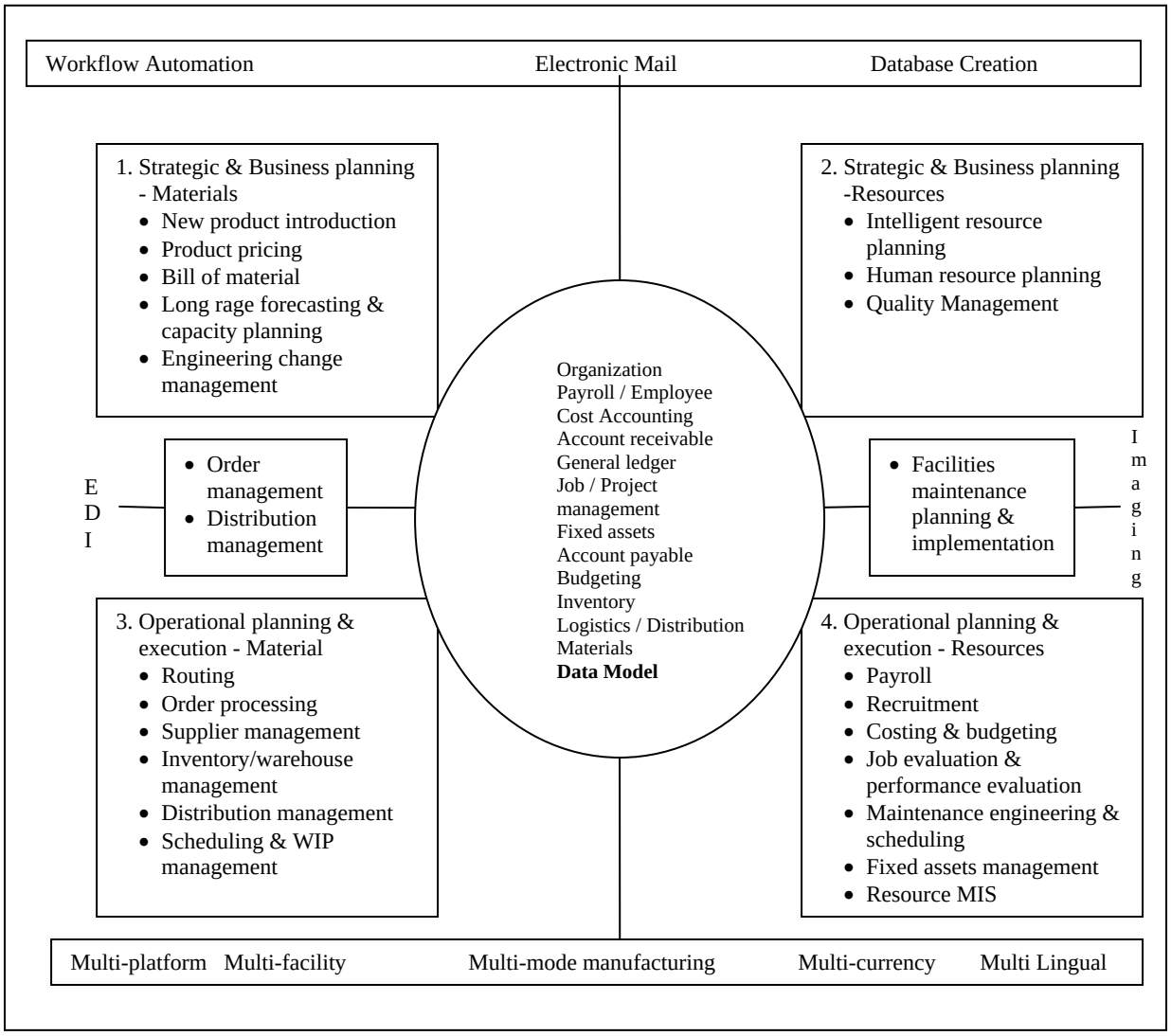

Figure 1.4: ERP Model of Integrated Management Information

Integration of information systems can be further enhanced through imaging. Imaging provides the ability to display drawings or specifications. In addition, it provides the ability to store original sales orders, purchase orders, quotations, contracts, etc. Closely aligned to this is the electronic approval process. To reduce paperwork, e-mail should be

tied to the electronic approval process for purchase orders and engineering change orders. All this adds up to effective workflow automation.

Database creation is the most significant cross-system application, starting with time and attendance reporting, going all the way to machine monitoring and control and post sales statistics. In between are the critical areas of material receipts and shipments, inventory issues and work order completion, operational labour collection, warehouse dispatch and collection of money.

Having explored the applications and cross-system functionality, let us now examine the various segments.

1.51 Seamless Integration

The upper two quadrants in above figure represent the strategic and business planning activities supporting an enterprise, while the lower two quadrants represent the operational planning and execution activities. The left quadrants depict functionality relating to materials while the right side depicts it for resources, The upper-left quadrant represents activities that go into the strategic and business planning process for materials. The most crucial is engineering change management. Whether it is the management of new product introductions or changes to existing products, integrating this application fully into the enterprise system is important. The engineering change management should include electronic approval routing, complete effectively control, revision-level control, change-order process routing, automatic generation of product structures, and also handle multiple parents and existing assemblies by issuing a single engineering change order.

Other important applications around the circle are bills of material or product structures. The materials database should provide for a single repository for item data shared by a variety of applications such as sales order processing, inventory and warehouse management, forecasting, material planning, purchasing, shop floor control and product costing. The database should include many units of measure, costing and pricing. Rules

and multiple item numbers per item with full cross-referencing capabilities are specific functions that should be available along with provision for multiple locations where an item could be stored.

Product pricing for material should handle all necessary cost information like direct material cost as well as the kind of cost, from last in, weighted average, or predicted value at its source. It should add overhead costs such as costs related to quality control, research and development, utilities, warehouse movement and space, scrap, or outside processing. It should also provide for various pricing scenarios and their impact on performance parameters such as sales and profitability. Interactive inquiries and reports should be available to display this information.

The strategic planning and operations application concerning materials is integrated by order management and distribution management. Specific line items within ‘one order should be able’ to be directed to individual shipping points preferably with the help of electronic data interchange.

The lower-left quadrant relates to applications involving execution of the materials function. It should be possible to do the most important forecasting at various levels, for example, the item and/or aggregate level, and the system should be able to select a suitable forecasting method based on data. Multiple forecasts should be available to represent geographic regions, time periods, market segments and business units, on request.

The other applications include distribution management, scheduling, routing and **work-in-progress (WIP)** management. The applications in the lower-left quadrant should be integrated allowing a seamless flow from one application to the other. The functionality provided should support timing, planning periods, type of items included or excluded, changes in safety stock and re-order policies.

1.52 Integrated Data Model

The heart of any ERP exercise is the creation of an integrated data model. As discussed earlier, the application should provide the true integration capability over the entire enterprise system particularly providing for data for employees, suppliers and customers. The database should reflect transactions involving processing of purchase orders and engineering changes.

General accounting should provide for multiple ledgers and sub-ledgers on a division-by-division basis. Online management summaries and consolidation eliminate extensive paperwork handling. The ability to drill down through successive levels of data should & be provided.

Data pertaining to job or project management is critical to many enterprises. Some firms may want to track the engineering, subcontracting, direct manufacturing and installation costs against a particular quoted job. It should also include the cost of a capital improvement project. It should be possible for older jobs and budgets to be copied into new ones.

Taken in its entirety, this enterprise resource planning and execution model and its flexible set of integrated applications will keep your operations flowing efficiently. If properly executed, it allows the enterprise to grow and flex, without the necessity of changing software solutions. It should be looked upon as the acquisition of an asset, not as expenditure.

1.6 ROLE OF ERP IN GAINING COMPETITIVE ADVANTAGE

In the past, manufacturing companies have searched frantically to gain better control of order winners and qualifiers. The advent of ERP has brought about an organized approach to managing order-winners and qualifiers, as they need an integrated perspective to do so. ERP has tried to handle this process by providing answers to the following questions:

1. What information do we need to manage the order-winners and qualifiers and what data model is required to support it?
2. How can groupware, workflow and document management technology be integrated to improve communication among work groups, manage paper documents by-routing them electronically, and control data so as to enable organizational processes to realize relevant order winners and qualifiers?

ERP has also helped organizations realize order-winners and qualifiers by providing software that facilitates modeling of logistic processes in terms of items, bill of materials, routing and also registering the goods flow in the processes in terms of production order and inventory. Support for making decisions based on logistic processes is built into these packages today. The intelligent resource planning which is built into many of these packages provides advanced material and capacity planning facilities so as to take care of order-winners and qualifiers in a specific situation.

The essence of strategy stems from the need for companies to gain detailed understanding of their current and future markets and the factors that help them gain a competitive advantage in the field. Various organizational functions are then required to develop strategies based on the corporate practices which can give the user a competitive advantage. This ensures that these perspectives form part of the discussion. Corporate strategy, therefore, consists of the strategic tasks that the ERP vendor organizations must do to support the company's order-winners arid qualifiers relating directly or indirectly to the various functions in the organization. During the 1970s, a number of organizations started using IS/IT in ways that fundamentally changed the way in which their business was conducted, and changed the balance of power in the industry with respect to competition, customers and suppliers.

It is observed that typical expressions of corporate strategy to gain competitive advantage include such general terms as service, responsiveness to and meeting of the customers'

needs. In addition, there have been generic statements concerning corporate strategy formulation ‘with expressions such as low cost, differentiation, and critical success factors. The use of generic terms similar to these breeds two major drawbacks. First, the difference is not brought into focus but is blurred, and second, decisions concerning the nature of the market segments in which a company wishes to compete are not resolved at the strategic level. A company may not recognize that orders for products, often within the same market segment, are won in different ways. This lack of clarity brings conflicting demands on the various corporate strategy functions and disperses the essential coherence necessary to provide strategic thrust, guidance and competitive advantage.

In order to gain a sustained competitive advantage, an analysis of market at the micro-level is essential. When the chief executive officers were asked whether the markets served by the group of companies under their control were similar in nature, most of them answered in the negative.

When looked at in detail and asked whether the markets served by a typical company are the same, the answer would again be ‘no’. Hence, a detailed analysis of the market will throw up different qualifiers and order winners and thus necessitate a change in the erroneous belief that manufacturing and support processes in terms of processing requirements and infrastructure investments would be the same. The situation being what it is, the companies should next apply the same manufacturing approaches to support their different markets not only in one plant but in all their different plants. It means multi-mode operation support is necessary to derive a competitive advantage which is one of the essential bases for any ERP solution.

The strategic process, therefore, needs to be based on a clear understanding of the markets and the differences within a market. As highlighted earlier, however, all too often companies debate strategy in general terms and undertake strategy using general courses of action. This invariably and increasingly leads to a lack of fit between

functional strategies and corporate markets. Where this happens, companies will find themselves at a serious disadvantage. Supporting logically different markets within the same physical market with the help of the necessary infrastructure and integration at the process level is an essential feature of ERP solutions.

Thus, the absence of a strategy within a business, which identifies the qualifiers and order-winners at the highest level, typically-leads to a strategic vacuum and that void, unless it is filled, will result in solutions including ERP implementation, which will not yield any significant advantage.

The foregoing discussion brings out a basic logic. Executives recognize that ERP, as a significant part of the company's infrastructure, must make and in fact needs to be making, a significant contribution to the overall success of the business. There is, therefore, due pressure on those responsible for ERP solutions to respond to these corporate demands and expectations. Without strategic context, however, IS/IT, where ERP has been treated as a part has traditionally responded by undertaking currently popular solutions. In this way, companies seek to achieve productivity in operations by modeling operations on best practice. However, although a solution .may be good in itself, its application to the specific problem is often inappropriate. (Given IS/IT's and ERP's infrastructural nature and the existence of corporate initiatives, it is easy to see why most companies have invested regularly and significantly over the years in responses that, by and large, are eventually discarded) The cause of their abandonment is principally the lack of relevance of the ERP solution in the first place to gaining the competitive advantage in a focused manner.

1.7 BENEFITS OF ERP

Installing an ERP system has many advantages-both tangible and intangible. The direct advantages include improved efficiency, information integration for better decision-making, faster response time to customer queries, etc. The indirect benefits include better corporate image, improved customer goodwill, customer satisfaction, and so on. Some of

the famous benefits of the ERP systems are:

(a) Reduction of lead-time
(b) On-time shipment
(c) Reduction in cycle time
(d) Better customer satisfaction
(e) Improved supplier performance
(f) Increased flexibility
(g) Reduction in quality costs
(h) Improved resource utility
(i) Improved information accuracy and decision-making capability

(a) Reduction of Lead Time

In order to reduce the lead-times, the organization should have an efficient inventory management system, which is integrated with the purchasing, production planning and production departments. In this era of just-in-time manufacturing, the knowledge of the exact lead-times for each and every item is of paramount importance for uninterrupted production. For a company dealing with hundreds and thousands of raw materials and components, keeping track of the lead-times for each and every individual item manually, is practically an impossible task.

The ERP systems help in automating this task and thus, make the inventory management more efficient and effective. Also, since the ERP system is integrated and the materials management module is integrated with other modules like sales, marketing, purchasing, manufacturing and production planning, the demand for a particular item can be known as early as an order is received. For example, consider that an order is received for supplying, say, 100 cars with air conditioners. As soon as the order details are entered into the system, a lot of actions are triggered. The system will check whether the items are available in the finished goods inventory. Then it will generate a BOM for the order and will check whether all the items are available in the inventory. Since all the records

are kept in the system's database and since every thing is up-to-date, finding out the parts that are to be ordered takes no time (a task which could have taken days in the case of a manual or nonintegrated system). Once the items that are to .be manufactured are identified, and once the production planning system prepares a production plan, the material management module will prepare purchase orders for each and every item taking into account the lead-times and when the items are required for production. If the purchasing process has to go through the invitation of quotations, vendor selection, etc. the system also does that.

Since most suppliers are also connected to the organization's system as soon as a purchase order or requisition is issued, the supplier's system is updated with that information. So the supplier knows what items are to be supplied and when. Since the activities like preparation of contracts, issuing of purchase orders and payments happen .through the system electronically, the time saved is phenomenal ERP systems, by virtue of their integrated nature and by the use of latest technologies [(like Electronic Funds Transfer (EFT), Electronic Data Interchange (EDI)], reduce the lead-times and make it possible for the organizations to have the items at the time they are needed (just-in time inventory systems).

(b) On-Time Shipment

Today, companies must be able to deliver customer-specific products (made to-order) with the lead-time of standard, off-the-shelf products. The companies must be able to change the mode of production from make-to-stock to make-to-order, yet retain the cost and time advantages of off-the-shelf products. Today, the ERP systems provide the freedom to change manufacturing and planning methods as needs change, without modifying or reconfiguring the workplace or plant layouts. With ERP systems, businesses are not limited to a single manufacturing method, such as make-to-stock or make-to-order. Instead, many manufacturing and planning methods can be combined within the same operation, with unlimited flexibility to choose the best method-or combination of methods-for each product at each stage throughout its life cycle.

To shorter product development cycle's efficiency is increased in design and development activities. ERP systems are designed to help your company trim data transfer time, reduce errors and increase design productivity by providing an automated link between engineering and production information. Most of these systems allow smooth integration with popular CAD packages to simplify the exchange of information about drawings, items, BOMs and routings. Using the Engineering Change Control (ECC) system, businesses can gain effective control over engineering change orders. The company can define the authorization steps for approving and implementing an Engineering Change Order (ECO). When these steps are completed, the ERP system automatically implements the change in the production database. Thus, by integrating the various business functions and automating the procedures and tasks, the ERP systems ensure on-time delivery of goods to the customers.

(c) Reduction in Cycle Time

Cycle time is the time between receipt of the order and delivery of the product. At one end of the manufacturing spectrum is the make-to-order operation, where the cycle time and cost of production are high. This is because in a make-to-order situation the manufacturer starts making the product or designing the product only after receiving the order. He will procure the materials and components required for production only after getting the order. On the other end of the manufacturing operations is the make o-stock approach, where the products are manufactured and kept in the finished goods inventory before the order is placed.

In the case of make-to-order items, the ERP systems save time by integrating with CAD/CAM systems. Dramatic time and cost reductions are possible when CAD engineered designs are converted automatically into software programs for computerized production machines using CAD/CAM systems. This automatic conversion eliminates the costly and time consuming steps of having a person convert design drawings into a computer program for computer-controlled production equipment, such as robots or

machine tools. These systems reduce cycle times by 30-50%. Combined with this, the automation achieved in material procurement, production planning and the efficiency achieved through the plant maintenance and production systems of the ERP packages go a long way in reducing the cycle times.

(d) Improved Resource Utilization

As manufacturing processes become more sophisticated and as the philosophies of elimination of waste and constraint management achieve broader acceptance, manufacturers place increased emphasis upon planning and controlling capacity. The creation of an accurate, achievable production schedule requires the availability of both material and capacity. It is useless, and indeed wasteful, to have financial resources tied up in material, if the capacity is insufficient or improperly planned. Waste not only raises costs, it also affects customer service levels and customer good will.

The ERP systems also have simulation capabilities that help the capacity and resource planners to simulate the various capacity and resource utilization scenarios and choose the best option. The efficient functioning of the different modules in the ERP system like manufacturing, materials management, plant maintenance, sales and distribution ensures that the inventory is kept to a minimum level, the machine down time is minimum, the goods are produced only as per the demand and the finished goods are delivered to the customer in the most efficient way. Thus, the ERP systems help the organization in drastically improving the capacity and resource utilization.

(e) Better Customer Satisfaction

Customer satisfaction means meeting or exceeding customers' requirements for a product or service. Assessment of the degree of satisfaction is usually made on at least three measures:

- Whether the product or service includes the features that are most important to the customer.

- Whether the company can respond to the customers' demands in a timely manner, a criterion that is especially important for custom products and services.
- Whether the product or service is free of defects and performs as expected.

ERP systems have proved that they can produce goods at the flexibility of make to-order approach without loosing the cost and time benefits of made-to-order operations. This means that the customer will get individual attention and the features that he/she wants, without spending more money or waiting for long periods. Also, with the introduction of the web-enabled ERP systems, the customers can place the order, track the status of the order and make the payment sitting at home. The customer could get technical support by either accessing the company's technical support knowledge base (help desk) or by calling the technical support.

Since all the details of the product and the customer are available to the person at the technical support department, the company will be able to better support the customer. All this is possible because of the use of the latest developments in information technology by the ERP systems, and this will go a long way in improving the customer satisfaction.

(f) Improved Supplier Performance

The quality of the raw materials or components and the capability of the vendor to deliver them on time, are of critical importance for the success of any organization. So, an organization needs to choose its suppliers or vendors very carefully and monitor their activities closely, so that problems can be corrected before it can disrupt the functioning of the company. To realize these benefits, corporations rely heavily on supplier management and control systems to help plan, manage, and control the complex processes associated with global supplier partnerships.

The ERP systems provide vendor management and procurement support tools designed to coordinate all aspects of the procurement process. They support the organization in its

efforts to effectively negotiate, monitor, and control procurement costs and schedules while assuring superior product quality. The supplier management and control processes are comprised of features that will help the organization in managing the supplier relations, monitoring the vendor activities and managing the supplier quality.

The Quality Management System in the ERP systems provides all the tools needed to implement Total Quality Management programs within an organization's procurement function. Using the system, organizations can establish and manage highly effective supplier certification programs which ensure maximum conformance of purchased material to specification, while maintaining lead-times and costs. The quality control program can be managed on the basis of original manufacturer leaving the buyers free to seek the best possible price and delivery terms from a variety of qualified distributors or brokers.

(g) Increased Flexibility

Flexibility is a key issue in the formulation of strategic plans in companies. Sometimes, flexibility means quickly changing something that is being done, or completely changing to adjust to new product designs. At other times, flexibility is the ability to produce in small quantities, in order to produce a product mix that may better approximate actual demands and reduce work-in:-progress inventories. Regardless of the definition of flexibility, traditional fixed automation manufacturing facilities, while efficient, are often inflexible. Similarly, extremely flexible operations are often inefficient. An argument can be made for the relative merits of both efficiency and flexibility. Actually, both are desirable. Product flexibility is the ability of the operation to efficiently produce highly customized and unique products. Manufacturers tried to introduce some amount of flexibility by using the assemble- to-order approach. This provided some amount of flexibility without increasing the production cost, but could not be applied to all situations. Along the broad spectrum of make-to-order manufacturing, there is a growing convergence between strictly assemble-to-order (limited options and features) and completely engineer-to-order (just about anything goes, at a cost) environments. This

evolving environment is often referred to as configure-to-order. Most ERP systems have now also added this technique to their systems. Using a rules-based product configuration system, configure-to-order (CTO) manufacturers are able to simplify the order entry process and retain engineer-to-order (ETO) flexibility, without maintaining bills of materials for every possible combination of product options.

(h) Reduced Quality Costs

Quality is defined in many different ways-excellence, conformance to specifications, fitness for use, value for the price, and so on. Whereas manufacturing and design engineers are typically responsible for some of the technological issues in the quality assurance for products, operations managers often conduct the analysis of quality-related costs which is an important task. Strategic opportunities, or threats, frequently motivate the launch of aggressive quality management initiatives. Analyzing the cost of quality can provide the financial justification for implementing them. Typically, the quality costs are in the range of 20% of the cost of goods sold. Carefully planning quality improvement activities not only improves quality, but lowers quality-related costs.

Elimination of defects in standard product designs and manufacturing methods before production is just as important as eliminating defects during production. In fact, to achieve quality levels, manufacturers must focus on identifying and correcting defects in underlying product designs and production methods, not simply inspect incoming material or finished goods. The Quality Management Systems in ERP packages support the benchmarking and use of optional product design, process engineering, and quality assurance data by all functional departments within the manufacturing enterprise, thereby facilitating definition of repeatable processes, root cause analysis, and the continuous improvement of manufacturing method.

Specification Control Systems in ERP packages offer a state-of-the-art approach for documenting specifications and enable an organization to standardize and simplify its quality assurance and control functions. Sample types, sample rules, and testing levels are

completely user-defined for maximum flexibility and ease of use. Maintenance of standard specifications, detailed sampling instructions and testing procedures are performed on-line. Cyclic, subsequent, and repeat testing options are available to support the material acceptance function, with provision for the breakdown of test procedures into multiple dispositions, to improve inventory turnover and reduce inspection lead times. The ERP system's central database eliminates redundant specifications and ensures that a single change to standard procedures takes effect immediately throughout the organization. The ERP systems also provide tools for implementing Total Quality Management programs within an organization. Original manufacturers may be defined independently from vendors, so that businesses can strictly adhere to quality assurance and control functions, without preventing their buyers from seeking the best possible price and delivery terms. Each item supplied by an original manufacturer may be linked to a standard product specification. Actual test results and material disposition histories are retained by item, lot, original manufacturer, and specification for in-depth quality performance review and analysis. Material Inspection Systems offer a wide range of capabilities for process supervision and control. These capabilities are fully integrated with other modules like purchasing, inventory management, and shop floor control functions to ensure that the right quality control procedures are followed. Thus by ensuring that the company has an efficient and effective quality assurance and management system, the ERP systems play a vital role in reducing the cost of quality.

(i) Improved Information Accuracy and Decision-Making Capability

To survive, thrive and beat the competition in today's brutally competitive world, one has to manage the future. Managing the future means managing the information. In order to manage the information, in order to deliver high quality information to the decision-makers at the right time, in order to automate the process of data collection, collation and refinement, organizations have to make Information Technology (IT) an ally, harness its full potential and use it in the best way possible.

The three fundamental characteristics of information are accuracy, relevancy and timeliness. The information has to be accurate, it must be relevant for the decision maker and it must be available to the decision-maker when he needs it. Any organization that has the mechanism to collect, collate, analyze and present high quality information to its employees, thus enabling them to make better decisions, will always be one step ahead of the competition. Today, the time available for an organization to react to the changing market trends is very short. To survive, the organization must always be on its toes, gathering and analyzing the data-both internal and external. Any mechanism that will automate this information gathering and analysis process will enhance the chances of the organization to beat the competition.

One of the major drawbacks of the legacy systems was that it did not have an integrated approach. ERP provides integrated approach through which it treats organization as single entity and helps in better decision making.

1.71 Beneficiaries of ERP

(Experiences of some Indian Companies)

"ERP is expected to give Radico a cutting edge tool that could enable higher productivity and quicker, "more accurate decision making."

-Abhishek Khaitan, MD, Radico Khaitan

We realized that our existing technology- Visipak- was a simple automation of manual systems. It was isolated and operated as individual islands of information. Our needs had grown beyond their capability and we planned to implement SAP, an integrated suite of applications to perform standard business functions through ERP. A six-month plan of accelerated SAP was meticulously chalked out. The plan involved the implementation of eight modules of SAP (SD, MM. FI, CO, PP, PM, QM and HR) in our main unit at the Rampur distillery, along with five zones, five depots and 60 factories across the country.

This included a detailed study of the type of network architecture required, which would form the backbone of the entire system.

VSAT was set up at our Rampur unit and its frame relay formed the backbone of the network. Conventional wisdom demanded that SAP should ideally be implemented on a Linux environment, so it was implemented on an AIX 5.1 operating system. The SAP roadmap consisted of five stages-project preparation, business blueprint, realization, final presentation, 'go alive' and support. Radico drew up a blueprint and highlighted what needed to be customized to best suit its requirements.

The implementation of SAP presented various benefits It brings in transparency of operation where all data is available on a real-time basis. ERP is expected to give Radico it a cutting edge tool that could enable higher productivity and enable faster and more accurate decision-making.

"**The biggest advantages are the universality of its applications and the IT TCD for solution management."**

--S.Sankaran, Head-internal Systems, Apollo Tyres

The management of an extensive distribution network of over 4000 dealers across the country, who are serviced through 140 sales and distribution offices, had created operational and logistical difficulties for our firm. In order to manage growth, it was imperative to find a business solution that would allow us to integrate data both vertically through the organization and for an enterprise-wide solution that would cater to our various needs and help us meet our strategic objectives better.

After a thorough evaluation, where the strengths of each solution provider were mapped to the company's critical requirements, we closed in on SAP simply because it fit the bill. So far, most of the SAP R/3 modules have been implemented. These include SD, MM,

QM, PM, FI/ CO, PP and HR. In addition, we have also integrated the APO, BIW and CRM modules.

The biggest advantages are the universality of its application and the IT TCO (Total Cost of Ownership) for solution management. Business processes now have become more vibrant and fleet-footed, while the transfer of major business operations onto SAP has led to productivity increases. TCO costs too have dropped as a result. A holistic view of the company's affairs and functioning has helped top management at Apollo Tyres move towards fact-based decision-making. Since the solution is stable, scalable and uniform, the company is equipped to meet emerging challenges brought about by business expansion. Several different areas were targeted for improvement by the SAP implementation, especially logistics and supply chain management. The company has started realizing the benefits in these key areas and is enjoying greater efficiency, transparency and consistency of information.

"ERP is not a magic wand that provides a solution for all the problems in the organization. It is a powerful tool. And like any tool, its utility is entirely a function of the way it is used."

-RK.Gupta, Director, Strategic Development, Intercontinental Operations, Legato Systems

ERP integrates the entire enterprise, from the supplier- to vendor, covering finance logistics, human resources etc. Since data is entered only once at the source, it avoids the duplication of data entry, thus dramatically improving data consistency and integrity.

Like any other enterprise, we are always continuously striving to improve ourselves in the area of development, Intercontinental quality, time to market, customer operations, Legato Systems satisfaction, performance and profitability. We believe that the winner will be those businesses that can most effectively gather vital information and quickly act

upon it to be successful and competitive. To execute this vision, we went for ERP and CRM software that would provide the necessary infrastructure.

There were hurdles in implementing these solutions. It takes time to train people, change their mindset and to implement these solutions, but they provide a lot of long term benefits. The coordination between departments is quite challenging. Before implementation, spending a good amount of time on process optimization helps a lot. Applying the USA principle (Understand, Simplify, and Automate) would be a great help. A good sequence would be to invest in assessment and planning before going into business design and prototyping and. finally, delivery and assimilation.

“The ERP solution ensured better understanding of our needs and faster implementation, resulting in a quicker ROI”

-C.S.Murthy, Chief of Information Management- Tata Ryerson Limited

Tata Ryerson operates in the business of steel processing and distribution, an unorganized sector, and hence the only way it could differentiate itself was through product and service quality. As the various units across the country were not integrated, real time information was not available, resulting in inefficient working capital management.

As a result, we started evaluating various ERP vendors and chose SAP as it could understand our business. We have implemented the SD. MM. FI, CO, PP and ALE modules of SAP. The implementation was completed within four months. Tata Technologies Limited, Pune was our implementation partner. Around 50 employees are using these modules on Windows NT and now the Windows 2000 platform with Oracle at the back-end.

The solution has resulted in more efficient business processes, improved productivity; reduced costs accelerated transaction time, optimized workflow and reduction in error.

With the availability of real-time information, transaction time accelerated. The company also witnessed improved customer service and quality control.

“We feel that the potential of the ERP solution is far more than we have been able to tap-we plan to leverage more and more of it, for which we require greater adherence to processes by our people.”

-Ranjeet Bhargav CIO, HCL Technologies

Before we implemented ERP, we had certain expectations from the ERP product. We wanted our operating people to start managing projects based on comprehensive information and trends rather than on incomplete bits of information. We also wanted to make available information to regulatory bodies and internal users faster and in a far more detailed way. The primary goals were clearly defined as

(a) Standardization of processes across the company;
(b) Better monitoring and control of the businesses through better project planning and monitoring;
(c) Making the information available to the operating managers;
(d) Collating and using inforn1ation for strategic planning; and
(e) HR processes like requisition. Recruitment, training and career planning

In order to achieve these, HCL began the implementation with finance, sales and distribution, material management and control. Subsequently, two more modules-HR and project systems-were added. It took us eight months 10 implement SAP from scratch and another six months for it to stabilize such that HCL started deriving benefits.

HCL now has standardized processes across all its companies the world over. Information for strategic planning is available and areas like monitoring resource Utilization and profitability of projects is uniformly available on time. All statutory reporting needs too are also being met in time, only now with less effort. As a result,

operating managers have access to the required information and figures for managing day-to-day operations with the ability to drill down to the lowest level in any area they need to analyze. Productivity has gone up with the teams now empowered with timely and accurate data, despite the fact that they spend less time and effort in procuring and collating information.

1.8 SCOPE OF ERP

To be able to recast their business in line with the above challenges, organizations are themselves getting redefined. Operations are becoming decentralized and multi-locational. Risks are being spread over multiple products and various classes of manufacturing discrete, process and make/engineer to order are coexisting. Some end products are becoming raw materials for others and manufacturing is getting diffused with distribution across an extended supply chain. The organization boundaries themselves are getting diffused as more and more stakeholders are getting tied in to form a synergistic and harmonious business ecosystem, each entity delivering value to the other.

It is logical to assume from a systemic viewpoint that such a pseudopodia business landscape needs a very robust underlying infrastructure. An infrastructure that primarily endows flexibility and agility to respond and readjust to the three Cs on the one hand and on the other, ensures tight control, checks and balances across all the enterprise resources, functions and processes.

One of the key features of a true ERP system is that the data is captured at the point of origin and impacts all related subsystems, thereby making it available to every participant in the process.

It is meant to integrate the entire enterprise, starting from supplier / vendor to the customer covering not only financial, inbound and outbound logistics and human

resources but also cross-functional supply chain optimization and execution and business intelligence function sets. The various areas covered by ERP are:

Financials

- Financial Accounting
- Treasury Management
- Enterprise Controlling
- Asset Management
- Portfolio Management etc

Logistics

- Production Planning
- Materials Management
- Plant Maintenance
- Quality Management
- Project Systems
- Sales and Distribution.

Human Resources

- Personnel Management
- Recruitment and Compensation Management
- Training and Development
- Skills and Management

Supply Chain

- Planner and Optimizer
- E-commerce/Business-to-business Commerce
- Sales Force Automation and Business warehouse

1.9 SUMMARY

Workflow: Workflow integrates the entire organization with flexible assignment of tasks and responsibilities to locations, positions, jobs, groups, or individuals. It integrates every employee in the value chain by providing a versatile inbox (universal inbox) at his or her workplace, which can be configured individually.

The business environment has changed more in the last five years than it did over the previous five decades. The pace of change continues to accelerate and cooperation around the world seeks to revitalize, reinvent and resize in an effort to position them for success in the 21st century. The ability to respond to new customer needs and seize market opportunities as they arise is crucial. Successful companies today recognize that a high level of interaction and coordination along the supply chain will be a key ingredient of their continued success. Enterprises are continuously striving to improve themselves in the areas of quality, time to market, customer satisfaction, performance and profitability. Tomorrow's winners will be those businesses that can most effectively gather, and quickly act upon crucial information. Making informed business decisions in this manner would enable organizations to accomplish their business growth and at the same time enable them to utilize the information to competitive advantage.

To make it possible for the companies to execute this vision, there is a need for an infrastructure that will provide information across all functions and location within the organization.

Earlier ERP packages use to come in different forms and in a non-integrated fashion, but slowly the need was felt to integrate various segment of an organization and this purpose is served by integrated data model in ERP system, which bind all these segments to work as an single entity.

Various Indian companies such as Radico Khaitan, Apollo Tyres, Tata Ryerson, HCL technology etc. have been benefited after implementing ERP system.

1.10 KEYWORDS

BOM: Bill of material

MRP: Material requirements planning

MRP-II: Manufacturing Resource Planning

ERP: Enterprise Resource Planning

BPR: Business process reengineering

WIP: Work-in-progress

CAD: Computer aided design

CAM: Computer aided manufacturing

ECC: Engineering change control

ECO: Engineering Change Order

CTO: Configure-to-order

ETO: Engineer-to-order

TCO: Total Cost of Ownership

EDI: Electronic Data Interchange

1.11 SELF ASSESSMENT QUESTIONS

1. What is the critical factor that decides the success of an enterprise in today's competitive environment?
2. What is ERP? Discuss the evolution of ERP.
3. What were the disadvantages of the Pre-ERP information model the isolated islands model?
4. What are the advantages of ERP Systems?
5. How is business integration achieved by ERP Systems?
6. How do conventional application packages and ERP packages differ?
7. What is an integrated information system?
8. Why are integrated information systems important for the organization's success?
9. Explain in detail important benefits of ERP.
10. What is scope of ERP? Explain in Indian context.

1.12 SUGGESTED READINGS

- Daniel Amor, “The E-business @evolution : Living and working in an international world”, Pearson Education, New Delhi
- Willium J. Buffam, “E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities”, Pearson Education, New Delhi
- Marcia Robinson, “E-Business : Roadmap for Success”, Pearson Education, New Delhi
- Samantha Shurety, “E-Business with Net. Commerce”, Pearson Education Asia, New Delhi
- Napier, “Creating a winning E-Business”, Vikas Publishing House, New Delhi
- “E-business”, magazine (January & September 2004 issues) ICFAI press
- Rayport, Jefforey, “Introduction to e-commerce”, Mc-Graw Hill
- Leon Alexis, “Enterprise Resource Planning”, TMH
- Parag Diwan, “Enterprise Resource Planning”, Pentagon Press

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LESSON: 2

SUPPLY CHAIN ENABLED ERP AND RELATED TECHNOLOGIES

Author: Kiran Khatter **Vetter: Prof. M.S. Turan**

STRUCTURE

2.0 Objectives
2.1 Introduction
2.2 ERP Related Technologies
- 2.21 Data Warehousing
- 2.22 Data Mining
- 2.23 On Line Analytical Processing
- 2.24 Supply Chain Management
- 2.25 Management Information System
- 2.26 Decision Support System
- 2.27 Executive Information System

2.3 Supply Chain Enabled ERP
- 2.31 Supply Chain
- 2.32 Demand Chain
- 2.33 Demand and Supply Chain Coordination
- 2.34 Sharing Data And Guts Instincts Electronically
- 2.35 Improvements In Supply Chain Managements
- 2.36 Success Mantra For Effective Supply Chain Management.
- 2.37 Tools in SCM
- 2.38 Future Direction

2.4 Summary
2.5 Keywords

2.6 Self Assessment Questions

2.7 Suggested Readings

2.0 OBJECTIVES

After going through this lesson, you will be able to:

- Learn a different technologies related to ERP Systems
- Know how different tools like MIS, DSS, EIS etc. have been phased out and dominated by ERP.
- Know how new concepts like Data warehousing, Data Mining, OLAP, SCM etc. improve the power, usefulness, efficiency and effectiveness of ERP systems

2.1 INTRODUCTION

ERP is an abbreviation for Enterprise Resource Planning and means, the techniques and concepts for the integrated management of businesses as a whole, from the viewpoint of the effective use of management resources, to improve the efficiency of an enterprise.

ERP systems serve an important function by integrating separate business functions-materials management, product planning, sales, distribution, finance and accounting and others-into a single application. However, ERP systems have three significant limitations:

1. Managers cannot generate custom reports or queries without help from a programmer and this inhibits them from obtaining information quickly, which is essential for maintaining a competitive advantage.
2. ERP systems provide current status only, such as open orders. Managers often need to look past the current status to find trends and patterns that aid better decision-making.
3. The data in the ERP application is not integrated with other enterprise or division systems and does not include external intelligence.

There are many technologies that help to overcome these limitations. These technologies, when used in conjunction with the ERP package, help in overcoming the limitations of a standalone ERP system and thus, help the employees to make better decisions. Some of these technologies are:

- Business Process Reengineering (BPR)
- Management Information System (MIS)
- Decision Support Systems (DSS)
- Executive information Systems (EIS)
- Data Warehousing
- Data Mining
- On-line Analytical Processing (OLAP)
- Supply Chain Management

Out of the above technologies MIS, DSS and EIS are forerunners of the ERP systems Once the ERP system and the other technologies (like Data Warehousing, Data Mining, OLAP, etc) are integrated, the MIS or DSS will become redundant as their functions will be taken care of by the new systems and they will be slowly phased out from the scene.

2.21 Data Warehousing

If operational data is kept in the databases of the ERP system, it can create a lot of problems. As time passes, the amount of data will increase and this will affect the performance of the ERP system. So it is better to archive the operational data once its use is over. When we say 'the use is over', it does not mean that the archived data is useless. On the contrary, it is one of the most valuable resources of the organization. However once the operation of the data is over, it should be removed from the operational databases. For example, once the financial year is over, the daily transactional data can be archived.

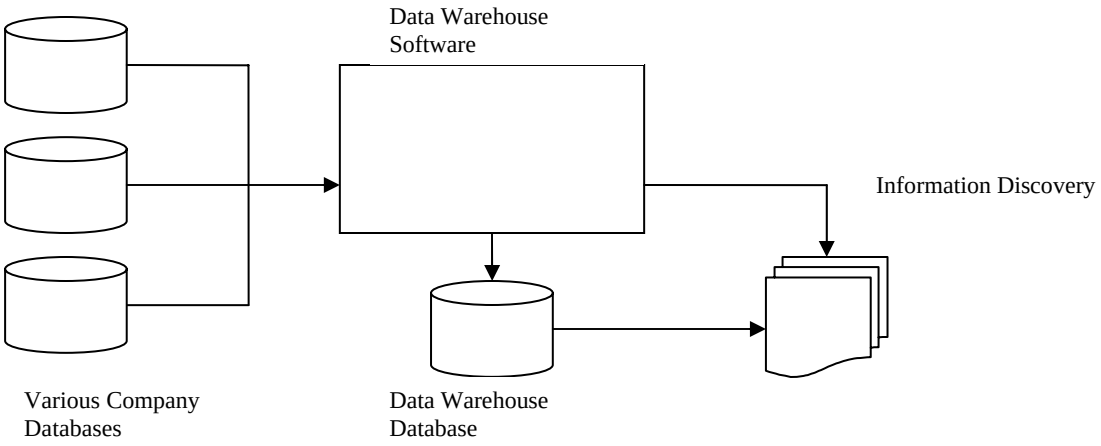

Figure 2.1: Data Warehouse

The components, structure and uses of the data warehouse system can be better understood and depicted with the help of the following figures from figure 2.2 to 2.3

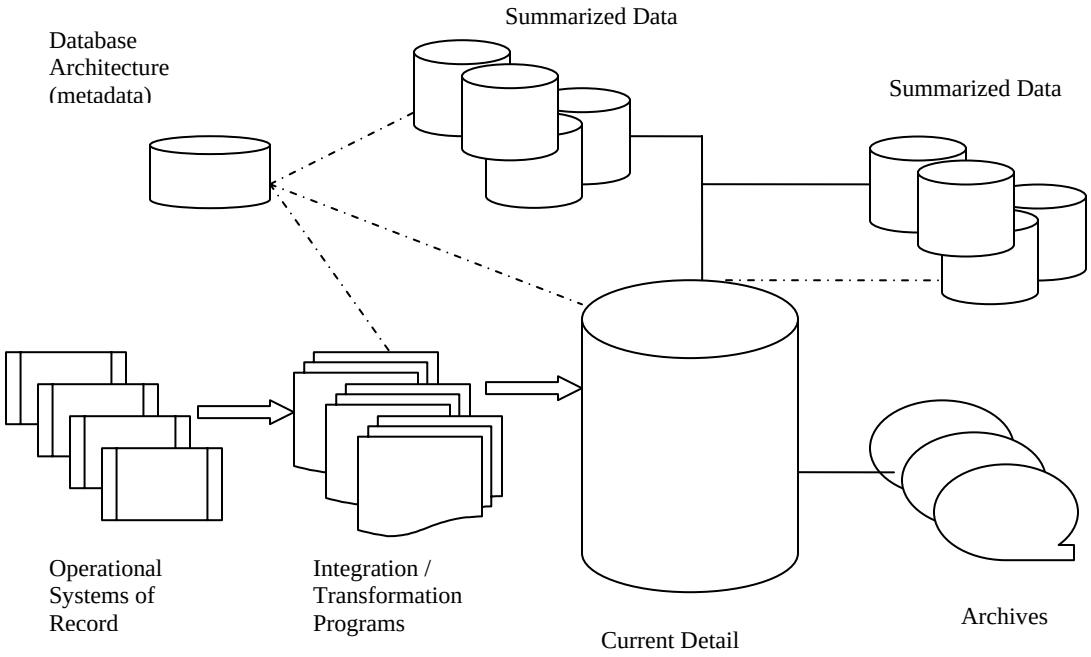

Figure 2.2: Components of a Data Warehouse

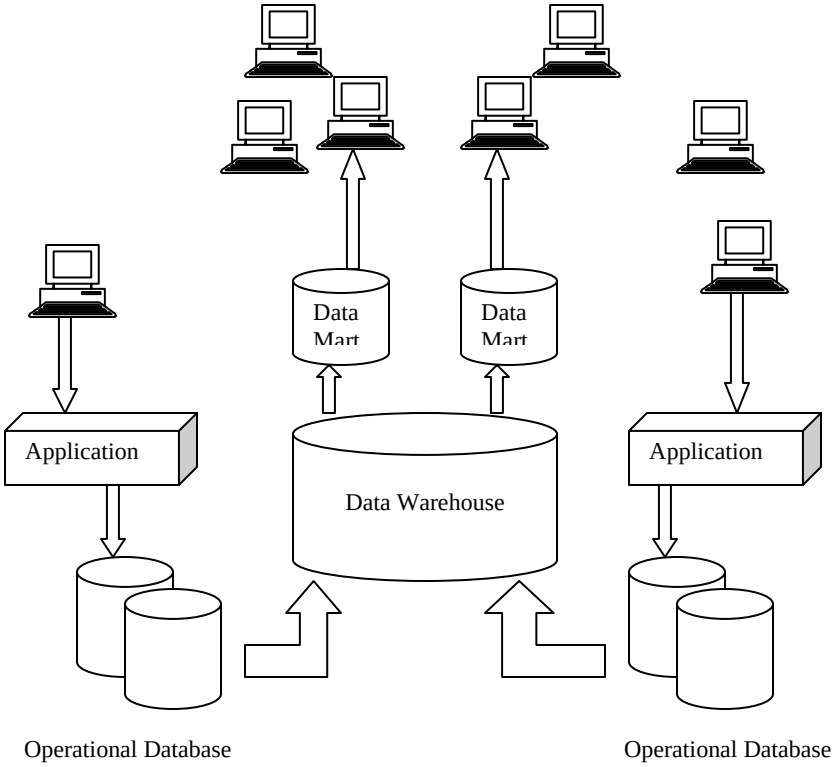

Figure 2.3: Components of a Data Warehouse

The primary concept of data warehousing is that the data stored for business analysis can be accessed most effectively by separating it from the data in operational systems. The most important reason for separating data for business analysis, from the operational data, has always been the potential performance degradation on the operational system that can result from the analysis processes. High performance and quick response time is almost universally critical for- operational systems. The reasons to separate the operational data from the analysis data have not significantly changed with the evolution of the data warehousing systems, except that now they are considered more formally during the data warehouse building process. Advances in technology and changes in the nature of business have made many of the business analysis processes much more complex and sophisticated. In addition to producing standard reports, today's data warehousing systems support very sophisticated online analysis, including multidimensional analysis.

2.22 Data Mining

We are living in the information age. The importances of collecting data that reflects ones business, or of activities that achieve competitive advantage, are widely recognized now. Powerful systems for collecting data and managing it in large databases are available in most organizations. However, the major bottleneck of converting this data into effective information is the difficulty faced in extracting knowledge about the system from the collected data. Modeling the investigated system discovering relations that connect variables in a database are the subjects of data mining.

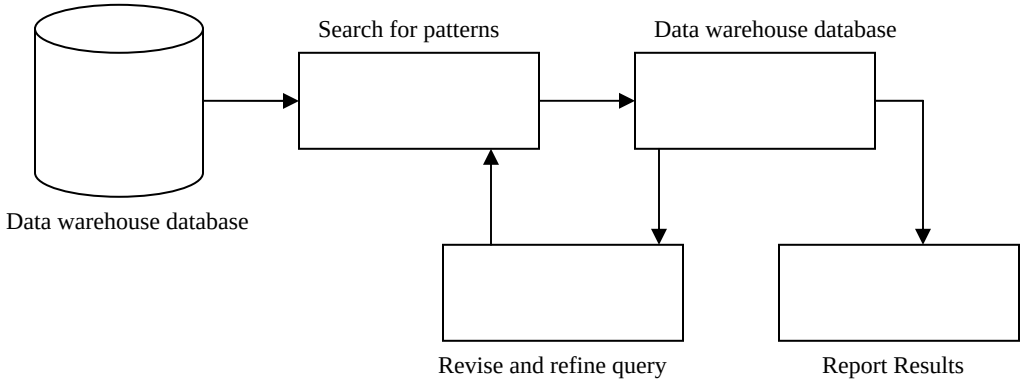

Figure 2.4: Data Mining Process

Data mining is the process of identifying valid, novel, potentially useful and ultimately comprehensible information from databases that is used to make crucial business decisions. Modern data mining systems self learn from the previous history of the investigated system, formulating and testing hypotheses about the rules, which the system obeys. When concise and valuable knowledge about the system of interest has been discovered, it can and should be incorporated into some decision support system which helps the manager make wise and informed business decisions.

The main reason for needing automated computer systems for intelligent data analysis is the enormous volume of existing and newly appearing data that require processing. The amount of data accumulated each day by various businesses, scientific and governmental

organizations around the world is daunting. Research organizations, academic institutions and commercial organizations create and store huge amounts of data each day. It becomes impossible for human analysts to cope with such overwhelming amounts of data.

Two other problems that surface when human analysts process data are:

- The inadequacy of the human brain when searching for complex multifactorial dependencies in the data
- The lack of objectiveness in analysing the data

One additional benefit of using automated data mining systems is that this process has a much lower cost than hiring an army of highly trained (and paid) professional statisticians. While data mining does not eliminate human participation in solving the task completely, it significantly simplifies the job and allows an analyst, who is not a professional in statistics and programming, to manage the process of extracting knowledge from data.

2.23 On-Line Analytical Processing (OLAP)

According to Business Intelligence Ltd., OLAP can be defined in five words-Fast Analysis of Shared Multidimensional Information.

FAST means that the system is targeted to deliver most responses to users within about five seconds, with the simplest analysis taking no more than one second and very few taking more than 20 seconds. ANALYSIS means that the system can cope with any business logic and statistical analysis that is relevant for the application and the user, and keep it easy enough for the target user. SHARED means that the system implements all the security requirements for confidentiality (possibly down to cell level) and, if multiple write access is needed, concurrent update locking at an appropriate level. Multidimensional means that the system must provide a multidimensional conceptual

view of the data, including full support for hierarchies and multiple hierarchies. INFORMATION is refined data that is accurate, timely and relevant to the user.

Simply put, OLAP describes a class of technologies that are designed for live ad-hoc data access and analysis. While transaction processing (OLTP) generally relies solely on relational databases, OLAP has become synonymous with multidimensional views of business data. These multidimensional views are supported by multidimensional database technology and provide the technical basis for calculations and analysis required by Business Intelligence applications.

OLAP technology is being used in an increasingly wide range of applications. The most common are sales and marketing analysis; financial reporting and consolidation; and budgeting and planning. Increasingly however, OLAP is being used for applications such as product profitability and pricing analysis; activity based costing; manpower planning; and quality analysis, or for that matter any management system that requires a flexible, top down view of an organization.

The 12 Rules of OLAP

Dr. E. F. Codd, father of the relational database, and his associates have produced a white paper (For more information on the white paper, call Arbor Software, Santa Clara, CA) listing the 12 rules for OLAP systems. The list is fundamentally a formula for a successful information system, whether you call it an EIS, a DSS, or a business information system. The rules are given below:

1. Multidimensional conceptual view-This supports EIS “slice-and-dice” operations and is usually required in financial modeling.
2. Transparency-OLAP systems should be part of an open system that supports heterogeneous data sources. Furthermore, the end user should not have to be concerned about the details of data access or conversions.

3. Accessibility-The OLAP should present the user with a single logical schema of the data.
4. Consistent reporting performance-Performance should not degrade as the number of dimensions in the model increases.
5. Client/server architecture Requirement for open, modular systems.
6. Generic dimensionality-Not limited to 3-D and not biased towards any particular dimension. A function applied to one dimension should also be able to be applied to another.
7. Dynamic sparse-matrix handling-Related both to the idea of nulls in relational databases and to the notion of compressing large files, a sparse matrix is one in which not every cell contains data. OLAP systems should accommodate varying storage and data-handling options.
8. Multi-user support-OLAP systems, like EISes, need to support multiple concurrent users, including their individual views or slices of a common database.
9. Unrestricted cross-dimensional operations-Similar to rule 6; all dimensions are created equal, and operations across data dimensions do not restrict relationships between cells.
10. Intuitive data manipulation-Ideally, users shouldn't have to use menus or perform complex multiple-step operations when an intuitive drag-and-drop action will do.
11. Flexible reporting-Save a tree. Users should be able to print just what they need, and any changes to the underlying financial model should be automatically reflected in reports.
12. Unlimited dimensional and aggregation levels - A serious tool should support at least 15 and preferably 20 dimensions.

2.24 Supply Chain Management

A supply chain is a network of facilities and distribution options that performs the function of procurement of materials, transformation of these materials into intermediate

and finished products, and the distribution of these finished products to customers. Supply chains exist in both service and manufacturing organizations, although the complexity of the chain may vary greatly from industry to industry and firm to firm.

Traditionally, marketing, distribution, planning, manufacturing, and the purchasing organizations along the supply chain operated independently. These organizations have their own objectives which are often conflicting- Marketing's objective of high customer service and maximum sales revenue conflict with manufacturing and distribution goals. Many manufacturing operations are designed to maximize throughput and lower costs with little consideration for the impact on inventory levels and distribution capabilities. Purchasing contracts are often negotiated, with very little information beyond historical buying patterns. The result of these factors is that there is not a single, integrated plan for the organization- there are as many plans as businesses. Clearly, there is a need for a mechanism through which these different functions can be integrated together. Supply chain management is a strategy through which such integration can be achieved.

2.25 Management Information Systems (MIS)

In the past, most payroll systems were data processing systems that did little more than process time sheets, print payroll checks and keep totals of annual wages and deductions. This was the case with most other departmental information systems. As managers began to demand more and better information about the working of the organization, the data processing systems evolved into management information systems. For example, a human resource MIS system is capable of predicating the average number of worker sick days, the amount that must be given as bonus, the overtime allowances, and so on.

MIS is an integrated an approach that visualize the business organization as a single entity composed of various inter related and inter-department subsystems looking together to provide timely and accurate information for management decision making, which leads to the optimization of overall enterprise goals.

MIS is a computer-based system that optimizes the collection, collation, transfer and presentation of information throughout .an organization, through an integrated structure of databases and information flow.

The major differences between a management information system and a Data Processing system are:

- The integrated database of the MIS enables greater flexibility in meeting the information needs of the management.
- The MIS integrates the information flow between functional areas (accounting, marketing, manufacturing, etc.) whereas data processing systems tend to support a single functional area.
- MIS caters to the information needs of all levels of management whereas data processing systems focus on departmental-level support.
- Management's information needs are supported on a timelier basis with the MIS (with its on-line query capability) than with a data processing system.

The main characteristics of the management information system are:

- The MIS supports the data processing functions of transaction handling and record keeping.
- MIS uses an integrated database and supports a variety of functional areas.
- MIS provides operational, tactical and strategic levels of the organization with timely, but for the most part structured information (ad-hoc query facility is not available).
- MIS is flexible and can be adapted to the changing needs of the organization.

2.26 Decision Support System (DSS)

Managers spend a lot of time and effort in gathering and analysing information before making decisions. Decision support systems were created to assist managers in this task. Decision support systems are interactive information systems that rely on an integrated set of user-friendly software and hardware tools, to produce and present information

targeted to support management in the decision-making process. On many occasions, decision makers can rely on their experience to make quality decisions. However, decision-makers, especially at the top management levels, are often confronted with complex decisions. The analysis of such complex decisions which involves many factors can be difficult for a human being. These decisions and the need for complex information analysis required for such decision-making, led to the evolution of decision support systems.

A decision support system is that system which helps the management in taking the business decisions. It is a system which allow human-machine interface whereby, the decision-maker possess control throughout the decision making process. It has one primary objective that is to provide the managers with the necessary information for making intelligent decisions. This approach not only helps in bringing decision-making information directly to the executives, but also goes one step further than typical management information systems by allowing decision-makers to interact with the computer.

Thus, Decision Support System (DSS) is a specialized MIS designed to support the executive skills at all stages of decision making i.e. problem identification, selecting relevant data, picking the approach to be used in decision making and evaluating the alternative courses of action. A decision support system must generate information in such a form that executives may understand and at a time when such an information is needed and place the information under the direct control of the executives. Thus, the DSS enables the business executives to take the efficient, effective and economic decisions.

A DSS can help close the information gap and allow managers to improve the quality of their decisions. To do this, the DSS hardware and software employ the latest, technological innovations, planning and forecasting models, 4th generation languages and even artificial intelligence. In many cases, DSS facilitates the decision-making

process, helping the decision-makers to choose between alternatives. Some decision support systems can automatically rank the alternatives, based on the criteria given by the decision-maker. DSS also help in removing the monotony and tedium of gathering and analysing data.

Management Information Systems are best at supporting decisions that involve structured problems such as when to reorder the raw materials, how much to order and the like. In contrast, DSS are designed to support decision-making processes involving semi-structured and unstructured problems. Here, the role of the DSS is to help managers in getting the information they want in the way they want. For example, a manager wants to reduce cycle time. He might look at various facts like the availability of raw materials, skilled personnel, the average machine down time, and so on. So there is no way the system can anticipate what the manager wants. DSSs are capable of helping the managers in making such decisions.

The main characteristics of a DSS are:

- A DSS is designed to address semi-structured and unstructured problems.
- The DSS mainly supports decision-making at the top management level.
- DSS is interactive, user-friendly can be used by the decision-maker with little or no assistance from a computer professional.
- DSS makes general-purpose models, simulation capabilities and other analytical tools available to the decision-maker.

A DSS does not replace the MIS; instead a DSS supplements the MIS. There are distinct differences between them. MIS emphasizes on planned reports on a variety of subjects; DSS focuses on decision-making. MIS is standard, scheduled, structured and routine; DSS is quite unstructured and is available on request. MIS is constrained by the (organizational system; DSS is immediate and user-friendly.

2.27 Executive Information Systems (EIS)

The line dividing DSS and EIS is very thin. EIS can be considered as a better and sophisticated DSS. Top-level executives and decision makers face many problems and pressures. They have to make right decisions at right time to take the company forward. In today's competitive world, reaction times are shrinking and time to make decisions is very less. EIS is a decision support system especially made for senior-level executives. An EIS is concerned with how decisions affect an entire organization. An EIS takes the following into consideration:

- The overall vision and mission of the company and the company goals. Strategic planning and objectives
- Organizational structure
- Crisis management/Contingency
- Strategic control and monitoring planning of overall operations

Executive decision-making also requires access to outside information from, competitors, governmental regulations, trade groups, news gathering agencies, and so on. A high degree of uncertainty and a future orientation is involved in most executive decisions. Successful EIS are easy to use, flexible and customizable and use the latest technological innovations.

2.3 SUPPLY CHAIN ENABLED ERP

Few concepts have revolutionized business more profoundly in recent years than supply chain management. Simply put, the streamlining of communications and materials delivery from vendors to operations and on to customers can yield enormous business benefits-improved customer service, reduced inventory, shorter cycle times, increased agility, and higher asset utilization levels, to name a few. After catching fire in the manufacturing and retail sectors, the same principles are now heating up virtually every industry.

With shrinking product lifecycles, shifting competitive landscapes, and drastic changes to consumer buying patterns, supply chain management is no simple task. But powerful new tools are helping replace guesswork about planning, scheduling, and execution with systematic and scientific insight. Earlier, waves of enterprise resource planning (ERP) software that integrated financial and distribution functions with distribution requirements planning (DRP), master production scheduling (MPS), and manufacturing requirements planning (MRP) had automated these tasks for many companies. The newest generation, which incorporates advanced planning and scheduling (APS), goes beyond those discrete tasks by fine-tuning the entire supply flow for a company's unique needs.

2.31 Supply Chain

In the supply chain, the delivery date demanded by the assembler is fixed and based on just-in-time principles. Via backward calculation the delivery dates can be calculated for the suppliers in the chain, assuming that suppliers in most cases do not have restrictions on flexibility. This calculation will be done in general for large volume orders, based on determined production volumes for a month, week or day.

The following should be included in this area: tier 3 suppliers, tier 2 suppliers, tier 1 suppliers, assemblers, head quarters and logistic service providers.

The targets that these parties strive for can be defined as follows:

- Improve efficiency (stock and labour reduction) and
- Deliver the large volume components just in time to the next party in the chain.

Some characteristics in this automotive supply chain are as follows:

- Assembler takes the lead,
- Flexibility expected from suppliers is growing,
- Long term relationships between assemblers and suppliers become more intensive,

Continuous pressure on cost reduction, Reduction of number of tier one suppliers, and Increase of value added logistics functions.

2.32 Demand Chain

In the demand chain, the delivery date to the end customer is not defined by the end customer, but based on constraints in the production plan and distribution network by the head office organization. Via a forward calculation the delivery date for an end customer can be calculated. Achieving delivery dates of few days for a new vehicle customer order will be very difficult to achieve. Therefore, it is common that the car seller will calculate for himself what a possible delivery date could be and give that information to the end customer.

The parties playing a key role between factory and consumer dealers are assemblers, distribution centres, headquarters, importer, dealer and consumer. Targets in the demand chain can be described as follows:

- Reduce vehicle stock,
- Provide reliable lead times, and
- Provide short lead times.

Some characteristics of the automotive demand chain are as follows:

- The Internet provides customer influence transparently on the chain,
- Balance between flexibility, responsiveness and low inventory is a major challenge,
- OEM headquarter takes the lead,
- Country / continental specific logistics are needed to take advantages of local factories, and
- IT solution for transparency over the chain is challenging operation.

2.33 Demand and Supply Chain Coordination

To be competitive in lead times and accurate about delivery dates of vehicles to the end customer, it is important to have the mechanisms in place to balance demand and supply. The following functions must be created in the headquarter organization to balance these two chains:

- A mechanism is needed to allocate forecast sales volumes within the defined production capacities.
- A capacity check for volumes and critical components should take place on line for a dealer to provide a reliable delivery date to the customer when he visits the showroom.
- Based on the confirmed delivery dates promised to the end customer, all parties in the logistic pipeline (from assembler to dealer) must be informed about which orders need to reach the next stage at which moment.
- All parties in the logistic pipeline must have transparency regarding the status and the number of vehicles available in different statuses.
- All parties must be able to inform the central pipeline when vehicles come into a delayed condition due to damage, hold or delayed shipments.
- All parties must have the chance to recognize delayed vehicles and must have a mechanism in place to take action to give priority to these vehicles.
- Headquarters must have a function to inform dealers/ customers about customer orders which will be delivered later than promised.
- All logistics parties must have a performance indicator programme in place so that continuous improvement can be made.

Factors driving supply chain management are globalization of commerce, sourcing and production, and rapid commoditization of products-all of which have led to creating unbearable price pressure on manufacturers. Also just-in-time manufacturing highlights the inefficiencies of old business models. The increasing dynamics in customer demand

now need manufacturers to have flexible capacities, greater efficiencies in product development, sourcing, production and distribution. This leads to a need to optimize all the essential resources, inventory and capacity as well as closer customer care and supplier integration.

A study conducted by Harvard University reported the following objectives for supply chain management:

- Reduced direct and indirect cost
- Reduced capital costs. Tax minimization
- Reduced logistics costs Overcome tariff barriers
- Provide better customer service
- Build alternative supply sources
- Pre-empt potential competitors
- Learn from local suppliers
- Learn from foreign customers
- Learn from competitors
- Learn from foreign research centres
- Attract talent globally

Supply chain management has assumed broader dimension with the coming of the internet. Today, it is seen as the planning and control of the flow of goods and material from the original supplier through multiple production and logistics operations to the ultimate consumer. Hence supply chain management today embraces multiple technologies-ERP, Advanced Planning and Scheduling (APS) systems, e-commerce and logistics execution systems supported by business intelligence tools. Logistics providers have also emerged as key players in the supply chain arena with logistics execution being a critical component for the effectiveness of the supply chain.

2.34 Sharing Data and Gut Instincts Electronically

An electronics manufacturer may put a premium on minimizing fast-obsolescing parts inventory, while a pizza franchiser cares more about faster delivery of foodstuffs to its stores. To that end, APS tools monitor and optimize the supply chain from end to end-as a unified whole of plants, warehouses, and retail sites instead of as separate pieces. Thanks to the Internet and electronic data interchange (EDI) networks, producers can now share operational data and even gut instincts systematically and instantly with wholesalers and retailers-and vice versa-across time zones and geography. The result: more visibility throughout the supply chain, fewer surprises, and less need to stock backup raw materials or finished goods. With better synchronization across the entire supply chain, each member achieves major benefits such as:

- Lower inventories and, therefore, lower financing costs
- Shorter receivables cycles
- Optimal use of production resources, costly work forces, and transportation fleets
- Faster response-to-market changes
- Greater satisfaction and loyalty among customers
- Greater profitability

The most successful companies maximize these benefits by selecting supply chain management solutions not on the basis of mere bells and whistles, but on how well they improve critical business processes procurement-to-pay cycles, demand forecasting, order-to-cash cycles. And the secret to achieving improvement is a supply chain management system that ties all of the steps in the chain together, together with the financial, production, and other critical systems. A standalone APS system, for example, is important but not sufficient to manage supply chain activities.

2.35 Improvements in the Supply Chain Management

The supply chain discipline has taken a huge leap forward with APS ability to simultaneously consider multiple constraints that affect production and delivery of moods. Making this possible is the tremendous increase in computer memory capacity,

now available at a reasonable cost from networked computers. It starts with constructing a detailed model of a given supply chain's elements-an enterprise's network of suppliers, distribution centres and factories, for example, with data on what each one can supply, the costs and time to retool, transfer costs between facilities, and the inventories on hand at every stage. Next, it takes in details on current orders, forecasts of future demand, the costs and availability of every part and raw material, each customer's special requirements and so forth.

Then comes the fun part using specialized algorithms embodying artificial intelligence techniques, the APS software grinds through all of this data to come up with an enterprise-wide plan for production, for distribution, or both, tailored to he company's specific goals. For example, it may optimize production to make sure that orders from two customers get delivered on time, at any cost. Or that a specific plant of the company is kept as busy as possible. Or that inventory level at a particular distribution centre doesn't fall dangerously low.

How does supply chain management apply to non-manufacturers? Think of Hospitals, whose purchase of enormous volumes of surgical supplies another Materials account for some 23 per cent of their average annual budgets; Instead of blindly stocking a central storeroom and paying for inventory while it sits for weeks, before getting used, an ERP system with APS can schedule and manage frequent delivery of supplies when and where they're .needed. Leading healthcare companies are extending these efficiencies to entire networks of hospitals and clinics for even greater cost savings.

In fact, all businesses that involve complex flows of material can take advantage if this kind of global optimization and efficient execution. Communications and power utilities, forced by market deregulation to manage assets more tightly than ever, deploy supply chain management to more efficiently purchase and schedule supplies for their network capital projects. Suppliers can deliver telephone poles or power transformers directly to

construction sites and bypass intermediate storage depots, eliminating inventory financing and re-shipment costs.

2.36 The Success Mantra for effective SCM

The ultimate goal is to meet customer demand cost effectively and efficiently. Hence the need to plan, manage and optimize inventory and capacity in a company's operations and communicate the planning and inventory information between the various levels of suppliers and 9ustomers.

The steps to success in supply chain management are:

- Integrating information.
- Analyzing this information to trigger a corresponding product transition
- Creating a nimble and responsive planning and execution process
- Enabling global process visibility and co-ordination between all supply chain partners
- Improving overall throughput and asset utilization
- Empowering people to identify and solve problems proactively.

2.37 Tools in Supply Chain Management

The tools available in supply chain systems to enable the above are:

- Online real-time Available to Promise (ATP)
- Online real-time Commit to Promise (CTP)
- Accurate forecasting
- Closed loop corporate to enterprise to department to work cell planning, optimization and execution
- Reactive dynamic scheduling
- Concurrent and collaborative planning
- Web-enabled communication of planning and inventory information between suppliers and customers.

2.38 Future Direction

New ERP solutions, which are real-time applications, are addressing entire supply chains through extended enterprises. These solutions are capable of optimizing both material and capacity with constraints, doing total order management, balancing supply with demand and supporting near virtual enterprises. These solutions are robust and include modeling tools that will expedite implementation. We will also see supply chain vendors consolidating with ERP vendors who will in turn also consolidate their supply chain product strategies.

2.4 SUMMARY

With the competition in the ERP market getting hotter and hotter, and ERP vendors searching for ways to penetrates new market segments and expend existing ones. Tomorrow's ERP systems will have most of these technologies such as Data Warehousing, Data Mining, OLAP, Supply Chain Management, MIS, DSS and EIS, integrated into them to provide intelligence support to the concerned managers.

Earlier, ERP software were focused on financial and distribution functions with Distribution Requirements Planning, (DRP), Master Production Scheduling (MPS), and Manufacturing Request Planning (MRP), but upcoming generation of ERP software incorporates advance planning and scheduling sub systems which stream lines communications and material delivery from vendors to operations and on to customers, yielding various benefits to organization such as reduced inventory, shorter lead time, higher assets utilization level etc.

2.5 KEYWORDS

Business Process Reengineering (BPR): It is the radical change in the thinking of an organization.

Data Mining: Data mining is the process of identifying valid, novel, potentially useful and ultimately comprehensible information from databases that is used to make crucial business decisions.

On line Analytical Processing: OLAP can be defined as Analysis of Shared Multidimensional Information.

Supply Chain Management: A supply chain is a network of facilities and distribution options that performs the function of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers.

Management Information System: MIS is a computer-based system that optimizes the collection, collation, transfer and presentation of information throughout .an organization, through an integrated structure of databases and information flow.

Decision Support System: It is a system which allow human-machine interface whereby, the decision-maker possess control throughout the decision making process.

Executive Information System: EIS is a decision support system especially made for senior-level executives.

2.6 SELF ASSESSMENT QUESTIONS

1. What are the important technologies related to ERP?
2. What is DSS and how is it different and MIS?
3. Explain the following in detail with important features and advantages:
    - Data warehousing
    - Data mining
    - OLAP
    - Supply Chain Management
    - DSS
    - EIS
4. What is Success Mantra for effective supply chain management?
5. Explain the Codd’s Rules of OLAP.

2.7 SUGGESTED READINGS

- Daniel Amor, “The E-business @evolution : Living and working in an international world”, Pearson Education, New Delhi
- Deborach L. Bayles, “E-commerce logistics & Fulfillment”, Pearson Education, New Delhi
- Willium J. Buffam, “E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities”, Pearson Education, New Delhi
- Marcia Robinson, “E-Business : Roadmap for Success”, Pearson Education, New Delhi
- Ravi Kalakota, “E-commerce : A managers Guide, Pearson Education”, New Delhi
- Kenneth C. Landon, “E-commerce :Business, Technology, Society”, Pearson Education, New Delhi
- Samantha Shurety, “E-Business with Net. Commerce”, Pearson Education Asia, New Delhi
- Napier, “Creating a winning E-Business”, Vikas Publishing House, New Delhi
- “E-business”, magazine (January & September 2004 issues) ICFAI press
- Rayport, Jefforey, “Introduction to e-commerce”, Mc-Graw Hill
- Leon Alexis, “Enterprise Resource Planning”, TMH
- Parag Diwan, “Enterprise Resource Planning”, Pentagon Press

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LESSON: 3

BUSINESS PROCESS RE-ENGINEERING

Author: Deepak Dembla **Vetter: Prof. M.S. Turan**

STRUCTURE

3.0 Objectives
3.1 Introduction
3.2 BPR and ERP
3.3 Phases in BPR
3.4 Role of IT in BPR
3.5 BPR, ERP and IT
3.6 When to Re-engineer - Before, During or After ERP?
3.7 BPR is an organization change
3.8 Difference between BPR and ERP
3.9 Summary
3.10 Keywords
3.11 Self Assessment Questions
3.12 Suggested Readings

3.0 OBJECTIVES

After going through this lesson, you will be able to:

- Learn about BPR concepts
- Explore the role played by Information Technology in BPR
- Define relationship between BPR, ERP and Information Technology
- Identify how BPR creates a change in the organization functioning
- Describe different phases of BPR
- Differentiate between BPR and ERP

3.1 INTRODUCTION

"Business Process Reengineering is the fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost, quality, service and speed."

-Dr Michael Hammer

"BPR revolves around information technology and continuous change. It is the constant refinement of an organization's changing needs."

"BPR is the rethinking of business processes to improve the speed, quality, and output of materials or services."

Business Process Reengineering (BPR) means not just change-but dramatic change and dramatic improvements. This dramatic change is achieved by the overhaul of organizational structures, management systems, job descriptions, performance measurements, skill development, training and most importantly, the use of information technology. BPR will impact every aspect of how the organization runs its business. Change on this scale can cause results ranging from enviable success to complete breakdown and failure.

A successful BPR can result in dramatic performance improvements, increase in profits, better business practices, enormous cost reductions, dramatic improvements in productivity and so on. It can also create substantial improvements in quality, customer service, employee satisfaction, profitability and other business goals. The promise of BPR is not empty; it can actually deliver what it promises. The stories of BPR failures are due to the improper implementation or other factors. BPR can help a successful company to stay on top or transform an on-the-verge-of-bankruptcy company into a successful one.

In many cases, the BPR projects have failed to meet the high expectations. Recent surveys estimate the percentage of BPR failures to be as high as 70%. Some

organizations have succeeded only in achieving marginal (and in some case negligible) benefits even after spending huge amounts of time and money on BPR. Some others who were not that lucky have succeeded only in destroying the morale and momentum built up over the lifetime of the organizations. These failures indicate that reengineering involves a great deal of risk. But even after all these talks about failures; many companies are willing to take the risk because the rewards can be astounding.

3.2 BPR AND ERP

The last five to six years have been, in many ways, testing times for the Indian industry. Thanks to the sudden exposure to global markets and competition, they are going through a metamorphosis. In the same period, even domestic competition has grown significantly.

Although some of philosophies are conflicting to each other (e.g., Business Process Engineering and Total Quality Management), there is a big confusion in the industry about similarities and dissimilarities amongst them. This confusion is even higher, if use of management tools is “complementary” to each other. Two such major complementary management tools currently being talked about by one and all are BPR and ERP. BPR evolves the fol1owing steps:

- Study the current system
- Design and develop new systems
- Define process, organization structure and procedures
- Develop customize the software
- Train people
- Implement new systems.

Davenport and Short (1990) define business process as a set of logically related tasks performed to achieve a defined business outcome. When properly scaled, attention to a business process can pay rich rewards; however, the company has to be aware of the

implications prior to defining a project. When the scale of the effort is too small, little can be accomplished beyond incremental improvements.

Business Process Redesign is the analysis and design of work flows and process within and between organizations (Davenport and Short 1990). Teng et al. (1994) define “BPR as the critical analysis and radical redesign of existing business processes to achieve breakthrough improvements in performance measures:”

The word reengineering today often implies changes from the most mundane to the most significant. The term commonly used is BPR (business process redesign).

Not all companies wish to make massive changes to their business processes. The changes companies require are on a continuum from streamlining to reinvention. Streamlining a business process implies making incremental changes to the current process to increase quality, decrease cycle time or reduce cost. Reinventing a business process means scrapping the current one and creating a process that truly meets the needs of the company. This usually requires a fresh look at the purpose of the business and the core competencies needed to see that purpose.

A company can decide to start a BPR project with a small element of the business for any number of good reasons such as:-

- The project may be a pilot to test the changes prior to involving the entire corporation.
- The purpose may be to test a hardware or software product, or to gain the skills needed in the long-term.

Projects that include major sections of the company will be undertaken by those who feel they are ready for a larger scale project or who feel the large scale is essential.

We can align these two dimensions in a matrix that will give us a sense of the size -and thus difficulty-of the undertaking. The indications of possible difficulties within each quadrant are examples to illustrate the concepts.

In the lower left quadrant, a company may decide to automate the cash applications process, increasing the speed and quality of this relatively minor process. In the upper left quadrant, a company may implement a process to standardize the human resource services. In this example, the change will streamline the collection and delivery of information to employees across the entire corporation.

Moving to the lower right quadrant, a company may decide that its highest leverage move is to completely reinvent the lead management process, a minor segment of the business.

And finally, the effort with the greatest amount of change across the largest portion of the company' may be to implement a new business model across all the strategic business units that might entail changing the order management, the sales and distribution and the supporting financial processes.

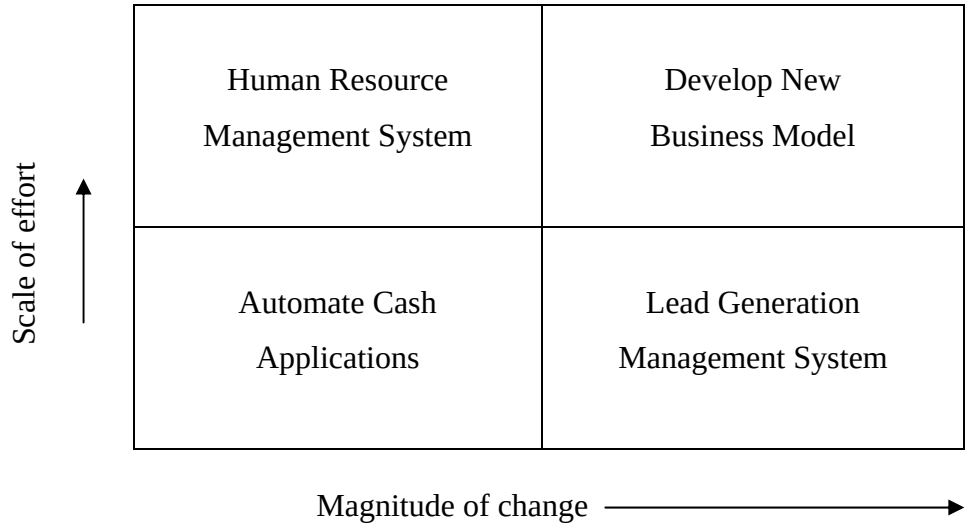

Figure 3.1: Scale / Magnitude Matrix

Identifying the correct quadrant helps the project team and the executive sponsor to choose the appropriate project process and to appreciate the amount of change required. This knowledge will positively influence their success rate. This is a critical point that will be emphasized throughout this book. The larger the scale and the closer to reinvent the project is the more attention must be paid to the critical success factors and the change management issues. Nothing will cause a project to fail more spectacularly than less than full attention to these matters.

3.3 PHASES IN BPR

According to Peter F. Drucker, “Reengineering is new, and it has to be done.” The tasks experts agree upon to successfully perform BPR can be grouped into seven steps, or phases. All successful BPR projects begin with the most critical requirement Communication throughout the organization.

1. Begin Organizational Change
2. Building the Reengineering Organization
3. Identifying BPR Opportunities
4. Understanding the Existing Process
5. Reengineering the Process
6. Blueprint the New Business System
7. Perform the Transformation

Phase 1: Begin Organizational Change

The main activities in this step are:

- Assess the current state of the organization
- Explain the need for change
- Illustrate the desired state
- Create a communications campaign for change

The first step is to take a long, hard look at how the organization operates. The focus of this analysis is on the operating procedures and the bottom-line results that are generated by them. The purpose of performing the analysis described below is to determine whether dramatic changes are possible by doing the BPR.

Aspects of the business that need to be evaluated are:

- How are things currently done?
- What changes may be occurring?
- What new circumstances exist in the business environment?

The next step is to look for harmful operating procedures, if any, within the organization that have caused or will cause irreparable damage to the company's business goal and functioning. What are the sources of concern for the organization? Maybe the demands of the marketplace are dwindling. Perhaps competitors have made significant advancements in products and services. Regardless of the reasons, it should be clear whether or not the organization, in its current state, is able to meet the needs of the markets it serves. The consequences of inaction should be identified and well understood. In most cases, these consequences are the loss .of jobs by shutting down portions of the business, or perhaps the entire business. Finally, the proper future direction of the organization should be decided. The future "vision" of how the business must operate will serve as a clear and concise guide with measurable goals for employees to focus on.

If an organization wishes to change the way it operates, it must turn to its people to make it happen. People are the agents of change and it is these same people who can create the maximum amount of trouble. Because BPR can potentially require significant changes throughout an organization, it must begin with a communications campaign to educate all those who will be impacted by this change. Communication to all levels of personnel must remain active from start to finish keeping everyone involved and working towards a common goal. Without a common understanding about what is happening, confusion and uncertainty about the future can result in resistance, strong enough to stop any

reengineering effort. BPR is most effective when everyone understands the need for change, and works together to tear down, old the business systems and to build new ones.

In order for change to take place, everyone must understand where the organization is today, why the organization needs to change, and where the organization should be in order to survive, thrive and beat the competition.

Phase 2: Build the Reengineered Organization

The major activities of the second phase are given below:

- Establish a BPR organizational structure
- Establish the roles for performing BPR
- Choose the personnel who will reengineer

An infrastructure must be established to support reengineering efforts. Although this phase consists of only a few tasks, it has a tremendous impact on the success of a BPR endeavor. The questions that must be answered as the reengineering staff gathers together to communicate, motivate, persuade, educate, destroy, create, rebuild, and implement are:

1. Who are the people that will be enlisted to reengineer the business?
2. What will their responsibilities be?
3. Who will they report to?
4. What will happen to the normal business functions when BPR is going on?

One of the most important members of the reengineering effort is the executive leader. The leader must be a high-level executive who has the necessary authority to make people listen, and the motivational power to make people follow. Without the commitment of substantial time and effort from the top management, no BPR project can overcome the internal forces and will never reach implementation.

A process owner is responsible for a specific process and the reengineering effort focused on it. There should be a process owner for each high-level process being reengineered. The process owner convenes a reengineering team to actually reengineer his/her process. The team, dedicated to the reengineering of a specific process should be made up of insiders, who perform the process and are aware of its strengths and weaknesses, along with outsiders who can provide objective input to spark creative ideas for redesign. The team must be small, usually five to ten people. Since they will be the ones who investigate the existing process, and oversee the redesign and implementation, they should be credible in their respective areas. The inclusion of the employees in the team is very important and plays a vital role in reducing the resistance by company personnel to the new process.

In some BPR initiatives it is helpful to institute a steering committee. Especially in larger or multiple reengineering projects, a steering committee can control the chaos by developing an overall reengineering strategy and by monitoring its progress.

Lastly, a reengineering specialist or consultant can be an invaluable addition to the overall effort. A reengineering specialist can assist each of the reengineering teams by providing tools, techniques and methods to help them with their reengineering tasks.

Phase 3: Identify BPR Opportunities

This phase consists of the following activities:

- Identify the core/high-level processes
- Recognize potential change-enablers
- Gather performance metrics within the industry
- Gather performance metrics outside the industry
- Select processes that should be reengineered
- Prioritize selected processes
- Evaluate pre-existing business strategies

- Consult with customers to know their desires
- Determine customer's actual needs
- Formulate new process performance objectives
- Establish key process characteristics
- Identify potential barriers to implementation

In this phase, we begin to break away from normal patterns of identifying business opportunities. We start by dividing the entire organization into high-level processes rather than the usual vertical business areas such as marketing, production, finance, etc. These processes, usually less than a dozen, are the major or core processes of the organization. This activity is not a time consuming task, but it is difficult because it requires a good knowledge of how the company thinks about itself. One goal here is to identify the process boundaries (where the process begins and where it ends), which will help set the project scope for those processes that are to be reengineered.

In many cases, seeing the company from the customer's point of view can help identify what these high-level processes might be. For example, when Texas Instruments outlined their major processes for their semiconductor business, they came up with only six processes as follows:' Strategy Development, Product Development, Customer Design and Support; Order Fulfillment, Manufacturing Capability Development, and Communications. Each of these processes converts inputs into outputs.

At this point, it is helpful to begin thinking about potential change levers that .may lead to dramatic changes in the organization's processes. Change levers will usually fall under one of these categories: the use of information, the use of information technology, and human factors.

In many instances, a modification in one of these areas information, IT and people requires changes in the other two areas as well to be most effective. Once the major processes have been defined, we need to decide which of the high-level processes need to

be reengineered. The most objective and accurate way is to compare the performance of the high-level processes, identified earlier, with the performance of the competitors as well as organizations of other industrial segments. Even if the direct competition is outperformed, there may be companies in other industries that may be more effective in performing a similar task-such as order fulfillment or product development.

If a company fulfills orders in six months, while a competitor fulfills orders in two weeks, then this process can definitely be considered as a candidate for reengineering. What one should look for are overall, bottom-line performance metrics for the high-level processes that will help in selecting the processes that must be reengineered. Typically, organizations use the following three criteria:

1. Dysfunction (which processes are the most ineffective)
2. Importance (which processes have the greatest impact on our customers)
3. Feasibility (which processes are at the moment most susceptible to accomplish a successful redesign)

Picking a process which has high success potential and which can show success fast is very important to build the necessary momentum and enthusiasm at all levels of the organization. Prioritizing the processes that have been chosen for reengineering, results in a schedule-the order in which the processes will be reengineered.

The first step is an assessment of the existing business strategy. Most likely, this existing business strategy is not focused on driving a process; therefore, a new process strategy has to be defined. This new process strategy should reflect the .new strategic goals for the process. Customers are an important source of information to set the new direction. Hence, they should be consulted not only to discover their desires, but also to find out what they actually need. Process goals and objectives can be determined by combining customer needs with competitor strategies and best practices of the business. In addition to goals and objectives, the conception of the new process needs to be completed by identifying key performance measures, key process characteristics, critical success factors, and potential barriers to implementation.

Phase 4: Understand the Existing Process

The main activities of the fourth phase are:

- Understand why the current steps are being performed.
- Model the current process
- Understand how technology is currently used
- Understand how information is currently used
- Understand the current organizational structure
- Compare current process with the new objectives

Now that we know which process to reengineer, we need to take a look at why we currently perform the process the way it is done. 'Understand' in key word here. We may not need to scrutinize every detail of how we are performing the process-this effort has the potential to go on indefinitely, sometimes referred to as analysis paralysis, which can weaken the momentum needed to carry the project all the way to implementation. Once we have the new process objectives clearly defined (in Phase 3), we can measure the existing process in terms of the new objectives to see where we are and how far we have to go.

Modeling the current process is an important part of this phase. It not only helps to better understand the existing process, but also helps with planning the migration from the old to the new process and executing the physical transformation of personnel, organizational structures, information requirements, as well as to understand how technology is used. Information that should be included in the models are process inputs (such as task times, data requirements, resources, demand, etc.) and. process outputs (such as data outputs, cost, throughput, cycle time, bottlenecks, etc.).

Understanding how and why the current processes use information is also important. Answering these questions will be helpful:

1. Do staff members have access to essential information?
2. Are some processes wasting time and effort by creating duplicate information when the information can be shared across organizational boundaries?
3. Why is technology used to support some tasks and not others?
4. How effective are the current interfaces?
5. Are they easy to use, or are they counterintuitive and thus inhibit the effectiveness of current tasks?
6. In what way does the existing process take advantage of technology, and in what way has technology imposed artificial restrictions?

We need to end up with an estimate of the current cost, robustness and functional value of each technology and information system that is currently being used.

Phase 5: Reengineer the Process

The major activities are:

- Ensure the diversity of the reengineering team
- Question current operating assumptions
- Brainstorm using change levers
- Brainstorm using BPR principles
- Evaluate the impact of new technologies
- Consider the perspectives of stakeholders
- Use customer value as the focal point

During this phase, the actual “reengineering” begins. We’ve moved from strategy and analysis phases into the redesign phase. The Reengineering Team that was formed to take part in the reengineering sessions should consist of designers and implementers, including people well versed in technology. These team members should come from both inside and outside the existing process.

The “inside” perspective may reveal information-about the existing process that was not uncovered in Phase 4. People, who will be the future process owners, or those responsible for the new process, are a critical component of the team. Including the future owners will help to ensure that the reengineered process succeeds once it is implemented.

Equally important is the “outside” perspective of someone who will look at the process with a “fresh eye” and raise questions about operating assumptions that may not be obvious to the insider, as he might be too close to the process to be objective.

Lastly, a technologist will provide insight as to how technology can be applied in new and innovative ways. In other words, the technologist will help to visualize how the process can be performed outside the boundaries of the current implementation. Including both outsiders and technologists on the team will help spark “out of-box” thinking-thinking creatively above and beyond the current restrictions.

Having developed a good understanding of how the existing processes work in the previous phase, it is now necessary to question the operating assumptions underlying the processes.

- Is there a reason why a process has been performed in a certain way?
- Are there customer requirements that dictate the steps in a process?

Many times the operating assumptions can be thrown out and new ones developed. However, it is important to evaluate the impact that these assumptions will have outside the process in question.

The Reengineering Team now has to conduct brainstorming sessions to create new process ideas. According to Dr Hammer, brainstorming sessions are most successful when the following BPR principles are considered.

- Several jobs are combined into one
- Workers make decisions
- The steps in a process are performed in a natural order.
- Processes have multiple versions
- Work is performed where it makes the most sense
- Checks and controls are reduced
- Reconciliation is minimized
- A case manager provides a single point of contact
- Hybrid centralized / decentralized operations are prevalent.

For example, hybrid centralized / decentralized operations encourage the formation of cross functional workgroups. Ideally, the Team will identify those processes that should be centralized as well as the processes, which are of value to a specific group within the organization. An organization might maintain a customer database on a centralized system, but it would provide data for a variety of processes throughout the organization such as sales, purchasing; or accounts receivables.

During the brainstorming sessions, the Reengineering Team must also consider new technologies. They will need to evaluate the impact of new technology on the process. Technologies that are often considered enablers of reengineering include:

- ERP systems
- Internet technologies
- Distributed computing platforms
- Client/server architectures
- Workflow automation technologies
- Groupware

The Reengineering Team should also search for uses of new information as well as new ways to use existing information. The reengineering process may enable the organization to collect data that was not gathered before, thereby bringing new knowledge into the process to help in decision-making. Another benefit is the sharing of data across the organization to eliminate redundancies in data storage and to increase internal communication.

The act of reengineering a process may require evaluation of the organizational model and the management strategy. A newly formed cross-functional workgroup will not fall neatly into a traditional hierarchical management structure. In addition, this workgroup will most likely require new measurement systems and reward programmes. Changes in the infrastructure can also have an impact on corporate values and belief systems. It may be found at this stage that a new process will simply not fit into the current organization without a new process-oriented organizational structure.

Lastly, the Reengineering Team must consider all process stakeholders in the redesign of a process. Stakeholders are those people whose actions impact the organization, and those who are impacted by the organization's actions. Stakeholders include both those internal to the process and those external to the process. External stakeholders may not be concerned with how a process is performed but they are certainly concerned with the output of the process, if they are the recipients.

Throughout this phase, the team must consider the impact on those external processes that interact with the reengineered process. Does the implementation of client/server architecture have an effect on another process? Will that process need to be reengineered also? Reengineering cannot be performed in a vacuum. However, it cannot be performed on all processes simultaneously either.

Phase 6: Blueprint the New Business System

The activities of Phase 6 are the following:

- Define the new flow of work
- Model the new process steps
- Model the new information requirements
- Document the new organizational structure
- Describe the new technology specifications
- Record the new personnel management systems
- Describe the new values and culture required

Blueprints are detailed plans required to build something in accordance with the designer's intentions. In BPR, blueprints must be created to identify all the necessary, details of the newly reengineered business system and to ensure that it will be built as intended. This phase of the project takes the reengineered process developed in the previous phase, and provides the details that are necessary to actually implement it.

Blueprinting involves modeling' the new process flow and the information required & to support it. Just as we modeled the "as is" process and information requirements in Phase 4, we need to create "to be" models to illustrate how the workflow will be different. The information models, or data models, will indicate where the new process will use information that is shared across, functional areas of the business.

The blueprints should also contain models of the redesigned organizational structure. Instead of the traditional organization chart a different kind of chart is needed.

This chart will show the new process flow along with the process team members, the process owners, the case managers and the process facilitators. The chart should also indicate parts of the organization which interact with the process personnel.

In addition, detailed technology specifications that are required to support the new process should be defined. Although minor changes, or fine tuning adjustments to the

technical configuration will probably occur during the implementation phase, an initial physical description of-the technologies used and their physical specifications should be recommended in this phase, to set the stage for rapid application development.

Included in the blueprints should be the new management systems and values or belief systems of this redesigned area of the business. New management strategies, along with new performance measurements, compensation systems, and reward programmes should be outlined. The reengineered process may require a change in the values or belief systems of the company. The redesign may require an entirely different culture, or atmosphere, than what is prevalent in the organization today. It is critical to have these areas, and their responsibilities, defined as we go into the implementation phase.

Phase 7: Perform the Transformation

The activities of this last phase are:

- Develop a migration strategy
- Create a migration action plan
- Develop metrics for measuring performance during implementation
- Involve the impacted staff
- Implement in an iterative fashion
- Establish the new organizational structures
- Assess current skills and capabilities of workforce
- Map new tasks and skill requirements to staff
- Re-allocate workforce
- Develop a training curriculum
- Educate the staff about the new technology used
- Educate the management on facilitation skills
- Decide how the new technologies will be introduced
- Transition to the new technologies
- Incorporate process improvement mechanisms

Now, we are ready to transform the organization. We have communicated, developed strategies, analyzed, reengineered and blueprinted our ideas for the new process. This is where all of the previous efforts are combined into an actual business system, thus enabling the business to meet the market demands of today and tomorrow.

The first step in transforming the organization is to develop a plan for migrating to the new process. We need a path to get .from where the organization is today, to where the organization wants to be. Migration strategies include:

- Full changeover to the new process
- Phased approach
- Pilot project
- Creating an entirely new business unit

An important point to consider is the integration of the new process with other processes. If only one process is reengineered, then it must interact with the other existing processes. If multiple processes are slated for reengineering, then the new process must not only integrate with existing processes, but also with the newly reengineered processes that will come online in the near future. Therefore, the implementation of the new process must be flexible enough to be easily modified later on.

Successful transformation depends on consciously managing behavioral as well as structural change, with both sensitivity to employee attitudes and perceptions, and a tough-minded concern for results. BPR implementation requires the reorganization, retraining and retooling of business systems to support the reengineered process. The new process will probably require a new organization, different in structure, skills and culture. The new management structure should result in the control paradigm being changed to the facilitation paradigm. The new process team structure should result in the managed paradigm being changed to the empowered paradigm. Once the new structures are

established, we should map tasks in the process to functional skill levels, and ultimately to workers.

Transforming the workforce will require an array of activities. It begins with an assessment of the current skills or capabilities of the workforce to inc1udes soft, operational and technical skills. This skill inventory compilation may require personal, peer and supervisor evaluations. Feedback should be provided to all personnel to ensure accuracy of current skills and interest for all staff. Armed with the new process skill requirements and a current skills inventory, the gaps can be assessed. Is the new process feasible with the current skill set? Which are the areas to focus on to enhance personnel skills to meet the requirements of the new process? An education curriculum needs to be established to get all the employees educated on the business and, most important, on how their jobs relate to the customer.

An educational pyramid is an effective way to transfer knowledge of team building, self-mastery, and subject matter knowledge. Systems training are essential to understand the use of new information systems and how to take advantage of their capabilities. Process training may be needed to help ‘employees think beyond a linear process to a more holistic interdependent process. Facilitating training for the management is critical in order to develop their abilities to listen, allow mistakes, handle disputes among process experts, and transition to a coach/facilitator role. Education may be necessary for Total Quality Management (TQM), Statistical Process Control (SPC), or Continuous Process Improvement (CPI), if these mechanisms are designed into the new processes. Finally, a structured on-the-job training (OJT) program is instrumental in providing continuity of the new process during periods of personnel turnover or conflicts.

As with any dramatic change, people will have personal difficulties, in varying degrees, with the paradigm shift that has taken place. All new process implementations are surrounded by confusion, frustration and sometimes panic. The best transition strategy is one that minimizes, as much as possible, the interference caused to the overall

environment. Attempts should be made to keep the new process chaos to a controlled level, to maintain the focus of the reengineering team and the faith of the employees.

Transforming information systems to support the new process may involve retooling the hardware, software and information needs for the new process. One approach .to this transition could be a controlled introduction. The method would ensure that each part of the system is operational for a segment of the business before the next module is implemented. Although the risk may be low while the bugs in the new system are ironed out, it may be difficult to integrate the hybrid old/new systems in a step-wise manner. The one-step approach is where the entire system is developed in parallel to the existing system, and a complete transition occurs all at once. This may put the organization at a higher risk, if the systems do not function properly at first, but this is the more common approach due to the “all-or-nothing” nature of BPR. Most reengineered processes function in an entirely different manner than existing processes; thus, a step-wise introduction would, most likely, not be fully functional until all the steps were introduced anyway. An important reason to justify the one-step approach is that the reengineering benefits can be realized much sooner than with a controlled introduction.

The faces and activity described here must be considered as the very minimum, and then adapted to circumstances, when attempting to successfully planned and perform Business Process Re-engineering.

3.4 ROLE OF INFORMATION TECHNOLOGY IN BPR

In the past several years, information technology has been recognized as 11 major forces in reengineering. It is typically identified as an enabler of the charges required. That is, reengineers develop a conceptual approach to changing the business processes expecting that IT will make it -possible. For example, reengineering the sales order process means providing a wide range of products, scheduling customer and financial information online to the order entry people. This is not possible without an integrated networked information system.

ERP has changed the nature of the reengineering process in two ways: first, it provides a system that is integrated and based on best available or to be established practices. It. makes available, as a matter of course, many of the improvements that companies identify in the process of reengineering. In this respect, it serves as the technology enabler identified by most reengineers and writers on the subject.

Second and more importantly, ERP is a driver, not as merely an enabler of substantive change. ERP forces the implementation team to specify how it wants to organize and rim the business in an integrated way, at a detailed level. Many companies have not done this and continue to operate with mixed and often conflicting organizational structures, processes and standards: This lack of clarity and integration is often based on history or on culture. The successful implementation of ERP requires you to define these elements.

ERP will not actually conduct the reengineering for you, but will trigger you to do it for yourself. With this force in hand, even companies who simply wanted to replace their 20-year old legacy.

3.5 BPR, ERP AND IT

In the vast majority of cases, information technology powers BPR. In the past, information technology was used to help companies automate existing business processes but now, technology is BPR used to change those processes fundamentally. Recent developments in information technology have not only made BPR possible on a radical and extensive scale, but also more effective. Today, information technology and business reengineering go hand in hand. The merger of the two concepts has resulted in the laying the concept, namely, Business Process Reengineering (BPR). The heart and soul of BPR lie in radical, process oriented business solutions, which have BPR greatly enhanced by the information technology of client/server computing; Most of the ERP systems are based on the client/serve solution model and Business Process Reengineering blueprint

that represent an advanced integration of business-process reengineering and information technology.

While the objectives of BPR have not been altered by information technology, they have gained an extra dimension in business engineering. The main thrust of BPR is the efficient redesign of a company's value added chains. By definition, value-added chains are the set of connected steps running through a business which, when quickly and efficiently completed, add value to both, the company and the customer. Formerly, information technology was little more than a streamlining tool applied to existing value-added processes. With the appearance of enterprise software systems, information technology has now BPR come a business-modeling vehicle that can assist in the redesigning of those processes.

3.6 WHEN TO REENGINEER-BEFORE, DURING, OR AFTER ERP?

When companies have chosen ERP, the question arises, "When should I do reengineering?" The approach you take will, of course, depend upon your business situation and thus, your motivation for choosing ERP. To provide some structure for answering this question, let us return to the sale/magnitude matrix and add to it and indication within each quadrant of the type of approach that is more successful.

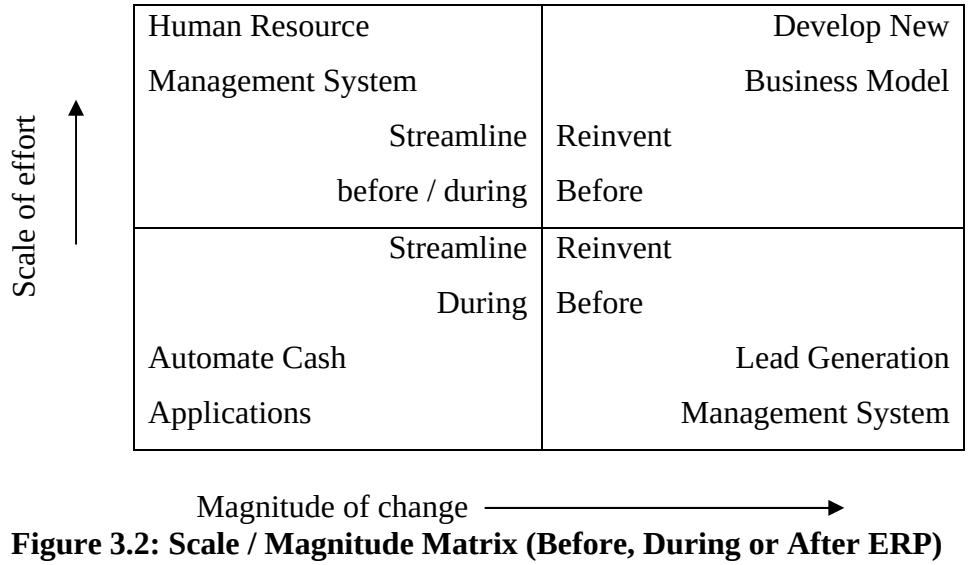

Figure 3.2: Scale / Magnitude Matrix (Before, During or After ERP)

- In the lower left quadrant, the project team can successfully undertake reengineering during implementation. The system will require identification of the structure, procedures, relationships and standards and win provide the latest in best practices for the modules selected.
- In the upper left quadrant, the project team should engage in a BPR process to identify the problems and issues caused by their current processes (streamlining). It should define a high level design for those changes, but move onto the system as quickly as possible to identify the details of the changes. Thus, it will do reengineering both before and during the ERP implementation.
- In the lower right quadrant, the project team is tasked with reinventing one of its business processes. It should begin by designing in some detail, the changes the company wishes to implement.

In some cases, the system did not provide some functionality and they were faced with the decision as to whether to eliminate it from their design or to provide a system work-around that they would have to maintain in the future. The outcomes of these decisions depended upon the criticality of the missing feature. Many companies have accepted a somewhat less than perfect solution to save them the time and expense a “fix” would entail.

- The upper right quadrant identifies efforts that are focused on reinventing significant portions of the business. These changed projects will take significant time and effort and are usually accomplished with the help of a consulting firm having vast expertise and experience in managing major changes. A successful effort here will focus on the dramatic, radical changes that are essential to long term survival and growth. Major reengineering projects should be undertaken prior to implementing ERP. As. in, the lower right quadrant, some relatively minor decisions may be impacted when ERP is implemented.

This matrix provides some indication of what type of process redesign to attempt under various circumstances. In any case, it will be counterproductive to delve too far into the details of the new business environment without understanding something about ERP.

What about reengineering after its implementation? Some companies assume that they will implement, without going to the trouble of BPR project and address, any needed changes after the fact. In cases where the corporate culture and processes fit well with ERP, this approach is possible, though not recommended. In cases where ERP requires greater or a different structure than the company possesses, the project teams will find themselves making decisions that will affect the company for years to come. Thus, they may reengineer their company without the benefit of a structured process for doing so. We strongly advise against this approach, although it may be successful.

Companies that have implemented ERP in several different projects may find their staff has become very experienced with certain modules. There is so much richness inherent in ERP that it takes considerable experience to even begin to understand what it will do. A representative of one manufacturing company stated that they were starting to use the system to suggest improvements they might make in the future. This approach is a creative use of reengineering after implementation.

3.7 BPR IS AN ORGANIZATIONAL CHANGE

Reengineering (and ERP is a form of reengineering) must be seen as a mechanism for organizational change. Teams that approach the implementation of ERP with this mindset are more successful1 than those that do not. With ERP implementation, there is the need to help employees to cope up with massive changes in their jobs, their organizational positioning, their decision making processes, even their pay.

This is true at all levels of the company. It includes the order entry clerk who is now asked to make decisions that he commit for the company to a course of action arid the

operations manager who discovers that his or her empire has grown or shrunk by 50% and that he or she is required to manages in a vastly -different way.

3.8 DIFFERENCE BETWEEN BPR AND ERP

It is clear from the fundamental definition that BPR and ERP are quite different from each other. While BPR focuses more on the transformation aspect of the business processes, using innovative business concepts, whereas ERP focuses on the automation aspect of the business processes, using Information Communication Technology (ICT) to achieve the same objective.

This can be explained by an example. If a huge fertilizer plant has two strong functional departments (namely operations and maintenance) located far from each other, there will be considerable delay in sending a work order from the operations department to maintenance department in case of an equipment breakdown. This delay would result in low availability of the-equipment, hence, higher costs and longer lead times.

An ERP can make the delay almost zero, where work order generation and communication is automatic and instant, thereby reducing the delay in attending it, increasing the availability of the equipment and decreasing cost. A BPR, however, may result in drastically changing the business process, where there are no separate departments for operation and maintenance. Additionally, maintenance (at least 95% of the cases, except where exceptionally high expertise is required) may also be required to be carried out by the operations man.

This would not only make him more responsible for the operations but also eliminate the need for generating a work order for maintenance department. Of course, this will lead to development of multi-skills concepts etc. This BPR would also increase the availability of the machines (by eliminating delays), reduce cost etc. and may not need automation at all. Thus, the approach of BPR and ERP can be quite different in achieving the same goal-more availability of equipment and lesser cost.

3.9 SUMMARY

In the early nineties, ‘downsize’ became the battle-cry for consultants and managers in the corporate world. As the urge to consolidate new organizations flourished, business engineering came to replace the outdated and overly-simplistic views implied y downsizing. While many pro-downsizing commentators spoke of obliterating existing organizations, consultants provided weights on how to restructure a leaner, more efficient company. Such insights then paved the way for anew company infrastructure based on a combination of process oriented business solutions and information technology. This new company infrastructure was designed to meet the challenge of creating a business environment that would optimize performance and remain flexible enough to accommodate change.

Now, throughout the world, the latest business buzzword, Business Engineering (BE) is fully underway. Various companies have created special groups, often led by senior executives, which focus solely on BE. This chapter throws light on the significance of Business Engineering, the principles and the link between Business Engineering and Information Technology specifically ERP.

3.10 KEYWORDS

BPR: Business Process Reengineering (also this term is commonly used for business process redesign

TQM: Total Quality Management

SPC: Statistical Process Control

CPI: Continuous Process Improvement

OJT: On-the-job training

ICT: Information Communication Technology

BE: Business Engineering

3.11 SELF ASSESSMENT QUESTIONS

1. What is BPR? What is Role of IT in BPR?
2. Explain in detail the different phases of BPR.
3. Differentiate BPR and ERP.
4. How BPR brings a change in the organization? Explain.
5. How decision is made - “when to reengineer”? Elaborate.

3.12 SUGGESTED READINGS

- Willium J. Buffam, “E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities”, Pearson Education, New Delhi
- Marcia Robinson, “E-Business : Roadmap for Success”, Pearson Education, New Delhi
- Samantha Shurety, “E-Business with Net. Commerce”, Pearson Education Asia, New Delhi
- Efraim Turban, “E-commerce : A managerial perspective”, Pearson Education, New Delhi
- Schneider P. Grey, “E-commerce”, Thomson Learning
- “E-business”, magazine (January & September 2004 issues) ICFAI press
- Leon Alexis, “Enterprise Resource Planning, TMH
- Parag Diwan, “Enterprise Resource Planning”, Pentagon Press

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LESSON: 4

ERP MARKET PLACE

Author: Kiran Khatter **Vetter: Prof. M.S. Turan**

STRUCTURE

4.0 Objectives
4.1 Introduction
4.2 Reasons for the growth of ERP market
4.3 ERP products
4.31 SAP
4.31.1 Company Profile
4.31.2 Products and Technology
4.31.3 R/3 - An overview
4.31.4 R/3 Modules
4.32 Baan
4.32.1 Company Profile
4.32.2 Baan Applications
4.32.3 Baan Modules
4.33 Oracle
4.33.1 Company Profile
4.33.2 Oracle Applications
4.34 JD Edwards
4.34.1 Company Profile
4.34.2 JD Edwards Modules
4.35 QAD
4.35.1 Company Profile

4.35.2 MGF/PRO - Modules
4.36 PeopleSoft
4.36.1 Company Profile
4.36.2 PeopleSoft' s - Business Management Solutions
4.37 SSA
4.37.1 Company Profile
4.37.2 SSA Applications
4.4 Summary
4.5 Keywords
4.6 Self Assessment Questions
4.7 Suggested Readings

4.0 OBJECTIVES

After going through this lesson, you will be able to:

- Make an assessment of the ERP market
- Identify the reasons for the growth of ERP market
- Describe various types of ERP products
- Define major players of ERP and their offerings

4.1 INTRODUCTION

Today, many organizations face continuous demands from rapidly changing and increasingly competitive global markets. They also must serve customers who want innovative, high quality products that feature special options. Additionally, further pressures are created by technology developments that shorten many product life cycles and by intensified international competition, which drives corporations to reduce costs and improve production efficiencies.

To increase competitive .advantage, companies require flexible business information systems that adapt to rapid change. To address these needs, enterprise business applications must provide solutions that concentrate on the customer by integrating the

supply chain. These systems must allow information access throughout the enterprise and provide software that adapts to the business. In addition, technical requirements include a true client/server computing environment that supports relational database technology and graphical user interfaces. Most importantly, these systems must provide open systems through choice and integrate the complete supply chain infrastructure, connecting whatever systems an organization has selected to meet its information technology requirements.

This chapter discusses the key features of some of the leading ERP packages available.

4.2 REASONS FOR THE GROWTH OF THE ERP MARKET

There is no doubt that the market for Enterprise Resource Planning (ERP) systems is in great demand. Industry analysts are forecasting growth rates of more than 30% for at least the next five years. Why are so many companies replacing their key business systems? The answer is:

- To enable, improved business performance
  - Cycle time reduction
  - Increased business agility
  - Inventory reduction
  - Order fulfillment improvement

- To support business growth requirements
  - New products/product lines, new customers
  - Global requirements including multiple languages and currencies

- To provide flexible, integrated, real-time decision support
  - Improve responsiveness across the organization

- To eliminate limitation in legacy systems

- Century dating issues
- Fragmentation of data and processing
- Inflexibility to change
- Insupportable tecn1ologies

- To take advantage of the untapped mid-market (medium size organizations)
  - Increased functionality at a reasonable cost o Client server/open systems teclu1ology
  - Vertical market solutions

These are some of the reasons for the explosive growth rate of the ERP markets and the ERP vendors. As more and more companies are joining the race, the ERP vendors are shifting their focus from big-Fortune 1000 companies to different market segments (Medium size companies, small companies etc.). The future will see fierce battle for market share and mergers and acquisitions for strategic and competitive advantage. The ultimate winner in this race will be the customer, who will get better products and better service at affordable prices.

4.3 ERP PRODUCTS

In this chapter, we will see the profile of some of the top vendors of the ERP market, their profile, their product offerings and product features. The companies featured here are SAP AG, Baan Company, Oracle Corporation, People Soft, J.D. Edwards and SSA. The information provided here has been collected from the Internet and printed media. For further details, you are directed to contact the companies directly.

4.31 SAP

4.31.1 Company Profile

Founded in 1972, SAP (Systems, Applications and Products in Data Processing), based in Walldorf, Germany, is the leading global provider of client / server business application solutions. Today, SAP has installations in more than 107 countries.

SAP's - ERP package comes in two versions: the mainframe version (SAP R/2) and the client/server version (SAP R/3). Most prominent among SAP's product range is the enterprise application suite R/3 for open client/ server systems. With SAP Systems, customers can opt to install the core system and one or more of the functional components, or purchase the-software as a complete package.

SAP customers have chosen to install SAP's client/server suite in more than 19,750 sites worldwide. The System is accepted as the standard in key industries such as oil, chemicals, consumer products and high technology and electronics. The SAP group employs a work force of over 19,300 and has offices in more than 50 countries worldwide. SAP IS "the Most Successful vendor of standard business-application software and is the fourth-largest independent software supplier in the world. In its most recent fiscal year, ending December 31, 1998, SAP AG reported revenues of DM 847 billion, a 41 % increase over 1997 s revenues. In the same period, sales of R/3 rose by 31%.

4.31.2 Products and Technology

SAP products feature a sophistication and robustness unmatched by other business software solutions. SAP has developed an extensive library of more than 800 predefined business processes, spanning each functional software requirement. These processes may be selected from the SAP library and included within installed SAP applications, after tailoring the application solution to suit the user's exact requirements. New business processes and technologies become available regularly, enabling SAP customers to add state of-the-art solutions to meet ever-changing business demands.

The power of SAP software lies in real-time integration, linking a company's business processes and applications, and supporting immediate responses to change throughout the organization on a departmental, divisional or global scale. The international strength of the products extends to every aspect of the applications such as the support of multiple

currencies simultaneously and the automatic handling of country-specific import/export, tax, legal and language requirements. The complete suite of R/3 applications is available in 24 1anguages, including Japanese (Kanji) and other double-byte character language.

4.31.3 R/3 - An Overview

R/3 employs a three-tier client/server architecture widely recognized by SAP customers, technology partners and industry analysts as a winning approach to solving some of today's most demanding information-management challenges. The three-tiered architecture separates a system into three functional layers, each structured to support the demands of its function.

1. The Database layer resides on central servers or mainframe host computers.
2. The Application layer holds the processing logic of the system, preparing and formatting data for individual offices or departments.
3. The Presentation layer, typically on personal computers, handles all the tasks related to the presentation of data, including user interfaces that enable easy access to complex applications and data.

SAP has also incorporated and integrated the intranet and Internet technologies into business solutions for its customers. Both internally and together with its partners, the company is defining and creating a number of Internet standards-based interfaces, applications and business processes that will extend the usefulness of SAP software in entirely new ways and to new classes of customers.

Through its Industry Business Units (IBUs) and its extensive development network, SAP works closely-with its customers to develop new information technology approaches, to meet the unique demands of a wide spectrum of industries. With this approach, customers become members of the SAP development team, sharing their best practices and solutions.

The R/3 System

As a company, one needs dynamic strategies to meet the challenges of today's fast paced business world. The ability to respond nimbly to new customer needs and seize market opportunities as they arise is crucial. A powerful, open IT infrastructure that will optimally support the business activities and is flexible enough to adjust to change and progress has become a necessity. SAP's R/3 System is the world's most used standard business software for client / server computing.

R/3 enables 'you to respond quickly by making you more flexible-so you can leverage changes to your advantage. Your everyday business will surge, letting you concentrate on strategically expanding to address new products and markets. The R/3 System is ideal for companies of all sizes and industries. It gives them both a forward looking information management system and the means to optimize their business process.

4.31.4 R/3 Modules

R/3's applications' are modules. They can either be used alone or in combination with other solutions. From a process-oriented perspective, greater integration of applications increases the benefits derived. The following are the R/3 modules:

- **Financial Accounting** Collects all the data in your company relevant to accounting, provides complete documentation and comprehensive information, and is at the same time an up-to-the-minute basis for enterprise-wide control and planning.
- **Treasury** A complete solution for efficient financial management that ensures the liquidity of your company worldwide, structures financial assets profitably and minimizes risks.
- **Controlling** A complete array of compatible planning and control instruments for company-wide controlling systems, with a uniform reporting system for coordinating the contents and procedures of your company's internal processes.

- **Enterprise** Controlling continuously monitors your company's success factors and performance indicators on the basis of specially prepared management information.
- **Investment Management** Offers integrated management and processing of investment measures and projects from planning to settlement, including pre-investment analysis and depreciation simulation.
- **Production Planning** Provides comprehensive processes for all types of manufacturing from repetitive, make-to-order and assemble-to-order production, through process, lot and make-to-stock manufacturing, to integrated supply chain management with functions for extended MRP-II and electronic Kanban, plus optional interfaces for PDC, process control systems, CAD and PDM.
- **Materials Management** Optimizes all purchasing processes with work flow driven processing functions, enables automated supplier evaluation, lowers procurement and warehousing costs with accurate inventory and warehouse management and integrates invoice verification.
- **Plant Maintenance** and Service Management Provides planning, control and processing of scheduled maintenance, inspection, damage-related maintenance and service management to ensure availability of operational systems, including plants and equipment delivered to customers.
- **Quality Management** Monitors, captures and manages all processes relevant to your quality assurance along the entire supply chain, coordinates inspection processing, initiates' corrective measures and integrates laboratory information systems.
- **Project System Coordinates** and controls all phases of a project, in direct cooperation with Purchasing and Controlling, from quotation to design and approval, to resource management and cost settlement.
- **Sales and Distribution** Actively supports sales and distribution activities with outstanding functions for pricing, prompt order processing and on-time delivery, interactive multilevel variant configuration and a direct interface to Profitability Analysis and Production.

- **Human Resources Management** Provides solutions for planning and managing your company's human resources, using integrated applications that cover all personnel management tasks and help simplify and speed the processes.

4.32 BAAN COMPANY

4.32.1 Company Profile

Baan Company is a leading global provider of enterprise business software. Baan Company offers a comprehensive portfolio of best-in-class, component based applications for front office corporate office and back office automation. These applications are in use at over 7,000 customer sites worldwide. Baan Company products reduce complexity and cost, improve core business processes, are faster to implement and use, are more flexible in adapting to business changes and optimize the management of information throughout the entire value chain.

Baan Company's product family offers on-going delivery of open components for enterprise applications, including a comprehensive and flexible suite of year 2000compliant software solutions and best-in-class business modeling tools. These tools are based on a flexible, multi-tier architecture which can scale to meet the needs of small, medium and large enterprises. Baan Company makes this possible with its open architecture which enables customers to migrate to new technologies and product releases at their own pace. Referred to within Baan Company as Dynamic Enterprise Modeling Strategy Execution (Baan DEMSE), this unique approach puts business requirements at the heart of the implementation process.

4.32.2 Baan Applications

Baan's applications support a fully integrated, hybrid .manufacturing environment, offering integrated applications that address the spectrum of manufacturing scenarios, like make-to-stock, assemble-to-order, make-to-order and engineer-to-order.

Baan manufacturing. This includes multi-site MRP, product configuration, project control and critical path activity analysis capabilities. It manages repetitive and job shop production and supply chain control for multi-site manufacturing.

Baan distribution and transportation. This section manages sales and purchasing, with order processing, margin monitoring and contract administration capabilities. Additionally, this module offers-comprehensive functionality for external logistics and transportation, providing route optimization, transport order management; transport maintenance, and public warehousing and packaging. It can be tightly integrated with Baan's EDI module, enabling rapid communication with clients and subcontractors.

Baan finance. It is a complete, integrated financial system that provides General Ledger, Axed Assets, Accounts Payable and Accounts Receivable capabilities. It can be used as an integrated portion of a complete Baan solution or in a standard mode for companies that only require the financial management capabilities.

Baan service. It offers installation control, contract control, service order control and invoicing.

Baan project. This is designed for the manufacturing and construction industries, and supports the management of large projects through all stages, from estimating tenders to delivery and throughout the guarantee period.

Baan process. This process delivers the key functionality required for process manufacturers, including formulation and co-product/by-product management fully integrated with discrete ERP for hybrid environments.

Baan tools. Baan tools are a powerful 4GL application development environment that provides end-users a fast, easy way to tailor Baan applications to achieve custom implementation. Baan Tools' open architecture enables users to develop applications that

are easily and seamlessly portable across multiple open systems hardware platforms, operating systems, databases, user interfaces and networks. All Baan applications are developed with Baan Tools, which also is available as a separate development product.

Orgware. Baan supports its customers with a comprehensive set of pres ales and post sales methodologies and services delivered by Baan directly or through a growing network of alliance partners. Ofgware offers customizable process models which are tightly linked to the applications to speed implementation and end-user training, enabling companies to maximize quickly their return on investment in their Baan system.

Baan Orgware comprises four components which resolve the critical business issue of mapping business systems to' an organization. These include the Enterprise Modeler modeling tool, Enterprise -Reference Models, Enterprise Performance Manager for, benchmarking implementation success, and Enterprise Implementer, which includes tools to manage the actual implementation process.

4.32.3 Baan Modules

Baan ERP, the successor to Baan IV, is a proven enterprise resource planning software application. It is fully integrated and provides exceptional functionality across the enterprise. Baan ERP consists of a number of interdependent components that can be deployed to meet business needs. The flexibility within Baan ERP allows customers to maximize the benefits of both best-in-class solutions and a fully integrated, high performance system. Baan ERP includes the following components: manufacturing, finance, project and distribution.

Manufacturing

Achieving flexibility, speed, and product quality in manufacturing operations can give a definitive competitive edge in the market. Baan Manufacturing supports many types of production management strategies, such as engineer to-order, make-to-order, assemble-to-order, and make-to-stock. For example, the Master Production Scheduling module

assists business in day-to-day production control and long-term planning, and the Product Configuration module streamlines the processing of configured products.

One outstanding Baan Manufacturing feature is an approach called customer order decoupling point (CODP). This approach distinguishes different types of production so companies are able to determine the point at which production changes nom standard-forecast production to customer specific production. Combining work orders and repetitive manufacturing in the production operation and manufacturing the same product using different methods is a benefit that lets companies change methods as needs change through a product's life cycle.

Baan Manufacturing's extensive planning and scheduling capabilities translate companies' business goals into manufacturing plans. Graphical simulations allow analyzing the effect of alternative plans on financial requirements, capacity, and inventory. Because the application supports both centralized and local planning, interplant relationships can be freely defined, thus providing complete supply-chain management. In addition, the shop-floor control modules in Baan Manufacturing monitor all shop floor activity, including subcontract operations, and simplify data entry for personnel, while at the same time providing complete visibility of manufacturing activities.

- Manufacturing Module (includes Bills of Material, Cost Price Calculation, Engineering Change Control, Engineering Data Management, Hours Accounting, Product Classification, Product Configuration, Production Control, Production Planning, Project Budgeting, Project Control, Repetitive Manufacturing, Routings, Shop Floor Control, Toor Requirements, Planning and Control, Capacity Requirements Planning, Master Production Scheduling and Material Requirements Planning)

Finance

Effective financial management is critical to business success, but a company's managers cannot manage what they cannot see. Baan Rnance delivers a high level of visibility for financial transactions and drill-down capability that gives detailed transaction information online.

Baan Finance's multi-currency capabilities allow transactions in any currency; accounts and invoices balances can be revalued easily. Companies can distribute or centralize accounting functions in whatever way is most appropriate without limiting the ability to consolidate corporate information. The Activity-Based Costing module which gives information needed to gauge the cost of the different activities in business is also included.

Key modules are:

Accounts Payable, Activity-Based Costing, Budget System, Cash Management, Cost Allocation, Financial Statements, Fixed Assets, General Ledger

Project

If a business executes customized projects for customers, comprehensive project control is undoubtedly fundamental to its profitability. With Baan Project, companies have the control needed to meet promised delivery dates and cost targets for even the most complex projects. Baan Project manages all the aspects of projects and contracts, providing visibility for all project activities and helping to ensure that delivery dates are met.

The goal of the Baan Project is cost effective management for each project according to its particular time schedule, specified budget, and required quality. The software includes estimates and bids, scheduling, planning, budgeting, purchasing, tracking, billing, and integration into financial, manufacturing, and distribution, operations. Finally, Baan Project enables companies to anticipate the impact of a project on capacity and cash flow,

with the result that productivity improves and resources are used in the best manner possible.

- Project Module (includes Project Budget, Project Definition, Project Estimating, Project Invoicing, Project Monitoring, Project Planning, Project Progress and Project Requirements Planning)

Distribution and Transportation

Baan-distribution and transportation: Strategies and tools for logistics management. Baan Transportation handles all modes of external logistics and transportation. The application includes powerful features for managing public warehousing and packaging, and offers the flexibility of easy configuration to specific requirements. In addition, Baan Transportation provides an integrated solution that is able to successfully manage both internal arid external logistics.

Baan Distribution is designed to provide companies with effective distribution operations that span the globe. The application handles day-to-day logistics for manufacturers and wholesalers using sophisticated forecasting tools, comprehensive sales, purchasing, inventory management, and extensive distribution planning and transportation management. Baan Distribution's electronic' data interchange (EDI) speeds up communications between businesses while fostering closer trading-partner relationships. The application also supports multiple distribution planning strategies that provide a solid link between distribution operations and manufacturing planning.

Distribution Module (includes Sales Management, Purchase Management and Warehouse Management.

4.33 ORACLE CORPORATION

4.33.1 Company Profile

Oracle Corp. (founded in 1977) is the world's second largest software company and the leading supplier of software for enterprise information management. With annual revenues exceeding $ 8.0 billion, the company offers its database, tools and applications products, along with related consulting, education and support services. Oracle employs more than 41,000 people in more than 145 countries around the world. Headquartered in Redwood Shores, California, Oracle is the first software company to implement the Internet computing model for developing and deploying enterprise software across its entire product line: databases and relational servers, application development and decision support tools and enterprise business applications.

Oracle software runs on network computers, personal digital assistants, set-top devices, PCs, workstations, minicomputers, mainframes and massively parallel computers. Oracle 8i, the latest version of Oracle industry's leading database, is the database for Internet Computing. Oracle's family of database, networking and gateway products enable corporations to access any data, on any server, over any network, from any client device.

Oracle Applications is a.1eading provider of packaged and integrated front office and ERP solutions for the enterprise and a division of Oracle Corporation, the world's second-largest software company and the largest supplier of software for information management. Oracle Applications strategy is to offer all the enterprise solution components-proven applications advanced technologies, business expertise and partnerships required-to enable customers to execute strategies quickly, manage the risk of change and lead their respective industries.

Oracle Applications is the only suite of enterprise business applications from a major Enterprise Resource Planning (ERP) vendor that follows the Internet Computing model. Each of the over 45 modules for financials, human resources, manufacturing, supply chain and front office automation is web enabled, allowing it to be deployed on corporate intranets with no software, other than a browser, required on users' desktops. This architecture allows companies to shift the complexity of application management,

maintenance and upgrading from users' desktops onto centralized, professionally managed servers, thereby dramatically reducing the cost of deploying and administering software. By minimizing network traffic, this approach also makes it economical to deploy the applications over Wide Area Networks (WANs) to hundreds or thousands of users, making it possible to distribute critical business information much more broadly than is feasible in the client/server model.

4.33.2 Oracle Applications

A brief overview of the Oracle applications categories is given below:

- Financials Oracle Financial Applications can transform a finance organization into a strategic force. In today's fast-moving corporate arena, organizations require access to critical financial management functions. With Oracle Financial Applications, companies will be able to work globally, lower their administrative costs, close their books faster and improve cash management-while providing the strategic information required for making timely and accurate decisions. .

- Projects Oracle Projects Applications improve operational efficiency by providing an integrated project management environment that supports the full lifecycle of every project in your enterprise, increasing top-line revenue growth and bottom-line profitability. As the bridge between operations systems and corporate finance, Oracle Projects Applications provide a central repository of validated cost, revenue, billing and performance data associated with your business activities or projects.

- Human Resources Well-managed human resources directly improve the bottom line and contribute to competitive advantage. The ability to hire, motivate and retain the most capable workforce; engage employees and line managers directly in managing their skills and careers; and provide comprehensive and up-to-date workforce information for management on a global basis-are a few of the

characteristics important for success. The Oracle Human Resource Management System (HRMS) provides comprehensive facilities for organizations to achieve such goals.

- Manufacturing Oracle Manufacturing Applications the industry leading mixed mode manufacturing solution that enables companies to achieve market leadership by becoming more customer-responsive and efficient. This product family supports companies from small, single facility environments to multi-plant, global manufacturers with complex requirements. Oracle Manufacturing Applications help companies increase revenue, profitability and customer loyalty by universally capturing demand, planning the extended enterprise in one rapid step and by ensuring that the most efficient manufacturing process is used to produce each product.

- Supply Chain Oracle Supply Chain Management Applications simplify supply chain processes by providing a single, integrated environment for managing the extended enterprise. From your suppliers' suppliers to your customers' customers, Oracle enables effective trading partner collaboration and supply chain optimization capabilities that are vital to gaining and sustaining competitive advantage. Oracle Supply Chain Management Applications help in increasing market share while improving customer service and minimizing costs across the networked supply chain.

- Front Office Oracle Front Office Applications provide a true customer- centric approach, allowing you to better understand your customer relationships, their value and profitability. Oracle Front Office Applications increase top-line revenues, decrease sales and service costs, and maintain customer retention and satisfaction. The sales, marketing and service solutions provide deep integration with the entire enterprise suite of applications, and enable you to attract and retain

profitable customers through a unified set of deployment channels, including Web mobile and call centre.

4.34 JD EDWARDS

4.34.1 Company Profile

In 1977, three men left the accounting world to form a software company that would specialize in midrange computing solutions. Each of the three founders-Jack Thompson, Dan Gregory and Ed McVancy-lent a small portion of his name for the company name. On March 17, JD Edwards was formed.

In the early years, JD Edwards designed software for several small and medium sized computers, eventually focusing on the IBM System/38 in the early 1980s. It was in this effort that ill Edwards pioneered the CASE software development and design tool, which lends consistency across the broad range of JD Edwards integrated applications.

As JD Edwards business continued to grow, it became obvious that servicing a large number of customers was creating challenges. The company could either remain small or serve customers on an individual basis or, with a breakthrough in technology; it could become an industry leader in enterprise software. When Mc Vaney and Thompson began to design and implement World Software, they provided the pathway to success. By the midl980s, JD Edwards was being recognized as an industry.1eading supplier of applications software for the highly successful IBM AS/400 computer, a direct descendant of the System/38.

With the June 1996 introduction of One World, the company once again achieved a technological breakthrough. Building on the CASE technology pioneered in the 1980s, One World combines a full range of platform independent applications with an integrated toolset. One World gives organizations the power to configure their systems and applications as their needs change.

Today, JD Edwards is a publicly trade company that has more than 4,700 customers with sites in over 100 countries and more that 4,200 employees. The company attributes much of its success to a corporate culture that emphasizes quality at all levels, JD Edwards' commitment to its product quality, its corporate culture and a customer centric approach enable the company to deliver and support leading enterprise software solutions that solve business problems.

4.34.2 JD Edwards Modules

The different product modules available from JD Edwards are:

- **Foundation Suite** (Back Office, CASE Foundation, Environment Toolkit, Financial Analysis Spreadsheet Tool and Report Writer, WorldVision GUI, Electronic Burst & Bind)
- **Financial Suite** (General Accounting, Accounts Payable, Accounts Receivable, Fixed Assets, Financial Modeling and Budgeting, Multi-Currency Processing, Cash Basis Accounting, Time Accounting)
- **Logistics / Distribution Suite** (Forecasting, Requirements Planning, Enterprise Facilities Planning, Sales Order Management, Advanced Pricing, Procurement, Work Order Management; Inventory Management, Bulk Stock Management, Quality Management, Advanced Warehouse Management, Equipment Management, Transportation Management, Job Cost, Service Billing)
- **Services Suite** (Contract Billing, Subcontract Management, Change Management, Property Management)
- **Manufacturing Suite** (Configuration Management, Cost Management, Product Data Management, Capacity- Planning, Shop Floor Management, Advanced Maintenance Management)
- **Architecture, Engineering, Construction, Mining and Real Estate Suite** (Procurement, Inventory Management, Equipment Management, Job Cost, Work Order Management, Subcontract Management, Change Management, Contract

Management, Contract Billing, Service Billing, Homebuilder Management, Property Management)

- **Energy and Chemical Suite** (Agreement Management, Advanced Stock Valuation, Sales Order Management, Bulk Stock Management, Load and Delivery Management)
- **Payroll Suite**
- **Human Resources Suite**
- **Customer Service Management Suite**
- **Government, Education, and Not-for-Profit Solutions** (Financial Administration and Reporting, Budget Administration, Fund and Encumbrance Accounting, Grant and Endowment Management, Purchasing and Material Management, Warehousing and Central Stores Management, Human Resources Management, Service and Work Order Management, Capital Project and Construction Management, Contract Management, Plant, Equipment, and Fleet Maintenance
- **Utility and Energy Solutions** (Customer Information System, Human Resources Management, Work Management, Regulatory Reporting; Supply Chain Management, Project Management, Enterprise Maintenance Management)

4.35 QAD

4.35.1 Company Profile

QAD was founded in 1979, and now has a presence in 21 countries and employs more than 1100 people. The company's products include MFG/PRO, On/Q, Service / Support Management, Decision Support, and Qwizard. The company's flagship product is its ERP solution-MFG/PRO. It is available in 26 languages and has more than 4,000 installed sites in over 80 countries. The company got the ISO certification in 1995.

QAD's flagship product, MFG/PRO Software, provides multinational organizations with an integrated Global Supply Chain Management solution that includes manufacturing, distribution, financial, and service/support management applications within an open

system environment. Internet-Enabled MFG /PRO allows you to share information and conduct commercial transactions over the Internet.

MFG/PRO

MFG/PRO is the flagship product of Qad, an ISO 9002 certified company, which started operations' in 1979. The products currently marketed by Qad are MFG/PRO, Qwizard, Decision Support, and service/support management. The software is available in 26 languages with more than 3,600 installed sites in over 82 countries.

MFG/PRO software, provides multinational organizations with an integrated global supply chain management solution that includes manufacturing, distribution, financial, and service/support management applications within an open system environment. This comprehensive ERP package supports host and fully-distributed client/server applications.

Component-based application development enables flexible and scalable architecture to ensure a sound path for future growth. Qad's time-to-benefit methodology makes MFGIPRO quick to implement and easy to use and maintain.

MFG/PRO's Windows-based graphical user interface (GUI) is an intuitive navigational 1001 that simplifies the learning process. MFG/PRO is a fully integrated software package available on a module by module basis. MFG/PRO addresses the entire manufacturing spectrum from repetitive to configure-to-order. It is appropriate for process, batch process, make-to-stock, configure-to-order and repetitive manufacturing environments. With world class supply chain management tools, it is particularly useful for multinational companies.

4.35.2 MFG/PRO Modules

- **Distribution** The Distribution Modules of MFG/PRO are used to monitor inventory balances and manage purchasing and sales order entry activities.

- **Manufacturing** The Manufacturing Modules are used to regulate all manufacturing activity within the various types of production environments.
- **Financials** The Financial modules interface with Planning and Manufacturing modules to report the financial implications of the company's activities.
- **Service/Support** Service /Support Modules are designed for companies which not only manufacture and sell their products, but also offer after-sales service and support.
- **Supply Chain** Supply Chain Management is the control of goods and information from supplier to customer.
- **Master Files** Master File's functions provide access to a series of foundation modules that are used by the rest of the MFG/PRO applications. These master files include: Items/Sites, Addresses/taxes, Inventory Control Settings, Physical Inventory, Multiple Database configurations and Manager Functions.

Decision support-Features

- Real-time decision support**.** *Power browse with multilevel drill down capability. * Automatic generation of MFC/PRO-style reports * Integrated data store. *Separation of data entry and reporting * Rapid configuration of new browses and reports. *Rapid time-to-benefit. *Definition of new key performance indicators. *Extreme flexibility. *Definition of new reporting categories. *Browses optionally updated online * Multiple Data Bases, size, currencies. * Summarization by predefined calendars.

4.36 PEOPLESOFT

4.36.1 Company Profile

PeopleSoft Inc. was established in 1987 to provide innovative software solutions that meet the changing business demands of enterprises worldwide. It employs more than 7,000 people worldwide. The annual revenue for the year 1998 was $1.3 billion. PeopleSoft's mission is to provide innovative software solutions that meet the changing business demands of organizations worldwide.

PeopleSoft develops markets and supports enterprise-wide software solutions to handle core business functions including human resources management, accounting and control, project management, treasury management, performance measurement and supply chain management. PeopleSoft provides industry-specific enterprise solutions to customers in select markets, including communications, financial services, healthcare, manufacturing, higher education, public sector, services, retail, transportation, US federal government and utilities. The company also offers PeopleSoft Select a complete packaged solution including software, hardware and services to address the needs of medium-sized organizations.

People Soft solutions run on a variety of leading hardware and database platforms, including Compaq, Hewlett-Packard, IBM, Sun Microsystems, Informix, Microsoft SQL Server, Sybase, DB2 and others. PeopleSoft delivers Web-enabled applications, workflow, online analytical processing (OLAP), etc.

PeopleSoft has over 7,900 customers in nearly every industry and geographic region in the world, including a large cross-section of the Fortune 1000.

4.36.2 PeopleSoft's Business Management Solutions

PeopleSoft solutions extend across the-globe. The applications help in man aging a broad set of business processes, from human resources and finance to supply chain management. One can implement a single application, or a complete enterprise-wide solution. The flexible design lets you tailor the applications to your specific needs. The PeopleSoft's business management solutions are in the areas given below:

1. Human Resources Management
2. Accounting and Control
3. Treasury Management
4. Performance Measurement
5. Project Management

6. Sales and Logistics
7. Materials Management
8. Supply Chain Planning
9. Service Revenue Management
10. Procurement

The service Revenue Management suite features modules supporting the tracking of time and labour, payroll processing, project management and billing, as well as expense and receivables processing. A suite of Procurement modules is also available supporting purchasing, inventory management, payables and expense processing, and asset management.

4.37 SSA

4.37.1 Company Profile

SSA was founded in December 1981 and has its headquarters in Chicago, USA. SSA has its presence in 91 countries and employees more than 2000 employees. The 1998 revenue of the company was $420.8 Million. The Company's product line, BPCS Client/Server V6, is currently live or being implemented in more than 1000 major industrial sector firms in over 4000 sites worldwide.

4.37.2 SSA Applications

BPCS Client/Server is a comprehensive set of integrated client/server applications. That addresses the core system needs of industrial sector enterprises on a global scale. BPCS Client/Server covers Configurable Enterprise Financials applications, Supply Chain Management applications, Multi-Mode Manufacturing and CIM applications, as well as Electronic Commerce applications such as EDI. BPCS Client/Server is based on SSA's proven object technology foundation that ensures that it operates identically from an end-user's perspective across any supported server, be it HP 9000, AS/400, or Windows NT.

BPCS Client/Server products offer numerous full function applications with capabilities to support solutions needed by the industrial sector. Major objectives of industrial managers have been to improve customer satisfaction, improve product quality, remain cost competitive', and reduce the time in launching a product in the market. SSA's BPCS Client/Server products provide a wealth of features and functions enabling industrial managers to achieve these objectives.

The BPCS Client/Server solution delivers unparalleled agility and reconfigures ability to meet changing market demands, through a quantum leap forward in ERP technology that delivers significant business benefits, including century dating.

4.4 SUMMARY

Today, many organizations have continuous demand for rapidly changing and increasingly competitive global markets. To increase competitive advantage, companies require flexible business information system that adapts to rapid change. To address these needs various ERP vendors such as SAP-AG, QAD, IFS, PeopleSoft, SSA etc. have entered in market place with various ERP modules equipped with emerging technologies and helped the management to meet the challenge of managing integrated information system.

4.5 KEYWORDS

SAP: Systems, Applications and Products in Data Processing, based in Walldorf, Germany, is the leading global provider of client / server business application solutions.

SAP R/2: The mainframe version of ERP package

SAP R/3: The client/server version of ERP package

IBU: Industry Business Units

BAAN: It is a leading global provider of enterprise business software

DEMSE: Dynamic Enterprise Modeling Strategy Execution

CODP: customer order decoupling point

ORACLE: Oracle Corp. is the leading supplier of software for enterprise information management

JD EDWARDS: Jack Thompson, Dan Gregory and Ed McVancy formed a company JD Edwards which is providing ERP solutions.

QAD: The company providing ERP packages that includes MFG/PRO, On/Q, Service / Support Management, Decision Support, and Qwizard etc.

PEOPLESOFT: It provides innovative software solutions that meet the changing business demands of enterprises worldwide

OLAP: online analytical processing

SSA: It is the developer of BPCS Client/Server V6

4.6 SELF ASSESSMENT QUESTIONS

I. What are the reasons for the growth of ERP markets?

2. What are important Applications and Modules available in the following ERP packages?
    - SAP R/3 Baan
    - Oracle
    - JD Edwards
    - QAD
    - PeopleSoft

4.7 SUGGESTED READINGS

- Daniel Amor, “The E-business @evolution : Living and working in an international world”, Pearson Education, New Delhi
- Willium J. Buffam, “E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities”, Pearson Education, New Delhi
- Marcia Robinson, “E-Business : Roadmap for Success”, Pearson Education, New Delhi
- Samantha Shurety, “E-Business with Net. Commerce”, Pearson Education Asia, New Delhi

- Napier, “Creating a winning E-Business”, Vikas Publishing House, New Delhi
- “E-business”, magazine (January & September 2004 issues) ICFAI press
- Leon Alexis, “Enterprise Resource Planning”, TMH
- Parag Diwan, “Enterprise Resource Planning”, Pentagon Press

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LESSON: 5

SWOT ANALYSIS OF ERP PACKAGES

Author: Deepak Dembla **Vetter: Dr. Karam Pal**

STRUCTURE

5.0 Objectives
5.1 Introduction
5.2 ERP Packages
5.3 SWOT Analysis (Oracle Application, Baan IV, SAP R/3, Ramco Marshal)
5.4 Opportunities and Problems in Selection of ERP packages
5.5 Selection Criteria for ERP packages
5.6 Implementation of ERP packages
5.7 Summary
5.8 Keywords
5.9 Self Assessment Questions
5.10 Suggested Readings

5.0 OBJECTIVES

After going through this lesson, you will be able to:

- Describe different ERP packages
- Do SWOT analysis of different ERP packages
- Explore the opportunities and problems in selecting the ERP package for an organization
- Identify the selection criterion for selecting ERP packages
- Learn how to implement ERP packages

5. 1 INTRODUCTION

Today, many organizations face continuous demands from rapidly changing and increasingly competitive global markets. They also must serve customers who want innovative, high quality products that feature special options. Additionally, further pressures are created by technology developments that shorten many product life cycles and by intensified international competition, which drives corporations to reduce costs and improve production efficiencies.

To increase competitive advantage, companies require flexible business information systems that adapt to rapid change. To address these needs, enterprise business applications must provide solutions that concentrate on the customer by integrating the supply chain. These systems must allow information access throughout the enterprise and provide software that adapts to the business In addition, technical requirements include a true client/server computing environment that supports relational database technology and graphical user interfaces. Most importantly, these systems must provide open systems through choice and integrate-the complete supply chain infrastructure, connecting whatever systems an organization has selected to meet its information technology requirements.

Enterprise resource planning implementation is one of the fastest growing segments in the Information Technology industry today To take advantage of emerging technologies and business practices and meet the evolving business requirements of a thriving industry are ERP vendors who are fighting for market share of this ‘holy grail’ of process management-ERP Companies like SAP AG, Baan, Oracle, Ramco Systems, SSA, to name a few of the leading ERP vendors, leave no stone unturned to capture this market.

In this lesson we will discuss the key features of some of the leading ERP - packages available

5.2 ERP PACKAGES

The most important factor that should be kept in mind when analysing the different packages is that none of them are perfect. The idea that there is no perfect package needs to be understood by everyone in the decision-making team. The objective of the selection process is not to identify a package that covers each and every requirement (a perfect fit). The objective is to find a package that is flexible enough to meet the company's needs. Or in other words software that could be customized to obtain a 'good fit'.

If one studies the history of the ERP packages and finds out how each package evolved, it soon becomes evident that every ERP package grew out of the experience or opportunity of a group of people working in a specific business who created systems that could deal with certain business segments. It is generally accepted that ERP packages are stronger in certain areas than in others, and each one is madly trying to add functionality in areas where they have been lacking. For example, PeopleSoft is strong in HR and less so in manufacturing; Baan, on the other hand, is historically stronger in manufacturing than in financial and so on.

The ERP packages evolved over time as the companies grew. The experience gained from implementation, the feedback by the users, the need to enter into new markets and the pressure from competitors forced most ERP vendors to redefine and expand the scope of the activities and functionality of their products. The concepts were expanded upon, new functions were introduced, and good ideas were copied from others and so on. But still each package has a history (or origin) that determines in which type of business it is best suited for.

Originally ERP packages were targeted at the manufacturing industry, and consisted mainly of functions for planning and managing core business activities such as sales management, production management, accounting and financial affairs, etc. However, in recent years, adaptation not only to the manufacturing industry, but also to diverse types of industry has become possible and the expansion of implementation and use has been progressing on a global level.

While making the analysis, it would be a good idea to investigate the origins of the different packages. Now; most packages cater to almost all the business and service sector. It would be wrong to say that a system that was developed initially for manufacturing is now not capable of catering to the needs of another business sector, say, software development. The system may have been throughway revamped and redesigned--to meet the needs of the diverse business sectors that it is catering to. It should be remembered that many ERP packages are better in some areas, even though they are capable of catering to the needs of other sectors.

After the decision to go in for an ERP package is taken, the company needs to develop selection criteria that will permit the evaluation of all the available packages on the same scale. To choose the best system, the company should identify the system that meets the business needs, that matches the business profile and that identifies with the business practices of the company. It is impossible to get a system that will perform, exactly as the company does business, but the aim should be to get the system that has the least number of differences.

5.3 SWOT ANALYSIS (Oracle Application, Baan IV, SAP R/3, Ramco Marshal)

Oracle Applications: Oracle Applications is the ERP package which has been developed by Oracle Corporation The company has been present in the software market for quite a long time with its proven and time tested Oracle products The company has a global client base who use the range of Oracle products Some of the key features of the package are described below:

Architecture

- Late entrant (1985+)
- Genuine client server but more of 2 Tier

- Grown from financials and manufacturing
- Less tight integration compared to others
- DBMS driven rather than application driven
- Loosely coupled systems

Strengths

- Industry leader in the enterprise market
- Everyone needs Oracle “engine” Great Gill
- Internal “beta site”
- Outstanding “courseware”
- Focused applications in specific areas

Weakness

- Dual Product (DBMS and ERP)
- Lacks tighter integration
  Wedded to Oracle DBMS
  Belated support to Windows NT
  Non model-based development
- Not strong in India (though very strong in DBMS in India)

Opportunities

- Established clients easily move to Oracle Apps
- Financial services industry
- Manufacturing industry
- Special solution for Oil and Gas industry
- Special solution for media industry

Threats

- Dominance of SAP

- ERP is reference based industry
- Consultants' indifference
- Technology dominated approach versus Business dominated approach

BAAN IV: The Baan Company is a worldwide leader in enterprise wide business software applications and consulting services for companies in the hybrid manufacturing, automotive, electronics, process and heavy equipment and project services industries Its corporate mission is to provide companies with innovative business software solutions which are aligned with a company's organizational structure, business practices and operational procedures.

The Baan Company is a leading provider of enterprise and inter-enterprise business software solutions. The company's family of products is designed to help corporations maintain a competitive advantage in the management of critical business processes by means- of a product architecture that lends itself to -fast implementations and ease of change.

Baan IV is an integrated family of manufacturing, distribution, finance and transportation, service, project and Orgware modules. The solutions offer a new concept in business management software-that incorporates and goes beyond ERP Using the principle of Dynamic Enterprise Modelling (DEM) implemented via its Orgware capabilities, Baan IV enables a company to match its specific business processes and organizational model with the extensive functionality of the Baan applications Baan IV is specially designed to meet the needs of key vertical markets Furthermore, Baan also extends supply chain support beyond the boundaries of an organization to support trading partner management as well Some of the key features of Baan IV are described below:

Architecture

- Unix and Client Server (1978+)
- Uses object technology more than anyone else

- Quick to adapt to new technology - DCOM
- DEM Model based application development
- Well documented three phase development
- Conference room pilot (rapid prototyping)

Strengths

- Manufacturing industry needs well met
- Reasonably complex models
- Model based development
- Blessings from “Big Six”
- Suits 5MB sector well
- Baan Series addresses version problems
- Truly open with provision for “mix” and “match” Wider support for hardware and software
- True support for n tier architecture
- Multi location development

Weaknesses

- Small compared to SAP
- DEM not fully integrated with product No industry specific solutions
- Late entrant into Fortune 100 companies Not very large site
- Limited client base
- Yet to break into major accounts Courseware availability Training infrastructure

Opportunities

- Growing faster due to technology leadership
- SME Sector
- New “packaged” option reduces time/cost implementation
- Conducive organizational style for innovation

Threats

- No new major accounts to capture (they are all gone)
- SAP's ability to do cost cutting
- Less aggressive marketing
- CIO's backing SAP RJ3 .

SAP R/3: SAP was founded in 1972 and has grown to become the world's leading software company' SAP is a German company but operates all over the world, with 28 subsidiaries and affiliates and six partner companies maintaining offices in 40 countries.

SAP is both the name of the company and the ERP package The SAP system comprises a number of fully integrated modules which cover every aspect of business management The system has been developed to meet the increasing needs of commercial and other organizations that are striving for greater efficiency and effectiveness While many software companies have looked at areas of business and developed systems to support those areas, SAP has looked toward the whole business They offer a unique system that supports nearly all areas of business on a global scale SAP provides the opportunity to replace large numbers of independent systems that have been developed
and implemented in established organizations with one single mod1,llar system Each module performs a different function but is designed to work with other modules It is fully integrated, offering true compatibility across business functions: One of the key features of SAP RJ3 are described below:

Architecture

- Both mainframe, (RJ2) (1975+)
- Client Server (RJ3) (1988+)
- Internet (SAP Java, RJ3 Ver4) (1996+)
- Truly scalable through n tier architecture

- Large software with very large number of features (mostly unused) Robust, industry class

Strengths

- World leader with impressive accounts
- Largest business processes embedded
- Great reference model
- Tools for all round support
- Most generic model (not truly object based)
- Support built in data warehouse
- Big Six “near total” support

Weakness

- Monolith, large software - very resource hungry
- Difficult to master and use
- Very expensive from every count
- Overkill for many organizations
- Too simplistic models
- Overly centrist, rigid

Opportunities

- Early lead advantage
- Ability to “price out” for SME
- Brand Image to hold on to the market
- Large consultant base
- Great business model

Threats

- Victim of early success

- Market perception as “old” “overweight”

New players like People Soft edging out with better practices Difficult to adapt to new technologies.

RAMCO MARSHAL: This Software is developed by the Indian Company which has a good global base in the field of ERP. This is the only Indian company except for a few other small players in the field of ERP. The company has excellent Research and Development facilities to help it in developing world class ERP solutions. The focus of the product is on the domestic market as well as the global market. This product is suitable for small and medium enterprises without any industry specific solutions. Some of the key features of the product are described below under the following heads:

Architecture

- Client server Architecture (1989+) Wedded to Microsoft
- Win NT (Unix), Great Gill, SQL Server DCOM Based
- Well integrated suite from grounds-up Designed for distribution

Strengths

- Engineered using 80s technology
- Focus using Microsoft Technology
- GUI including multimedia support
- Early learning through internal use
- Global client base
- 1000+ Engineers in Chennai
- Better support for Indian clients

Weakness

- Not available on many platforms
- Does not support n tier architecture

- Non robust software engineering
- Lacks access to ‘‘world class practices”
- Implementation Methodology not well developed
- Blessing of Big Six consultants, Rating Agencies

Opportunities

- World class software product from India
- Access to high quality, large pool of manpower
- Partnership with Microsoft - with the winning combination (Wintelco)
- Single product
- “Swadeshi” spirit
- Better support due to limited platform

Threats

- Suffer from “Image” - No rating
- Too small in size (70M Vs 1-5)
- “Shake out” in the market
- No industry specific solutions
- ERP too “mission critical” to be left to “babies”

5.4 OPPORTUNITIES AND PROBLEM IN SELECTION OF ERP PACKAGES

Deciding on a vendor to supply ERP software is probably the’ most complex decision in the entire ERP project planning and implementation process for an enterprise. The reasons are many First, ERP software being expensive, one’ cannot afford to make a mistake and collect it later. Second, it is not clear as to who the decision-makers are and whose benefits are addressed If the decision-maker is a CEO who is genuinely looking for ERP for organizational benefits, he is likely to be pragmatic and look at the true benefits Many CEOs today go for ERP because it is fashionable-a sort of “club membership”

Third, the genuine difficulty is of non availability of ERP consultants who are indeed knowledgeable about multiple products being complex products, ERP software take years to master very few consultants have the luxury of knowing genuinely the strengths and weaknesses of many of the ERP software products. The knowledge of consultants is limited to vendor's brochures!

There-are very few consultants who are knowledgeable enough to know multiple ERP software and their process details. The process modeling tools available in the market are not good enough to model existing organizational processes in that much detail Research is still on to get at the level of process modeling that is "industry class."

Many organizations "pass on" this problem to the vendors to "develop prototypes" The poor vendors put an army of people on the job The end result is a hopeless confusion with many man months ,?f precious effort almost invariably wasted The developed prototypes would just not be comparable-such a comparison would be comparing bananas (not apples) and oranges! Every ERP vendor has a ''world view" The entire software is built on their world view. The great contribution of ERP software, namely, "tight integration" and "process view", emanates from this world view

Whichever software you choose today-be it SAP R/3, Ramco Marshal, Baan, Oracle Applications, JD Edwards, People Soft or Mfg/ Pro-they are successful because they have "rich" worldviews The very goal of ERP implementation is to quickly find a "worldview" that matches yours and start using it for organizational benefits None of them would fit completely Since, all of them are "rich" in their capability, choosing any of them would not be a mistake Not choosing any of them or expecting to be sure that your elaborate evaluation exercise is going to yield perfect ERP is a blunder.

It is unfortunate that while corporations around the world are talking of months -, for ERP implementation, many corporations in India, not necessarily public sector, are taking

many quarters, if not years, for ERP evaluation. It is imperative for them to cut this cycle-time dramatically. Some of the key issues that they have to take into account are discussed below:

1. Product Architecture

The ability of the architecture to scale as the organization grows and the disreputability of the project at the architectural level is very important The available WAN infrastructure puts limitations on the distributed operation; ultimately, with networking infrastructure improving, this might change too Some of the ERP vendors provide enormous flexibility in hardware (RISC/CISC) and software (operating systems / DBMS) One should realize that flexibility does not come without accompanying costs With the strong shift towards Intel/Microsoft combination among the Indian corporate sector, such flexibility is of little value The existing IT infrastructure (Unix, AS/4061 decides these issues to a large extent

2. Maintainability and Up gradation

These are issues that must be addressed with the maturity of the products, they are not very serious except for installations with a remote location Software such as SAP R/3 or Baan series with a larger installed base has more knowledge available in the hinterland If you are on Oracle shop with lots of development skills already with you, your team might more easily accept Oracle Applications.

3. Interfaces

Interfaces to your existing application portfolio might be important if you have large applications running-already Payroll is a “bread and butter” application in most Indian corporations Practically everyone provides “hooks” to interface with legacy systems Locally developed software such as Ramco Marshal might provide better support and understand Indian practices better A vendor committed to the Indian marketplace such as Baan or Oracle might be equally good at this too If your operation, involves specialized integration such as PLC (for process control), DNC/CNC (for manufacturing), DCS (for continuous process control), PDM (for product data management and CAD) etc , more

established vendors like SAP might provide richer suite of solutions Almost every vendor today provides interfaces; it is only the extent and your needs that should decide the choice.

4. Internet Support

Web enabling, once again, is available nom practically every vendor A web friendly company such as Oracle, would provide superior web enabling compared to a traditional ERP company such as SAP It is just a matter of time when such a feature is common What is missing today is the business model for software licensing that is holding up the full release Currently, most ERP vendors charge depending on client and module based license.

5.5 SELECTION CRITERIA FOR ERP PACKAGES

The most important criterion in the package selection is the functional fitment. Some other criteria you may like to check are:

- Number of installations in a similar industry segment
- Number of implementation in the country
- Is the package compiled (i.e., does it cover all functional areas)?
- Is the package localized?
- Is the package too old or too new?
- Is implementation of the package easy?
- How easy / fast is it to get skills on the package?
- Who is supporting the package?
- How big is the company?
- Is the implementation their main focus?
- Are they interested in Local implementations or are local projects training ground for them?
- Quality of the consultants
- Financial health of the company

- Will the implementing agency let a third party do a quality check on the implementation work?
- What technology does the package use?
- Is the package integrated or interfaced?

5.6 IMPLEMENTATION OF ERP PACKAGES

ERP software packages promise great benefits. But what are the costs involved? Exactly how much will one have to pay to get them? In most cases, the ERP implementation cost exceeds the budget why is this? Even the most well planned and thought out budget is exceeded.

Few companies buy enterprise resource planning, or ERP, software just to save money. The objective is the integration of company-wide information. A single, enterprise-wide computer system should be cheaper and easier to maintain than a hodgepodge of antiquated COBOL applications from a dozen different vendors. The move to ERP is a project of breathtaking scope, and the price tags on the front end are enough to make the most stoic manager a little twitchy In addition to budgeting for software costs; financial executives should plan for consulting, process network, integration testing and a host of other expenses before the benefits of ERP start to appear Underestimate the price-Of teaching users their new job processes? Fail to consider data warehouse integration requirements on the need for extra software to duplicate the old report formats. A few such oversights in the budgeting and planning stage can send ERP costs spiraling out of control, faster than oversights in planning almost any other information system undertaking. Although different companies find different hurdles and traps in the budgeting process those who have implemented ERP packages agree that some costs, are more commonly overlooked or underestimated than others Armed with insights from across the business, ERP implementation veterans agree that major problem areas in ERP implementation is Budget over run. There are following areas which are most likely to result in Budget over run.

1. Training

Training is the unanimous choice of experienced ERP implementers as the most elusive budget item. It is not so much that this cost is completely overlooked as it is consistently underestimated. Training expenses are high because workers almost invariably have to learn a new set of processes, not just a new software interface. Take, for instance, a receiving clerk who accepts shipments of raw material With an ERP package like SAP, that clerk now becomes an accountant, because he is keying new inventory directly into a live system Mistakes have an immediate impact on the books Once every receiving clerk has access to the system, the plant's accounting department can no longer simply look at their data in batches Now, they need to be able to pinpoint the origin of each data entry to verify its accuracy, if necessary Employees at all levels have to accept different responsibilities ERP isn't so much about technology implementation, it is a lot of work to set up the software, but it isn't difficult It does, however, force you to do a huge amount of change management And change management appears in the budget on the training line .

2 Integration and Testing

Most ERP packages are very complex systems interfacing with those systems are not an easy task. Testing the links between ERP packages and other corporate software links that have to be built on a case-by-case basis is another essential cost easily missed. Most companies will have some system that will not fit into the ERP package's functionality and which will have to be interfaced with the ERP package. In most cases, this type of integration can be costly.

Unless and until the management and the IT experts feel that-there will be a substantial and concrete payoff for modifying the software to match a key business process, don't modify the ERP products core code Once the code is modified, the cost of integrating, testing and maintaining the system will grow exponentially If you decide to modify, you should have a solid reason to do it. As with training, testing ERP integration has to be done from a process-oriented perspective Instead of plugging in dummy data and moving

it from one application to the next, veterans recommend running a real purchase order through the system, from order entry through shipping and receipt of payment involving the employees who will eventually do these jobs.

3 Data Conversion

It costs money to move corporate information, including customer and supplier records, product design data and the like, from the old systems to the new ERP system A lot of data in most legacy systems is redundant but most companies seem to deny that a vast amount of their data is useless until they actually have to move it to the new client/server setups that popular ERP packages require As a result, these companies are more likely to underestimate the Cost of the move But even clean data may demand some overhaul to match the process modifications necessitated or inspired by the ERP implementation.

4 Data Analysis

A misconception that the ERP vendors perpetuate is that you will be able to do all the analysis you want to, within their product. Often the data from the ERP system must be combined with data from external systems for analysis purposes. Users with heavy analysis needs should include the cost of a data warehouse in the ERP budget and should expect that quite a bit of work will be required to make it run smoothly.

5 ERP Consultants

The extravagant cost of ERP consultants is a well known fact like training expenses, this cost is hard to circumvent. Choosing a lesser-known ERP package to avoid premium-priced consultants won’t necessarily help either when users fail to plan for disengagement from the existing system or consulting fees will overshoot the budget. To avoid this, companies should identify objectives for which its consulting partners must aim when training internal staff. It is a good practice to include performance metrics and time schedules for the consultants. For example, a specific number of the company’s staff should be trained to be at a certain specified level in a particular time period.

Although these five areas represent the biggest trouble spots for ERP budgeters, they are not the only source of hidden costs a company could encounter. To avoid getting hit by unexpected expenses, veterans recommend assembling cross-functional teams to identify the costs upfront. These teams should include both senior executives and the end users who will have daily contact with the ERP system, as lower-level employees will be able to provide a level of detail that executives alone may be likely to miss. Heeding advice from veterans and soliciting input from across different corporate functions will help those just diving into ERP to avoid overruns and make the software payoff match its promises. Even though most companies don't buy ERP just to save money, everyone is clearly happier when the costs come in as expected.

5.7 SUMMARY

Evaluating ERP packages available in the market place and selecting one is the most critical decision. This is the decision that can make or break organization. If choices not right, than organization will pay dearly for it.

All ERP packages have different architectures, concepts and sets of functionality therefore SWOT analysis must be conducted for choosing ERP package which can meet out organizational requirements.

Since ERP software being expensive, one can't afford to make a mistake and correct it later, so key persons of organization define criteria for selecting and implementing an ERP package.

5.8 KEYWORDS

PeopleSoft, Oracle Application, Baan IV, SAP R/3, Ramco Marshal: Famous ERP packages

PDM: Product data management

DEM: Dynamic Enterprise Modelling

DCS: Continuous process control

COBOL: High level programming language earlier used for developing business applications (now obsolete)

5.9 SELF ASSESSMENT QUESTIONS

1. Make a SWOT analysis of any two ERP packages of your choice
2. Enlist 1he criteria for selection of ERP package.
3. What are the important problems in selection and implementation of ERP packages?

5.10 SUGGESTED READINGS

- Daniel Amor, “The E-business @evolution : Living and working in an international world”, Pearson Education, New Delhi
- Willium J. Buffam, “E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities”, Pearson Education, New Delhi
- Marcia Robinson, “E-Business : Roadmap for Success”, Pearson Education, New Delhi
- Samantha Shurety, “E-Business with Net. Commerce”, Pearson Education Asia, New Delhi
- Napier, “Creating a winning E-Business”, Vikas Publishing House, New Delhi
- Leon Alexis, “Enterprise Resource Planning”, TMH
- Parag Diwan, “Enterprise Resource Planning”, Pentagon Press

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LESSON: 6

ERP IMPLEMENTATION

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STRUCTURE

6.0 Objectives
6.1 Introduction
6.2 ERP Implementation Methodology
6.3 Key Issues/Success Factors of ERP Implementation
6.4 Guidelines for ERP Implementation
6.5 Role of Consultants, Vendors and End Users
6.6 Summary
6.7 Keywords
6.8 Self Assessment Questions
6.9 Suggested Readings

6.0 OBJECTIVES

After going through this lesson, you will be able to:

- Define the implementation methodology of ERP
- Describe the key issues/success factor of ERP implementation
- Identify the guidelines for ERP implementation
- Explore the role of consultants, vendors and users

6.1 INTRODUCTION

At the first glance, all implementation methodologies look very much alike. For example, many terms and names are common to all of them. But once you start talking with the

consultants about their implementation methodologies, the differences start appearing. Every consulting firm will try to impress upon the fact that their implementation methodology is the most foolproof and the one which will guarantee success. Their presentations will convince you (till you see the next one) that their way is the most appropriate way to develop a business solution. So the contracting company must pay special attention when comparing the different methodologies. One important point to note is that selecting the consultants (and an implementation methodology) is as important as selecting the package.

Since almost all the methodologies look the same, the company should look into minute details when comparing the different methodologies. In fact, 'little things' say whether the methodology is practical and successful. The little things, like the content of a particular slide, the write-up in a brochure, the conduct of the consultants during the presentation and most importantly, the practical experience of the consultants in dealing with similar situations before, should be considered before making the selection.

6.2 ERP IMPLEMENTATION METHODOLOGY

Broadly, the steps involved in a total ERP implementation can be listed as:

1. Identification of the needs for implementing an ERP package.
2. Evaluating the "as-is" situation of your business.
3. Deciding upon the desired would be situation for your business.
4. Reengineering of the business processes to achieve the desired results.
5. Evaluation of the various ERP packages.
6. Finalizing of the ERP package.
7. Installing the requisite hardware and networks.
8. Finalizing the implementation consultants.
9. Implementation of the ERP package.

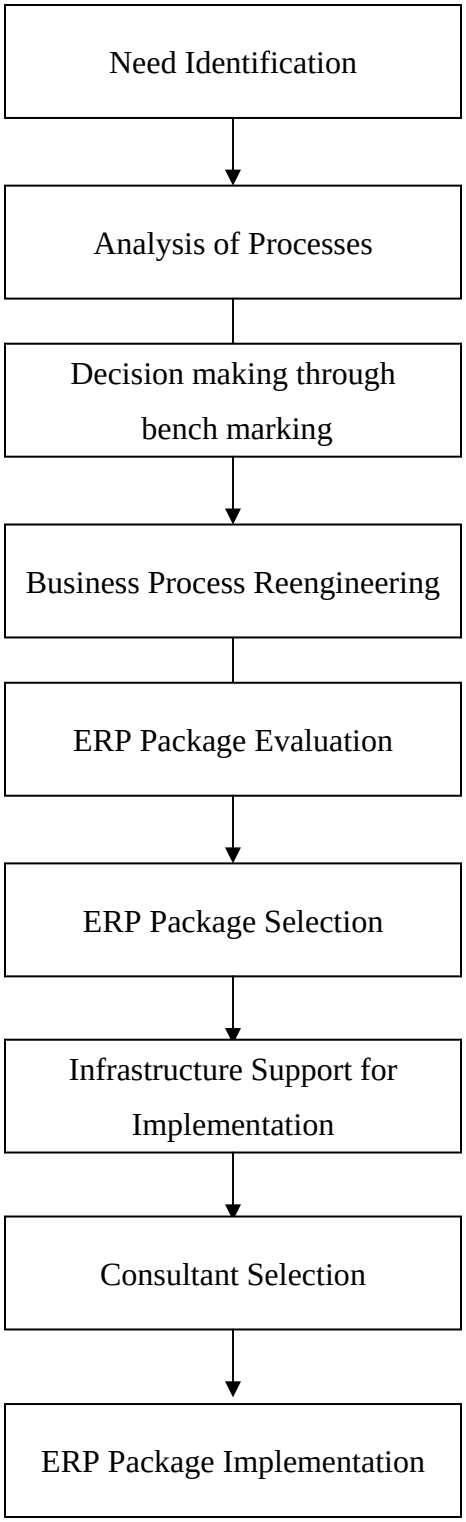

Figure 6.1: Steps of ERP Implementation Methodology

We now briefly discuss these steps:

1. Identification of the needs for implementing an ERP package. The first step for implementing an ERP package is to identify the reasons for going in for an ERP solution for your business. This step prepares you for some basic questions like:

- Why should I implement an ERP package?
- Will it significantly improve my profitability?
- Will it lead to reduced delivery times for my products?
- Will it enhance my customers' satisfaction level in terms of cost, delivery time, service and quality?
- Will it help reduce the costs of my products?
- Will it enable me to achieve the same business volume with reduced manpower?
- Will it enable me to reengineer my business processes?

The above questions, although very obvious, should form the basis of the decision to adopt an ERP implementation and should at all times be the final goal. The other factors that should be taken into-consideration are:

- Need for quick flow of information between business partners
- Effective management information system for quick decision-making
- Elimination of manual preparation of various statutory statements

Need for a high level of in integration between the various business functions.

2. Evaluating the "as-is" situation of your business. In this step, one needs to thoroughly understand what existing business processes the organization is following to transact its business. The various business functions should first be enumerated. For example, procurement, production, sales, etc. Now the processes used to achieve the business transactions should be listed in detail. The technique of process mapping can be

used here. The process map should give you the following details for any business process:

- The total time the business process takes to complete
- The total number of decision points involved
- The number of departments / geographical locations that the business process involves
- The flow of information
- The number of reporting points.

3. Deciding upon the desired would-be situation for your business. In this step, we decide on what we want our business processes to finally look like. Here we use the techniques of benchmarking to ensure that the targets set are comparable to the best in the industry. Benchmarking can be done on various aspects of the business like cost, quality, lead time, service, etc.

4. Reengineering of the business processes to achieve the desired results. To achieve the new business processes we reengineer the existing processes in such a manner that

- The business process cycle time is reduced significantly
- The number of decision points are reduced to the bare minimum
- The flow of information is streamlined, i.e. there is no unnecessary to-and-fro flow of information between departments.

5. Evaluation of the various ERP packages. In this step various ERP packages available in the market are evaluated with respect to the following aspects:

Global presence. Check the performance and acceptability of the package globally.

Local presence. Check how the package is performing in the local market-this gives an idea as to how well a package is taking care of the country specific business needs.

Investment in R&D. Evaluate the package from the point of view of investments the ERP vendor is making in R&D to continuously upgrade their product. A good investment in R&D is a healthy indication of the longevity of the package.

Target market. See which segment of the industry the packages basically airing at. Some packages, for example, are specific to process industry type of applications whereas others cater specifically to discrete manufacturing. Choose a package that has a strong hold in your type of industry.

Price. This is of course the main criteria which decide what package you will finally go in for.

Modularity. This aspect needs to be considered when you want to implement only some particular functions in the ERP package. The availability of the package as independent modules is a must in this case.

Obsolescence. While considering a package it is essential to see what would be the active life of the product before it becomes obsolete. The investment in R&D directly contributes to upgrade a package from time to time, thus increasing its useful life.

Ease of implementation. This factor needs to be looked into detail because a quick, smooth and hassle-free implementation is the key to successful transition from the legacy system. This in turn ensures that your business is not adversely affected in the transition period.

Cost of implementation. With large-scale integration of ERP packages and the consequent complexity built into them, it has become-essential to consider the cost of implementation which in some cases can be phenomenal.

Post-implementation support. Before deciding on an ERP package, it is advisable to check the quality and range of the post-implementation support that the vendor provides for his package.

6. Finalizing of the ERP package. After a thorough evaluation of all the ERP packages vis-à-vis the key factors of your business, the package best suited to your

business needs is selected. ‘The process of finalizing can be simplified by making a matrix of the key factors. You cart then rate all the packages under these heads.

7. Installing the requisite hardware and networks. In this step one has to install the hardware and networks required for the chosen ERP package. The installation of the hardware has to be well planned because generally the hardware arrives in time and lies idle due to the delays in implementation. Also, the induction of the hardware should be in a phased manner to avoid blocking of capital.

8. Finalizing the implementation consultants. The factors which go into the selection of the consultant are:

- Skill-set available with the consultant (application area)
- Installation base of the consultant
- Industry-specific experience (knowledge oft he various industry specific business processes)
- Finances involved in hiring the particular consultant.

9. Implementation of the ERP package. The broad steps involved in the implementation of the ERP package are:

i. Formation of implementation team
ii. Preparation of implementation plan
iii. Mapping of business processes on to the package
iv. Gap analysis
v. Customization
vi. Development of user-specific reports and transactions
vii. Uploading of data from existing systems
viii. Test runs
ix. User training

x. Parallel run
xi. Concurrence from user on satisfactory working of the system
xii. Migration to the new system
xiii. User documentation
xiv. Post-implementation support
xv. System monitoring and fine tuning.

i. Formation of implementation team. It is of the greatest importance to form an implementation team consisting of knowledgeable users from all functions along with IT personnel and personnel from the implementation consultant. From the people chosen, the project manager, project leaders and the module leaders should be identified and also a steering committee should be formed. The functions of the steering committee are:

- To monitor the progress of the implementation
- To see to it that the schedule of the implementation is adhered-to
- Resolve any problems that come up in the due course of the implementation · Allocation of resources for implementation.

ii. Preparation of implementation plan. An important task is the preparation of a detailed implementation plan that covers the total implementation process. Here various project management techniques like PERT charts can be used. The implementation plan should have clear components and should include the schedule for the following:

- Training of project team
- Mapping of business processes onto the software
- Function-wise implementation
- Customization
- Uploading of data
- Test runs
- Parallel run

- Crossover

iii. Mapping of business processes on to the package. This is a crucial step where the reengineered business processes are mapped on to the software. In mapping, the implementation team tries to fulfill the user requirements by making use of the standard functionality available in the software. However, if the requirements cannot be covered fully by the standard system, then the next step of implementation, i.e. gap analysis comes into the picture.

iv. Gap analysis. As mentioned earlier, the user requirements that cannot be directly mapped on to the standard system form the basis of gap analysis. Here, all such uncovered requirements are compiled into a gap analysis report. The 'gaps' are then classified into the following three heads:

- Gaps which can be taken care of with a little programming effort
- Gaps- which involve an extensive programming effort and hence require extra resources
- Gaps which cannot be taken care of in the system

For the first category, the project team directly takes action and resolves the issue. For the second and third category of gaps, however, the steering committee comes into the picture and decides on the extra resource allocation/process change.

v. Customization. Once the process of mapping and gap analysis has been done, the actual customizing starts. In this step, first the customizing needs are chalked out and then the actual job is handed over to the respective functional teams.

vi. Development of user-specific reports and transactions. As mentioned under gap analysis, any user requirements not covered by the standard system need to be

provided by extra Programming effort. In this step, the required reports and transactions are created.

vii. Uploading of data from existing systems. With customizing in place, the system is now ready to receive the master and transaction data from the existing system. In this step, programmed transfer of data takes place from the existing system to the new system. To avoid wrong tabulation of master data, the transfer process needs to be thoroughly checked in the trial runs. At times it too involves a lot of programming effort.

viii. Test runs. In this step, the test runs on the system are started. Sample transactions are tried to see whether the customizing and master data uploading has been error-free. The result of the sample transactions is evaluated and any changes required in settings to get the desired results are incorporated.

ix. User training. The training of users can be started alongside the test runs. Users belonging to different functionalities are trained in their respective functions. Normally user training includes:

- Logging in and logging out
- Getting to know the system
- Navigating through the various menu paths
- Trying sample transaction in respective functions

x. Parallel run. With the successful test run and user training in place, the parallel run of the system can be now startett1nparallel run, the business transactions are carried out both through the existing systems as well as through the new system. The implementation team then takes care of any lacunae which come to light during the parallel run.

xi. Conference from user on satisfactory working of the system. If the parallel run is satisfactory and error-free or errors that may have come up, have been resolved. The users may be asked for their final approval.

xii. Migration to the new system. When the parallel run has been successfully tried for a reasonable length of time and when the users and the implementation team feel absolutely confident, it is time to go 'live'.

xiii. User documentation. User documentation includes the details on how to carry out the various transactions. It is different from the regular ERP package documentation in the sense that it is more specific in nature than general documentation. It only covers alternatives that are being used in the particular business so as to make it easy for the user to understand and use them.

xiv. Post-implementation support. Post-implementation support generally involves queries from the user, minor changes in the report formats, as well as small changes in layouts of various printed formats like purchase orders etc.

xv. System monitoring and fine tuning. In this phase, the IT people monitor the system closely to see the performance aspects and fine tune the database and other administrative aspects of the system so that the user can derive the best performance from it.

6.3 KEY ISSUES / SUCCESS FACTORS OF ERP IMPLEMENTATION

The three key issues that could determine the success of an ERP implementation and work towards delivering quicker and better ROI are:

1. Functionality. The ability of the package to support the best business practices followed in the company's line of business would be a crucial factor in determining the smoothness of implementation. Major gaps in required functionality can lead to time

consuming and cumbersome customizations that could put time schedules and budgets off track. A focused evaluation exercise at the selection stage would help eliminate incompatible choices. The quality and commitment of business consultants and product consultants involved in the ERP implementation would also be a very crucial factor in ensuring its success.

2. Technology. Scalable ERP solutions that support open, non-proprietary technology standards would provide for protection .of investment and ensure minimal risk. They should' support different kinds of operating systems, databases and operate on most major client/server hardware platforms, local area networks (LAN) and user interfaces (ASCII Motif: Windows 95, etc) so as to minimize risk towards technology obsolescence. The ERP package's programming language; software development tools should permit ready adaptation of the system in response to ongoing changes in production and operational processes. To minimize customization effort and time, the development tool-set for the applications should be easy to use.

3. Implement ability of the solution. This would be the most crucial and significant factor as customer satisfaction and the benefit of ERP would depend not only on functionality but also on ease of configuration, ease of use and the software's flexibility to support optimization of business processes.

Much of the complexity of a software implementation process has also to do with setting of parameters, designing menus and authorizations. The roles and responsibilities of different employees have to be clearly identified, understood and configured in the system. The involvement and willingness of the employees to accept and use these new procedures laid by the ERP would, to a great extent, determine the success of the implementation. Simple, easy to use processes and procedures go a long way in creating user trust and confidence. There have been instances of large and complex packages failing to deliver on implementation because of the misgivings users had in terms of difficulty of configuration and usage.

When organizational changes take place, the software solution should grow and adapt to the changing demands of information needs. The ability of the ERP package to manage and support dynamically changing business processes is a critical and vital requirement for the organization.

6.4 GUIDELINES FOR ERP IMPLEMENTATION

- **Understand your corporate needs and culture**

Readiness for change and the capability to implement that change will be the first step towards successfully choosing the right ERP-based business solution. The top management team along with the various departments must be prepared to accept that change, and to implement the ERP package.

There is a difference between seeing the need for change, and being willing to accept it. Time and understanding the opportunity to change and the cost of not changing will help increase readiness. For example, the production planning people might be ready to change, but if the sales people are not prepared to give them product-wise forecasts, it will not work. Manual and non-ERP solutions could get away with patchwork and hazy data but the project will be undermined by the inconsistencies in data and will not succeed.

The greater the element of change involved, the greater will be the challenge in implementing it. Excellent project leaders prepare for change by first understanding the degree of difficulty they face. Often, management does not understand at the start of the project the need to change, and the interrelationships between the various functions.

An ERP implementation will bring about a change in the roles of different departments, requiring different skill-sets and changes in the authority and responsibility.

In short, it will result in a change in the existing power structure. You must place this understanding within the context of your company's risk profile to define your project approach. Be sure not to underestimate the complexity of this change initiative. Remember, an ERP implementation is not an IT projects.

- **Complete business process changes**

The organization should first use the ERP implementation process to identify the changes in business processes and in skills and attitudes that must be made. While the company will be willing to do this,-it may not have a complete understanding of the implications of the changes it is adopting. It will be useful for the organization to engage in a brief business process redesign exercise prior to the implementation. In that effort, however, it will have to keep in mind the structure of the ERP package so as not to design new requirements that are not supported by the package.

- **Communicate across the organization**

Obtaining support from executives is the key criterion for success. Successful feedback and a forum for top management are required to address their concerns and are also vital. Employees at all levels who are affected by the new system need to be informed by a rigorous communications programme. The key to success in this effort is repetition and a realistic setting of expectations. People need to be told several times about change.

Expectations must be managed. If they are set too high, people are bound to be upset, frustrated, and disappointed by the results. Set too low, employees will be surprised by the extent of change and will find it difficult to adapt. In either ease, this will slow their ability to accept and fully use the system.

- **Provide strong leadership**

It is very crucial for a successful project manager to appreciate and apply this success factor. Many executives can be supportive of a project but will fail to provide real hands on leadership and commitment. The difference between informal support and active

leadership is the difference between success and failure. It is imperative to develop a steering team which must be capable of change management and the process of redesign and integration. This is not easy, as most successful managers are not trained as good - business analysts. However, it is possible, with the right modeling tool, to make it easy for the managers to understand graphical business process maps and visualize the limitations and potential improvements. The same maps can be summarized for senior management to get a broad view and drill down to see the details of vertical (within the department), or horizontal (across departments) checks, tasks, delays, and hands-off operations.

- **Ensure an efficient and capable project manager**

Managing a complex, large-scale-project like an ERP implementation is best done by blending the organizational and IT skills, along with the management of change. A successful project manager integrates concerns that would otherwise fall between the cracks, and communicates with all those who may be involved. This requires sensitivity to three perspectives: information technology, business and change management.

Integrated change means that these three aspects are viewed as a whole, wherein a change in one affects each of the others. In the past, IT change, business process change and the organizational and individual change were viewed as disparate e1emen1s. Each could, and usually did, trigger changes intheo1hem. These changes have historically been carried out sequentially. So you could introduce an IT inventory system, make the store stocks accurate and then go in for an MRP meanwhile gradually changing the roles of the sales, production, materials and finance departments to start integrating the operations. With the advent of enterprise-wide integrated information systems, integrated change is not only available, but is required.

- **Choose a balanced team**

The systems environment of today's ERP solutions is complex: RDBMS, servers, nodes, application servers, LANs, WANs, networking, etc. The hardware/software package is

increasingly seen as a utility, similar to the network. Customizing the software to fit the requirements of a particular function of the business will become the job of the analyst and user. There will no longer be a lot of documentation to specify the requirements. These will be on-line, as an integral Part of the package. But it is a shift in user responsibilities to include those which earlier lay with the IT department, e.g. response times, query searches and so on and so forth. The user becomes an expert in the integrated IT and manual process. Hence, the business people in the project team must start thinking of the process as a whole.

This is why most ERP project teams primarily comprise individuals from the business departments who will be part of the ERP deployment exercise. They configure the systems, using the tables and functi9ns available to run the business in the new way. After implementation, they take responsibility to maintain the systems, when changes are needed.

- **Select a-good implementation methodology**

You may not follow every step in the process you choose, but it is extremely helpful to have a road map. It is advisable for the project leaders to set out clear, measurable objectives at the very outset, and review the progress-at intervals, as the implementation progresses.

IT projects are essentially systems integration projects. They are complicated and require attention on issues such as the implications-of even the slightest change. With the many modules of an ERP which interact with each other, a small change can create a ripple effect across the whole system. Up front, it is important to scope out the project. The scope should be arrived at after deliberation by the steering team and the process redesign team. That would form the starting point, or the charter for the project team. It should be treated seriously and once fixed, should not be changed.

Software and hardware requirement is should be accomplished with the approval of the project manager, concurrence of the steering committee, and a review of the impact of the change on project schedules. The temptation to agree to change must be resisted, and a proper configuration control mechanism must be put in place.

- **Train everyone**

A new system inevitably means new ways of adapting and operating. The requirements of an ERP solution with trigger off process reengineering exercise and the users must be informed about the needs for such a change, from the, company's perspective as well as from that of an individual.

The steering team should be trained in process analysis and redesign, and given an overview of the ERP package functions and processes. The project leader should be trained in project management techniques; the users in the project team will need functional training in the package, and customization.

- **Commitment to adapt and change**

An ERP" implementation should not be looked upon as a short distance run. It has wide implications, and will impact the future of the company for many years to come. Implementation, if it is to be effective, is a long-drawn out process. All above factor have to be kept in mind for successful implementation. The project will not yield quick benefits and the management must be patient with the project team. An ERP project is perhaps more complex than physically putting up anew plant as it involves many changes. If you do not have the heart to change, you should not opt for an ERP solution.

6.5 ROLE OF CONSULTANTS, VENDORS AND END USERS

Why can't companies develop their own ERP packages? Developing an ERP package is a very complex and time-consuming process, which needs a lot of skilled manpower and other resources. Many companies have personnel in their ITIIS departments who can absorb the necessary knowledge and who have experience in developing sophisticated

systems. The problem is that such specialized computer work is not the main business of these companies. They should be directing all their available resources into improving their own products or services so that they can remain competitive, serve their customers better and continue to grow.

Since designing and implementing integrated software packages is not the business of most companies, or a focus of their executives, the systems that their in house teams come up with will never equal in quality, scope, functionality or technology those systems created by software firms whose business this is. These software firms (ERP vendors) can produce sophisticated packages and provide their clients with products that allow them to maintain a focus on their own chief activities, thus improving revenues, profits and shareholder returns.

Consultants

The functional team is assisted by a team of implementation consultants, using their knowledge of process integration and experience in applying proven techniques. The implementation consultants simplify and expedite the implementation process. Some members of this consulting team, who possess specialist knowledge and experience in implementation of ERP systems in the specific-functional area, are appointed team leaders for that function. The team leader coordinates the activities of his team and ensures that team milestones are achieved within budgeted time. In addition to assisting the functional team in all the activities mentioned above, the implementation consultants are also involved in:

- Providing an overview of ERP to the top management in the organization
- Training the project team members in the ERP system
- Ensuring that vendor supplied training material, along with company specific data, is extensively used for the training
- Providing a fresh, unbiased perspective oil the way of doing business, sometimes even challenging the status quo

- Conducting an extensive post implementation audit (All the procedures which have undergone changes after ERP implementation are documented in detail along with their impact on the overall functioning of the business in this report. The report is discussed in the steering committee meeting along with the project leader's comment and the committee members' individual observations before the- final sign-off of the project.)
- Conducting a post-implementation review after the system is fully implemented and the entire staff is familiar with the system (It provides a formal review point to measure the success of the project and the system against the original objectives and identifies ways in which further benefit can be gained by better use of the system or by further development work). Along with functional consultants, the team also consists of one or two IT specialists who assist the client IS team in issues such as system administration, security, network management etc.

Vendor

First and foremost, the vendor should supply the product and its documentation as soon as the contract is signed. Only after the software is delivered, can the company develop the training and testing environment for the implementation team. The vendor is responsible for fixing any problems in the software that the implementation team encounters. So the vendor should have a liaison officer who should constantly interact with the implementation team.

Another role the vendor has to play is that of the trainer to provide the initial training for the company's key users, people who will play lead roles in the implementation of the system. These Key users are the ones who will define, together with the consultants, how the software is to serve the company. In other words, it is these in-house functional experts who will decide how the functionalities are to be implemented, as well as how to use or adapt the product to suit the company's unique requirements. So it is very critical that these key users are given a thorough training on the features of the package.

Vendor's training should achieve the goal of showing the key users how the package works, what are the major components, how the. data and information flows across the system, what is flexible and what is not, what can be configured and what cannot, what can be customized and what should not, what are the limitations, what are the strengths and weaknesses' and so on.

Now some of you might ask: we are hiring consultants who are experts in the package so why can't we get training from the consultants? This is true. Most of the consultants are capable of providing sound training for the packages. But-we are hiring the consultants for implementing the system. The objective of the vendor training is to show how the system works, not to show how it should be implemented. This means that the vendor demonstrates the product as it exists and highlights what are the possible options available. The company's employees who are participating in the vendor training should try to understand the characteristics of the package and the impact of the system on their business processes. The trainees should use these training sessions to question the vendor on all aspects of the system.

The consultants also have a role to play during this vendor training. They should participate in the training sessions to evaluate how the users react to the reality that is starting to take shape from the detailed presentations and demos. Consultants should also ask questions that the vendors are trying to avoid and the users are unaware of. This is the best way to present the real picture to the users and it will also prevent the vendors from making false claims.

The role of the package vendor does not end with the training. The vendor also plays an important project support function and must-exercise the quality control with respect to how the product is implemented. It is the vendor who understands the finer details and subtleties of the product and can make valuable suggestions and improvements that could improve the performance of the system. It is also in the best interests of the vendor that this participation continues, because if the implementation fails, most of the blame will

fall on the vendor. Also a successful implementation means another satisfied client, improved goodwill and good referrals and so on. So the vendor will continue to participate in all the phases of the implementation, mostly in an advisory capacity, addressing specific technical questions about the product and technology.

The vendor has other responsibilities also. There will be ‘gaps’ between the package and the actual business processes. The software might have to be customized to suit the company’s needs. Customizing means altering the product so that it is suited for the company’s purposes. The choice of whether to customize or not is the one that can have enormous impact on the project and it often constitutes a point of conflict between the consultants and users. But if the decision to customize has been taken, it is the vendor’s duty to carry out the necessary modifications. This is because only the vendor knows the product well enough to make the necessary changes without affecting the other parts. Moreover, the company should get a guarantee (in writing) from the vendor that despite the customization, it will be able to benefit from the future software improvements introduced by the vendor.

End User

These are the people who will be using the ERP system once it is in place. These are the people who were doing the functions that are being automated or computerized by the ERP system. With the Implementation of the ERP system, the old job descriptions will change, the nature of the job will undergo drastic transformation. It is human nature to resist change. When we are talking about implementing an ERP system we are taking about change in a very massive scale. Employees, will, fear that system will replace existing jobs, as many functions will be automated. Also people will be afraid of the amount of training they have to undergo and learning they have to do to use the new system. Job profiles will change, job responsibilities will-undergo drastic alterations, and people will be forced to develop new skill sets of these fears are not addressed and alleviated well in advance, it will cause trouble for the organization.

It should be worth noting the fact, that while the ERP systems eliminate many existing jobs, it creates many new ones-ones with more responsibilities and value addition. It is easy to see that the automation of the business processes, though technology, can eliminate the jobs of many employees whose function it is to record, control, calculate, analyze, file or prepare reports. But it must be pointed out to the employees that the same automation creates many more opportunities for the, because they can get away from the monotonous clerical work and transform themselves into highly valued individuals, in a new and challenging working environment using modem technology. If the company can succeed in making its employees accept this fact and assist in making the transformation (by giving them training), then the major (and most critical) obstacle in the path of an ERP implementation is solved.

6.6 SUMMARY

Successful implementation is the obvious goal of any organization that has chosen to go for ERP. ERP implementation is a special event, since it involves the entire organization over a period of time. It brings together different functionality, people, processors, and identifies, and leads to sweeping changes through out the organizations.

Since almost all methodologies look same, the company should look into minute details when comparing different methodologies and also considers key factors which determine the success of ERP project implementation.

Developing and implementing ERP package is very complex and time consuming process. Therefore it requires implementation consultants, vendors, end users to work as an effective team.

6.7 KEYWORDS

PERT: Program Evaluation Review Technique

LAN: Local area network

WAN: Wide area network

ROI: Return on investment

ASCII: American standard code for information interchange

RDBMS: Relational Database Management System

6.8 SELF ASSESSMENT QUESTIONS

1. Describe Methodology of ERP implementation project.
2. Describe how you would go about the different phases of the ERP implementation lifecycle, if it were being done in your company.
3. Why the cooperation of each group is vital for the success of an ERP implementation.
4. Enlist the important success factors and guidelines for ERP implementation.

6.9 SUGGESTED READINGS

- Daniel Amor, “The E-business @evolution : Living and working in an international world”, Pearson Education, New Delhi
- Deborach L. Bayles, “E-commerce logistics & Fulfillment”, Pearson Education, New Delhi
- Willium J. Buffam, “E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities”, Pearson Education, New Delhi
- Marcia Robinson, “E-Business : Roadmap for Success”, Pearson Education, New Delhi
- Kenneth C. Landon, “E-commerce :Business, Technology, Society”, Pearson Education, New Delhi
- Samantha Shurety, “E-Business with Net. Commerce”, Pearson Education Asia, New Delhi
- Napier, “Creating a winning E-Business”, Vikas Publishing House, New Delhi
- Leon Alexis, “Enterprise Resource Planning”, TMH
- Parag Diwan, “Enterprise Resource Planning”, Pentagon Press

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LESSON: 7

ERP BUSINESS MODULE-I

Author: Deepak Dembla **Vetter: Dr. Karam Pal**

STRUCTURE

7.0 Objectives
7.1 Introduction
7.2 Finance Module
- 7.21 Financial Accounting
- 7.22 Controlling
- 7.23 Investment Management
- 7.24 Treasury Management
- 7.25 Enterprise Controlling

7.3 Human Resources Module
- 7.31 Personnel Management
- 7.32 Organizational Management
- 7.33 Payroll Accounting
- 7.34 Time Management
- 7.35 Personnel Development

7.4 Summary
7.5 Keywords
7.6 Self Assessment Questions
7.7 Suggested Readings

7.0 OBJECTIVES

After going through this lesson, you would be able to:

- Describe various functional modules of ERP packages.

- Have an insight about subsystems or sub modules of Finance and HR.
- Analyze how these modules functions together.

7.1 INTRODUCTION

Business uses resources to produce goods and services. These resources are land, labour and capital. These three resources become productive when combined in a rational way for some creative or gainful purpose. This is the function of the fourth resource entrepreneurship or management. Entrepreneurs or managers combine the resource like land, labour and capital in different ways to produce goods or services. It is the function of the management to plan the effective and efficient use of the resources available to the enterprise. The enterprise resource planning (ERP) system help the management in making the planning process more productive and efficient.

ERP system can be better understood from the figure 7.1.

7.2 FINANCE MODULE

The entire concept of inforn1ation technology is based on the premise that providing the right information, to the right people, at the right time can make a critical difference to the organization. Much of this key mforn1atlon could be taken from the financial data. But merely having the financial data is not enough. You need a set of processes and views of your data that provides up-to-the-minute financial inforn1ation in exactly the forn1 you need it to make that critical difference and help with that crucial decision. Accounting software needs access to information in each area of your organization, from R&D and market research through manufacturing, distribution and sales. Your financial solution must provide the management with information that can be leveraged for strategic decisions, in order to achieve competitive advantage.

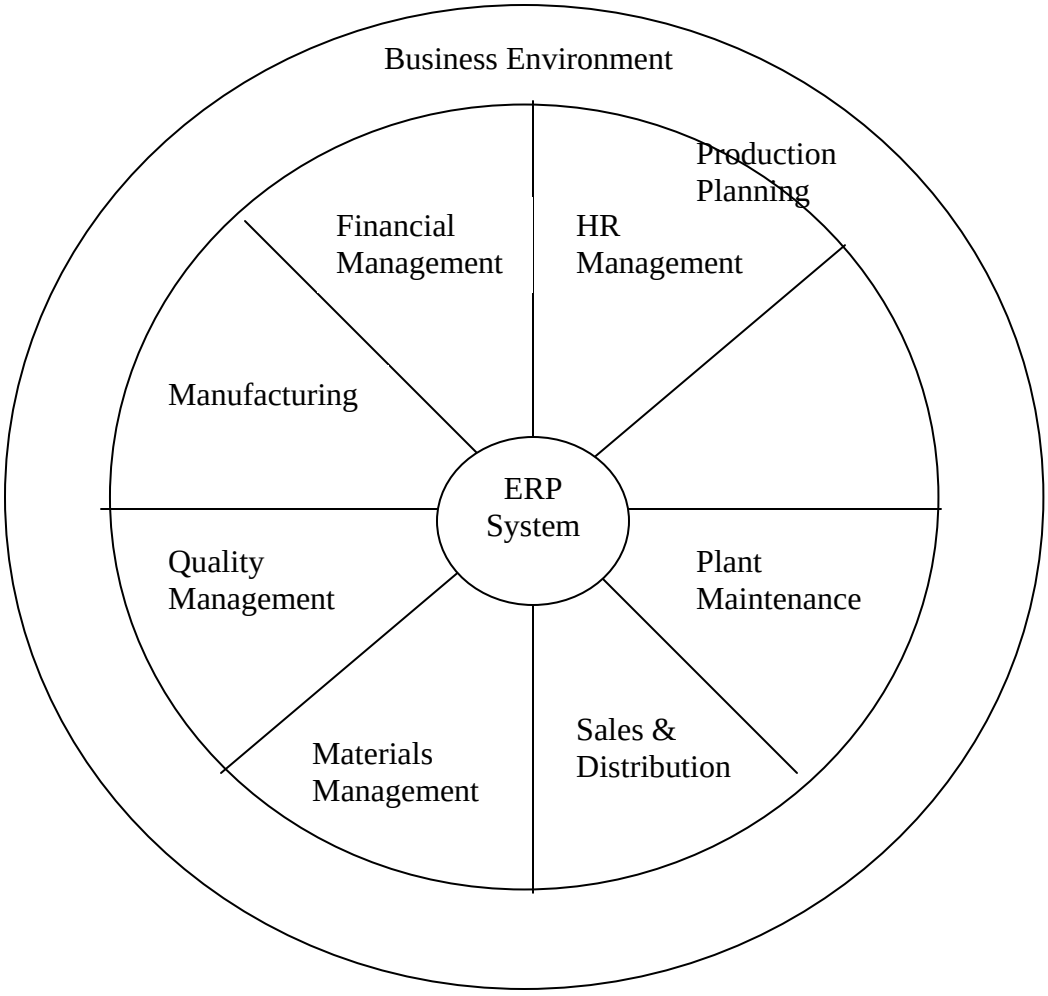

Figure 7.1: ERP SYETEM

This section provides an overview of the financial solutions in most of the ERP packages. In today's business enterprise, you need to-know that your financial decisions are based on today's data, not numbers from records closed a month ago, or even a week ago. And you need to know that this same today's data represents every segment of your organization's activities, whether your enterprise stretches across a room or around the globe. This is essential, because .the most efficient way to get your enterprise to where you want it tomorrow is to know exactly where it is today.

Whatever be the financial goals of your organization, the financial application components of the ERP solutions work hand-in-hand to improve the bottom line. This is true because the financial functionality is tightly integrated across all business areas and all geographic areas. This tight integration includes all the other different modules, from materials management to human resources to logistics. Because the ERP system automatically links related areas, it eliminates the need to repeat procedures. You enter your data only once. Within the ERP system, all areas work in concert, creating anew level of efficiency in handling your financial data.

The finance modules of most ERP systems provide financial functionality -and analysis support to thousands of businesses in many countries across the globe. These ERP systems include not only financial application components, but also Human Resources, Logistics, Business Workflow and links to the Internet. Hundreds of business processes are covered in these systems.

The finance modules of most ERP systems will have the following sub systems:

- Financial Accounting (General Ledger, Accounts Receivable/Payable, Special Ledgers, Fixed Asset Accounting, Legal Consolidation)
- Investment Management (Investment Planning/ Budgeting/ Controlling, Depreciation Forecast/ Simulation / Calculation)
- Controlling (Overhead Cost Controlling, Activity-Based Costing, Product Cost Accounting, Profitability Analysis)
- Treasury (Cash Management, Treasury Management, Market Risk Management, J Funds Management)
- Enterprise Controlling (Executive Information System, Business Planning and Budgeting, Profit Centre Accounting)

7.21 Financial Accounting

The objective of a good financial accounting system is to provide company wide control and integration of financial information that is essential to strategic decision-making. The Financial Accounting Module of an ERP system gives you the ability to centrally track financial accounting data within an international framework of multiple companies, languages, currencies, an4 charts of accounts. For example, when raw materials move from inventory into manufacturing, the system reduces quantity values in inventory and simultaneously, subtracts values for inventory accounts in the balance sheet. Most of the Financial Accounting modules comply with international accounting standards, such as GAAP and IAS. They also fulfill the local legal requirements of many countries.

General Ledger

The General Ledger (GL) is essential both to the financial accounting system and to strategic decision-making. Through active integration with business processes in logistics and in the accounting sub-ledgers, the GL serves as a central pool of financial data for financial reporting as well as for other accounting areas. However, the origin of centrally stored data can still be traced at any time by drilling down on data from a given transaction.

The General Ledger supports all the functions needed in a financial accounting system. This includes flexible structuring of the chart of accounts at the group and company level, distributed application scenarios, real-time simultaneous update of sub-ledgers and the general ledger, elimination of time consuming reconciliation, and parallel views of data, in both the general ledger and the managerial accounting applications. The GL provides document parking, posting, reporting, and an integrated financial calendar for automating periodic activities. A typical general ledger is shown in Figure 7.2. The system also provides summary information from other components at a user-defined level of detail. By creating combinations of entered data, you generate data summaries that can be used in planning, allocation, distribution and reporting.

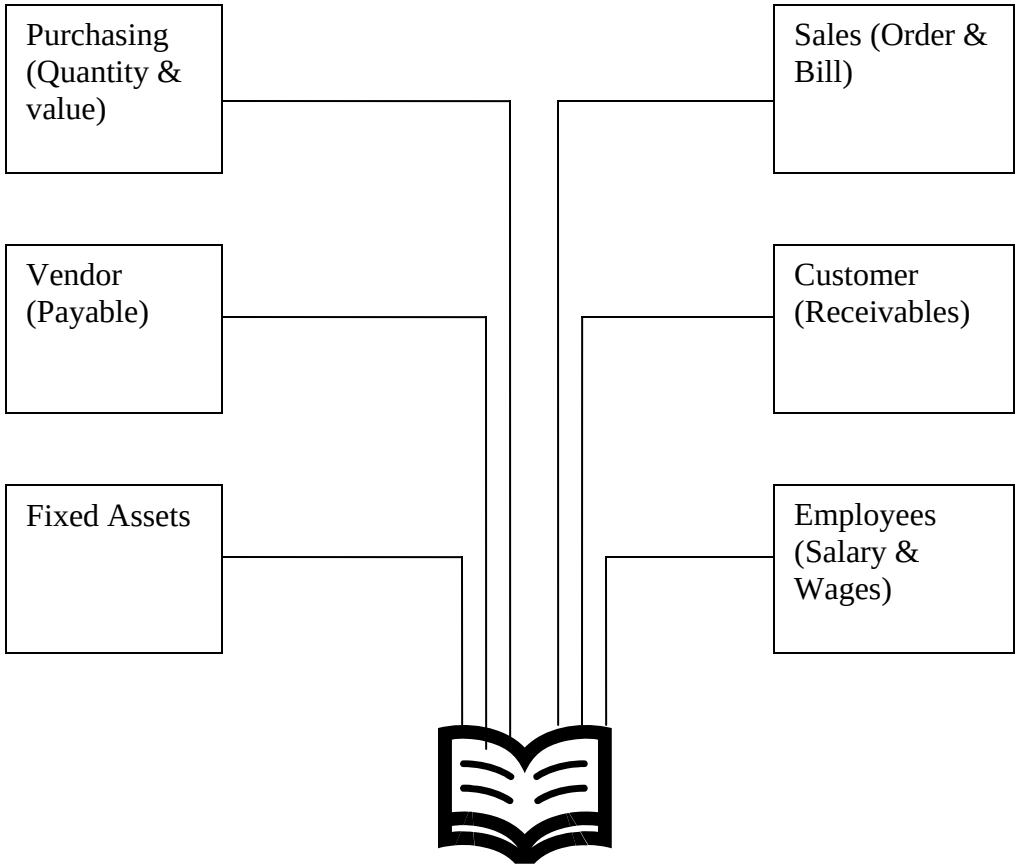

Figure 7.2: Typical General Ledger

Usually, the GL has features that allow you to take advantage of more functions in General Ledger and in Cost Centre Accounting. For example, you can create your own database tables and define non-standard fields, to suit specialized accounting or reporting, requirements. Some ERP systems support features, like the option of grouping data selectively and then, updating it in only there ledgers which have been specified; provision for parallel charts of account and currencies; planning and allocation tools; direct data entry in special purpose ledgers for adjustment postings; user-defined reporting; etc.

Accounts Receivable and Payable

ERP systems offer a financial overview of global business partner relationships, in the Accounts Receivable and Payable functions. These sub-ledgers are integrated, both with the General Ledger and with, areas in Sales and Distribution and Materials Management, where financial data originates. Accounts Receivable and Payable transactions are performed automatically, when related processes take place in other modules. This module uses standard business rules for procedures ranging from data entry and reporting, to processing payments and bank transactions. Accounts Receivable and Payable functions include Internet integration, document management, and full support for EDI processing, including automatic integration with cash management and flexible reporting using customer and vendor information systems. The module also provides enterprise-wide credit management with workflow integration, payment automation with EET and check processing, and document parking with various approval procedures.

Asset Accounting

Asset accounting, manages the company's fixed assets. Within the Financial Accounting system, Asset Accounting serves as a sub-ledger to the General Ledger, providing detailed information on asset-related transactions. Significant features include country-specific charts of depreciation complying with local legal requirements, full support throughout the asset life cycle from acquisition to retirement, depreciation simulation and interest calculation, and integration with project management and order accounting for management of capital assets. Asset Accounting also provides integration with Plant Maintenance for management of machinery and equipment, management of leased assets and assets under construction, mass processing with workflow integration, and interactive reporting.

Legal Consolidation

Consolidated financial statements need to be integrated effectively with operational data at the individual company level. By using different valuation methods, you can plan balance sheet strategies to suit the company's requirements. The Legal Consolidation sub-system is closely linked to the Financial Accounting system, permitting direct data

transfer, from individual statements into the consolidated report. This eases the workload of the staff and reduces data entry errors. In addition to the consolidated statements required by law, Legal Consolidation also allows you, to create multiple views of your consolidation data. With these views you can generate reports about legal entities or segments of your business.

7.22 Controlling

The controlling system gathers the functions required for effective internal cost accounting. It offers a versatile information system, with standard reports and analysis paths for the most common questions. In addition, there are features for creating custom reports to supplement standard reports.

Overhead Cost Controlling

Many organizations experience a significant increase in the percentage of indirect costs, which cannot be directly assigned to either the products manufactured, or to the services rendered. While cost monitoring and optimization may be quite advanced in production areas, transparency is often lacking in overhead cost areas. The Overhead Cost Controlling subsystem focuses on the monitoring and allocation of overheads.

Cost Centre Accounting

Cost centre accounting analyses where overheads occur within the organization. Costs are assigned to the sub-areas of the organization where they originated. The system offers a wide variety of methods for allocating posted amounts and quantities. In particular activity accounting permits the allocation of great many costs to products, based on cost sources and enabling assignments, which were not previously possible.

Overhead Orders

Overhead orders subsystem collects and analyses costs, based on individual internal measures. This system can monitor and automatically check budgets assigned to each measure.

Activity-Based Costing

The goal of the entire organization, should come before the goals of individual departments, when if comes to business process reengineering. The Activity-Based Costing module is a response to the growing need for monitoring and controlling cross departmental business processes, in addition to functions and products. Seeing costs from a-new perspective substantially enhances organizational transparency in overhead areas. The system automatically determines the utilization of business processes by products, customers, and other cost objects based on the cost drivers taken from the integrated accounting environment. This significantly reduces the effort involved in maintaining a business process model in a separate system.

Product Cost Controlling

Product Cost controlling module determines, the costs arising from manufacturing a product, or providing a service. Plan and standard values, serve in valuating warehouse stock and for contrasting revenues received with costs. In addition, the values in Product Cost Controlling are crucial for determining the lowest price limit for which a product is profitable. Simulations illustrate the effects of changes in production methods on the cost of goods manufactured.

Cost Object Controlling

Cost object controlling helps you monitor manufacturing orders. Integration with the logistics components results in a logistical quantity flow, that provides instan1 information on actual cost object costs, allowing ongoing costing calculations at an) time. Follow-up calculations determine and analyze the variances between actual manufacturing costs, and the plan costs resulting from Product Cost Planning.

Profitability Analysis

Profitability analysis subsystem examines the sources of returns. As part of sales controlling, Profitability Analysis is the last step in cost-based settlement, where revenues

are -assigned to costs according to the market segment. You can define an) market segment-distinguishing, for example, between products, customers, orders, sales organizations, distribution channels and business areas-and evaluate it, according to contribution and revenue margins. Information from Profitability Analysis, frame important decisions in areas such as determining prices, selecting customers, developing conditions and choosing distribution channels.

7.23 Investment Management

Investment management provides extensive support for investment processes right from planning through settlement. Investment management facilitates investment planning and budgeting at a level higher than that needed for specific orders or projects. You car define an investment program hierarchy using any criteria-for example, department-wise. As a result of subsequently assigning specific investment measures (internal orders or projects), to positions in the hierarchy, you are kept up-to-date about available funds planned costs, and actual costs already incurred from internal and external activities. The investment program allows you to distribute budgets, which are used during the capital spending process. The system helps you monitor,-and thereby avoid, budge overruns.

Investment Management provides tools, enabling you to plan and manage your capital spending projects right from the earliest stage. In the initial stage of the capital spending process, you enter the application for the spending project as an appropriation request. You define your own evaluation and approval process, during which the system keeps a detailed history of the-status of the appropriation request. You transfer the data from the appropriation request, to the investment measure, when the request is approved for implementation. You enter detailed plan values in the appropriation request, and its different variants, for use in the pre-investment analysis.

Depending on their complexity, investment-measures that need to be monitored individually can be represented either as internal orders or projects. These internal orders or projects provide the means for actually carrying out the capital investment; that is, they

serve as the objects for collecting primary and secondary costs, for calculating overhead and interest, for managing down payments and commitments, and for handling other related tasks. As the result of having an asset under construction assigned to it, the investment measure also benefits from the entire required asset accounting functions. Settlement is both flexible and almost fully automatic. This kind of settlement ensures a complete integration with business planning and control, and provides consistently up-to-date values. Investment Management module recognizes the importance of the asset accounting aspects of investment measures. The system automatically separates costs requiring capitalization from costs that are not capitalized, debiting the correct costs to the asset under construction. For different accounting needs, the system can use different capitalization rules for making the split. At its completion, the investment measure can be settled to various receivers by line item. Asset accounting provides precise proof of origin for all transactions affecting acquisition and production-costs.

Budgeted balance sheets and cost planning are always based on current values. Planned depreciation values for investment measures and appropriation requests can be transferred directly to ongoing overhead cost planning. The system recalculates expected depreciation amounts whenever planning data is updated.

7.24 Treasury Management

You can gain a significant competitive advantage by efficiently managing the short medium, and long term payment flows and the resulting risk exposure. Tasks such as short-term monitoring and concentration of bank account balances, medium- term planning, and forecasting of incoming and outgoing resources in accounts receivable and payable, to a long-term view of areas such as materials management and sales, underline the importance of integrating information from various company divisions. Linking these operating divisions to realized and planned financial transactions and positions in Treasury, has a significant impact on the company’s success. Such integration also facilitates management and control of cash flows, and risk positions through all the

divisions in the company. The Treasury component provides you with a basis for effective liquidity, portfolio and risk management.

Cash Management

The cash management subsystem, allows you to analyze financial transactions for a given period. Cash Management also identifies, and records future developments for the purposes of financial budgeting. The company's payment transactions are grouped into cash holdings, cash inflows and cash outflows. Cash Management provides information on the sources and uses of funds to secure liquidity in order to meet payment obligations when they become due. Cash Management also monitors and controls incoming and outgoing payment flows, and supp1ies the data required for managing short-term money market investments and borrowing. Depending on the time period under review a distinction is made between cash position, short term cash management, medium and long-term financial budgeting. The Cash Management component thus ensures that all information relevant to liquidity is available to you for analysis purposes, creating a basis for the necessary cash management decisions.

Treasury Management

In your role as treasurer, you take the results of your current liquidity, currency, and risk positions and consider die conditions prevailing on the money and capital markets, before implementing concrete decisions in the form of financial instruments in Treasury Management. The Treasury Management component offers functions for managing financial deals and positions, from trading to transferring data to Financial Accounting. Treasury Management also supports flexible reporting and evaluation structures or analyzing financial deals, positions and portfolios. For short-term liquidity and risk management, you can use the money market, or foreign exchange transactions, to smooth out liquidity squeezes and gluts, or to eliminate currency risks. Securities and loans come into play in the medium and long-term.

Derivative financial instruments facilitate active management of interest rate and currency risks. The trading area contains functions for recording financial deals, exercising rights, performing evaluations and calculating prices (for example, option, price calculator in back office processing, you enter the additional data required for processing deals (such as account assignment and payment details and generate automatic confirmations. Position management functions, such as securities account transfers or corporate actions relating to securities, are also supported in the back office area. The general ledger is updated in the accounting area, which also offers flexible payment processing functions in addition to valuation and accrual/deferral methods. By using, common organizational elements throughout, various organizational structures can be represented in the system, such as a central enterprise-wide treasury department or in house banks. This also ensures full integration of Treasury into other modules of the system.

Market Risk Management

Market risk management plays a vital role within Treasury, in ensuring your company's competitiveness. The process involves a complex feedback loop encompassing data collection, risk measurement, analysis and simulation as well as active planning of financial instruments. This process dovetails closely with other treasury and corporate functions. Market Risk Management acts as an integrated, central risk control station with monitoring and management functions. Access to information on current and future cash flows and on financial deals already processed, is an absolute must. As a result, Cash Management, which pools all cash flows from the business sectors, such as sales and distribution or purchasing, forms the basis. Consequently, all cash flows from the company's operating business can be accessed for the purposes of risk management. Furthermore, all financial transactions managed in Treasury Management can be evaluated together with the cash flows generated by the various M operating divisions. The component provides various measurements for analyzing and assessing interest rate and currency risks. Mark-to-market, effective rate and effective yield calculations are based on up-to-the minute market data, uploaded via data feed, and financial transactions

or positions. By simulating market data, you-can determine, the risk structure of what- if analyses (such as crash scenarios or worst case scenarios). You can also measure and compare the impact of alternative hedging strategies using simulated transactions.

Funds Management

Funds management subsystem supports your funds management process from budgeting all the way through to payments, including monitoring expenditures, activities, resources and revenues. Budgets are entered for areas of responsibility that can cover as many management levels, as you require. Funds centres and their hierarchical structure provide a base for top down budgeting and represent responsibility areas with in budget control. The system enables you to control your various funds commitments and determine how much of your budget has already been utilized via availability checking. The information system can supply you with information at any time, on when, where, and how your funds commitments arose. Analyses by responsibility area and commitment items allow you to identify any budget bottlenecks.

7.25 Enterprise Controlling

Enterprise controlling comprises of those functions that will optimize shareholder value, while meeting internal objectives for growth and investment. These modules usually include executive Information System, Business Planning and Budgeting, Consolidation, and Profit Centre Accounting.

Executive Information System

The executive information system provides an overview of the critical information necessary to manage the organization. This component integrates data from other ERP components, and non- ERP data sources both inside and outside the enterprise. Drill-down reporting and report portfolio are available to evaluate and present the data. In drill-down reporting, you can analyze the data interactively. Exceptions can be defined in order to highlight areas of concern. The drill-down reports can also be made available in the graphical report portfolio for less experienced users. The report portfolio is aimed at

users with basic knowledge of the system who wish to access information put together for their specific needs.

Business Planning and Budgeting

Business planning and budgeting supports the management teams of business units and groups in the calculation (business targets, such as return on investment.) This module also supports central investment planning, budget release and tracking. This module automatically transfers data about investment requirements from transaction applications, and provides extensive analysis functions for budget monitoring.

Profit Centre Accounting

Profit centre accounting analyses the profitability of internal responsibility centres. A company's organizational structure is represented in the form of a profit centre hierarchy, with the profit centre as the smallest unit of responsibility. All business transactions in Financial Accounting, Materials Management, Asset Management, and Sales and Distribution, which affect profits, are automatically reflected in Profit Centre Accounting. It is also possible to analyze selected balance sheet items by profit centre and use them for calculation of ratios (such as ROI). Profit centre planning is part of total corporate planning. Profit centres, in particular, emphasize the integration aspect of corporate planning, as plans from other application areas can be combined, extended and altered in this module. Profit centre related postings can be analyzed through the system's standard reports and facility, to create custom reports for special analyses. There is also a provision to provide profitability information to appropriate management and controlling departments.

7.3 HUMAN RESOURCES MODULE

The last two decades have seen a marked change in human resources management the process of acquiring, deploying and developing people for organizational success. Until recently the people involved in human resources work were usually called personnel managers. Their duties normally centered on staffing activities such as hiring, keeping

employee records, attending to minor medical benefits problems and organizing company teams and outings. Since then, dramatic changes have occurred in our society and in make-up of the workforce. No longer have companies afforded to look at people as a commodity to be exploited to exhaustion and then discarded. In today's organizations, employees are viewed as human resources that need to be carefully nurtured, accommodated and developed.

Human resources management is an essential factor of any successful business. The competitive environment of the next millennium, with its economic and technological challenges, will affect the HR department in the same way it will all the other areas of your enterprise. In short, HR managers must continually review and optimize their business processes. The HR modules of most ERP systems have a set of rich features and will integrate seamlessly with the other modules and are thus, invaluable aids in improving productivity.

They offer company-wide solutions for HR departments and make it possible for other departments to access specific employee data.

A human resource management system has to be adaptable to company-specific requirements, and should constantly grow with increasing HR requirements. It should cover all the functions required in business practices. It should be flexible enough to allow you to optimize your business processes by tailoring the ERP solution to suit your organization's needs. Today, many businesses cross boundaries. The system should support the organization's international needs with country specific versions of the HR components. Apart from languages, currencies and legal requirements, accounting systems often vary from country to country as well, making this a vital feature. A flexible structure enables quick and easy customization of the system to suit your requirements.

When you log on in a particular language, screens, messages and documents appear in the language you specify .You then have access to the system's complete functionality.

The different ERP systems offer many different subsystems under the HR umbrella. Listed below are some of most common subsystems. Here again, the idea is not to be comprehensive but to give you an idea about the options available. The various subsystems under the HR module are:

- Personnel Management (HR master data, personnel administration, Information Systems, recruitment, travel management, benefits administration, salary administration)
- Organizational Management (Organizational structure, Staffing schedules, Job descriptions, Planning scenarios, Personnel cost planning)
- Payroll Accounting (Gross/net accounting, History function, Dialog capability, Mu1ti-currency capability, International solutions)
- Time Management (Shift planning, Work schedules, Time recording, Absence determination)
- Personnel Development (Career and succession planning, Profile comparisons, Qualifications assessments, Additional training determination, Training and event management)

7.31 Personnel Management

Personnel management includes numerous software components, which allow you to deal with human resources tasks more quickly, accurately and efficiently. You can use these components not only as part of the company-wide ERP solution, but also as stand-alone systems.

Personnel Administration

Information is no longer owned by specific departments, but is shared by multiple entities across an organization. This eliminates duplicate entries, reduces the chance for error and improves data accuracy. The HR modules provide a global, fully integrated data structure

for the enterprise, without compromising your control over individual segments of the operations.

Employee Master Data

Human Resource module has a centralized database with integration to multiple N components for processing employee information. The system provides tools to save; time and help you tailor the system to fit your needs. The HR module contains features for storing any desired infom1ation about your employees. Most systems have the facility to scan the original documents for optical storage. The HR Information System displays graphical information such as organization charts or employee data. The system can produce charts and reports-both standard and customer-defined.

Recruitment Management

This function helps in hiring the right people with the right skills. Reducing the cost of recruiting and hiring new employees is a challenge for the HR professional, who is responsible for placing people in the right job, at the right time, and with the right skills and education. These requirements are fulfilled only through effective automation of the entire recruitment process. The recruitment component is designed to help meet every facet of this challenge. This component includes processes for managing open positions / requisitions, applicant screening, selection and hiring, correspondence, reporting and cost analysis.

Effective management of the organization’s job openings helps the HR recruiters, managers, and also, interested candidates. The HR Recruitment component allows direct access to data stored in other components of HR including Personnel Administration, Payroll and Personnel Planning. These links eliminate duplication of data entry and improve your productivity. Some examples of shared data related to job openings include position open date, location and reporting specific, job descriptions, and skills and education requirements. This information can be used for both internal job postings and external advertisements in newspapers, magazines, colleges or recruitment firms.

You match employee and applicant qualifications with the requirements of the job to select candidates. HR Recruitment interfaces directly with word processing packages to generate standard applicant letters. In some systems there is even die facility to send e-mail messages.

Many systems provide tools to analyze costs incurred during advertising and interviewing for each open position. With the HR Recruitment component, you can efficiently and effectively manage your job openings, your applications and applicant data, costs and the hiring process. Once a selection has been made and an applicant bas been hired, the data gathered during the recruitment process becomes new hire information. Duplicate data entry is eliminated along with the possible introduction of errors if the data had been re-entered.

Travel Management This module helps you in processing the travel expenses effortlessly, in several currencies and formats. HR Travel Management allows you to process a business trip from start to finish- from the initial travel request right through to posting in Financial Accounting and Controlling. This includes any subsequent corrections and all retroactive accounting requirements. Integration with the other modules ensures correct posting, taxation and payment of trip costs. Travel data can be entered by the person traveling, or by a secretary or by the relevant department, either before or after the trip. The entry of a travel request automatically generates a workflow that makes the administrator's work much easier. Business, employee, and country specific trip provisions can be implemented via system settings. Travel management automatically calculates the tax. It also automatically process credit card transactions for a particular trip. The receipts can be entered in any currency and include supplementary receipt information. An optical archive is available for the long term archiving of travel receipts. Travel costs can be divided into different levels (employee, trip destination and receipt). Expenses can be posted to numerous account assignment objects, fro example, cost centre, order, project or cost object. You reimburse costs incurred during a trip through

payroll accounting accounts payable accounting, or by data medium exchange. In addition, Travel Management provides multiple report formats. You can enter receipts in any currency and then print reports in your native currency. Travel Expense Accounting provides you with self explanatory forms, statements and an electronic approval process to improve communications and reduce unnecessary calls to the HR department.

Benefits Administration.

This system brings flexibility and power to your benefits-program. As organizations continue to grow, as laws change and employee requirements expand, you need a flexible system to satisfy all your requirements. The Benefits Administration component provides you with the capabilities and flexibility to effectively, manage benefits programs for diverse employee populations. Benefits Administration uses a hierarchical structure that gives you the ability and flexibility to add new programs at any time. This system can maintain an unlimited number of benefits types and individual plans that are offered to the employees. With Benefits Administration you cap establish benefits groups based on specific employee demographics. A company needs options for enrolling employees in benefits programs. This module furnishes you with real- time processing, allowing you to prepare employee specific enrollment forms and using any employee data. Using the Benefits Administration component, you can define eligibility groups and rules based on a wide range of factors. You can determine the variables, rules and cost formulas for each benefits plan. You can design the types of benefits plans that best fit your employee demographics. You determine the options to offer employees and the. Benefits Administration component provides the framework to administer them efficiently. The costs associated with each benefits plan option are automatically calculated to ensure consistent and accurate reports.

With the Benefits Administration feature, you can maintain an unlimited amount of savings plans for your employees to consider. The Benefits Administration component gives you the capability to maintain both deferred and non-deferred options, as well as

employer-matched and unmatched contributions. The component tracks employee changes and investment histories.

These systems have powerful querying and reporting features that can provide you with standard reports, to assist you in administering your programs and help you respond to requests quickly, accurately and confidently. The employees can also have direct access to their individual benefits information, eliminating many time consuming questions that the HR staff would otherwise have addressed every day.

Salary Administration

This function helps you in simplifying the process of rewarding your employees. Administration of salaries is an ongoing process within your human resources department. It is particularly important during the review process, when your goal is to justly reward good performance. The Salary Administration module assists you in the salary review process by taking into account standard salary changes within the company, as well as individual compensation exceptions.

7.32 Organizational Management

This module will assist you in maintaining an accurate picture of your organization's structure, no matter how fast it changes. In many cases, graphical environments make it easy to review any moves, additions, or changes in employee positions. You can also create multiple simulations for the organization, as you explore your options for making adjustments in personnel. Planning features designed to assist you include graphical organization charts; staffing schedules by head count, percentage and working hours; job and work centre descriptions and job tasks and descriptions.

Personnel costing is a strategic success factor for every company. Accurately forecasting personnel costs provides your management team with a more complete cost picture to assist them in making informed decisions. The Personnel Cost Planning functions enable you to perform cost comparisons between target and actual personnel costs and create

cost previews. You can forecast wages, salaries and other cost elements for open and filled positions, based on simulated, planned, or actual payroll figures.

7.33 Payroll Accounting

The Payroll Accounting system can fulfill the payroll requirements and provide you with the flexibility to respond to your changing needs. Payroll Accounting should address payroll functions from a global point-of-view. You should be able to centralize your payroll processing, or decentralize the data based on country or legal entities. Most Payroll Accounting systems give you the options and capabilities to establish business rules without modifying the existing payroll. Many systems have the features to remind you when transactions are due for processing. When the process is completed, a built-in audit trail date stamps the record for future reference. The system automatically creates a history record for every payroll transaction. With Payroll Accounting, you have the ability to tailor the system to your organization's requirements. When policy or legislative changes occur, you can adapt the system. The system maintains information on employees in a master file shared with all other modules. Whether your business operates solely in one country or has expanded to international locations, most ERP vendors have incorporated features that will satisfy your requirements. With country specific versions of Payroll Accounting, you can fulfill language, currency and regulatory requirements.

7.34 Time Management

This module assists you in simplifying the administration and evaluation of time data. Time Management is a powerful tool that helps you administer and evaluate data related to the time your employees spend working. This component can simplify your efforts irrespective of whether the organization uses centralized or decentralised data to determine employee working hours. Time Management manages work schedules efficiently and effectively by automating schedule generation and allowing flexible definition of time models and schedules per location and organization level. With Time Management, you can set flexible working hours and process work notices as times are

recorded. Individual and group piecework calculation for employee incentive wages is also available though the incentive wages feature. The Time Evaluation component allows daily processing of employee time data. It is a flexible tool designed to handle complicated evaluation rules to fulfill regulatory requirements and determine overtime and other time-related data. The Time Evaluation component stores your organizations' business rules and automatically validates hours worked and wage types. The results of time evaluation can be shown on a time sheet that provides a detailed overview of daily balances and time wage types. Most packages provide a review feature that will provide all necessary information and tools to review and maintain employee time data.

Shift Planning

Shift planning module helps you to plan your workforce requirements quickly and accurately. You are able to arrange a target plan that can be drafted for any given period. You can plan your shifts according to your requirements, taking into consideration all criteria, including absences due to leave or sickness, and employee requests for time off. Shift planning keeps you informed at all times of any staff excess or deficit; a convenient planning board is provided to guide you when entering and copying shifts for any designated period of time. Furthermore, you can check the plans at any time against rules governing employees' working time, for example, to detect non- compliance with relevant legislation. At all times data relating to your employees is centrally administered. This means that not just the planned working time but also short term changes to your shift plan brought about by, for example, sickness or over-time are relayed directly to the Time Management component. Another advantage of Shift Planning is that it enables you to temporarily assign an employee or employees to another organizational unit where they are needed, allowing for a temporary change of cost centre.

7.35 Personnel Development

This function helps in selecting the best people and enhancing careers more effectively. The system provides advanced tools to automate the labour-intensive process of matching internal job requirements to qualified candidates. You can profile predefined tasks and

prerequisites of each position in your organization. Additionally, you can profile the qualifications of employees and external candidates under consideration for each position. A comparison of the qualifications and profiles assists you in selecting individuals for further consideration. Effective personnel development planning ensures that the goals of the organization and the goals of the employee are in harmony. The benefits of such planning include improvements in employee performance, employee potential staff quality, working climate and employee morale. A good system should provide organizations with a method of modeling suitable career opportunities for employees within the company. Also, there should be features to determine the areas in which employees need further training. Once this is established, you can then draw up individual plans for further education.

Training and Event Management

Every successful organization should plan the training and events, faster than ever before. A good HR system will have features to assist you with planning, managing and analyzing your scheduled seminars, training courses and business events. Detailed information for each of the events is maintained to facilitate production of event catalogs and schedules. There should be tools to maintain information the internal or external, organizers of each event, as well as details such as prerequisites, objectives, content, time schedule, prices, capacity, locations, attendee billing information and budgets. Resources such as instructors, rooms, equipment and course materials can be automatically suggested, saving you a great deal of data entry time. On completion of a training course, appraisal forms can be automatically issued. Appraisals can be carried out for instructors, attendees, business events and training courses. There will be features for providing the training coordinator with reports on even data, ranging from catering requirements to registrant qualifications for each business event. The reporting feature provides measurements of education and training performance.

7.4 SUMMARY

Main function of organization is planning and coordination of organizational resources such as land, labour & capital. All these resources become productive if ERP system helps the management in planning process.

In today's business enterprise, final decisions are based on today's data, therefore, financial module is needed to provide financial functionality in business. As we know, finance decisions are most important for organization, various financial modules such as financial accounting, investment management, treasury management and controlling, are needed to provide a control over financial information which is essential for strategic decision making.

No organization can function without manpower, therefore different ERP systems offer many different sub modules such as personnel management, organizational management, payroll, accounting, time-management, personnel development under HR umbrella, in dynamic environment which streamlines the HR operations and contributes to organizational development.

7.5 KEYWORDS

GL: General Ledger, it serves as a central pool of financial data for financial reporting as well as for other accounting areas.

Asset Accounting: It serves as a sub-ledger to the General Ledger, providing detailed information on asset-related transactions.

Legal Consolidation: This sub-system is closely linked to the Financial Accounting system, permitting direct data transfer, from individual statements into the consolidated report.

Investment Management: Investment management provides extensive support for investment processes right from planning through settlement.

Treasury Management: It provides a base for effective liquidity, portfolio and risk management.

Cash Management: It allows to analyze financial transactions for a given period. Cash Management also identifies, and records future developments for the purposes of financial budgeting.

Funds Management: Funds management subsystem supports your funds management process from budgeting all the way through to payments, including monitoring expenditures, activities, resources and revenues.

Executive Information System: The executive information system provides an overview of the critical information necessary to manage the organization.

7.6 SELF ASSESSMENT QUESTIONS

1. What are different sub modules available in:
   a) Finance Module
   b) Human Resources Module
   Explain in Detail.

7.7 SUGGESTED READINGS

- Daniel Amor, “The E-business @evolution : Living and working in an international world”, Pearson Education, New Delhi
- Deborach L. Bayles, “E-commerce logistics & Fulfillment”, Pearson Education, New Delhi
- Willium J. Buffam, “E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities”, Pearson Education, New Delhi
- Marcia Robinson, “E-Business : Roadmap for Success”, Pearson Education, New Delhi
- Kenneth C. Landon, “E-commerce :Business, Technology, Society”, Pearson Education, New Delhi
- Samantha Shurety, “E-Business with Net. Commerce”, Pearson Education Asia, New Delhi
- Napier, “Creating a winning E-Business”, Vikas Publishing House, New Delhi
- Whitely David, “Electronic Commerce”, TMH N. Delhi

- "E-business", magazine (Janurary & September 2004 issues) ICFAI press
- Rayport, Jefforey, "Introduction to e-commerce", Mc-Graw Hill
- Leon Alexis, "Enterprise Resource Planning", TMH
- Parag Diwan, "Enterprise Resource Planning", Pentagon Press

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LESSON: 8

ERP BUSINESS MODULE-II

Author: Kiran Khatter **Vetter: Dr B S Bodla**

STRUCTURE

8.0 Objectives
8.1 Introduction
8.2 Sales & Distribution Module
8.3 Logistic Management Module
- 8.31 Production Management
- 8.32 Plant Maintenance
- 8.33 Quality Management
- 8.34 Material Management

8.4 Summary
8.5 Keywords
8.6 Self Assessment Questions
8.7 Suggested Readings

8.0 OBJECTIVES

After going through this lesson, you will be able to:

- Describe various functional modules of ERP packages.
- Have an insight about subsystems or sub modules of Finance of Sales & Logistic Distribution and Logistic Management modules.
- Analyze how these modules functions together.

8.1 INTRODUCTION

In today's global business environment, the one thing companies can count on is rapid change-and the new opportunities and challenges that the change is sure to bring. New competition pushes businesses to achieve higher levels of service, while evolving technology compresses product life cycles and forces companies to adopt new technologies or risk losing market share. In this ever-changing environment, having a competitive edge means being able to anticipate and respond quickly to changing business conditions. To keep pace with these rapid changes, companies need an integrated and flexible enterprise system that supports all aspects of their business with state-of-the art functionality. This innovative solution should upgrade effortlessly and interface easily with third-party applications, as well as have the ability to incorporate existing system while extending its reach to the Internet and ecommerce.

With today's business environment characterized by growing competition, shrinking cycle times and the accelerating pace of technological innovation, companies are increasingly being forced to streamline business processes. In a world in which it is no .longer enough to simply have the best product, these companies are focusing on core competencies and closer partnerships over the whole supply chain. Here, increased efficiency in sales and distribution is a key factor to ensure that companies retain a competitive edge and improve both profit margins and customer service. In helping business to 'beat them on delivery', the sales and distribution modules of many ERP vendors offer a comprehensive set of best-of-breed components for both order and logistics management. Many of these systems are tightly integrated with the Distribution Requirements Planning (DRP) engine of the 'for just-in-time' deliveries. This integration enables the mapping and supply of single-site of multi-site organizations and the definition of relationships in a company's internal supply chains. Developing precise logistics planning for just-in-time deliveries, this system can also generate replenishment orders by using defined warehouse requirements.

The following are the sales related business transactions:

- Sales queries, such as inquiries and quotations

- Sales orders
- Outline agreements, such as contracts and scheduling agreements
- Delivery/Shipment
- Invoicing/Billing
- After sales support

During sales order processing, the following basic functions are carried out:

- Inquiry handling
- Quotation preparation and processing
- Contracts and contract management (order management)
- Monitoring the sales transactions
- Checking for availability
- Transferring requirements to materials planning (MRP)
- Scheduling the delivery
- Calculating pricing and taxes
- Checking credit limits
- Invoicing /Billing
- Creating printer or electronically transmitted documents (confirmations, and so on)

Depending on how your particular system is configured, these functions may be completely automated or may also require some manual processing. The data that results from these basic functions (for example: shipping dates, Confirmed quantities, prices and discounts) is stored in the system where it can be displayed and, m some cases, changed manually during subsequent processing. The sales and distribution module very, actively interacts with the Material Management and Financial Accounting modules for delivery and billing.

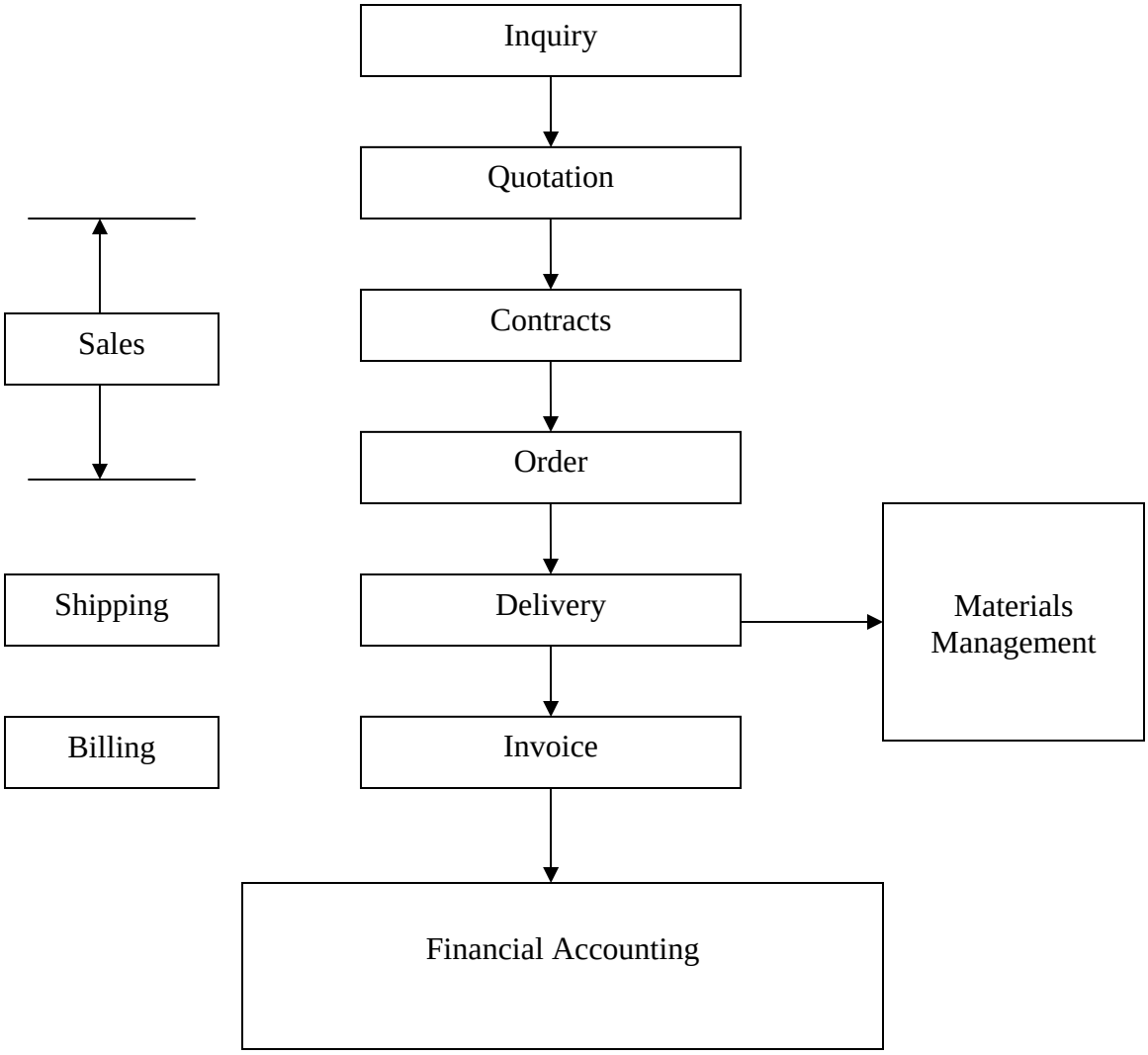

Figure 8.1: Sales and Distribution Module

Figure 8.1 shows sales and distribution and its associated processes. Typically, a Sales and Distribution module will contain the following subsystems:

- Master Data Management
- Order Management
- Warehouse Management
- Shipping
- Billing

- Pricing
- Sales Support
- Transportation
- Foreign Trade

➢ **Master Data Management**

Every company will have products, customers, and will require raw materials and will have suppliers. The task of the Master Data management module is to keep information about all these entities, so that these can be made available to the decision - makers and also for the automatic generation of reports, contracts, invoices and so on.

In sales and distribution, products are sold or sent to business partners, or services are performed for them. Data about the products and services as well as about the business partners forms the basis for sales processing. Automatic sales processing, using an ERP system, requires that the master data has been stored in the system. In addition to sales and distribution, other departments of the company, such as accounting or materials management access the master data.

➢ **Order Management**

This module usually includes Sales Order Management and Purchase Order Management and supports the entire sales and purchase processes from-beginning to ending. Companies today are being confronted with increasingly demanding customers and complex buying and selling organizations, both internally and externally, Order Management combines the provision of efficient management solutions with the possibility of anticipating and responding quickly to changes in global business conditions.

➢ **Sales Order Management**

Applications in sales order management represent a company’s most important point of contact with the customer. These applications allow a company to manage sales

operations quickly and efficiently and provide comprehensive solutions for the management of quotes, orders, contracts, prices and customer discounts. Through the use of templates, the system streamlines, order entry procedures to manage products ranging in complexity from, standard stocked items to those that are engineered-to-order. The system can also customize and streamline order entry procedures to the specific requirements of both an individual business and its customers.

Intelligent pricing and discount strategies are accompanied by simulation capabilities to support ‘what-if scenarios and are available for multi currency environments.

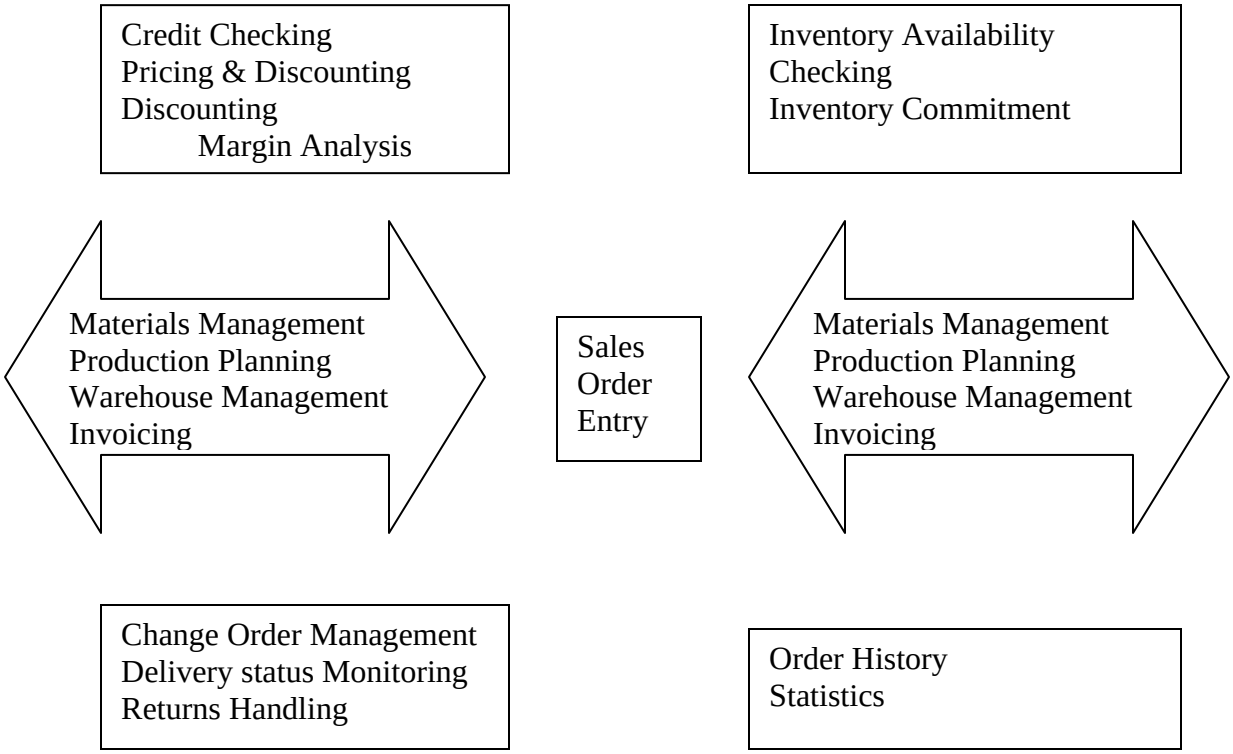

Figure 8.2: Sales Order Management

On-line Available-to-Promise calculation ensure that there is sufficient product availability for a specific customer and, If so, to Identify exactly where and when that product is available. Built-in contract and release management system evaluates whether or not customer contract agreements are being met with and incorporates multilevel

customer credit reviews and substantial order blocking functionality. Evaluation of sales performance is possible through extensive report capabilities that retrieve both current past information that concern orders, cancellations, budgets arid revenues. Rebate d commission control enables the automatic calculation of employee and supplier commissions to reward achieved targets based on predefined agreements and customer bonuses, or rebates to reward customers for purchasing certain quantities. Electronic Data Interchange (EDI) streamlines communication throughout a company's entire supply-chain, from customer to supplier. The system should support standard business documents such as orders and invoices, along with general information such as project information and product specifications.

A good system will have tools and features for Sales Force Automation (SFA) and customer service. These tools include the tracking and tracing of appointments, schedules and follow-ups, plus product and sales feasibility information.

Purchase Order Management

Purchase order management is increasingly essential in today's ever more competitive business environment because it enables a company to make the correct purchase decisions about quality and price, where quality refers to supply lead-time as well as to the (to be purchased) product itself. Purchase order management includes online requisitioning, centralized contract management, just-in-time schedules and vendor management. Offering access to an approved supplier list, purchase order management enables a purchase quotation to be sent to multiple suppliers. The purchase contract information is made available to the people in the purchasing department. This information will help supplier in selection and provides an insight as to which suppliers can supply items with the right specifications, in the shortest period of time. The system will have facility to generate purchase contracts.

Purchase Flow Purchase requisitions allows companies to enter non-system-planned requirements for various types of items. Requisitioning can be linked to workflow for

authorization purposes and to approve suppliers. Schedules can be used, instead of orders, to provide detailed purchase and delivery .information. These schedules are generated in contracts in just-in-time environments in which customer service, in-time delivery and cost reduction are all important, and can be sent through the supply chain by means of EDI communication. In addition, schedules are fully linked with other modules of the system.

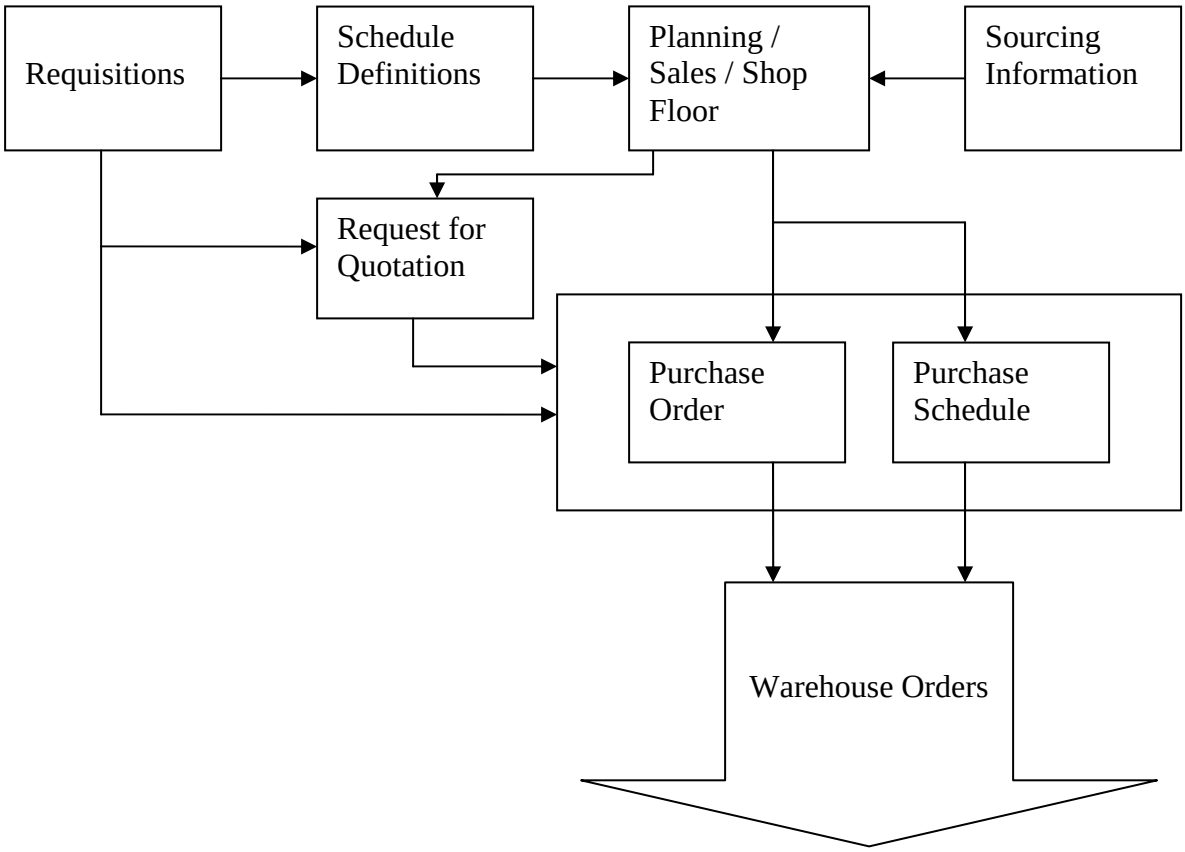

Figure 8.3: Purchase Flow

Sophisticated vendor management tools allow companies to check the reliability and performance of vendors. The vendor rating system can handle both objective and subjective criteria. Objective criteria are tracked and traced automatically by the system and can include information about receipts, quality approval, invoicing and purchase order confirmation. Subjective criteria are determined by the user. Together, these criteria

enable companies to make the right purchase decisions with regard to quality, price and delivery .Purchase Order Analysis enables historical as well as statistical data to be used to assist in the analysis of purchase activities.

- **Warehouse Management**

This module provides real-time information about inventory levels across the enterprise and tools to manage the daily operational needs of single-site or multiple- site four-wall warehouses. Coordination of an organization's warehouse network is one of today's most important business needs and requires an understanding of the relationship between the different organizational units such as warehouses, production facilities, sales offices, and purchase offices. While the mapping of a single-site or multi-site organization and the definition of relationships in the internal supply chain can be undertaken with the help of the Distribution Requirements Planning (DRP), the actual transfer of goods can be-handled through the Warehouse Management application.

The various components of a good Warehouse Management application will be designed to meet a wide range of warehousing needs, such as the mapping of internal goods flow within warehouses and the monitoring of all warehouse inventory transactions. In addition, these components are centralized for areas that include production, sales, purchase projects and service and provide companies with the tools to inform customers about where (the company's or the customer's) goods are located, the number of goods in hand, current storage conditions and projected delivery schedules. The Warehouse Management application should also offer expanded capabilities such as cross-docking, rules-based inventory replenishment, picking optimization, multi-level packaging and consigned goods management. These capabilities also allow for easy integration with financial tools to provide greater enterprise-wide insight into costs.

Components of a good Warehouse Management Application include the following:

- Inventory Planning Comprises all planned inventory movements, which enable the accurate forecasting of trends and the consequent adjustment of reordering

points, safety stock, lead times for orders and service levels. Inventory planning also allows the commitment of inventory to a specific customer order, 'hard allocation' so that customers receive the right order in the right quantity at the, right time.

- Inventory Handling Allows for monitoring of all warehouse order scenarios such as the receipt, issue and transfer of inventory .Functions include the previously mentioned expanded capabilities such as; cross-docking, receipt by back-flushing, rules-based replenishment of inventory, picking and wave picking optimization, assembly and multi-level packaging. To ensure fast communication with suppliers and customers, advanced shipping notifications can be received or sent by means of Electronic Data Interchange (EDI), which enables shipments to be received and allocated ahead of time.
- Intelligent Location Assignment Used to create intelligent storage put-away lists enables the storage of goods that are, automatically inspected for quality and the detection of dedicated locations by criteria such as item, storage conditions, packaging definitions, size restrictions and location availability.
- Inventory Reporting: This function permits full visibility of inventory at single or multiple sites and provides a company with the tools to give customers accurate delivery dates. The system's extensive reporting capabilities also enable consigned goods management.
- Inventory Analysis: This module enables the analysis of information that result from warehousing activities and the use of feedback in process optimization. In addition, inventory analysis supports inventory forecasting, inventory valuation, ABC analysis and slow-moving analysis.
- Lot Control: This facility offers lot tracking and tracing, so that a company can trace all the raw materials and finished goods that its products require. In a business world where customers demand product responsibility, lot control helps to store product quality data and meet ISO 9001 certification standards.

- Distribution Data Collection: This is an essential element in paperless warehousing that provides the communications link between storage and shipping systems and warehousing equipment like bar-coding scanners.

➢ **Shipping**

The shipping module supports the following functions:

- Monitoring dates of orders due for delivery
- Creating and processing deliveries
- Planning and monitoring work lists for shipping activities
- Monitoring material availability and processing outstanding orders .Picking (can be linked to the Warehouse Management System)
- Packing deliveries
- Information support for transportation planning
- Support for foreign trade requirements
- Printing and sending shipping output
- Data update in goods issue

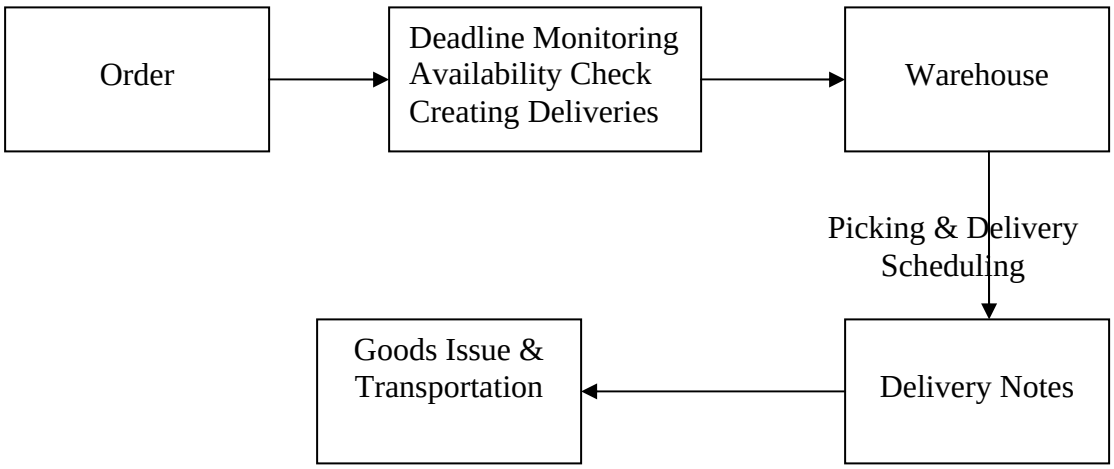

Figure 8.4: Order & Shipping

Shipping Process

The ‘Delivery note’ is the central shipping document. When a delivery is created (at the shipping point), shipping activities such as picking and delivery scheduling are initiated and monitored, and the data generated during shipping processing is recorded (see in Fig). A delivery note can be referred to a sales order or a transportation order for stock transfer. Depending on your requirements, you can create deliveries automatically using work lists or manually. You can make agreements with your customers for complete and partial deliveries and for order combinations. The monitoring functions allow monitoring created deliveries and outstanding sales activities.

- **Billing**

A business transaction is completed for Sales and Distribution once it has been billed. The ERP system supports billing functions like; issuing of invoices on the basis of goods and services, issuing of credit and debit memos based on corresponding requests and proforma invoices, canceling billing transactions, giving rebates, transferring billing data to Financial Accounting, Purchasing and so on. The billing system is integrated with the other modules like Financial Accounting, so that the documents are automatically generated.

- **Pricing**

The term pricing is used broadly to describe the calculation of prices (for external use by customers or vendors) and costs (for internal purposes, such as cost accounting). The pricing module keeps the information about the prices of the various items, the details about the quantity discounts, and the discounts to the different customer categories and so on and enables the organization to generate documents like quotations, delivery notes, invoices and so on. Also, since this information is available to all the sales people, they can make better decisions thus improving the sales performance.

- **Sales Support**

The Sales Support component helps the sales and marketing department to support the existing customers and, at the same time, to develop new business. Sales Support

provides an environment where sales personnel-both the field sales people and the staff in the sales office, can contribute to and access valuable information about customers, sales prospects, competitors and their products, and contact people. The Sales Support component functions, both as a source of information for all other areas of Sales and Distribution and as an initiating force for acquiring business.

The Sales Support function has a rich tool set that will help in creating direct mailings to develop new business as well as to consolidate the existing customer base. On the basis of the sales information already stored in the system, you can create address lists of the customers and sales prospects that you wish to target with direct mailing campaign.

- **Transportation**

Transportation is an essential element of the logistics chain. It effects both inward and outward movement of goods. Effective transportation planning is required to ensure that shipments are dispatched without delay and that they arrive on schedule. Transportation costs playa considerable role in determining the price of a product. It is important that these transportation costs are kept to a minimum, in order to keep the price of a product competitive. Efficient planning and processing of transportation contributes to keeping these costs down. The aim of the transportation element of the SD System is to provide basic functions for transportation, like, transportation planning and processing, freight calculation, freight settlement, customer freight calculation, customer freight invoicing as well as functions for service agent selection.

The transportation functionality fulfills the requirements in the areas of transportation planning and processing, for both inbound and outbound shipments. One can control and monitor the entire transportation process from the planning stage right through to the dispatch of the goods from the shipping point (outbound shipment) or the vendor location (inbound shipment) and their arrival at the customer location (outbound shipment) or the plant (inbound shipment).

- **Foreign Trade**

In domestic, and increasingly, in international trade, you are required by the authorities to adhere strictly to the laws and regulations. The growing tendency towards the formation of trade areas is a further challenge to a company operating on a worldwide basis. The entire logistics chain, from the import of raw materials, finished and unfinished goods, to the sale of goods and the transfer of data to materials management and financial accounts, is significantly influenced by foreign trade activities. These main tasks in foreign trade processing can be carried out using the foreign trade system.

8.31 Production Management

A good manufacturing system should provide for multi-mode Manufacturing applications that encompass full integration of resource management. These manufacturing applications should allow an easier exchange of information throughout the entire global enterprise, or at a single site within a company. Regardless of how big or small an enterprise is, these applications should provide a wealth of feature/function, broad scope of coverage, operational stability and a platform-independent architecture. These capabilities empower an enterprise to achieve productivity gains, adopt forward- thinking technologies and implement process reengineering. As a company's internal processes become more sophisticated or as market forces change, these solutions should be capable of meeting the challenge. The manufacturing system should be integrated with the other modules of the package.

A robust system of manufacturing planning business process and execution must satisfy a variety of business practices and production methods. These business practices and production methods place stringent demands on the manufacturer. Regardless of how manufacturers view their internal operations, to the customer, it boils down to quick response to customer demand in two fundamental ways; Manufacturers either make products to stock prior to receipt of a customer order, or they make and ship the products upon receipt of a customer order. Manufacturers must accomplish this task quickly,

efficiently and cost effectively to remain profitable and competitive. These two fundamental ways of responding to customer demand are as shown in Fig. 8.5

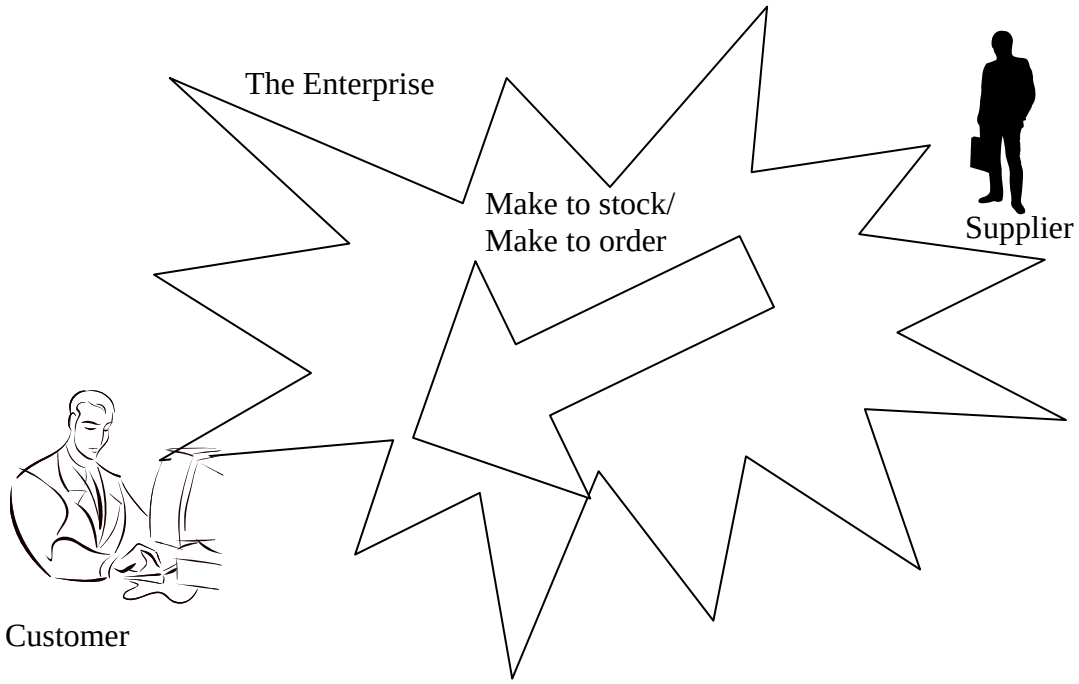

Figure 8.5: Manufacturing process

[From raw materials (supplier) to finished goods (customer)]

Today, companies must be able to deliver customer-specific products with the le time of standard, off-the-shelf products. To help manage product and market shifts, manufacturing module provides the freedom to change manufacturing and plan methods, as and when they need a change. The Manufacturing modules of most ERP vendors, do not limit businesses to a single manufacturing method, such as make-to-stock or make-to-order (Figure given below). Instead, many manufacturing and planning methods can be combined within the same operation, with unlimited flexibility to choose the best method or combination of methods for each product, at each stage throughout its life cycle.

In addition, this control and visibility comes without having to sacrifice the functionality needed to efficiently manage different types of production. These systems support the entire range of production strategies; only one system is needed to manage all

manufacturing activities. Engineer-to-order products can be planned using the system, while the system's forecasting and distribution planning features handle make-to-stock items. Products that are assembled-to-order can be planned using advanced features available in the Manufacturing module. All demands can be aggregated into user-definable plans at a detail or summary level. Enterprise requirements then flow into consolidated production schedules and material and capacity plans, and all production activity can be scheduled and tracked through shop floor control systems.

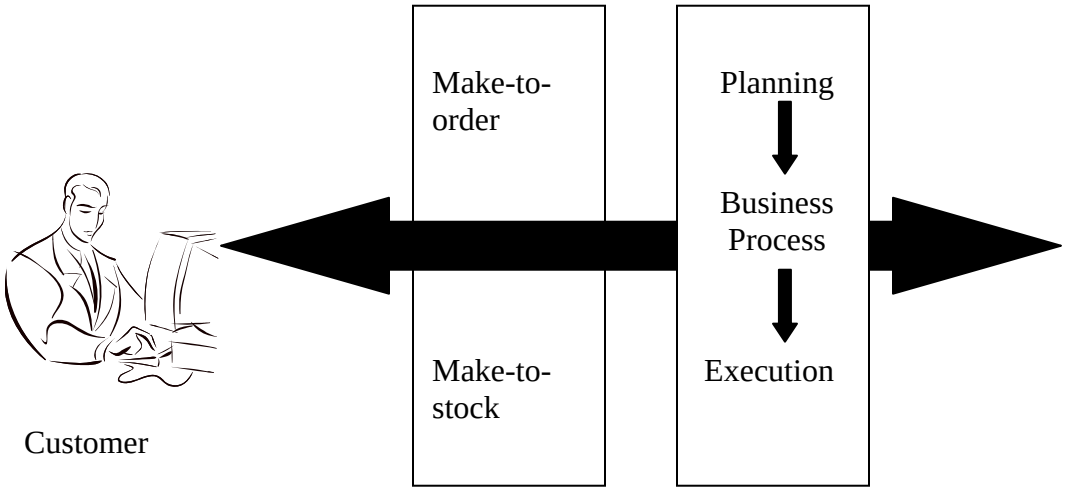

Figure 8.6: Make-to-order & Make-to-stock

The manufacturing module should enable an enterprise to marry technology with business process to create an integrated solution. It must provide the information base upon which the entire operation should be run. It should contain the necessary business rules to manage the entire supply chain process, whether within a facility, between facilities, or across the entire supply chain. Control and execution can be performed at strategic, tactical and operational levels within the business. These require effective planning to support contract commitments throughout the supply chain, control .over intermediate range planning horizons and time fences, and execution over the short range of frozen scheduling required by the shop floor. Whether a single-site implementation, several sites within one country, or hundreds covering the globe, the manufacturing

system should provide the foundation for creating concurrent business processes across the supply chain and achieving Return on Assets (ROA) improvement.

HOW DOES MANUFACTURING RESPOND TO THE CUSTOMER?

Manufacturers must respond quickly and effectively to customer demands. While agility is desirable, agility without an effective enterprise manufacturing system results in speed without purpose. The very heart of an enterprise manufacturing system centres on its integrated planning, business process and execution capabilities. Traditional, Closed Loop MRP concepts have long heralded the importance of effective planning, business process understanding, and timely execution. Strategically, effective-planning results in improved inventory turns, increased productivity and improved return on assets. Tactically, effective business processes provide improved customer satisfaction, reduced time to market and improved market share. Effective execution provides short cycle time, quality assurance, continuous improvement and quick response to process variability. All three elements contribute to a management's decision to install an enterprise-wide manufacturing management system. Some of the major subsystems of the Manufacturing module are:

- Material and Capacity Planning
- Shop floor control
- Quality Management
- JIT/ Repetitive Manufacturing
- Cost Management
- Engineering Data Management
- Engineering Change Control
- Configuration Management
- Serialization
- Lot Control
- Tool

8.32 Plant Maintenance

The achievement of world class performance demands, delivery of quality products expeditiously and economically. Organizations simply cannot achieve excellence with unreliable equipment. The attitude towards maintenance management has changed as a result of quick response manufacturing, Just-in-Time reduction of work in process inventory and the elimination of wasteful manufacturing practices. Machine breakdown and idle time for repair was once an accepted practice. Times have changed. Today when a machine breaks down, it can shutdown the production line and, the customer's entire plant. The Preventive Maintenance module provides an integrated solution for supporting the operational needs of an enterprise-wide system. The Plant Maintenance module includes an entire family of products covering an aspect of plant / equipment maintenance and becomes integral to-the achievement of process improvement. The major subsystems of a Plant Maintenance module are:

- Preventive Maintenance Control
- Equipment Tracking
- Component Tracking
- Plant Maintenance Calibration Tracking
- Plant Maintenance Warranty Claims Tracking

- **Preventive Maintenance Control**

Preventive Maintenance Control provides planning, scheduling and control of facilities and equipment. Equipment lubrication, component replacement and safety inspection can be planned scheduled, and monitored. Maintenance tasks can be tracked for each machine, or piece of equipment, by two user-defined modes, as well as calendar day frequency. These modes could include tracking by hours of operation, units of production produced, gallons of fuel consumed, or the number of days in operation since the .last service interval. Preventive Maintenance Control enables organizations to lower repair costs by avoiding downtime, machine breakage and process variability. Companies

achieve higher machine utilization and improved machine reliability and tolerance control, along with higher production yields.

- **Equipment Tracking**

Equipment is an asset that needs to be monitored and protected. In many situations, .equipment maintenance costs constitute the single largest controllable expenditure of an organization. All facets of plant location history and utilization history are described and tracked. This history includes acquisition and disposition information and associations between different pieces of equipment to pinpoint operational dependencies. Running totals for operation units to date (miles, hours, days, units of production, etc.) are also provided. Each piece of equipment is defined by a model and serial number. User-defined data sheets can be developed, which allow for the grouping of user data into formats that can be linked to equipment records. All of this information can be used to create equipment specifications, which provide detailed information for technical specialists working in equipment operations, maintenance and transportation control.

- **Component Tracking**

Components are, typically, subsets of larger equipment and deserve the same amount of cost controlling scrutiny. Component tracking enables equipment managers to identify components with chronic repair problems. They can determine whether a repair or replacement should be covered by warranty .Planning component replacements, rather than waiting for component failures to occur, reduces unscheduled equipment downtime. Component tracking includes repair/exchange history and component service life.

- **Plant Maintenance Calibration Tracking**

Plant Maintenance Calibration Tracking allows organizations to leverage their investment in the Plant Maintenance module by providing for the tracking of equipment calibration in support of ISO 19000 requirements.

Plant Maintenance Warranty Claims Tracking is an administrative system designed to provide control of all items covered by manufacturer and vendor warranties. It enables plant management to recover all of the warranty; reimbursements to which they are entitled but have not been able to recover in the past. Features include the ability to establish the type and length of warranty, for example, elapsed day, months, mileage stipulation, or operating units. A complete history .is performed for each item covered by the warranty, and complete information regarding the warranty service provider is generated.

8.33 Quality Management

The ISO 9000 series of standards defines the functions of quality management and the elements of a quality management system. The functions in the Quality Management module support the essential elements of such a system. The other integrated modules in the system complement this functionality .The ISO standards require that quality management systems penetrate all processes within an organization. The task priorities, according to the quality loop, shift from production (implementation phase) to production planning and product development (planning phase), to procurement, and sales and distribution, as well as into the entire usage phase. In the area of production, quality assurance is no longer viewed in terms of inspection and the elimination of defects alone. Instead, the production process itself becomes the focus of attention.

- **CAQ and CIQ**

Just as the requirements for quality management systems have changed as a result of the ISO 9000 standards, the term Computer-Aided Quality Management (CAQ) must also be redefined. Computer- Integrated Quality Management (CIQ) is a more appropriate (term because an isolated CAQ system cannot carry out the comprehensive tasks of quality management system. The ERP system takes this into consideration by integrating the quality management functions into the affected applications themselves for example procurement, warehouse management, production and sales/distribution, instead of delegating those to isolated CAQ systems. As a result of this approach, the processes

described in the quality manual can be implemented and automated in the electronic data processing (EDP) system.

The representation of the elements of a quality management system within the ERP system is not only the responsibility of the Quality Management module. Instead the ERP system must be considered as a whole, in which all integrated modules contribute their part. Within the framework of the system, for example, the Human Resources module handles personnel-related matters, the Controlling module handle the management of quality related costs and the Plant Maintenance module handles the monitoring of test equipment. As a part of the Logistics application, the Quality Management module handles the traditional tasks of quality planning, quality inspection and quality control. For example, it supports quality management in 'procurement, product verification, quality documentation and in the processing of problems. The Quality Management module's internal functions do not directly interact with the data or processes of other modules.

- **Quality Management Module-Functions**

The Quality Management module fulfills the following functions:

Quality Planning: Management of basic data for quality planning and inspection planning, Material specifications, Inspection planning.

Quality Inspection: Trigger inspections, Inspection processing with inspection plan, selection and sample calculation, Print shop papers for sampling and inspection, Record results and defects, Make the usage decision and trigger follow-up actions.

Quality Control: Dynamic sample determination on the basis of the quality level history, Application of statistical process control techniques using quality control charts, Quality scores for inspection lots, Quality notifications for processing internal or external problems and initiating corrective action to correct the problems, Inspection lot

processing and problem processing, Quality Management Information System for inspections and inspection results and quality notifications.

- **Computer Integrated Quality Management (CIQ)**

The integration of Quality Management in the ERP systems provides considerable advantages, because only an integrated system can support all the elements of a quality management system, according to ISO 9000. The integration allows the quality management functions to influence all processes within a company, thereby affecting all phases of a product's life cycle.

The Quality Management module uses the system's integration to link the tasks of quality management with those of the other applications, such as materials management, production, sales/distribution and cost accounting. An inspection that is triggered automatically upon goods receipt is an example of this. The Quality Management module is integrated with the master data and processes of the following applications:

- Materials management (purchasing, inventory management, warehouse management, material requirements planning)
- Production (work scheduling, shop floor control) .Sales and distribution (delivery , creation of quality certificates)

8.34 Materials Management

The Materials Management module optimizes all purchasing processes with workflow-driven processing functions, enables automated supplier evaluation, lowers procurement and warehousing costs with accurate inventory and warehouse management and integrates invoice verification. The main modules of the Materials Management module are:

- Pre-purchasing Activities
- Purchasing

- Vendor Evaluation
- Inventory Management

Invoice Verification

- **Pre-purchasing Activities**

This system supports the complete cycle of bid invitation, award of contract and acceptance of services. The Pre-purchasing activities includes maintaining a service master database, in which the descriptions of all services that are to be procured can be

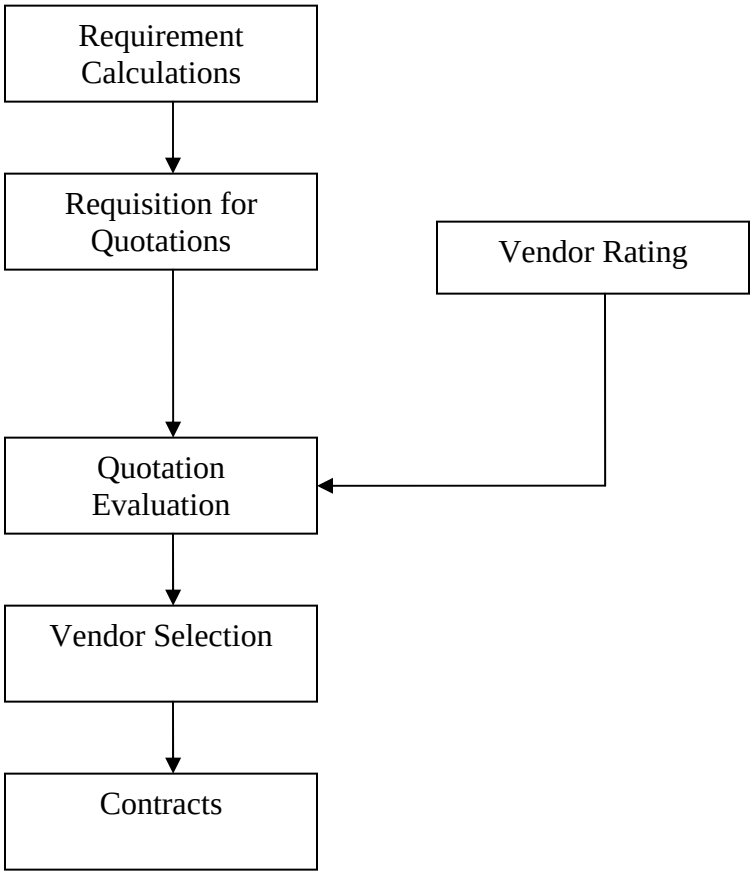

Figure 8.7: The Pre-Purchasing activities module

- **Purchasing**

Purchasing is a very important component of the Materials Management module. The Materials Management module is fully integrated with other modules in the system. It supports all phases of materials management: materials planning and control, purchasing, goods receiving, inventory management and invoice verification. Good communication between all participants in the procurement process is necessary for purchasing to function smoothly. Purchasing communicates with other modules in the system to ensure a constant flow of information. For example, it works side by side with the following modules:

Cost Accounting: System Orders for materials and services consumed directly illustrate the interface to the cost accounting system. This is because they can be assigned to a cost centre directly.

Financial Accounting: Purchasing and Accounting both maintain information on vendors. Information on each vendor is stored in a vendor master record, which contains both accounting and purchasing information. The vendor master record represents the vendor account in financial accounting. Through Purchase Order account assignment, Purchasing can also specify which GJL accounts are to be charged in the financial accounting system.

Sales and Distribution: Within the framework of material requirements planning (MRP), customer requirements from Sales can be passed on to Purchasing. In addition, when creating a requisition, you can assign it to a sales order. Purchasing system performs tasks like procurement of materials and services, determination of possible sources of supply for a requirement identified by the materials planning and control system or arising directly within a user department, monitoring of deliveries and payments to vendors, and so on.

Vendor Evaluation

The vendor evaluation component has been completely integrated into the Materials Management module. Information such as delivery dates, prices and quantities can be taken from purchase orders. Vendor Evaluation also uses data from Quality Management, such as the results of incoming inspections or quality audits. It also accesses basic data in Materials Management, such as goods receipt data from Inventory Management.

The Vendor Evaluation System supports the optimization of the procurement processes in the case of both materials and services. In the case of procurement of materials, the system helps you select sources of supply and facilitates the continual monitoring of existing supply relationships. It provides you with .accurate information on prices, and terms of payment and delivery .By evaluating vendors, you can improve your enterprise's competitiveness. You can quickly determine an- resolve any procurement problems that may arise on the basis of detailed information and in collaboration with the relevant vendors. In the case of procurement of services, you can check the reliability of the vendors from which you procure services on a plant by plant basis. You can determine whether the vendors perform the services within the specified time frames and appraise the quality of the work carried out.

- **Inventory Management**

Inventory Management system allows you to manage your stocks on a quantity and value basis, plan, enter and check any goods movements and carry out physical inventory. In the Inventory Management system, the physical stocks reflect all transactions resulting in a change in stock and thus, in updated inventory levels'. The user can easily obtain an overview of the current stocks of any given material. For each material, not only are the stocks in the warehouse shown, but also the stocks ordered but not yet delivered, reserved for production or for a customer, and the stocks in quality inspection can be monitored. If a further subdivision by lots is required for a material, one batch per lot is possible. These batches are then managed individually in the stock. Special stocks from the vendor or from the customer (for example, consignment stocks) are managed separately from the company's own stock.

- **Invoice Verification and Material Inspection**

The Invoice Verification component is part of the Materials Management system. It provides the link between the Materials Management component and the Financial Accounting, Controlling and Asset Accounting components. Invoice Verification in Materials Management serves the following purposes:

- It completes the materials procurement process-which starts with the purchase requisition, continues with purchasing and goods receipt and ends with the invoice receipt
- It allows invoices that do not originate in materials procurement (for example, services, expenses, course costs, etc.) to be processed
- It allows credit memos to be processed, either as invoice cancellations or discounts

Invoice verification does not handle the payment or the analysis of invoices. The information required for these processes is passed on to other departments.

8.4 SUMMARY

In today's business environment there is hardly any difference between the products provided by different companies, but a company can have a competitive advantage by providing value added services along-with products. Therefore Sales and Distribution factor can retain a competitive advantage and improve both profit margins and customer services.

Since all business firms are involved in some type of production, the key concept in operations management is transformation, conversion of input into output. Main aim of company is to deliver customer specific products with the lead time of standard, off the shelf-products. To help manage products and market shift, Production Module provide

the freedom to change manufacturing and planning methods, as and when they need change.

The Plant Maintenance module provides and integrated solution for supporting the operational needs of an enterprise wide system. It includes entire family of products, covering all aspects of plants/equipments maintenance and becomes integral tool to the achievement of process improved.

The Materials Management module optimizes all purchasing processes with workflow-driven processing functions, enables automated supplier evaluation, lowers procurement and warehousing costs with accurate inventory and warehouse management and integrates invoice verification.

The Quality Management module supports the exchange of data with other applications in order to prevent related data from being recorded and stored redundantly. For example, the information provided by a goods receipt posting relating to the material, vendor and lot size is automatically transferred to the inspection lot data record when an inspection is triggered.

8.5 KEYWORDS

Master Data Management: The task of the Master Data management module is to keep information about all those entities, so that those can be made available to the decision - makers and also for the automatic generation of reports, contracts, invoices and so on.

Order Management: It combines the provision of efficient management solutions with the possibility of anticipating and responding quickly to changes in global business conditions.

Sales Order Management: It represents a company’s most important point of contact with the customer.

Purchase Order Management: It enables a company to make the correct purchase decisions about quality and price, where quality refers to supply lead-time as well as to the (to be purchased) product itself.

Warehouse Management: This module provides real-time information about inventory levels across the enterprise and tools to manage the daily operational needs of single-site or multiple- site four-wall warehouses.

Preventive Maintenance Control: It **provides** planning, scheduling and control of facilities and equipment.

Component Tracking: Component tracking enables equipment managers to identify components with chronic repair problems.

Plant Maintenance Calibration Tracking: It allows organizations to leverage their investment in the Plant Maintenance module by providing for the tracking of equipment calibration in support of ISO 19000 requirements.

Computer Integrated Quality Management (CIQ): It allows the quality management functions to influence all processes within a company, thereby affecting all phases of a product's life cycle.

Materials Management: This module optimizes all purchasing processes with workflow-driven processing functions, enables automated supplier evaluation, lowers procurement and warehousing costs with accurate inventory and warehouse management and integrates invoice verification.

Inventory Management: It allows in managing stocks on a quantity and value basis, planning, entering and checking any goods movements and carrying out physical inventory.

8.6 SELF ASSESSMENT QUESTIONS

1. How Sales and Distribution Module can become a competitive advantage of a firm.
2. Explain the subsystems of Sales and Distribution Modules.
3. What are the main functions of Production Module?

4. How does the Plant Maintenance and Material Management Module help in achieving competitiveness?
5. How Quality Management Module plays an important part in an organization?

8.7 SUGGESTED READINGS

- Daniel Amor, “The E-business @evolution : Living and working in an international world”, Pearson Education, New Delhi
- Willium J. Buffam, “E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities”, Pearson Education, New Delhi
- Marcia Robinson, “E-Business : Roadmap for Success”, Pearson Education, New Delhi
- Samantha Shurety, “E-Business with Net. Commerce”, Pearson Education Asia, New Delhi
- Napier, “Creating a winning E-Business”, Vikas Publishing House, New Delhi
- “E-business”, magazine (January & September 2004 issues) ICFAI press
- Leon Alexis, “Enterprise Resource Planning”, TMH
- Parag Diwan, “Enterprise Resource Planning”, Pentagon Press

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Lesson: 9

ERP & INTERNET

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STRUCTURE

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9.0 OBJECTIVES

After going through this lesson, you will be able to:

- Get familiar with Internet, Intranet and Extranet concepts.
- Describe relationship of intranet with supply Chain Management, Customer Asset Management, Manufacturing Management & Corporate Finance Management

- Define about Extranet
- Explore the relevance of ERP with Internet

9.1 INTRODUCTION

Internet is the world's largest computer network, the network of networks, scattered allover the world. It was created nearly 25 years ago as a project for the U.S. Department of Defense. Its goal was to create a method for widely separated computers to transfer data efficiently even in the event of a nuclear attack. From a handful of computers and users in the 1960s, today the Internet has grown to thousands of regional networks that can connect millions of users. With the popularity of the World Wide Web, the Internet has revolutionized the way in which business is conducted. Now, as technology continues its forward leap, newer innovations are being developed each day. Every day we hear about new technologies that are changing the way business is done. Keeping pace with these changes is the most difficult task that the ERP vendors are facing.

Internet is the one technology that has dramatically changed business scenario. We now have e-commerce, on-line shopping, company web sites, digital verification, secure transactions and so on. The beauty of these systems is that the: are accessible even to the individual customers. Anybody who has a browser and a credit card can make a purchase on-line. People can sit at their home and place orders for computers, configure the item according to their specifications, and make the payment on-line. The same applies to company employees too. They can be anywhere in the world and armed with a laptop and a cellular phone, update the company database, retrieve information and so on. All this is possible because of the Internet.

Since the way of doing business is changing, companies have to adapt to these changes otherwise they will be left behind. ERP vendors are adding functionality and new features to make their systems capable of doing business in the Internet world.

9.2 INTERNET CONCEPTS

Millions of people throughout the world use the internet: They use it for communication with individuals and with groups to share information and ideas by electronic mail (e-mail). They use it to connect to other computer systems so they can lookup information and retrieve files, documents, data, programs and images. They use it to search for information on all sorts of topic in the arts, recreation, humanities, business, the sciences & social issues. All these activities are possible because thousands of networks are connected to internet and exchange the information in the same basic ways. Furthermore, the internet is growing at an astounding rate in terms of the number of users, the number of computer systems and networks making up the internet, and the number of resources available. Through a single computer or terminal connected to a network, which itself is connected to the internet, users have access to a wide variety of services, tools, information and other people.

Concept of internet can be stated by the following definitions:

1. The internet is a vast collection of information that can be searched and retrieved electronically. This collection include advice on all sorts of topics, data, electronic text, government information, images, museum exhibits, scholarly papers, software, and access to commercial activities. Tapping into these resources requires knowing which tools and services to use.

2. The internet is a network of thousands of computer networks. Together the networks making up the network consist of over a million computer systems. These computers and networks communicate by exchanging data according to the some rules, even though the computers and network systems individually use different technologies.

3. The internet is device through which millions of people are communicating or sharing their ideas or information. They communicate electrically on a one-to-one basis or in groups.

In essence, internet can be defined as “The network of networks that connects people and computers worldwide.”

The Net, one of the oldest long distance networks in the country, is a network of networks. It links approximately 1.5 million computers, attached to more than 13,000 networks in 100 or more countries.

Businesses use Net for a number of tasks, such as sharing files, sending e-mail and selling goods and services. Less than 1% of major companies today are not attached to the internet. Intact, the internet has become such an integral part of the corporate landscape that it is generating a number of entrepreneurial opportunities and highly specialized jobs. There are internet explorers, security experts, technicians, librarians, trainers and other service providers. In fact, the internet is becoming so common that many employers expect their new recruits to have a working knowledge of it.

Think of the internet as a huge repository of information on almost every topic imaginable. People all over the world can search the Net for information; add new information, and exchange views on different topics. The internet is an electronic web that connects people and businesses that have access to networks and allows them to send and receive e-mail and to participate in a number of other activities, around the clock. Infact, the internet is so huge, with such a wide variety of features, that there are few, if any, experts in the world who know everything about it.

Thus, in spite of its enormous power and potential, no one really owns the internet, although some segments of it may have their own finding and guidelines.

The primary workings of the internet are funded by the National Science Foundation (NSF); The Internet Engineering Task Force (IETF), a committee of scientists and experts provides technical supervision standards and guidelines for the Net. Any network colli1ected to the internet must abide by the standards established by the Internet Architecture Board (IAB).

9.21 Internet Tools

The important and popular tools include:

1. Information retrieval tools
2. Communication tools
3. Multimedia Information tools
4. Information search tools

1. Information Retrieval Tools

Information retrieval tools include:

(a) File Transfer Protocol (FTP)
(b) Gopher

(a) File Transfer Protocol (ftp)

It is one of the first tools on the internet which allows users to move files, such as text, graphic, sound and so on, from one computer to another. It is command that activates a type of client-server relationship file transfer protocol (ftp) works as follows:

The user first uses the software on his or her machine (or service provider: called the client to gain access to the remote machine, caller the server. The user' client programs communicate with a program on the remote computer to either upload or send to the remote computer or download (receive) certain required files from it.

This category of another popular way to retrieve files is by using what is called an anonymous ftp server. In this case, the user logs on to the server using the special user ID anonymous. If the server asks for a password, the user types in his or her user ID freeware and shareware programs that are available at no cost on the net can be obtained through anonymous ftp servers. Although it is easy to retrieve the information once the

site is located, sometimes it is difficult to locate an ftp site or identify the files available on that site.

(b) Gopher

The second type of information retrieval tool available on the internet is Gopher, a menu based interface that provides easy access to information residing on special servers, called Gopher sites. Although Gopher performs primarily the same tasks as the ftp command, its interface is much more user friendly and it provides additional functions, such as links to other internet services. By selecting an item on the Gopher menu users can move, retrieve, or display files from remote sites. The menu also allows users to move from one Gopher site to another, where each site provides different information. The entire Gopher space (which refers to the interconnected gopher servers) can be easily expanded by adding more servers.

2. Communication Tools

Internet communication tools: facilitate written communication. These tools include:

(a) E-mail

(b) Telnet

(c) Usenet

(a) E-mail

E-mai1, which refers for sending and receiving messages electronically, was one of the first internet tools. With the help of e-mail we can send and receive any information and message.

(b) Telnet

Telnet is a command that connects the user to a remote machine which may be located anywhere on the internet and the user can then type commands to the remote machine. For example to change directories in search of certain files, the services that talent provides depends on the services provided by the host machine, which may include much

more than simple file transfers, for example, some servers are dedicated to the playing of board games, such as chess or go.

(c) Usenet

The Usenet is a network that provides users with discussion groups. A user ports an article to a chosen news group on the Usenet where each news group is devoted to a particular topic such as politics, the environment, surfing and so on. The article is routed only to those sites that have expressed an interest in receiving information on the topic. Many find the Usenet to be helpful for gathering information on a variety of topics. Nowadays we have more than 2000 groups. Some of them are:

1. COMP: Related to computer
2. SCI: Related to science
3. BIZ: Related to business

3. Multimedia Information Tools

These tools include:

(a) Worldwide web (WWW)

(b) Home page.

(a) World Wide Web (www)

The worldwide web (www) is one of the newest and most popular hypertext based internet tool. It allows users to access and display documents and graphics stored on any server on the internet.

(b) Home Page

The World Wide Web has also spawned new service, known as service a provider that provides a multitude of services on the web. For example, a web service provider can help a company establish a home page on the net an electronic description of the company and its products and services, similar to catalogs or a brochure. Just as catalogs

should be attractive and grab the interest of customers, the home page should also be attractive and encourage the user to further explore the company and its products.

4. Information Search Tools:

These include:

(a) Archie

(b) Veronica

(c) Wide area information server (W AIS)

(a) Archie

Archie tool, one of the first information search tools developed on the internet, periodically searches anonymous ftp servers that participate in the Archie data base and identifies all files on these servers. It then creates a central data base that users can access to locate information. Users who have the Archie software, or who can use the Telnet command to connect to an Archie server, can access this database. The only disadvantage is that the user must know at least part of the filename in order to be able to search for the file. When the desired file is located, the service identifies the file's address and the user use the ftp: command to access and retrieve the file. Though Archie is a very useful tool for locating files, it must be noted that not all anonymous ftp sites participate in the Archie data base, and therefore, the data base is not a comprehensive one.

(b) Veronica

It is a tool for searching the items on gopher menus throughout the internet. With the help of Veronica, user can get necessary information very rapidly. Any user can easily access any data base with the help of Veronica server.

(c) Wide Area Information Server (WAIS)

WAIS provide a common method to access almost all the others. Having a single way to access all the internet services means more than having one super-duper program or exceptional tool. We need those, but we also need standard Internet wide way to indicate which service to use, which site to contact, and what to do at that site. The idea behind

the World Wide Web (www) is just that a single means of access to virtually everything available through the internet: services, resources, tools and information.

9.3 INTRANET

Most organizations often require their employees to have easy and quick access to department, corporate, and customer information. To address this requirement, they need more dynamic ways to link people and information than conventional means of communication. Several organizations have started using Intranets to fulfill this requirement. An Intranet is a network that connects the computers and networks within an organization by using the hardware and software that is used on the Internet. Typically it uses the TCP/IP protocols and server and browser software used for the Internet.

With an Intranet, the basic services of the Internet (electronic mail, file transfer protocol, telnet and Usenet news) become available to the employees and business partners of the organization. This allows the employees and business partners of the organization to communicate effectively and quickly by using electronic mail facility, and to share information, software and other computing resources by using the other facilities.

The various departments of the organization can put the information on their web pages on to the Intranet, and all interested parties can access the information, read it, and download it without wasting the paper to copy it, or the time to make and circulate the copies. Similarly, employees of the various offices of the organization located across the world can form a newsgroup to brain-storm or exchange ideas collectively on topics of common interest. An Intranet being confined to the computers and networks of an organization, the information on the Intranet is confined to the employees and business partners of the organization. This is a great security advantage of intranets. Furthermore, since an Intranet uses the same software as the Internet, which most computer users are already familiar with, the users of the intranet do not require any additional training. Owing to all these features, the usage of intranets is growing rapidly to more and more organizations.

9.31 Intranet & Supply Chain Management

Supply-chain management takes isolated business functions-marketing, materials management, purchasing, manufacturing, and distribution and allows them to function in tandem.

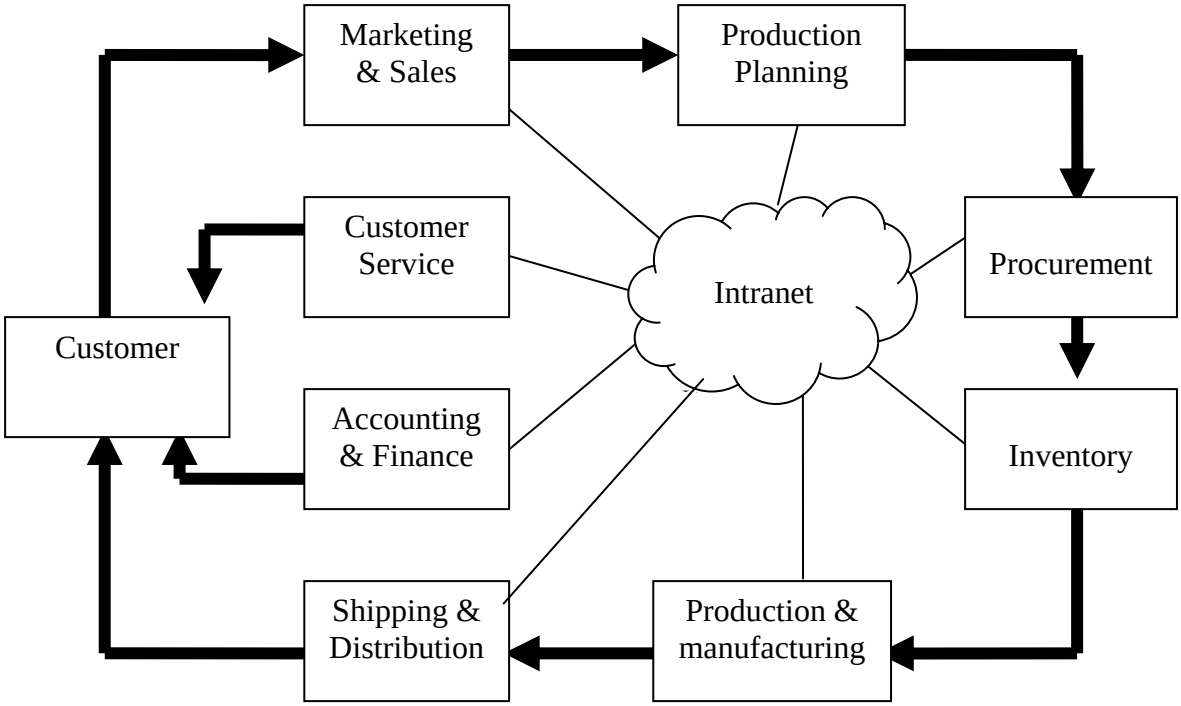

Figure 9.1: Integrating Supply Chain Function using Intranet

This is not limited to an individual company, but across all firms in a supply chain- from supplier through to the customer.

The Key functions in supply chain management are:

- Managing information about demand to enable a better understanding of title markets and customer needs. By drawing on data from customer service as well as sales support and other functional systems, companies can funnel information gathered in customer facing operations to manage proactively. This aspect of the supply chain is called the customer asset management function.

- Managing the flow of physical goods from suppliers. This aspect of the supply chain is known as integrated logistics, and includes production planning, procurement, and inventory management
- Managing the manufacturing process to ensure low production costs. This aspect of the supply chain is known as Agile Manufacturing
- Managing the financial flows with suppliers and customers through financial intermediaries. This aspect of the supply chain is known as Financial and Accounting Management

Coordination of processes and integration of data are common in all of the above supply-chain functions. Often, competitive advantage is gained by integrating supply chain activities at a lower cost than competitors. As a company begins to conceptualize itself as a complex network of business processes, it becomes clear that the supply- chain processes extend beyond the boundaries of anyone building, anyone corporation, or anyone country. Coordination of activities and management of supply-chain relationships can be a source of competitive advantage and can bring additional value to the customer. Supply-chain coordination is also known as workflow management.

However, the effective orchestration of the basic premise (more integration is. better for all) requires that all participants align key technology and business process goals to eliminate waste, maximize long-term profits, and add value to final consumers. This alignment can be daunting, as companies are challenged with finding ways to meet ever-rising customer expectations at a manageable cost. To do so, companies must identify which parts of their supply chain are not competitive, understand which customer needs are not being met, establish improvement goals; and rapidly implement necessary improvements.

The need for effective chemistry of business applications, often conflicts with today's intense competitive pressure that require a fast response. Unfortunately, most business development efforts cannot keep up. They take too long to install, and once imta1loo take too long to adapt to the ever changing environment. The movement toward modular

software as exemplified by client/server computing is a promising new direction for supply-chain application development. If implemented properly, modular applications let firms upgrade business processes. Finns can deploy them quickly, change them as needed and always use the latest technology to drive state-of-the-art business processes. This trend toward modularity is the key driver behind the Web, Intranets, and application packages.

9.32 Intranet & Customer Asset Management

Conventional SCM systems focus on basic operations but ignore a key point; that is, most "pull" supply chains are customer demand driven. In the "pull" model, customer satisfaction depends on effectively linking the customer information gathering front line (sales and customer service) to the upstream functions (manufacturing and distribution). To facilitate smoother information flow, new Web-enabled approaches are displacing traditional stand-alone sales force automation and customer support implementations.

In parallel to the technological changes, a new customer interaction strategy, Customer Asset Management, is being employed by companies seeking to increase revenue and competitive advantage. Basically, Customer Asset Management is the integration of the front-line activities in a supply chain-namely sales, market intelligence gathering, and customer service to act in a coordinated manner rather than pulling in different directions.

Customer Asset Management is based on the premise that customers are the most valuable asset of any business. Each interaction is viewed as critical and must add value. You might immediately ask: What is new here?

The importance of attracting, pleasing, and keeping customers is as old as the notion of marketing itself. What is new, however, is the use of technology for the active management of a firm's current (or installed) customer base as a strategic asset. The goal is to use technology to add value to every customer interaction and produce revenue growth.

Major components of Customer Asset Management:

- Online sales force automation: contact management, activity management; opportunity management, call reporting, lead tracking, order entry and support, customer contact, and telemarketing
- Online customer service and support-account management, maintenance/help desk services, and field service applications
- Market intelligence-competitor intelligence, trend analysis, and supplier management
- Online Sales Automation

The Intranet-enabled sales automation framework has multiple benefits. First, it helps bridge the “islands of information” that can exist within a company, especially within sales and marketing. Intranets are an important tool for augmenting sales productivity as they provide a single point of access to all essential information on customers, prospects, products, marketing programs, and marketing channels. Some existing systems supplement the essentials with industry data (growth rates, entries, exits, and regulatory trends) and data on competitors (products, pricing, sales trends, and market shares).

Second, the availability of interactive Web monitoring software and intelligent agents makes it possible to build a “smart” solution that delivers vital, specific sales intelligence directly to the desktop of each sales representative, instead of mounds of general information. These intelligent agents make direct sales and direct marketing more efficient by automating highly repetitive support tasks, like answering requests for product literature and writing letters, and by reducing the time salespeople spend on & non-selling tasks, like scheduling sales ca.1ls, compiling sales reports, generating proposals and bids, and entering orders.

Third, Intranets can also be used for electronic publishing, to educate and inform sales representatives and make the selling process more proactive by providing all the information and tools necessary to close the sale on-site at a customer location. Using

Intranets as a publishing- medium offers an inexpensive, easy-to-use, easily updated alternative to paper based, LAN-based, and CD- ROM -based documentation systems. Also, Intranets remove the obstacles inherent with publishing information in multi platform environments.

And finally, once the Internet-based solution is in place, companies find it possible to extend information sharing beyond the boundaries of the enterprise, to outside parties critical to the sales effort. The collection and analysis of marketing information improves the timeliness arid quality of marketing and sales executives' decision making. Organizations can extend marketing and sales intelligence to distributors, third-party partners, or even customers.

Finally, management must institute policies that coordinate and direct sales resources toward the highest priority prospects and customers. In this context, management must understand that the technology resources are employed to further corporate goals rather than the goals of individual marketing or sales groups. While this may sound like something obvious, research shows that optimizing marketing resources is -much more easily said than done. Often, salespeople routinely discard hundreds of sales leads, making little or no effort to evaluate or review them. In essence, they are dissipating the resources that generated these leads-budgets for advel1ising, trade shows, public relations, and other communications media.

Efficiencies gained through automation and improved marketing management is interdependent and reinforcing. Automation drives the collection of more complete customer and marketplace information, and more informed decision making targets marketing and sales activities where they are most effective. In this way, marketers get a bigger pay off from low-cost, low impact selling methods like direct mail and catalogs as database customize the timing and content of mass-marketing campaigns. At the same time, high-cost, high-impact selling methods, like personal selling and national account management, become more efficient as information systems perform routine sales support tasks, reduce non-selling time, and synchronize the use of these resources.

Online Customer Service Support

Ask any forward-thinking business executive to name his company's most valuable asset, and his most frequent answer will likely be "our customers." This need for companies to be customer-centric is no longer questioned. Most realize that effective customer management is a key competitive advantage. Over the past decade, businesses have invested heavily m customer service systems, sales systems, and personnel. Despite these investments, most businesses are still unable to maximize the value of their customer asset.

The on1ine revolution has brought about a fundamental shift in the way companies are thinking about customer service and support. With millions of users, the Web is changing the way that businesses interact with their customers, suppliers, and partners. The potential for improved customer communications and leveraged business offerings is enormous. It is obvious that online customer service is the "killer" application opportunity via the web.

Business Reasons for Customer Service on the Web:

- Lower support costs by empowering customers to solve issues independently
- Provide global access to critical customer service information and forums any time
- Improve service by focusing internal customer support resources on complex Issues
- Empower business partners with hot links to related online resolution information
- Create proactive service and marketing programs
- Seamless Web / telephony integration for priority responsiveness

The Web and Customer Service

Many companies have begun to use Web sites and e-mail systems to provide answers to frequently asked questions or to allow customers to access procedures for repairing an

item or initiating a service call. Several technology companies post on electronic bulletin boards software upgrades and code patches that customers can, download to upgrade or fix applications.

The web will allow companies to achieve new heights of responsiveness. By extending service applications through a Web site, a company can provide customers with more information quickly, interactively, and eventually in real-time. A Web site can be like an A TM of customer service. Product users will get service when they want it. They can browse at their own pace; at their own level of interest. They can ask questions and get upto-date information about parts or product availability and about service scheduling and status. And, increasingly, they will be able to receive direct service over the Web when and where they need it.

In fact, the Web represents an opportunity for companies to dramatically redefine the relationships with customers. With the many capabilities the Web offers, the nature of the relationship can change from responsiveness to involvement. Eventually, companies will be able to use Web sites not just to provide information about products and services, but to show customers new products, gather their ideas, and set up a dialog. Increasingly, when a customer says “show me,” the Web will provide the way to do it The Web’s multimedia capabilities will make it possible for customers to see and hear how some products work. And customers will be able to experiment with products online, or download demonstrations and provide feedback later. By continually “listening” to customers’ feedback and acknowledging or acting on it, a company will be able to build and nurture relationships with customers and thus claim their loyalty.

Intranet & Customer Service Support

Customer service representatives (CSRs) need a variety of tools to delight customers at every interaction and build and nurture customer relationships. CSRs need access to timely, relevant, and accurate information that portrays all aspects of the customer-company relationship. Many times this I information is specific to the CSR’s area of expertise, as for example, when a customer calls a product support group with a specific

technical question. Often, the information required to satisfy a customer resides outside the CSR's department or area of expertise. As a result, the CSR never sees the total customer picture and lacks the essential ingredients required to meet or exceed expectations. To enhance customer relationships, CSRs need access to a single enterprise Customer Asset Management solution that includes help desk, customer response, and service tracking features. Extensive customer response and service tracking systems include many capabilities, such as call management and contract administration, service delivery tracking, inventory control features, and invoicing.

Market Intelligence

Historically, marketing managers have developed marketing strategy using the 4Ps: product, price, promotion, and place. Strategy was developed by focusing on .individual products and their associated metrics (market share, product performance, and penetration). Today, increasingly customized products and services, new distribution and communication channels, and multiple pricing options are making the marketing process more complex and difficult to manage. Also, the vast amounts of detailed real- time data that must be collected and analyzed -to make effective decisions in this environment will require new ways of building information systems.

Firms are discovering that traditional product-oriented marketing management is not sufficient to manage the information-intensive environment. Already, traditional metrics are proving inadequate for measuring marketing activities across multiple product categories, diverse distribution channels, and constantly changing pricing schemes. New information-based metrics will enable organizations to dynamically .allocate marketing resources to those activities that generate the best return. In this context several questions emerge:

- How can technology help marketing to respond to challenges such as global competition, rising customer expectations, and emerging markets?
- What architectures, tools, and applications will be ideal for technology enabled marketing?

- What impact will information availability have on marketing strategy and decision- making processes?
- Entering new markets is time consuming, risky, and expensive. How can technology help firms expand into new markets at a low cost?
- What cost-effective strategies can organizations use to market and advertise effectively?

To answer these questions, marketing organizations are increasingly looking at new applications of technology in developing marketing strategy.

Marketing Decision Support Systems

Sharper competition means that there is a business imperative for organizations to make decisions quickly. Product innovations and marketing strategies are rapidly copied, so the ability to respond quickly to a changing market becomes the crucial determinant of both profitability and survival. To do this, marketing managers need information that is timely, accurate, and relevant, and that contains the right level of detail.

Data Mining and Decision Support

The architecture that is emerging as an industry solution for marketing decision support is data mining. The most successful data mining solutions are tuned to deliver optimum performance for knowledge workers easy data access and manipulation enabling them to use data creatively. This is in sharp contrast to operational systems such as relational databases and online transaction processing (OLTP) systems, which are tuned for repetitive, continual updating with each task, typically using very small amounts of data. In practice, data mining means that the data in the data warehouse exhibits characteristics that distinguish it very clearly from traditional operational systems. First of all, the data is subject -oriented-organized according to the different ways the managers view it, not for a specific function, process, or application. Second, when data resides in many separate sources, encoding is usually inconsistent, so when it is transferred to the data warehouse, it must be integrated through a consistent naming convention. Third, the data must be time-variant-collected and organized consistently over time for use in comparisons,

identifying trends, and forecasting. And fourth, the data is nonvolatile. Once it is in the data warehouse, it is not updated or changed-only reloaded and accessed.

Intranet & Market Intelligence

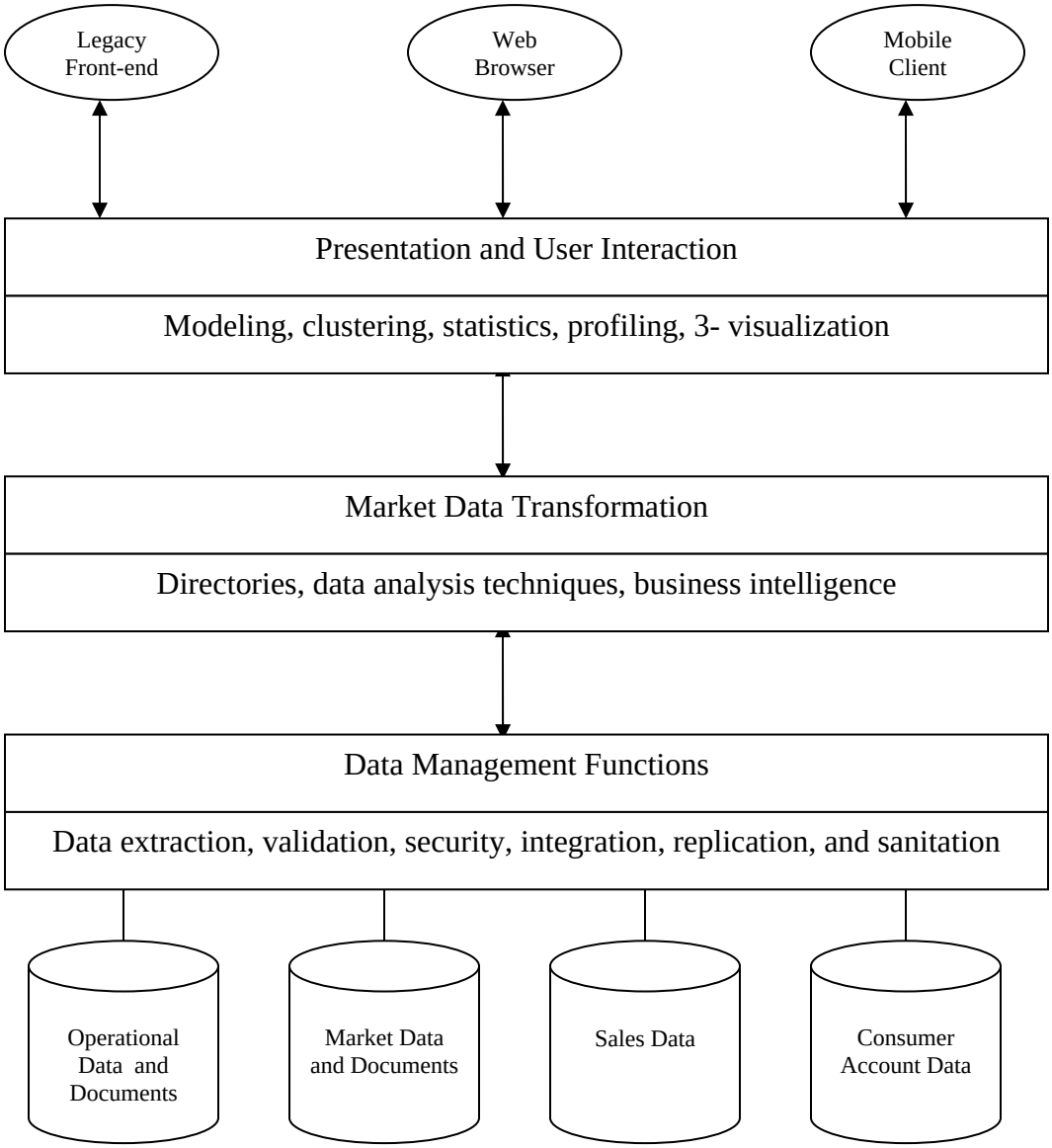

Figure 9.2: Internet Architecture for Marketing Decision Support

Figure 9.2 shows how the Intranet architecture links all the databases together with tools that summarize and aggregate data. Summarization gives tremendous speed of access to data, and information can be enhanced, for example, by adding value with data from

other sources. Thus, the marketing manager can gain a very quick overview of the situation, or can drill down to the required level of detail on a particular subject. The key in figure 9.2 is the use of electronic commerce technology to improve the gathering, analysis, and distribution of information among the sales, customer, and marketing functions. Linking the sales force with regional and corporate offices establishes greater access to market intelligence and competitor information that can be funneled into better customer service and service quality .Companies need to collect market intelligence quickly and analyze it more thoroughly. They also need to help their customers (relationship management) introduce their products to the market faster, giving them a competitive edge.

The architecture consists of three key components:
(a) storage and loading
(b) transformation and integration of data
(c) visualization and presentation of data

Data transformation makes the architecture efficient and effective. This dictates that the database be very flexible and dynamic capable of supporting creative and inquisitive requests made by managers. Fully integrated directories-which are essentially data about data -are part of the architecture. These directories define how the database is structured, where the data comes from, what it represents, and how it can be used, thus providing applications with the intelligence to select and use only that information relevant to a task. Data visualization for business purposes is a major part of data mining. Managers are always looking for ways to gain new perspectives and insights.

Managers typically request information by sending queries across the network, and they access the results via desktop PCs. A query could be “drilled down” through several layers of summarized and aggregated information. For example, an inquiry into sales in the prior quarter could be extended into displays of sales by product, region, or sales representative. These reports also could be displayed graphically, with summaries of information highlighting problem areas in operations as well as text discussing numerical

operating data. Interest in using data mining applications is spreading among middle management as it gives middle and lower managers access to the information with which their superiors are working, and thus allows them to work more efficiently with higher-level management.

9.33 Intranet & Manufacturing

Today's manufacturing companies are driven by a new set of operating requirements as they face intense global competition and significant unpredictability in both customer demand and material availability .As customers insist on customized products at mass-produced prices, the pendulum has shifted in the direction of flexible, demand-driven manufacturing. In such a competitive environment, companies need to reengineer operations to produce and distribute products effectively at low cost and high quality. To cope, companies have embraced and implemented different manufacturing strategies: Manufacturing Resource Planning {MRP-II), Total Quality Control {TQC), Just- In-Time {JIT) capacity optimization techniques, and demand flow manufacturing. More recently, companies have realized that the competitive edge comes not from optimizing production or competing on price but from a holistic perspective of managing the entire supply chain, that is, their ability to deliver product faster, shortening the cycle from order to cash receipts.

The supply chain extends far beyond the traditional supplier-to-customer model. It encompasses what is becoming commonly referred to as the "virtual corporation" or extended supply chain. Almost overnight, management of the supply chain has become a critical factor in any manufacturing company's ability to compete effectively in markets at home and overseas. The gap between best-in-class and the average company is widening. Companies who cannot manage the supply chain more competitively are falling behind more rapidly. The competitive edge that can be attained from a well-managed supply chain is hardly trivial. For a computer manufacturer such as Dell Computers, the total logistics costs of managing the movement of product and raw materials can be a difference of 4 to 6 percent of revenue compared to the other performers in that industry . That is a huge margin.

However, the information systems used to implement these strategies have not evolved; much and are often based on concepts developed in the sixties with mainframe computing. With the tremendous Impact of the Web and Intranet technology, manufacturers are beginning to look toward applications built on these technologies to maintain their edge. For instance, in the area of procurement, manufacturers are using the Internet to be in constant contact with their suppliers and subcontractors to manage inventories and schedule shipments.

By using the Web to interact with customers, manufacturers are exploring new ways: to respond to changing customer demand; to adapt to a changing business climate; to be flexible enough to redesign their processes as control shifts in two directions: “upstream” to suppliers, and “downstream” to customers or retailers; and to operate as one Integrated organization while at the same time having decentralized operations. What lies ahead? In this chapter, we examine how electronic commerce and the web and Intranets in particular can serve as a glue to bring about a more integrated manufacturing and logistics organization. But before discussing technology, it may be helpful to describe in more detail some of the key business requirements in modern manufacturing and logistics.

Intranet & Manufacturing

To maintain a competitive advantage in today’s global marketplace, an Intranet-based software solution must take a more contemporary and innovative approach to addressing today’s manufacturing issues. A new generation of manufacturing systems should embody these three critical concepts into the standard system design

- Customer / demand-driven manufacturing.
- Real-time decision support and advanced planning and scheduling.
- Intelligent process management-proactive notification and event-driven problem solving.

Customer-Driven Manufacturing

Inevitably, information systems must address the change in focus from factory management to demand management. New systems must address changing core concepts in manufacturing, such as cycle time reductions that have been addressed by a number of methods, including IT and flow manufacturing.

For example, demand can flow into the information system many different ways via EDI, fax, e-mail, Web pages, or a phone call. When demand is received, concurrent processing should occur: inventory reserved; dropship requirements placed with suppliers for non-stocked items; production allocated, adjusted, or scheduled; and resources planned. If the demand forces a change in priorities, the system should be able to reschedule resources and immediately notify the user.

Unfortunately, the solutions of today do not take advantage of the latest technology to support the new core concepts effectively. Many present systems are built on the MRP centric model and are not designed to accommodate customer-oriented production. The overemphasis on incorporating new technology for its own sake has overshadowed the need to rethink and update the business model that traditional MRPII and some ERP implementations were designed to address.

Through creative use of Web and EDI technologies, manufacturers can now communicate directly with consumers and suppliers with little or no human intervention. Technologies like electronic forms, e-mail, and EDI can be incorporated into the system to facilitate flow-through replenishment and fulfillment; electronic commerce (for supplies, raw materials, and finished product); line sequencing and allocation; and demand-driven manufacturing (concurrent and linked processing to the automatic receipt of demand). Fundamentally, this represents a shift from a predominantly “push” model supported by MRP to a “pull” orientation. Because the model also implies a closer relationship with the consumer, sales quotation and configuration systems become more important. For example, a configuration and quotation system would allow salespeople to generate a quotation and create a drawing of the product to exact specifications on a

laptop in front of the prospect. When the quotation was complete, the sales representative would connect to the host system to download the quotation and receive information generated from a real-time planning and scheduling system.

Real- Time Decision Support

Traditional MRP-2/ERP systems rely on cumbersome, time-consuming batch processing. They are based on single-resource optimization (that is, material, capacity) that is performed in a linear fashion. These work in the batch mode because of the volumes of data required, and can be run during off-hours, typically weekly. However, between the last batch run and the next scheduled run, the plant is operating with outdated and, in some cases, inaccurate-information.

As noted earlier, companies are beginning to replace the conventional MRP engine as the core planning mechanism with an advanced system based on real-time planning and scheduling. Advanced planning systems use technology, which allows the user-to run the equivalent of an MRP in minutes.

In addition to running the MRP quickly, the planning system allows the combination of multiple resources into single planning runs such as material and capacity or material and costs. Any selection of resources can be combined. Planners can create predictive- data models, which can be optimized with one another. Synchronized with the supply-chain execution processes (such as rescheduling, production order creation, purchasing, transfers, capacity leveling, and so on, advanced planning creates a system able to support “fast cycle” manufacturing.

Finally, decision support relies on the use of simulation techniques. The ability to simulate multiple schedules rapidly and review their effect on operations has become a key contributor to successful business management. There is no substitute for actually seeing the effect of changing priorities, using an alternate supply source, adding manufacturing resources, or enacting any other management change.

Intelligent Process Management

All business applications include some administrative workflow elements. Conventional manufacturing systems have typically considered administrative tasks beyond their purview and required them to be handled through manual processes. These tasks included:

a. anything that required approvals such as purchase requisitions
b. review of exceptions on a periodic basis for lot expiration, material shortages, and cost variances
c. sequenced production activity that involves movement from one operation to the next, purchase requisitions to suppliers, and distribution.

Workflow technology targets these types of tasks. Applications like loan processing and human resource management applications which have a lot of associated manual processing have used workflow technology to achieve improvements in the quality of work and reductions in processing time and cost. Basically, workflow automates the flow of information from one person (or one company) to another. It uses intelligence to get the right work to the right person at the right time for the right action. It propels business processes through departments and out across the enterprise. By applying workflow technology, the Intranet application becomes a virtual manager, sifting through the information stream using business rules to identify aberrations or out-of-tolerance conditions, and routing work to the operations personnel who can fix the process.

In addition, workflow can also be used for proactive notification. Take the example of credit limit violations in the payment management function. Often, the customer is not aware of a credit problem until an order is placed. With workflow and agent technology, a proactive agent can be established to monitor credit conditions.

When the credit limit condition is met, workflow notifies a specified account representative to take action and call the customer. The result is higher customer satisfaction and fewer payment defaults.

Why is the workflow model appropriate for manufacturing? Traditional inventory and materials management applications require each transaction to be pushed through the system. This may also require a small army of operations clerks to sift through the daily material flow reports to determine the state of the business-usually after the fact. As a result, managers know what happened yesterday, not what is occurring right now. An integrated workflow engine can automate, streamline, and control the flow of information across the enterprise, running distribution, manufacturing, and financial applications. Conventional systems do not support this type of inter- and intra-company process interaction. This can be accomplished through the use of workflow in conjunction with technologies such as the e-mail/ electronic forms systems, fax recognition software, and EDI.

9.34 Intranet & Corporate Finance

The true competitiveness of a firm is determined by the ability of its management to make accurate, timely decisions that improve profitability and long-term prospects. To make these decisions, an organization must possess knowledge about various customers, products, and suppliers, the availability of assets, the status of commitments, and the profitability of activities.

While most organizations have sophisticated transaction systems that collect operational data, the information that managers require for decision making and performance measurement purposes is not readily available. This is why companies are focusing increasingly on the question: How can we transform voluminous data about various supply-chain activities into useful information?

So, what is the problem? There is too much detailed data and not enough information. Firms seeking to gain a competitive advantage by making smart decisions are hampered by the inability to turn data into nuggets of information. Why? Because developing a response to an emerging business situation means sifting through large amounts of data from business units or product lines. To enable large-scale data analysis, firms are increasingly using online analytical processing (OLAP}.

The problem is not just limited to tools for analyzing the data. Accuracy, timeliness, and accessibility of the data are also important. With management facing increasing pressure to make profitable decisions faster, they need to be free of the constraints of time and space to access distributed data from their office, home, or "the road," twenty-four hours a day, seven days a week. The next generation of Intranet applications will be required to provide access to the- full range of corporate data needed to make strategic decisions. This might involve developing software "agents" that pull together information from a variety of relational and legacy systems at regular intervals to construct an integrated view of business activities. These "agents" then transform the data into a consistent, easily accessible format and distribute it where needed for decision making.

Financial Intranet Finance and accounting software has typically been characterized as dull, not trendsetting. Accounting software, for instance, provided a way to enter transactions and manage those transactions in. the form of audit trail. This was the primary focus of accounting software: transaction entry and behind-the-scenes management of the audit trail, critically important but not terribly exciting stuff.

Today, there is a lot more that business managers need from the information locked inside accounting databases. In short, the information is there but it is very difficult to obtain. Intranets can playa big role in solving this problem because they will allow the integration necessary to provide accounting information that managers need, in the specific form they need, when they need it, and where they need it.

Well-managed companies watch their financial indicators carefully and set clear financial objectives for their line managers. Providing access to important financial information securely and in an easy-to-use, online manner is a top priority at many firms. By using internal web applications, finance departments can begin to more easily disseminate this information to key managers by securely "posting" corporate finance information or by providing simple forms-based query capabilities. This will allow information to take the

form of hundreds of specific views rather than one general view or report, like the typical set of financial statements.

New systems technologies offer integration and make it possible for information to be put into a system once and moved to all the different places. This frees accountants from having to spend time manually moving information from one place to another because there was no other way to accomplish the task. Accountants need to recognize - the inevitable changes technology is going to bring about and must look for new ways to add value to the business. This value must be in alignment with the needs of the business process.

Finally, large financial systems developed in the era of mainframes have become too costly to maintain, troublesome to document, inefficient, ineffective, or even strategically dangerous as they are difficult to change as business conditions evolve. This viewpoint-widespread dissatisfaction with current accounting systems-is echoed by a Deloitte and Touche study of senior-level financial and accounting executives at 200 corporations. Sixty-eight percent of the respondents stated they plan to implement a new system within the next two years. From this population of respondents, 80 percent intend to purchase packaged solutions and 64 percent want client/server hardware platforms. These statistics suggest that systems based on new technology are well positioned to benefit from a major surge in demand expected to occur over the next few years.

The rapid growth of intranet accounting applications is partly a replacement cycle phenomenon. It is estimated that the average enterprise general ledger in a “Fortune 1000” company is believed by some to be about fifteen to seventeen years old. Virtually all of these are running on mainly IBM mainframes. A significant majority are internally developed applications. Replacement of these old applications is being driven by high maintenance costs and the desire to enable accounting to provide decision support data and facilitate business process reengineering.

What Should Financial Intranets Do?

Successful Intranet implementations must help tackle four thorny problems that existing systems are not well equipped to handle:

1. *Lack of insight into production control: Current systems do not produce accurate product costs for pricing, sourcing, product mix, and responses to competition.*

With the increasing amount of global sourcing, financial flows related to production are getting pretty complicated. Currently, managers rely on a patchwork of systems to support financial management activities, such as accounts payable, accounts receivable, fixed-asset management, purchasing, and general ledger. These systems worked well when their primary responsibility was to collect and present historical information. Not surprisingly, most of these systems are only equipped to handle routine transactions, and little consideration is given to their connection to other business activities. For example, if the general ledger and the procurement systems were linked through an integrated information process, the financial analyst would have an accurate picture of' accounts payable. Clearly, by integrating financial functions into decision making, the organization can assess the financial consequences of its strategic and operational decisions on a timely and accurate basis, regardless of the type of decision or where it is made.

2. *Lack of insight into how daily operations are affecting short-term and long term strategy. The current systems encourage managers to contract to the short term cycle of the monthly profit-and-loss statement.*

While many financial systems make the accountants happy, they often fail to give requisite operating information to line managers or provide performance information to senior management on a timely basis. To be useful, strategic information must be culled from the morass of operational data being stored; overnight batch reports are no longer sufficient. Managers need to operate in discovery mode. In the near future, the title of CFO (chief financial officer) could become CAO (chief analytical officer), with a bigger role in modeling the whole business operation. The ability to construct queries on the fly and to quickly ask follow-up questions that drill deeper into the data with each successive

query is necessary to allow managers to better understand the business environment before making critical decisions.

Consider the realm of customer intelligence systems. Managers can rarely predict in advance what information they will need, other than that used to track historic performance of previous business decisions. Changing market conditions and specific business situations, such as inventory levels and detailed analysis of customers' behavior (derived by mining customer, transaction, and product data), can point analysts down potentially profitable paths that they could not have anticipated. For example, even a simple question about pricing can lead to more detailed queries about the customer base, such as: Where are we losing market share? What products are our competitors advertising? What type of customers buy on sale and when? What combinations of products are the customers buying? To accommodate such a stream of questions, the systems should be developed to help managers make better strategic decisions.

3. ***Lack of insight into cost control:*** *Existing accounting information provides little help for reducing costs and improving productivity and quality. Indeed, the information might even be harmful.*

New technology must be used to achieve better cost control. As businesses in the 1990s focus on downsizing and cost control as means to survive, there is a growing need for quicker, more accurate, and more useful information that allows companies to perform better financial management. Unfortunately, this is easier said than done. Many companies, especially those that are large or highly decentralized, are finding it difficult to get at the information they need to effectively manage their business. Saddled with inflexible legacy systems and a variety of different accounting methods, these companies have difficulty handling simple reorganizations, let alone using their financial information to manage strategically in a rapidly changing world.

9.4 EXTRANET

Extranets are semi-private networks located in the corporate fire wall which provides selective internal information to business partners such as clients/customers and suppliers as well as to report employees. Extranets support activities such as sales and marketing, supply chain management, customer/product support, employee support, and office equipment and supply procurement. In other words, an extranet is a business-to-business internet that allows limited, controlled, secure access between a company's internet and designated, authenticated users from remote location. An extranet is an internet that allows controlled access by authenticated parties.

9.5 RELEVANCE OF ERP WITH INTERNET

A few years back, transmissions over the Internet were not secure. They could be intercepted and the data could be stolen. This was a major hurdle in using Internet as a medium for doing business, as sensitive data could not be sent over the Internet. So business had to develop their own private networks which were very expensive to build and maintain. However, technologies like VPN, SSL and SET have made transactions over the Internet secure and suitable for business. Now, we will briefly see what these technologies are:

1. A Virtual Private Network or VPN connects the geographically dispersed; facilities (networks) of an enterprise over a public network like the Internet. It essentially provides secure global communications across the enterprise without the need for private leased lines. The VPN can be implemented with dedicated hardware or with software, or it can be integrated into a firewall A VPN is a cheaper alternative to leased lines. VPN over the Internet can be implemented using IP- layer encryption.

2. The Secure Socket Layer (SSL) protocol is used extensively on the web to protect credit card numbers and other sensitive data transmitted between a user's web browser and an Internet web server through the HTTP protocol. SSL supports different encryption systems and key lengths. The protocol is bundled into the web browsers, so it does not depend on the host computer to supply encryption. With SSL, a credit card number is encrypted by the customer's computer and decrypted by the merchant's. With the number

in hand, the merchant then charges the purchase against the account. This process however, has a weakness. Insiders and intruders with access to the merchant's customer records can potentially compromise the card number.

3. The Secure Electronic Transaction (SET) protocol addresses this vulnerability in SSL by providing an encrypted channel between the customer and the bank. Upon receipt of an order, the merchant forwards the encrypted payment information to the bank. The bank decrypts the message, validates the payment information, and informs the merchant whether to go ahead with the sale. With this approach, a customer's credit card number is never made available to the merchant and is never exposed on the merchants-web site.

Now, organizations use VPNs for their business-to-business communications and SSL or SET technologies for business-to-customer transactions. Irrespective of the time and location, anybody who needs to access the ERP system is able to do so with these options. This provides tremendous advantages in terms of customer reach, faster response time, improved customer satisfaction, reduction in costs and so on. Figure shown below gives an overview of how the business is conducted over the Internet.

9.6 SUMMARY

Since, Internet is an insecure medium, so sensitive data can't be transmitted over the network. So private networks have to be developed to make the secured transactions over the Internet.

Internet builds integration between isolated business functions such as marketing management, material management, purchasing, manufacturing and distribution, and this tandem leads to supply chain management.

Conventional Supply Chain Management Systems focused on basic operations, but ignored customer information gathering operations. To facilitate this operation a new customer interaction strategy, customer assets management is required in the organization

which provides the integration of front line activities in a supply chain such as Sales, Market Intelligence gathering etc.

9.7 KEYWORDS

Internet: Network of networks all around the world is known as internet.

Intranet: Privately owned network with in an organization is known as intranet.

Extranet: Extranets are semi-private networks located in the corporate fire wall which provides selective internal information to business partners such as clients/customers and suppliers as well as to report employees.

File Transfer Protocol (ftp): It allows users to move files, such as text, graphic, sound and so on, from one computer to another.

Gopher: It is a menu based interface on internet that provides easy access to information residing on special servers, called Gopher sites.

E-mail: E-mai1, which refers for sending and receiving messages electronically.

Telnet: Telnet is a command that connects the user to a remote machine which may be located anywhere on the internet and the user can then type commands to the remote machine.

Usenet: The Usenet is a network that provides users with discussion groups.

World Wide Web (www): It allows users to access and display documents and graphics stored on any server on the internet.

Archie: It periodically searches anonymous ftp servers that participate in the Archie data base and identifies all files on these servers. It then creates a central data base that users can access to locate information.

Veronica: It is a tool for searching the items on gopher menus throughout the internet.

Wide Area Information Server (WAIS): WAIS provide a common method to access almost all the others.

Customer Asset Management: Customer Asset Management is the integration of the front-line activities in a supply chain-namely sales, market intelligence gathering, and customer service to act in a coordinated manner rather than pulling in different directions

9.8 SELF ASSESSMENT QUESTIONS

1. Discuss various Internet tools.
2. Discuss the role of Intranet in:-
    - Customer Asset Management
    - Sales force automation
    - Customer Service & Support
    - Market Intelligence
3. Explain the relevance of ERP with Internet.

9.9 SUGGESTED READINGS

- Daniel Amor, "The E-business @evolution : Living and working in an international world", Pearson Education, New Delhi
- Deborach L. Bayles, "E-commerce logistics & Fulfillment", Pearson Education, New Delhi
- Willium J. Buffam, "E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities", Pearson Education, New Delhi
- Marcia Robinson, "E-Business : Roadmap for Success", Pearson Education, New Delhi
- Efraim Turban, "E-commerce : A managerial perspective", Pearson Education, New Delhi
- Kienam, "Managing Your E-commerce Business", Prentice Hall of India, N. Delhi
- Ravi Kalakota, "Frontiers of Electronic Commerce", Addison Wesley
- Napier, "Creating a winning E-Business", Vikas Publishing House, New Delhi
- Whitely David, "Electronic Commerce", TMH N. Delhi
- "E-business", magazine (January & September 2004 issues) ICFAI press
- Rayport, Jefforey, "Introduction to e-commerce", Mc-Graw Hill
- Leon Alexis, "Enterprise Resource Planning", TMH
- Parag Diwan, "Enterprise Resource Planning", Pentagon Press

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Lesson: 10

ERP & E-COMMERCE

Author: Kiran Khatter **Vetter: Dr. Karam Pal**

STRUCTURE

10.0 Objectives
10.1 Introduction
10.2 Understanding E-commerce
    10.21 Evolution of E-commerce
    10.22 Distinct Categories of E-commerce
10.3 Relevance of ERP E-commerce
    10.31 Electronic Data Interchange (EDI)
    10.32 Electronic Fund Transfer (EFT)
    10.33 Role of ERP Vendors (SAP, BAAN, Oracle, PeopleSoft in E-commerce)
10.4 Summary
10.5 Keywords
10.6 Self Assessment Questions
10.7 Suggested Readings

10.1 OBJECTIVES

After going through this lesson, you would be able to:

- Learn about the basic concepts of E-commerce
- Describe electronic concepts, payment systems and electronic data Interchange
- Analyze the role of various ERP vendors in E-commerce

10.1 INTRODUCTION

According to the International Data Corp. report Internet Commerce Market Model, the value of business conducted over the Internet is expected to grow from $2.6 billion in 1996 to some $220

billion in 2001. Service providers supporting Internet ecommerce are also reporting rapid growth. The Internet Billing Company is currently delivering e-commerce services to more than 10,000 Web sites worldwide. It reports that requests to sign up grew by 20 per cent a month in 1997, resulting in a record 1.3 million transactions being processed during the third quarter of 1997. Meanwhile, Priority One Electronic Commerce Corporation reported that the electronic payment transaction volume handled by the firm in January 1998 was five times higher than that in January 1997.

You may never have heard of Internet Billing or Priority One. These are just two of dozens of new businesses that have sprung up in the last few years to provide infrastructure services for Web e-commerce. But you have surely heard of the leading enterprise resource planning (ERP) application providers SAP AG, Oracle Corp., PeopleSoft, and The Baan Co. These vendors provide the back-office accounting, supply chain, payroll, and manufacturing systems that interact with e-commerce systems to process orders, ship goods, and generate payments. During 1997, all these vendors responded to customer interest in Web e-commerce by delivering new features in their already functional broad and deep application suites. SAP partnered with Intel to create a standalone an e-commerce company called Pandesic and took an equity stake in an ecommerce software company Commerce One. However, considering the pervasive effect that e-commerce is expected to have on the business process workf1ows and value chains managed by ERP software, the vendors have been slow to respond to the customer demand implied by the statistics quoted above. Admittedly, e-commerce is just one aspect of Web-enabling ERP packages, an effort that also encompasses self-service information access and the delivery of “push” reports and notifications using the web.

10.2 UNDERSTANDING E-COMMERCE

E-commerce is the use of telecommunication and data processing technology to improve the quality of transaction between business partners. It has existed in some form’ since the Invention of the telegraph and early automated data processing equipment but its use has greatly increased. E-commerce improves organisational efficiencies by leveraging data processing, database storage, and data communication technologies. Existing network facilities can be utilized to achieve great savings in labour costs at the reduction of paper storage and handling facilities. It enabled firms to be more effective in improving the quality standard goods and services and to offer a variety of

new service. The global marketplace has become larger and wider than e, because of the expansion of E-commerce activity.

Electronic commerce is doing business online. It is about using the power of digital information to understand the needs and preferences of each customer and each partner; to customize products and services for them; and then to deliver the products and services as quickly as possible. Personalized, automated service offer businesses the potential to increase revenues, lower costs and establish and strengthen customer and partner relationships achieve these benefits, many companies today engage in electronic commerce for direct marketing, selling and customer service, line banking and billing, secure distribution of information, value chain trading; and corporate purchasing. While the benefits of electronic commerce systems are enticing, developing, deploy and managing these systems is not always easy. In addition to adopting new technology, many companies will need to re-engineer their business processes to maximize the benefits of electronic commerce.

“Electronic Commerce is a dynamic set of technologies, application, and business processes that link enterprises, consumers, and communities through electronic transactions and the electronic exchange of goods, services, and information.”

“Electronic Commerce is the carrying out of business activities that lead to exchange of value across telecommunications networks.”

“Electronic Commerce is about doing business electronically. 1t is based on the electronic processing and transmission of data, including text, sound and video. It encompasses many diverse activities including electronic trading of goods and services, online delivery of digital content, electronic fund transfers, electronic trading of goods and services, online delivery of digital contents, electronic fund transfers, electronic share trading, electronic bills of trading, commercial auctions, collaborative design and engineering, online sourcing, public procurement, direct consumer marketing, and after-sales service. It involves both products (consumer goods, specialized medical equipment) and services (information services, financial and legal services); traditional activities (healthcare education) and new activities (virtual malls).”

“Digital technology has transformed the economy. Value creation for consumers has shifted from the physical goods to an economy that favors service, information, and intelligence as the primary sources of value creation.”

In essence e-commerce is characterized by several attributes:

- It Is About the Exchange of Digitized Information Between Parties. This information exchange can represent communications between two parties, coordination of the flows of goods and services, or transmission of electronic orders. These exchanges can be between organizations or individual.
- It is Technology-Enabled. E-commerce is about technology-enabled transactions. The use of Internet browsers in the World Wide Web is perhaps the best known of these technology-enabled customer interfaces. However, other interfaces-including ATMs, electronic data interchange (EDI) between business to-business partners, and electronic banking by phone-also fall in the general category of e-commerce. Businesses once managed transactions with customers and markets strictly through human interaction; in e-commerce, such transactions can be managed using technology.
- It is Technology-Mediated. Furthermore, the focus is moving away from the simply technology-enabled transaction to a technology-mediated relationship. Purchases in the marketplace at Wal-Mart are technology-enabled in that we have human contact along with a cash register that does PC-based order processing. What is different now is that the transaction is mediated not so much through human contact but largely by technology-and, in that sense, so is the relationship with the customer. The place where buyers and sellers meet to transact is moving from the physical-world “marketplace” to the virtual-world “market space”. Hence, the success of the business rests on screens and machines in managing customers and their expectations. Coming from a past of transactions with human-human contact, that is a big difference.
- It includes Intra- and Inter-organizational Activities That Support the Exchange. The scope of electronic commerce includes all electronically based intra- and inter-organizational activities that directly or indirectly support marketplace exchanges. In this sense, we are

talking about a phenomenon that affects both how business organizations relate to external parties-customers, suppliers, partners, competitors, and markets-and how they operate internally in managing activities, processes, and systems.

10.21 Evolution of E-Commerce

During 1930's American Airlines first pioneering effort with reservations was the "request and reply" system used in the 1930s. A reservations agent would telephone the central control point where inventory was maintained to inquire about space available on a flight, and a response would be returned via teletype.

During 1940's through the mid-1940s reservations were recorded manually with a pencil on different colored index cards, nicknamed "Tiffany" cards after the lamps with the colored glass shades. These cards were arranged in a "Lazy Susan," and flights were controlled by half a dozen employees sitting around a table spinning the lazy Susan for index cards that would correspond to particular flights. By counting the pencil marks on each card, a clerk at the reservations center could give a "yes" or "no" to a request for a seat. Using the Tiffany system to complete a booking for a round-trip reservation from New York City to Buffalo required 12 different people performing more than a dozen separate steps during a three-hour period-longer than the flight itself! American developed the industry's first electrical/mechanical device for controlling seat inventory in 1946. It was called the Availability Reservisor, and it applied basic computer file technology to the task of tracking American's seats and flights.

During 1950's by 1952, the airline had added basic computer file technology - a random access memory drum and arithmetic capabilities to the Reservisor. With the Magnetronic Reservisor a reservations agent could check seat availability and automatically sell or cancel seats on the electronic drum. As advanced as this was for its time, the airline reservations process was still intensely manual. In 1953, a data processing system was developed that would create a complete reservation and make all the data available to any location throughout American system, called Semi-Automated Business Research Environment (SABRE).

During 1960's By 1964, the telecommunications network of the SABRE system extended from coast to coast and from Canada to Mexico. It was the largest real-time data processing system - second only to the U.S. government's SAGE system.

During 1970's in May 1976, American installed its first SABRE unit in a travel agency. By the end of the decade, SABRE had more than 100q travel agency customers. Today, more than 300000 devices in 74 countries on six continents are connected to SABRE.

During the 1970's, the introduction of electronic funds transfer (EFT) between banks over secure private networks changed financial markets. Electronic funds transfer optimizes electronic payments with electronically provided remittance information.

During the late 1970's and early 1980's electronic commerce became wide spread within companies in the form of electronic messaging technologies: electronic data interchange (EDI) and electronic mail. Electronic messaging technologies streamline business processes by reducing paperwork and increasing automation.

Business exchanges traditionally conducted with paper, such as checks, purchase orders, and shipping documents, are conducted electronically. Electronic data interchange allows companies to send/receive business documents (such as purchase orders) in a standardized electronic form to/from their suppliers. For example, combined with just-in-time (JIT) manufacturing, EDI enables suppliers to deliver parts directly to the factory floor, resulting in savings in inventory, warehousing, and handling costs. Electronic mail does much the same for unstructured organizational communications both inside and across the organizational boundaries.

1980's & 1990's the introduction of easy SABRE in 1985 allowed personal computer users to tap into SABRE to access air, hotel and car reservations. Through SABRE - the recognized leader in the travel industry - an estimated $45 billion in travel products is booked each year. SABRE has evolved into the world's largest privately-owned real-time computer network. In 1995 SABRE helped develop Travelocity allowing ticket purchase and flight information via the web.

In the late 1980's and early 19908 electronic messaging technologies became an integral part of workflow or collaborative computing systems (also called groupware). A prominent example of such systems is Lotus Notes. Groupware focused primarily on taking existing non-electronic methods and grafting them onto an electronic platform for improved business process efficiency. Although hyped as the "Killer app" in the early 1990's, groupware efforts resulted in small gains in productivity and efficiency.

In the mid-1980's a completely different type of electronic commerce technology spread among consumers in the form of online services that provided a new form of social interaction (such as chat rooms and inter-relay chat [IRC]) and knowledge sharing (such as news groups and File Transfer Programs). Social interaction created a sense of virtual community among the cyberspace inhabitants and helped give rise to the concept of a "global village." At the same time, information access and exchange have become more affordable. By using the global Internet, people can communicate with other around the world at ever-decreasing costs.

In the 1990s, the advent of the World Wide Web on the Internet represents a turning point in electronic commerce by providing an easy-to-use technology solution to the problem of information publishing and dissemination. The Web made electronic commerce a cheaper way of doing business (economies of scale) and enabled more diverse business activates (economies of scope). The Web also enabled small businesses to compete on a more equal technological footing with resource-rich multinational companies. For example, in Web-based electronic publishing, giant companies like Time Warner, Disney, and others are working overtime to keep up with upstarts who can enter the new marketplace of several million customers with a minimal infrastructure investment: a PC, a modem, and an Internet account.

10.22 Distinct Categories of E-commerce

Business-to- Business: Business-to-business (B2B) activity refers to the full spectrum of e-commerce that can occur between two organizations. Among other activities, this includes purchasing and procurement, supplier management, inventory management, channel management, sales activities, payment management, and service and support. While we may be familiar with major players such as FreeMarkets, Dell, and General Electric, there are some exciting emerging

consortia that combine the purchasing power of heretofore competitors, such as GM, Ford, and Daimler Chrysler, which joined together to create Covisint. Similar initiatives are under way with industry groups, including pharmaceuticals, commercial real estate development, and electronic subcomponents.

Business-to-Consumer: Business-to-consumer (B2C) e-commerce refers to exchanges between businesses and consumers, such as those managed by Amazon, Yahoo, and Charles Schwab & Co. Often, transactions take place that are similar to those in the B2B context. For instance, as with smaller B2B interactions, transactions that relate to the "back office" of the customer (e.g., inventory management at the home) are often not tracked electronically. However, all customer facing, or front-office, activities are typically tracked. These include sales activities, consumer search, frequently asked questions, and service and support.

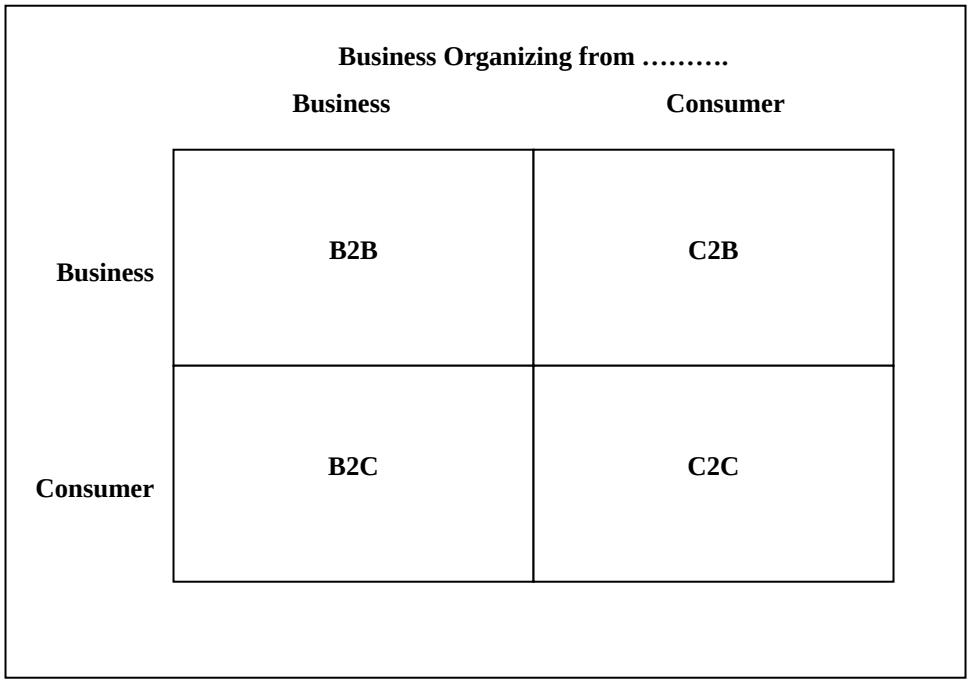

Figure 10.1: Four Categories of E-Commerce

Consumer-to-Consumer: Consumer-to-consumer (C2C) exchanges involve transactions between and among consumers. These exchanges can include third-party involvement, as in the case of the auction website eBay. Other activities include classified ads (www.numberoneclassifieds.com),

games (www.heat.net), jobs (www.monster.com), communications (www.icq.com) and personal services (www.webpersonals.com). C2C is also often referred to as peer-to-peer (P2P).

Consumer-to-Business: Consumers can band together to present themselves as a buyer group in a consumer-to-business (C2B) relationship. These groups may be economically motivated, as with demand aggregators, or socially oriented, as with cause related advocacy groups www.speakout.com

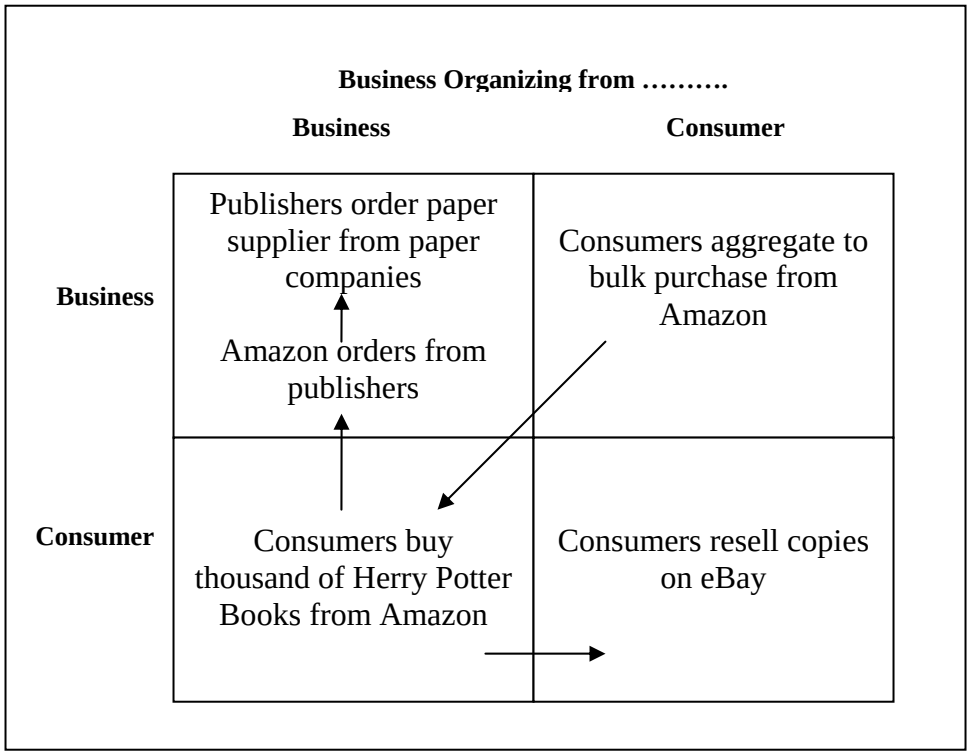

Figure 10.2: Convergence of E-Commerce Categories

Consider, for example, the purchase of a Harry Potter book at Amazon.com figure shown below illustrates how the sale of Harry Potter books can ripple throughout the four e-commerce quadrants. At time period one, thousands of consumers buy the most recent Harry Potter book through Amazon. This purchase triggers an electronic exchange between Amazon and the publisher to request more books. This ordering forces the publisher to print new copies. The new copies trigger a reordering of new paper products, shipping materials (from cardboard suppliers), and ink. Meanwhile, consumers may be able to "demand aggregate" through public sites or through

corporate bulk purchase rates. Finally, after the books are consumed, they may be saved or sold on eBay. Thus, it could be argued that the categories of e-commerce are not distinct, but rather, they are intimately linked in a broader network of supply and demand.

10.3 RELEVANCE OF ERP WITH E-COMMERCE

Before discussing how the ERP vendors are responding to the Web e-commerce opportunity, let's consider two fundamental ways in which you can use the Web to support e-commerce:

1. Using the Internet as a router for e-commerce transactions and transaction-related notifications and documents between two parties.
2. Using workflow to connect internal systems and external Internet service provider systems to create new types of e-commerce "value-chains" between business partners.

Important issues involved (EDI and EFT)

Electronic data interchange (EDI) and electronic funds transfer (EFT) software and service providers were delivering e-commerce long before the business world discovered the Web. The Internet has not significantly changed what either EDI or EFT software does, only how it does it. In the past, users of EDI and EFT software typically transmitted transactions between a buyer and a seller or a remitter and a bank via a privately run, value-added network (VAN). This locked in users to a particular communications infrastructure and service pricing structure. Today, people increasingly use the Internet as the router for EDI and EFT transactions, replacing VANs with virtual private networks (VPNs). These use point-to-point tunneling techniques to package and encrypt EDI or EFT transactions for faster, more secure transmission of data between two parties. The fact that giant EDI users, such as the General Electric Company, have begun moving some of their EDI transaction processing onto the Internet and that many banks are rolling out Internet-based online banking services seems to indicate that EDI and EFT on the Web are considered safe. Nevertheless, the industry press continues to debate whether an insecure, public wide-area network (WAN) is really the right medium and whether it has the bandwidth capacity to handle the bulk of EDI and EFT transactions.

The Web is affecting EDI in other areas by supporting better visibility into transaction exception handling queues, putting a friendlier front on it with Web storefronts and reducing the cost of EDI

software. EDI exception handling is being improved by integrating the transmission of EDI transactions with workflow and e-mail in order to trigger the generation of exception messages for automatic feedback to transaction originators via Web e-mail. Initiatives at the small business end of the market also indicate that EDI is becoming friendlier and cheaper. For less than $200, you can order an EDI-based e-commerce application that integrates a Web based electronic storefront builder and an EDI transaction transmission with an accounting system. These types of products mean that the entry barrier to small businesses for taking advantage of EDI transmission of sales orders is largely a thing of the past, mostly because of the impact of the web.

9.32 Electronic Data Interchange (EDI)

Computer-to-computer exchange of business information has become an increasingly popular form of electronic commerce. EDI is important because it enables firms to exchange business information faster, more cheaply, and more accurately than is possible using paper-based systems. Take, for instance, logistics. Key areas in the logistics communication channel are likely to include: the order processing system, the demand forecasting, the sales recording system, and the stock reordering system. EDI works like a glue to support the movement of this information through the supply chain.

EDI is used in manufacturing, shipping, warehousing, utilities, pharmaceuticals, construction, petroleum, metals, banking, insurance, retailing, government, health care, and textiles, among others. EDI was first used in the transportation industry more than twenty years ago, by ocean, motor, air, and rail carriers and the associated shippers, brokers, customs, freight forwarders, and bankers.

EDI consists of standardized electronic-message formats (transaction sets) for business documents such as requests for quotations, purchase orders, purchase change orders, bills of lading, receiving advices, and invoices. These six types of documents constitute 85 percent of the official communications associated with commercial transactions in the United States. These transaction sets allow computers in one company to talk to computers in another company without producing paper documents. To move to EDI, a company must have computerized accounting records and establish trading partners who agree to exchange EDI transactions.

A typical EDI configuration will involve translation software (to perform document conversion to a standard format) at all participating sites, with a standard communications package to shuttle the converted documents between locations. On arrival, standard documents are converted again to the internal format, a relatively straightforward business, but with compelling economies of scale.

Benefits of EDI

The benefits of EDI are cost reductions nom eliminating paper document handling and faster electronic document transmission. Other benefits include:

1. Improvements in overall quality through better record keeping, fewer errors in data, reduced processing time, less reliance on human interpretation of data, and minimized unproductive time.
2. Reduced inventory. EDI permits faster and more accurate filling of orders, helps reduce inventory, and assists in JIT inventory management.
3. Better information for management decision-making. EDI provides accurate information and audit trails of transactions, enabling businesses to identify areas offering the greatest potential for efficiency improvement or cost reduction.

Firms are adopting EDI as a fast, inexpensive method of sending invoices, purchase orders, customs documents, shipping notices, and other business documents. The improved ability to exchange documents quickly tends to speed up business processes. Furthermore, these processes can be closely monitored, providing the companies with the ability to trace, manage, and audit the operations. Such flexibility allows firms to adopt business techniques aimed at removing the bottlenecks and making the business processes more efficient.

EDI in Action

The idea behind EDI is very simple. EDI takes what has been a manually prepared form or a form nom a business application, translates that data into a standard electronic format, and transmits it. At the receiving end, the standard format is “untranslated” into a format that can be read by the recipient’s application. Hence, output from one application becomes input to another through the

computer-to-computer exchange of information. The result is an elimination of the delays and the errors inherent in paper based transactions. The benefits of ED I can be seen by comparing the flow of in formation between organizations before and after its implementation. For this purpose the purchasing application provides an ideal scenario. In general, EDI has been used extensively in the procurement function to streamline the interaction between the buyer and seller. Other uses for EDI are also prevalent. Universities use EDI to exchange transcripts quickly. Auto manufacturers use EDI to transmit large, complex engineering designs created on specialized computers. Large firms use EDI to send to customers, online price catalogs, listing products, prices, discounts, and terms.

Figure 10.3 shows the information flow when paper documents are shuffled between organizations via the mailroom. When the buyer sends a purchase order to a seller, the relevant data must be extracted from the internal database and recorded on hard copy. This hard copy is then forwarded to the seller after passing through intermediate steps. Sellers receive information in the form of letters and in some cases facsimiles. This information is manually entered into the internal information systems of the recipient by data entry operators. This process generates a considerable amount of overhead in labor costs and time delays. The reproduction of information also increases the risk of errors caused by incorrect data entries.

This pervasive practice of converting digital data into hard copy data that is reconverted into electronic information again on the receiving end generates unnecessary costs. It is quite possible to exchange the information in its electronic format by means of other carriers. Such carriers include magnetic tapes and diskettes and, more recently, the EDI third-party services. The use of EDI carriers saves administration costs by reducing paperwork. Furthermore, the accessibility of the information is improved, which enables a more efficient audit of the operations.

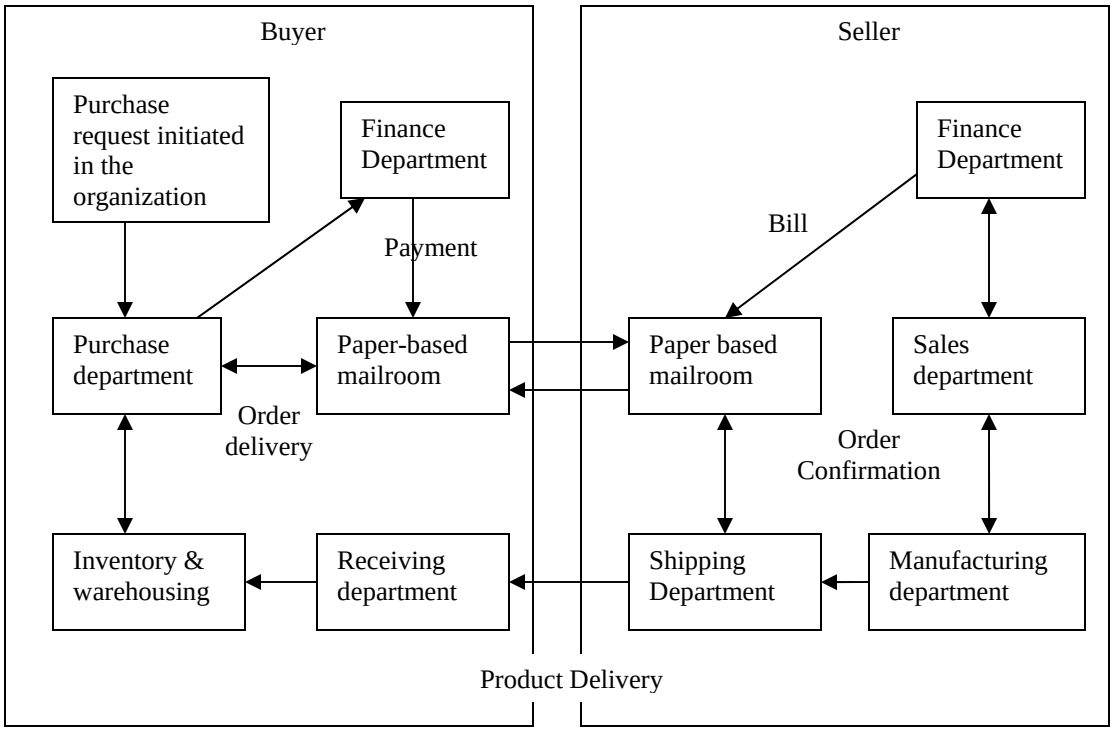

Figure 10.3: Document Flow without EDI

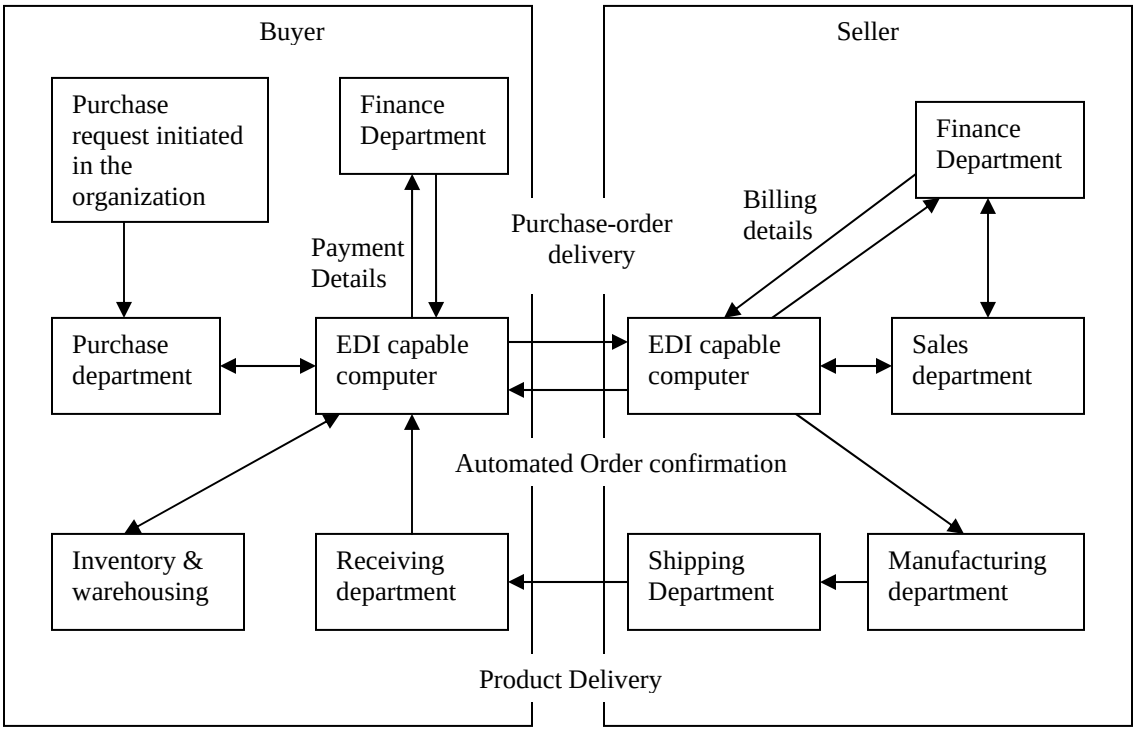

Figure 10.4: Document Flow with EDI

EDI can substantially automate the information flow and facilitate management of the business process as shown below.

The EDI transactions for a purchase, shipment, and corresponding payment are as follows:

1. Buyer's computer sends purchase order to seller's computer.
2. Seller's computer sends purchase order confirmation to buyer's computer.
3. Seller's computers sends booking request to transport company's computer.
4. Transport company's computer sends booking confirmation to seller's computer.
5. Seller's computer sends advance ship notice to buyer's computer.
6. Transport Company's computer sends status to seller's computer.
7. Buyer's computer sends receipt advice to seller's computer.
8. Seller's computer sends invoice to buyer's computer.
9. Buyer's computer sends payment to seller's computer.

The purchase order confirmation is the seller's acceptance of the price and terms of sale. Note that the various internal departments are aggregated and called buyer and seller to simplify the description. All the interactions occur through EDI forms and in most cases are generated automatically by the computer.

Why has EDI Adoption Lagged?

Even with proven benefits, EDI has not seen widespread acceptance because of some specific limitations. These limitations are discussed next.

- High costs: EDI applications are costly to develop and operate. The high cost of development increases prices and increases the entry barrier for new entrants.
- Limited accessibility: EDI applications do not allow consumers to communicate or transact with vendors in an easy fashion. For example, to do business with a company, a supplier must subscribe to an online service called Value-Added Network (VAN), which then provides proprietary software with which to communicate with the firm registered with that service.

- Rigid requirements: EDI applications usually require highly structured protocols, previously established arrangements, and unique proprietary bilateral information exchanges. Those requirements involve dedicated connections or VANs. For example, EDI requires transacting parties to follow rigid agreements about the structure and meaning of data. These agreements are time-consuming to negotiate, inflexible, and difficult to maintain, especially in a changing environment. The resulting costs and lead times create barriers to investment in EDI applications by small companies, and inhibit its expansion beyond large companies and their trading partners.
- Partial solutions: EDI applications automate only a portion of the transaction process. For example, although the ordering of a product can be nearly simultaneous, the supporting accounting and inventory information, payment, and actual funds transfer tend to lag, often by days. This time lag, and the decoupling of the accounting and payment information from the ordering and delivery of goods and services that results, increases the likelihood of discrepancies, requiring expensive and time-consuming reconciliation. Ideally, an electronic commerce application should eliminate these gaps between ordering, distribution, and payment, and enable real-time links to record keeping and accounting systems.
- Closed world: EDI applications are very narrow in scope. The Web is beginning to break the “closed world” of ED I Proprietary architectures. The “open world” of the Web makes it easier for suppliers to enter into market, creating a more efficient market

ERP and EDI Integration

The information needs of enterprise or organizations are growing with data flooding into the management structure of the enterprise, continuously creating new information relationships. Various functionality relationships in areas of finance, sales and marketing, distribution, manufacturing, purchase, human resource and payroll are required for optimum function of resources. Similar relationships in the areas of supply chain management, distribution channel, field service computational analysis etc. are also becoming extremely necessary.

ERP has become the means to support and accelerate the above processes. It is capable of managing a range of business processes like order entry, procurement, manufacturing and distribution management; and often requires Electronic Data Interchange (EDI) for the same. There

is a need for integration of manufacturing systems not only within an organization but also in multiple plant sites, distribution centres and points of sale. New decision-support applications for forecasting demand planning, distribution management and supply chain optimization rely on ERP to generate data. There is a need for integrating these systems with EDI/E-commerce organization information systems and are mainly transaction systems running mission-critical business applications, involving transfer of huge databases to large number of users. Such transaction-based systems can be best supported by EDI/E-commerce.

ERP implementation leads to process redesign, which can bring phenomenal improvements in critical areas of businesses. The improvements can be measured using conventional yardsticks like quality, response, service and cost. Faster response and service in the purchase/ delivery process will help in reducing inventory and the resulting savings will help in lowering the costs of the end product. BPR is much more flexible when information is used in its electronic form, such as EDI. The argument also works in reverse-EDI is much more effective when it is applied with BPR. In most cases, BPR is simply an application of commonsense to the business processes.

It is essential to integrate the ERP system with EDI. The integration facilitates capture of information electronically, at source, without readying it at any stage. For instance, information from trading partners may already be in EDI format. This information can be fed directly into the company's ERP systems and reused.

WHAT IS EDI?

EDI is the direct transfer of business information between computer applications in different organizations (without human intervention), .using commonly agreed standards to structure the transaction or message data.

With EDI one has an electronic alternative. EDI is a logical extension, after the computerization of in-house operations. It is the direct transfer of structured business information between the systems of different organizations. Instead of printing information on paper and then dispatching it, one can send information directly from his computer to that of his business partner and the information can be processed immediately.

INTERFACE SOFTWARE

Under an EDI environment, data needs to be validated before it is transmitted through the central network system. This is to ensure that it is structurally correct and is packaged according to the agreed format for transmission. These functions are done usually by the interface software, installed at the user's computer.

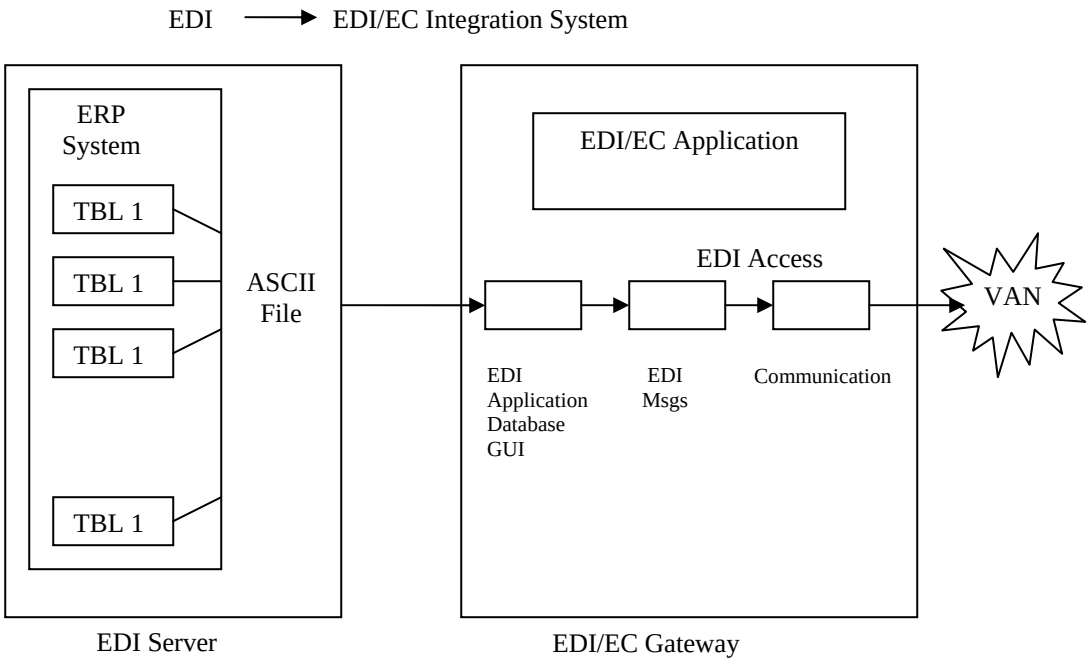

Figure 10.5: ERP: EDI Integration System

DATA TRANSLATION

Data to be exchanged can either be generated from a host computer running an ERP system or directly from the communicating terminal. The interface software then transforms the in-house data into the agreed interchange format and transmits the formatted one to the external organization from the central network system. The data sent is translated to a UN/EDIFACT standard. Likewise, at the receiving end, the incoming data will be received by the interface software and transformed into recipient's in-house application format. This is the function of an EDI translator.

COMPLIANCE CHECKING

In order to optimize the efficiency of data transfer, very often, before it is transmitted, some form of compliance checking is done. The checking involves the data structure and not the data content. It includes the following:

- All required information is there in the document (i.e., all mandatory data is present).
- The required conditions are correct and satisfied.
- Proper data sequences maintained.
- Loop and repetition counts are not exceeded.
- All length constraints (maximum and minimum) are met.
- All data elements are of the proper type (alpha, integer etc.)

9.32 Electronic Fund Transfer (EFT)

Electronic funds transfer systems have shortened the time of payment instruction transfer between banks, and in the process have reduced float. However, EFT systems have not changed the fundamental structure of the, payment system. Many of the so called payment innovations over the past two decades have been aimed at minimizing banking costs such as reserve requirements, speeding up check clearing, ad minimizing fraud. However, the consumer rarely interacted with the early EFT systems. Recent innovations in electronic commerce aim to affect the way consumers deal with payments and appear to be in the direction of a real-time electronic transmission, clearing, and settlement system.

Recently, several innovations helped to simplify consumer payments. These include:

- Innovations affecting consumers: credit and debit cards, automated teller machines (ATMs), stored-value cards, and electronic banking.
- Innovations enabling online commerce: digital cash, electronic checks, smart cards (also called electronic purses), and encrypted credit cards.
- Innovations affecting companies: the payment mechanisms that banks provide to corporate customers, such as inter bank transfers through automated clearing houses (ACHs) that allow companies to pay workers by direct deposit. (The U.S. government can also use direct deposit for social security recipients).

- Electronic funds transfer at point of sale (EFT/POS): This is an existing method and as the name suggests, financial transaction is completed at the point of sales. It uses special card-readers, located at the merchants' premises, and the cards of the consumers are inserted in these machines while the transaction is being processed. There are two variations in this technique and these are given below.
- Credit Card Transactions: This is a normal credit card transaction. When the purchase transaction is completed, the card issuer transfers the money to the merchant and raises a monthly bill with the card user. The improvements ad automation could result in immediate transfer of funds to the merchant, with the record of transaction kept with the credit card issuer.
- Debit Card Transaction: This a new form of value transfers. Here, an account holder of a bank or any other shopping center has a token in the form of data bearing card. This card authenticates the consumer. On completion of the transaction, the consumer enters his/her PIN code and this facilitates the transfer of money from the consumer's account to merchants account. Compared to the credit cards, in this case the finance transaction is more direct.

Apart from routing EDI and EFT transactions, Web e-commerce is also about .new consumer-to-business, business-to-business, and even business-within-business commerce workflows. These workflows may involve a collection of business partners, such as buyers, sellers, shippers, distributors, salespeople, and banks, collaborating across the Internet as part of an extranet (an intranet "extended" to allow access to business partners of a corporation). The new Web-aware workflows integrate the Internet into traditional business processes.

However, the scope of ERP applications means that ERP vendors face a number of challenges to deliver Web e-commerce to their customers, including:

- Where to focus their Web-enabling initiatives
- Whether to build or buy (by integrating with third-party storefront or procurement application)
- The Java or ActiveX approach to delivering client access

- Allowing integration of the Web into their workflow reference models
- Delivering architecture that can accommodate potentially significant transaction growth

Generally, the ERP vendors have faced these challenges in a consistent way. They claim to have responded to customer demand in terms of the focus of their Web enabling effort. They have built some functionality in-house and use third party partners as well-although it seems inevitable that ERP vendors will eventually integrate everything into their core suites. They have embraced both Java and ActiveX on the front-end and have begun making their workflow engines Webaware. Transaction overload does not seem to be a major issue in the Web e-commerce initiatives so far, but it is likely to become one as more and more customers move to an all web deployment of these far reaching application suites on an enterprise-wide basis

9.33 Role of ERP Vendors (SAP, BAAN, Oracle, PeopleSoft) in E Commerce

SAP AG : The three-tier architecture, process-oriented functionality, and existing business APIs (BAPIs) of SAP's R/3 suite has meant that enabling the application for Web e-commerce has probably been easier for SAP than for many other vendors. Basically, SAP had three tasks:

1. To introduce a "fourth" tier to its architecture to handle interaction with the Web
2. To let workflows reach out to the Internet as part of a process flow
3. To adapt the presentation layer for use within a Web browser.

The SAP-built Internet Transaction Server (ITS), currently limited to running on Windows NT 4.0 servers, is the conduit for Internet-related activity processed by presentation layer clients. ITS lets Web browser clients interact with R/3 application servers to reach business processes and components using the Computing Center Management System (CCMS) and the functional BAPIs. This means CCMS can monitor and load-balance e-commerce transactions reaching R/3 from Internet sources, and these transactions can interact with functional components using the same APIs that any other external application would use. Workflow processing can now reach out to the Web and manage events that occur as a result of interacting with external Web services. The R/3 presentation layer uses ActiveX controls and Java Bean-based applets for providing access to functionality via a Web browser. The R/3 release 4 Business Client provides on-demand delivery of

these applets to PCs and includes a new HTML frame component for managing data displayed in HTML formats.

SAP is steadily integrating Web e-commerce capabilities into its suite (it had EDI and EFT capabilities for many years) and is also working with partners to deliver other Web e-commerce solutions. Release 3.IG of R/3, delivered Web e-commerce functionality that included product catalog access, online store building, and Web browser access to sales order creation, tracking sales order status, querying available to promise inventory, and retrieving customer account information. SAP has teamed up with Aspect Development Inc. and Acquion Inc. to supply catalog content for use in Web-based procurement applications. Meanwhile, the SAP/Intel Joint venture, Pandesic. LLC, bundles R/3 with other storefront-related software such as Taxware's Internet Tax System and CyberCash Inc.'s payment software, Intel-based hardware, and third-party implementation and support services to deliver a turnkey consumer-to-business Web e-commerce and accounting solution. Pandesic launched this solution with a purchase price of $25,000 coupled with a monthly transaction fee varying from 1 to 6 per cent, depending on volume (a business model that Pandesic is currently in the process of changing).

BAAN

Baan IV delivers Web e-commerce capabilities primarily for managing the sales order fulfillment process from product selection to product feedback. Baan IV uses both Java and ActiveX to deliver access to Baan functionality through popular desktop browsers. Baan claims that by using the Web-enabled functionality in the Baan IV suite, users can manage the sales order entry and tracking process entirely via a Web browser. The processes include:

1. Browse item product catalog
2. Use product configuration manager.
3. Check item availability to promise
4. Enter order header/lines
5. Check credit, tax, shipment business rules
6. Commit order to database
7. Allow customer self-service access to order

8. Send status change notification e-mails
9. Send shipping/delivery documents bye-mail
10. Allow customer self-service to record claims/complaints.

ORACLE

Unlike those of the rest of the top four ERP vendors, Oracle's applications benefit from the company's ownership of many of the infrastructure tools required to support Web e-commerce, including, of course, a market-leading relational database. For example, you can use Oracle's application development tool Developer/2000 to build applications deployable across the Internet from Microsoft NT-or Unix-based servers via a Java-based client interface. Developer/2000 also includes Oracle Reports 3.0, which provides HTML and Adobe portable document format (.pdf) output so you can view reports generated by Oracle Reports on the server from within a client-based Web browser. Developer/2000 and Designer/2000 (a repository and data modeling tool) and a new Java-based integrated development tool are slated to be merged into a complete Internet-ready application development suite.

Oracle also has Oracle Application Server (previously known as Web Server), Oracle Commerce Server and Oracle Payment Server. These products deliver server centric, Java-based application deployment services and Web storefront building and management capabilities. Together, they represent Oracle's shot over the bows of Microsoft's Site Server. Oracle claims that its Commerce Server also offers seamless integration with third party Web e-commerce service providers such as Cybercash (digital money), Verifone (digital authentication) and TanData (shipment costing and management). This integration uses Oracle's cartridge components, an approach to integration similar to using COM-compliant objects that can be called from the order pipeline in Microsoft's Site Server/Commerce Edition.

Because much of Oracle's Application suite has been rewritten in Developer/2000, Oracle has been able to ship an early-to-market, fully Web-enabled version of its Oracle Application suite. It has effectively become possible to run any Oracle Application form from a Web browser. As a result, you can run any business process that Oracle Applications support piecemeal, or as a whole, over the Internet. This is where all the major ERP players are aiming to be.

PEOPLESOFT

PeopleSoft's Web e-commerce initiatives are behind those of its competitors because the company has focused more on the self-service aspect of using the Web than on e-commerce. This makes sense given PeopleSoft's' historical focus on human resource applications. A new version of PeopleSoft's Java-based Web client for accessing application functionality across its suite is available in PeopleSoft 7.5. PeopleSoft has focused some attention on delivering a richer EDI product for business-to business interaction by including better transaction exception handling and exception notification, through the use of drill-down browsers and e-mail. Trading partner profiles can drive special business rule-driven relationships that determine how workflows between those partners should be processed in the event exceptions occur (such as sending a purchase order acknowledgment document only if an order cannot be filled within a certain time frame). PeopleSoft has also pre-integrated the top ANSI X12 EDI transactions (such as #810 invoice or #850 purchase order) for easier generation and reception by the software.

10.4 SUMMARY

All ERP vendors are largely focusing on the use of Java for programming web related server objects and delivering web browser access to application functionality.

Business-to-Business web E-commerce for the leading ERP vendors is largely EDI based with initiatives focused on connecting web based storefronts and allowing web catalog driver procurement. EDI and EFT support E-commerce transactions.

Different ERP vendors SAP, BAAN, Oracle and PeopleSoft are providing self service aspect of using the web for managing different business functions such as sales order fulfillment, tracking sales order statements etc.

10.5 KEYWORDS

E-Commerce: Doing commercial transaction online

EDI: Electronic Data Interchange, the process of transfer of structured data between two trading partners agreed upon standard rules.

EFT: Electronic funds transfer optimizes electronic payments with electronically provided remittance information.

B2B: It refers to the full spectrum of e-commerce that can occur between two organizations.

B2C: It refers to exchanges between businesses and consumers

C2B: Consumers can band together to present themselves as a buyer group in a consumer-to-business (C2B) relationship.

C2C: involve transactions between and among consumers. These exchanges can include third-party involvement

SAP, BAAN, Oracle, PeopleSoft: Famous ERP vendor

10.6 SELF ASSESSMENT QUESTIONS

1. Describe E-commerce and its various categories.
2. What is EDI? How it is beneficial to organization.
3. Write a short note on:
    - Electronic Fund Transfer
    - Role of ERP vendors in E-commerce.

10.7 SUGGESTED READINGS

- Deborach L. Bayles, “E-commerce logistics & Fulfillment”, Pearson Education, New Delhi
- Willium J. Buffam, “E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities”, Pearson Education, New Delhi
- Marcia Robinson, “E-Business : Roadmap for Success”, Pearson Education, New Delhi
- Ravi Kalakota, “E-commerce : A managers Guide, Pearson Education”, New Delhi
- Kenneth C. Landon, “E-commerce : Business, Technology, Society”, Pearson Education, New Delhi
- Samantha Shurety, “E-Business with Net. Commerce”, Pearson Education Asia, New Delhi
- Efraim Turban, “E-commerce : A managerial perspective”, Pearson Education, New Delhi
- Kienam, “Managing Your E-commerce Business”, Prentice Hall of India, N. Delhi
- Kosiur, “Understanding E-commerce”, Prentice Hall of India, N. Delhi
- Ravi Kalakota, “Frontiers of Electronic Commerce”, Addison Wesley
- Whitely David, “Electronic Commerce”, TMH N. Delhi

- Schneider P. Grey, “E-commerce”, Thomson Learning
- Rayport, Jefforey, “Introduction to E-commerce”, Mc-Graw Hill
- Leon Alexis, “Enterprise Resource Planning”, TMH
- Parag Diwan, “Enterprise Resource Planning”, Pentagon Press

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Lesson: 11

ERP & E-BUSINESS

Author: Deepak Dembla **Vetter: Dr. Karam Pal**

STRUCTURE

11.1 Introduction
11.2 E- Business
11.3 Components of E-Business
11.31 SCM
11.32 CRM
11.4 Functionality of E-Business
11.5 Categories of E-Business
11.6 Internet Banking
11.61 Stages in Internet Banking
11.7 Security & Privacy Issues
11.8 Future & Growth of E-Business
11.9 Summary
11.10 Keywords
11.11 Self Assessment Questions
11.12 Suggested Readings

11.0 OBJECTIVES

After going through this lesson, you would be able to:

- Understand about e-business concepts.
- Have an insight on internet banking.
- Explore security issues involved in e-business.

11.1 INTRODUCTION

Ask a dozen Information System professionals what they understand by “e-business,” and you’ll probably get at least 13 different answers. To Some people, “e-business” means using the Web to do business-period. To others, it covers every imaginable application of information technology to business. To help characterize e-business in the total context of IS solutions; we can think about the role of IS within an enterprise in a five-era view. This approach divides IS functionality according to the changing purposes that IS resources have evolved to serve.

What distinguishes e-business from the earlier eras is that it represents IS solutions that extend beyond the enterprise. Inter-enterprise communications, and business-to-consumer communications, are the chief characteristics that distinguish e-business solutions from those of earlier eras.

This picture is a little oversimplified, because we have indeed been running inter-enterprise IS communications since the early 1980s, in the form of electronic data interchange (EDI) transactions. In fact, what we appreciate as real e-business depends on other characteristics as well:

- The use of the ubiquitous connectivity, business-to-business and business-to consumer, provided by the Internet
- The critical mass of consumers now having access to the Internet
- The universally approachable user interface provided by the World Wide Web browser paradigm
- The availability of robust security technology

The coming together of all these forces has brought enormous potential for radical reinvention of enterprises’ internal and external processes. The rapid maturation of the Internet has transformed the face of electronic communications, and the arrival and astonishing growth of the World Wide Web has made electronic communications much more usable, more standardized, and more available than ever before. With startling suddenness, the Internet has brought a general purpose and powerful information transport capability within the reach of every enterprise and consumer in the developed world.

Universal Internet availability has brought with it the opportunity for, fundamental transformation of every business process. Now that every enterprise has built-in capability for computer-to-computer communication with every enterprise, the potential for overhauling and streamlining every conceivable facet of business interaction is mind boggling. Even more mind boggling is the potential to create classes of business interaction never before imagined.

E-business is all about the practical realization of these mind-boggling opportunities-opportunities, in terms of business- to-business interaction over the Internet, in supply chain planning, analysis, and automation; catalogue management: order management (entry, confirmation, tracking. fulfillment. invoicing, and payment); warehousing and inventory management; shipping and freight: pricing; promotions; taxes; duties; reporting; customer relation management; customer service; customized product and service development; marketing. . . the list is endless. And these possibilities arc available to all types of enterprise, whether governmental, educational, nonprofit, or commercial.

One of the effects of e-business has been to enable a phenomenon that has been dubbed "disintermediation," wherein business functions provided by intermediaries have become redundant, because the Internet and World Wide Web now allow end users to perform functions directly. Examples of disintermediation are:

- Elimination of entire legions of customer service representatives, whose sole function was to provide an interface between a customer and a database or process (such as a product-ordering system)
- Elimination of middlemen of low added value, such as retailers of commodity products
- Replacement of expensive physical brick-and-mortar storefronts by electronic equivalents

Not without irony, a more recent effect of the proliferation of e-business has been the phenomenon of re-intermediation. While disintermediation of one-to-one and one-to-many relationships is a natural consequence of Internet technology.

Perhaps less obvious is the need for new intermediation of many-to-many relationships. The Internet opens up the means and the scale through which many-to-many relationships can exist and flourish. Without intermediaries, these kinds of relationships cannot be efficient given the scale, complexity, and amorphousness of the Internet-business partners cannot economically find each other, negotiate terms, ‘or transact business. Responding to this need, intermediaries appearing in various guises such as trading groups, e-market makers, channel enablers, commerce networks, and online exchanges have come into being.

E-business is good news for some, bad news for others. It’s good news for those who welcome new opportunities to get a jump on traditional competitors. It’s bad news for those who prefer the status quo. The stark reality is that e-business is not optional. It’s not something your business can think about maybe taking a crack at someday. Companies that build the better e-business solutions will outperform their competitors. Companies that build the very best e.-business solutions will transform themselves into zero-latency enterprises. Companies that choose not to embrace e-business, or do so ineffectively, will under perform or be driven out of business.

11.2 DEFINING E-BUSINESS

Internet has turned the whole world into a virtual market place, thus removing the country barriers that have existed so long. You can now log into the website of your favorite florist, sweet mart, book store, dress outlet, hotels, choose the item of your liking, place an online order for it, pay over the net through credit card and have the item couriered to you. To put it in a nutshell, you the end customers have got the power to do online shopping. This concept has got popular as e-commerce.

Figure 11.1 depicts the hierarchy in the business community. The parent member is the manufacturing industry. It could be yam manufacturing, automobile, food processing, or plastics. The manufacturing firm forms the first link in the chain. In some cases, it could be the importer also, in case the goods are not made indigenously. The next link is the countrywide distributors. Then the region wise wholesalers, the next one are the retailers from whom, you will buy and finally, it is you, with whom the sequence terminates. The concept of e-commerce consists of making the process of you buying from the retailer e-based. This has been reckoned as the first phase of Internet influence into business.

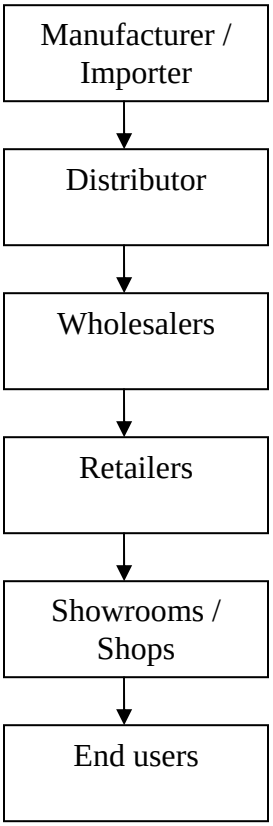

Figure 11.1: Business Community Hierarchy

With the concept of e-commerce, the customer can now:

- Buy anytime, 24 hrs. a day
- Buy at competitive rates
- Get home delivery
- Buy the latest in the market
- Make payments through credit cards
- Participate in the process of churning quality goods by posting his views to be taken action on.

Now, what all these mean to the business world is:

- Every retailer has adequate stock at all times, else has a tie up for acquiring stock in times of shortage
- Every business is aware of the happenings in the market, so that it can stay competitive
- The distributors are very efficient and are able to communicate in times of crisis, so that the outlets can be proactive
- Every business house should have knowledge about the technological advancements in his field to be able to deliver the trends
- All showrooms have business understanding with financial institutions to be able to offer lucrative loan schemes to the customers
- Every business house be broad-minded and respect consumers intelligence

The fruits of e-commerce can be reaped only it the business backbone is strong and adapts accordingly to form an integrated environment, where the manufacturers, distributors, retailers, technology givers all come together and work. This is the manufacturers, distributors, retailers, technology givers all come together and work. This is the second stage of the influence of Internet on business, where, the various business processes are becoming e-based. Every business house will have is its web presence, where its distributors, retailers, bankers, transporters, come together. This is the concept of e-business, e-business aims to automate and streamline the working of links in a business-chain by integrating their working. For, example in the case of manufacturing industry, the links could be the factory, stores, distributor, stockiest and the showroom. This scheme also makes communication between the interacting parties transparent.

11.3 COMPONENTS OF E-BUSINESS

Figure 11.2 shows e-services to be forming the superset for the e-commerce and e-business and e-commerce domains are shown to be intersecting since, e-commerce also finds place in the e-business chain. Whenever, a retailer purchases his stock from a wholesaler, the transaction is also considered as an e-commerce transaction.

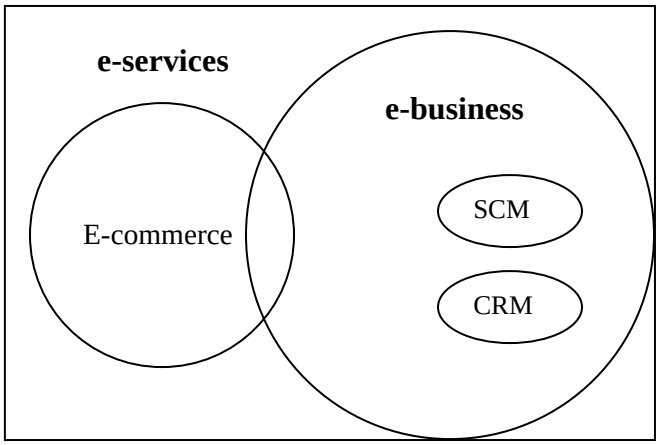

Figure 11.2: Components of E-Business

The Figure 11.2 further shows the two components that comprise e-business. They are:

- Supply Chain Management (SCM)
- Customer Relationship Management (CRM)

11.31 Supply Chain Management (SCM)

In the past, supply chain was viewed as:

"A network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers."

These processes were usually managed in a silo-like structure by individual departments of a company. Information was not shared with suppliers and distributors, who were viewed rather as competing forces than potential partners. SCM included an array of disparate functions such as logistics, transportation, purchasing and distribution.

The approach to SCM changed in the 1980s, when companies started to realize that managing relationships with other supply chain participants and sharing information might bring greater benefits.

Today, the definition of SCM is much broader, and has come to include areas such as collaborative product development and demand forecasting:

"Supply Chain Management is a set of approaches utilized to efficiently integrate suppliers, manufacturers, warehouses, and stores, so that merchandise is produced ,and distributed at the right quantities, to the right to locations, and at the right time, in order to minimize system wide cost while satisfying service level requirements."

Supply Chain Strategies

Push Supply Chain

In the 'push' supply chain model, manufacturing decisions are made based on demand forecast, which are often long-term. Inventory of finished product is created based on these forecasts, and then sales and marketing techniques are used to 'push' these products, generating sales from Customers.

An issue with the push technique is that often the long-range demand forecasts can prove inaccurate. This causes inventory pile-ups along the supply chain or the 'Bullwhip Effect' which occurs when the variability in information increases as one moves up the supply chain away from the customer. Small changes in demand results in large inventory fluctuations upstream in the supply chain.

Inaccurate information about quantities demanded causes the need for large safety stock and often results in low service level.

Pull Supply Chain

In a 'pull' supply chain manufacturing is fully demand-driven, which means that the production process begins after an order from a customer is received. In a pure pull system a company has no inventory. This strategy seems to be the most attractive from the cost point of view as no inventory-related costs are incurred; however it may hinder the benefits of economies of scale resulting from producing large quantities.

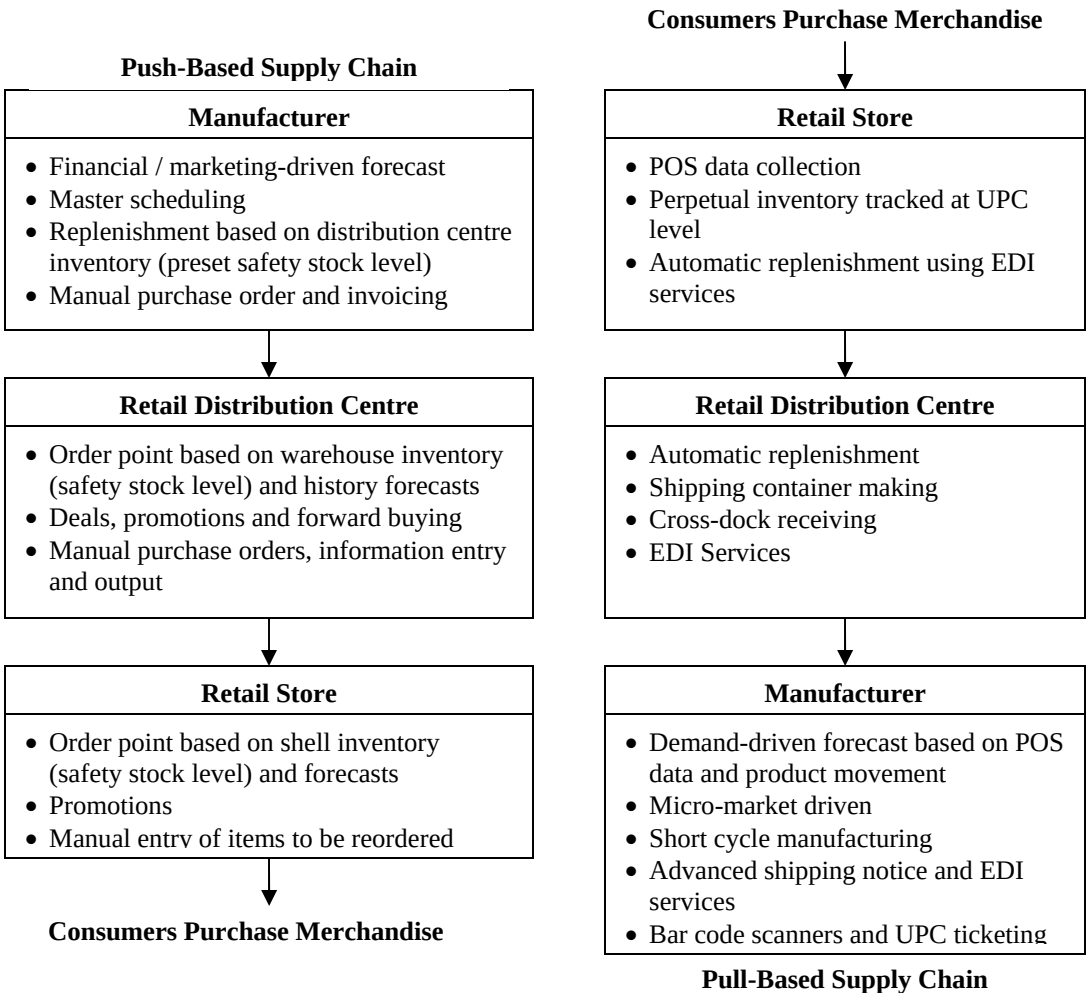

Figure 11.3: Push versus Pull Supply Chain

Components of Supply Chain Management

- Supplier management. Use electronic commerce to help reduce the number of suppliers and get them to become partners in business in a win/win relationship.
- Inventory management. .Shorten the order-ship-bill cycle with electronic commerce processes, and keep inventory levels to a minimum.
- Distribution management. Use electronic data interchange to move documents related to shipping (bills of lading, purchase orders, advanced ship notices, and so on.)
- Channel management. Use E-mail, bulletin board systems, and news groups to quickly disseminate information about changing operational conditions to trading partners.

- Payment management. Use electronic funds transfer to link the company and systems suppliers and distributors so that payments can be sent and received electronically.
- Financial management. Use electronic commerce systems to enable global companies to manage their money in various foreign exchange accounts.
- Sales force management. Use sales force automation methods to improve the communication and flow of information among the sales, customer service, and production functions.

11.32 Customer Relationship Management

CRM is the second component of e-business. CRM refers to - "one point contact between the supplier and the buyer". The buyer can register his complaints and ensure corrective actions are taken. He can monitor the progress of the action closely. It involves viewing customer interactions at various levels to sense his sensitivity, and ensure his satisfaction. It also helps the companies to retain the existing customers and increase their profitability in the market.

Anyone can keep one ball in the air; some can even juggle two or three. But what customer relationship management requires is that the whole company work together to keep the flaming sticks, bowling pins, and razor-sharp knives of customer demands in the air. CRM is defined as an integrated sales, marketing, and service strategy that precludes lone showmanship and depends on coordinated actions. The goals of this business framework are as follows:

- Use existing relationships to grow revenue: Composite a comprehensive view of the customer to maximize his or her relationship with the company through up-selling and cross-selling. Enhance profitability by identifying, attracting, and retaining the best customers.
- Use integrated information for excellent service: Use customer information to better serve his or her needs. It's about saving time and easing frustration for customers. For instance, they shouldn't have to repeat information to various departments over and over again. Customers should be surprised by how well you know them.
- Introduce more repeatable sales processes and procedures: With the proliferation of customer contact channels, many more employees are involved in sales. In order to enjoy

continued success, companies -must improve consistency in account management and selling.

- Create new value and instill loyalty: It can be your point of difference, your competitive advantage, to become a company known to prospects and customers for the ability to respond to needs and accommodate requests, a company well deserving of their patronage, a company to which they will become loyal.
- Implement a more proactive solution strategy: Use a customer-focused business solution that works across the entire enterprise. Instead of just gathering data and eventually using it, eliminate issues before they reach the crisis stage. Move from reactive data collection to proactive consumer relations that resolve problems on the first call.

Becoming customer focused doesn't necessarily mean improving customer service. It means having consistent, dependable, and convenient interaction with customers in every encounter. As you can see, CRM is an integration framework or a business strategy, not a product. Putting the CRM business strategy into practice requires developing a set of integrated applications that address all aspects of front-office needs, such as the need to automate customer service, field service, sales, and marketing. To succeed, companies are looking to application software vendors to support integration across the range of business functions.

Managing the Customer Life Cycle: The Three Phases of CRM

There are three phases of CRM: acquisition, enhancement, and retention. Each has a different impact on the customer relationship and each can more closely tie your company to your customer's life and dance card.

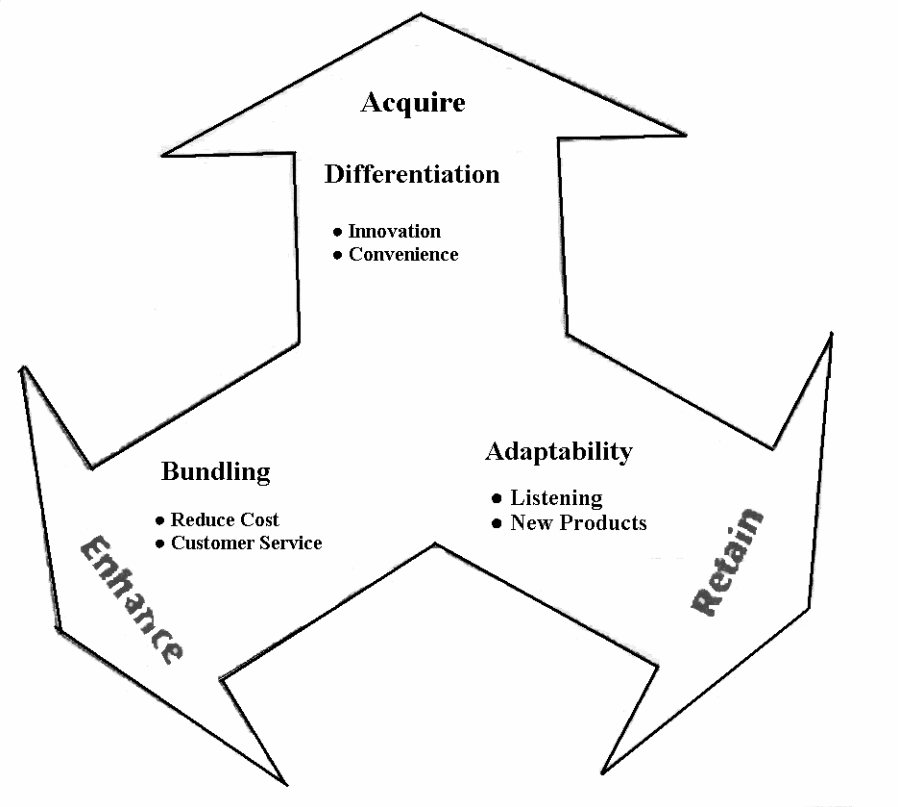

Figure 11.4: Customer Life Cycle

1. Acquiring new customers: You acquire new customers by promoting product / service leadership that pushes performance boundaries with respect to convenience and innovation. The value proposition to the customer is the offer of a superior product backed by excellent service.

2. Enhancing the profitability of existing customers: You enhance the relationship by encouraging excellence in cross-selling and up-selling. This deepens the relationship. The value proposition to the customer is an offer of greater convenience at low cost (one-stop shopping).

3. Retaining profitable customers for life: Retention focuses on service adaptability delivering not what the market wants, but what customers want. The value proposition to the customer is an offer of a proactive relationship that works in his or her best interest. Today, leading companies focus on retention much more than on attracting new customers. The reasoning behind this strategy is simple: If you want to make money, hold onto your good customers. But don't be fooled; it's not as easy as it seems.

11.4 FUNCTIONALITY OF E-BUSINESS

E-Business offers following functionalities:

- Business-business commerce: It refers to buying and selling between the business chain members. For example, when a retailer store or outlet buys his stock from a distributor, it comes under the category of business- to-business ecommerce.
- Online retailing: The documents involved in making the sale from the distributor to the retailers are fully online. The retailer first raises the purchase order. The P.O. is transmitted through the net and the dispatches are made against it on credit.
- Corporate purchases: When companies buy low cost items in bulk, like pins, paper, compact disc, it is known as corporate purchase. Online buying of such items offer great discounts. Also it helps the corporate to save on a lot of time as the Internet has turned this labor and paperwork intensive work of ordering MRO (Material, repair and organizational material) into an easy task.
- Reduces inventory-holding cost: The inventory system is no more centralized, B-2-B is responsible for integrating the inventory information of and the distributors of a company. Therefore, the dispatch to the demand center is done from the supply center, which is the most cost effective in terms of distance, provided they have the stock. In a cyclic fashion, the supply center gets replenished.
- Helps achieve VCI (Value Chain Integration): In any business-line, each link adds to some value. For example, consider a manufacturing concern. Distributors, retailers and outlets form the value chain When, we integrate their inter communication channel it is VCI. The links with the company are on the same platform, capable of sharing information. Hence delays of all kinds can be anticipated and plugged. The reporting structure also becomes more accurate, since it happens only once and not in layers.

Unified Customer Channels: The process of integration has also helped in achieving CRM. This improves:

- Customer satisfaction and retention by deploying appropriate .communication channels or multi-channel strategy, using the Internet, phone, face-to-face meetings to effectively sell the products and service the customers.
- Increase customer satisfaction and reduce his defections to another product brand

- Customer-Company relations. Efforts to make the relations one to one are taken by companies. Door to door surveys, TV shows, etc., are the touch points to achieve 1-1 relations. Information from all business touch points (points of contact between the company and customer, could be media shown ads, interviews, surveys.

11.5 CATEGORIES OF E-BUSINESS

The following categories have been selected, because of their proven success on the Internet. Many other categories exist and in order to make one of these categories successful it needs to interact with the other categories. Commerce, for example, without marketing and communication does not make a lot of sense. These categories need to work together, both offline and online. The Internet offers huge possibilities to integrate the categories and automate the interaction between the processes.

- **E-Auctioning**

Auctioning on the Internet has become a new dimension. In traditional auctions a number of people turned up at the auction house and some people were allowed to bid over the phone. Getting to the auction house or bidding over the phone did involve costs, which may be higher than the value of the goods. Either auctions were restricted to a location or to a very exclusive circle of people.

The Internet makes auctions more democratic allowing everyone with an Internet connection to bid for any good offered. Everyone is able to go to the auction web site with a click, no matter where the server is located physically. The Internet also speeds up the bidding process. In the real world it can take quite a while until a final bid has been made. On the Internet most live bids are over in a few seconds. During the live bid an auctioneer registers the bids and hands over the goods to the highest bidder.

Besides the live bid, the larger sites offer bidding for everyone. The auction sites offer the possibility to present goods on a web page, which belong to individuals and that they want to sell. These private auctions are not live, the bidders place their price onto the web page and the auctioneer waits until a certain value has been reached or a time limit has been passed and then

hands out the goods to the lucky one. Suddenly everyone does not only become a bidder, but also has the possibility to organize an auction.

- **E-Banking**

Electronic banking is one of the most successful online businesses. E-banking allows customers to access their accounts and execute orders through a simple to use web site. There is no special software to install other than a web browser ‘and many banks do not charge for this service. Some banks even lower costs for online transactions versus real life banking transactions. Electronic banking saves individuals and companies time and money.

Online banking puts the power of banking into the hands of the customer and allows the customers to self-service themselves with all their banking needs, just as customers have become used to getting money from an automated teller machine (ATM) instead of walking up to the cash desk in-the bank. With this online service, customers can view their account details, review their accounts histories, transfer funds, order checks, pay bills, re-order checks and get in touch with the customer care department of the bank. The only transaction that currently can’t be done is the withdrawals of cash, but banks are working on resolving this problem.

- **E-Directories**

Directories have always played an important role in finding a particular service or product. Telephone directories, the- so-called white pages for private telephone numbers and the yellow pages for businesses have been essential in locating a person or business. In addition to the directories in book form the telephone companies allowed people to call in to ask for information.

These two functionalities have been merged on the Internet. The database is located in a single place, providing a centralized functionality, but offering it to anyone at any time, making it a decentralized solution.

The Internet offers the possibility to replicate the phone directories without many hassles, but it can do more than just search for a name and receive a phone number. On the Internet, for example, it is

possible to enter a phone number and get the name. Moreover new directories are necessary to locate the web pages of people and businesses and their e-mail addresses.

The Internet makes the retrieval easier and more difficult at the same time. Easier, because the means of searching are more powerful. But finding a particular piece of information has become more difficult as the amount of information has increased dramatically with the introduction of the Internet.

- **E-Engineering**

Engineering has also changed dramatically over the last few years. Just a few years ago, engineers working on a draft needed to be all in the same office to work effectively. If a design needed to be sent out to another location, large prints needed to be made, which were sent via posta1 service to the other location. There the design was refined, checked or processed. All these processes involved a lot of manual work, making them slow and error-prone.

The Internet changed the speed of design. It enabled electronic collaboration to a much higher degree than was possible ever before. The location of the engineers does not play a role any more. Everyone with an Internet connection is able to take part in the development. New tools for concurrent development have been developed to support the possibilities of the Internet.

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Through the Internet is has also become possible to develop continuous engineering by letting engineers participate from all over- the world. Open source development is done that way very efficiently. Anybody is able to take part and can donate a piece of code whenever there has been some time to program it.

- **E-Franchising**

In the past, big traditional franchising companies like McDonald’s and Benetton have made their money by vending their products and brands to resellers who sell exclusively the products of the franchising company. These resellers are called franchising partners. By offering a set of products and brands the franchising company guarantees a certain success for the retailer, as people tend to like buying these products, as the brands are well-known. The advantage of the franchising

companies is that they do not need to invest in shop personnel, for example. The franchising partner is responsible for the employees and the financial success of the single outlet.

Electronic franchising works very similarly. It has become actually much easier on the Internet. Moving digital product, processes and brands is extremely easy. The affiliation programs of the large booksellers on the Internet are one example. They are not truly franchisers, as the large booksellers have their own store. But they allow franchising partners to exclusively distribute their products on the partners' web sites. The advantage of this system is that there is no distribution costs involved. It is possible to link to the original products without letting the customers know.

- **E-Learning**

The constant change in the Internet requires also a change of learning. In the industrial age, the; subjects and the content taught did not change a lot. Changes to the curriculum did occur over the years, but compared to the Information age change was extremely slow. Having a job for forty years, working in a steel plant, for example, is not possible anymore. Fluctuation between jobs is much higher, which requires a readjustment of the job focus. New technologies appear in Internet time, which require learning new technologies, paradigms and processes all the time. Long-life learning has become a necessity, as teachers need the same time to learn a new subject just as long as the pupils need to. As knowledge becomes a major income factor, it is often not possible to wait and learn a thing in a school.

Computer-based training (CBT) has been introduced a few years ago, making it possible to learn via computer. Software is used to explain the subject and then tests the pupil. Although this is an effective way of learning some subjects, there is nobody you could ask, in case of a misunderstanding.

Electronic learning sometimes also called Internet-based training (IBT) offers a new dimension in digital learning. Instead of receiving an executable file, which is used to explain and test a subject, the material is presented online. Tests are executed in real-time together with other participants and the pupils are able to exchange ideas and questions. In addition an online teacher can be offered, which is a real teacher, who may explain topics to anyone attending a course, no matter where the

people are located. This can all happen in real-time. Instead of waiting for the next hour, the students can connect to the learning network, whenever they want, making the learning experience more individual, and allowing people to learn at their own pace.

An Internet-based training can also be offered to students, before the complete course is available. For hot topics the course can be developed at the same time as the students start to learn.

- **E-Mailing**

Many people do not think about e-mail when talking about digital business. But communication is the basis of all business. The Internet breaks into the traditional communication markets. Postal services and telecommunications companies are losing market share to the electronic communication, especially e-mail. E-mail combines the strengths of phone calls and letters. The advantage of a phone call is its immediacy and the letter has the advantage that everything is in written form. The Internet enables instant communication in written form, either bye-mail or online chat.

More and more businesses are talking digitally to each other. Other than a phone call, e-mails can contain more than just the text. It is possible to attach files, which may, for example, contain formatted documents, presentations, images or sounds. Information can be shared much more easily.

E-mail does also change the way people communicate: Instead of writing down every aspect in a single letter, thoughts may be spread over multiple emails. The advantage is that a thought may evolve through instant response, but it also means that you expect instant response to every e-mail that has been sent out, just as everyone expects a response from you.

- **E-Marketing**

Traditional marketing was focusing on target groups and creating a positive image for that particular group. Communication in advertising was one way only. The marketing team could not get immediate results on the customer reaction. In the pre-information society this was fine, as

there was time to do surveys and publish the results, which influenced the company strategy and the products.

In the information society everything has started to flow. Products, strategies, prices, everything depends on the customers' needs. Everything becomes much more customer centric. The demands of the customer directly affect product design, marketing strategies, and the product pricing. As marketing traditionally has direct ties to the customer, the information flowing back from the customer in real-time needs to be passed on to the appropriate department within the company to react in real-time to the ever faster changing demands of the customers.

The Internet allows companies to react to individual customer demands. All customers can be treated in their preferred way. One-to-one marketing has become the standard way of dealing with customers over the Internet. One-to-many marketing does not work any more in Internet time.

- **E- Trading**

Before the Internet, buying and selling stocks was restricted to people with access to financial networks, in order to buy and sell the stocks at the right moment. Others could only get the stock quotes in the newspaper, which was fine, if you did not want to make money fast with the stock market.

The Internet has changed the way stocks are traded. E-trading, often also called E-brokering offers the real-time stock prices to every desk throughout the world. People are able to react in real-time to changes in the stock market. Everyone with an Internet bank account is able to buy and sell stock. This enables anyone to participate in the stock market and earn money by investing. Although the stock market is more risky than ever through the computer based trading, it also offers access for people who did not even know what a stock option was a few years ago.

11.6 INTERNET BANKING

"Internet banking" refers to systems that enable bank customers to access accounts and general information on bank products mid services through a personal computer (PC) or other intelligent device.

It simply means, conducting banking business by using the internet, which is a worldwide network of computers that use certain protocols for data transmission and exchange. It involves the use of internet for the delivery of banking products and services. It is a cost-effective delivery channel for financial institutions. The internet banks, depending upon the types of services they provide to customers can be divided into three categories:

- Complete Internet Bank/Virtual Banks
- Semi-Internet Banks
- Pseudo-Internet Banks.

Complete Internet Bank/Virtual Bank:

The virtual banks traditionally have no branches and no ATMs. NetB@nk, Telebank, Computebank, Security First Network Bank, et al., all foreign banks are the examples of virtual banks. In India, presently, we do not have any virtual bank

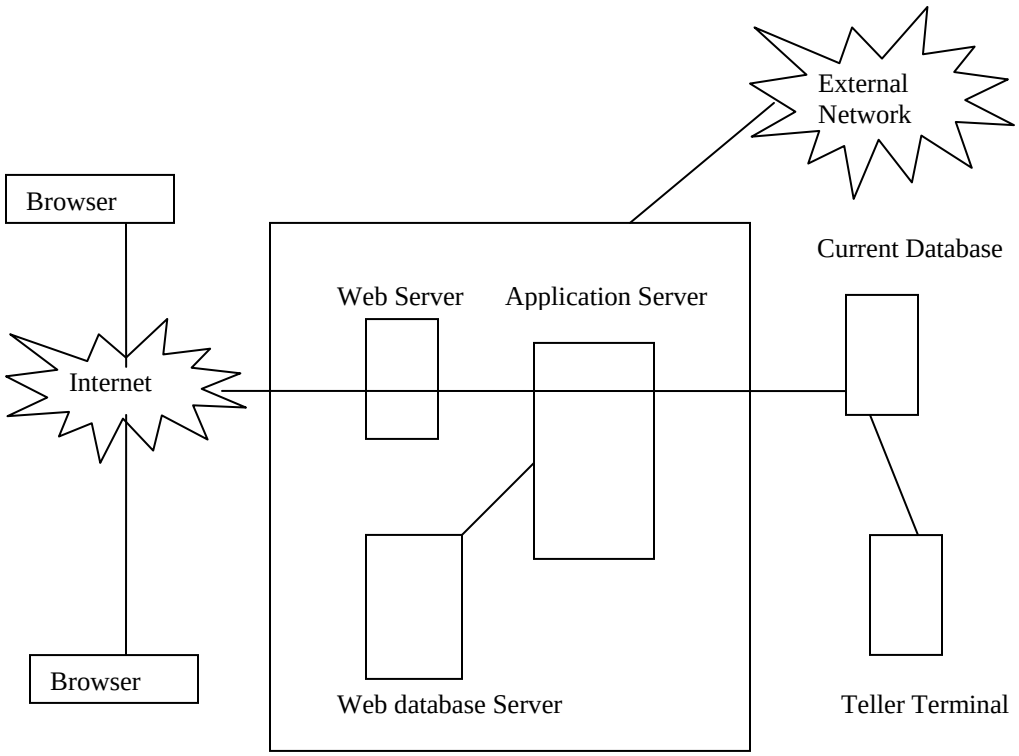

Figure 11.5: System Architecture

The system architecture for a virtual bank, having three main components:

- Web Browser

  The browser is the user interface, through which the banks customers interact with the web server.
- An NT Box

  The NT box interacts with various external networks.
- Central Database

  The central database is a store for all data kept by the bank. The transaction is recorded on the central database through the teller terminal.

Semi Internet Bank:

Semi-internet banks are often large traditional banks with large branches, A TM network, large staff and provide comprehensive banking services like opening new account or canceling the cheques, or knowing the balance online.

Pseudo internet Bank:

Pseudo internet banks, on the order hand operates on the customer's PC by introducing PC banking software. The customer, dials through the secure phone line and downloads the transactions. In fact, this is not internet banking and most banks, offering PC banking services are transitioning their customer to web-based banking.

Internet banking products and services can include wholesale products for corporate customers as well as retail and fiduciary products for consumers.

Ultimately, the products and services obtained through Internet banking may mirror products and services offered through other bank delivery channels. Some examples of wholesale products and services include:

- Cash management
- Wire transfer

- Automated clearinghouse (ACH) transactions
- Bill presentment and payment

Examples of retail and fiduciary products and services include:

- Balance inquiry
- Funds transfer
- Downloading transaction information
- Bill presentment and payment
- Loan applications
- Investment activity
- Other value-added service

11.61 Stages in Internet Banking

Stage 1. Internal Basic Electronic-Banking

In this stage the all main internal activities of the bank are to be performed by the help of the Computer and by the help of the other basic machines. The functioning of the internal system becomes very fast and- the customer gets the benefits of it indirectly. The system or machines needed for this stage are as:

1. Electronic or Computer based information system.
2. Proper well maintained Network.
3. The proper well organized human resource.
4. The basic machines like “Counting machines’ “Authentication Apparatus” etc.
5. The proper maintenance and control.

In this stage the basic changes in the infrastructures are related to the physical changes’ and the development in the banking staff and no change affects the way of all operations done at the customer level. The infrastructure is very limited up to that Bank only.

Stage 2. Complete Internal Electronic banking

In this stage the all system of the banking operations are totally latest technology based and complete operations are to be performed electronically. All banking operations are supposed to be done by the means of the electronic machines. The main aim of this is to provide the fast and the efficient way of the banking. The customers also get the basic advantage of the same. The main features of this stage of the banking are as:

1. The complete computerized office.
2. The complete and secure electronic transaction of the data or the information.
3. The use of the latest networking technology to provide fast data transmission.
4. The need of the well-trained staff to operate the all machines.
5. The basic system is made and maintained to help the customer to perform under the design of the new working criteria or environment.
6. The proper maintenance and climate (physical) is developed to avoid the interruption.

At this stage some basic changes are needed to go for the use of the latest best way of operation handling. But the set-up infrastructure is limited to the main bank or to the near-by branches only.

Stage 3. Personal Interactive electronic Banking

In this stage the main concentration is given on the use of the technology the environment to provide the basic advantage to the customers by the use of the typical machines to go for the machine-man interaction for many activities from the customer part. The main features of this approach are as:

1) The some basic machines are installed at busy locations go provide the basic advantage to the customer.
2) The customer needs not to visit the bank's office for the many operations.
3) In India this stage of banking is performing at the very large stage and banks are being differentiated on this base.
4) The main machines are being used under this approach or stages are like "ATM", "Card Reader", "Conversion Machines" etc.
5) The main technology being used is as "Digital Cash Handling", "Proper Remote Sensing", "Digital Money Transfer" "Security Related Protocol" etc.

6) The functions and the area of operation of a particular bank has improved Up" to the marginal level.
7) The customers are enjoying the functioning and the growth rate is very high.

The infrastructure needed is totally based on the easiness of the customer and the full proof security reasons. The main target is to provide banking services at the remote area by the help of the well maintained system by the bank and the basic training: is given to the customer about the use of the facility provided to them.

Stage 4. Global Banking

In this approach the main concentration is kept on the main points related to increase the functions of the bank beyond the limited boundary even beyond the national boundaries, it may only be limited up-to the information seeking at everywhere by the help of the "Satellites", "Telephonic Networks' and most basic by the help of the "Internet", The main features of this approach or stage are as:

1) The concentration is to go for the "Global Operations".
2) To step foreword in the direction of the "Branchless Banking".
3) To provide the basic 1 00% security over the Banking Network.
4) The main aim is to compete with the international banking operations or the banks.
5) The "Internet Technology" is being used as the base technology for this stage.
6) The banking operations are to be performed by the help of electronic machines and the banking related functions can be performed even from the remote area without visiting the bank even once.

The Infrastructure is totally based according the "Virtual Banking Technology" and not too popular in India but very popular in USA and UK mainly.

11.7 SECURITY AND PRIVACY ISSUES

The E-business applications need support on three fronts, given as under:

1. Internet and its services notably the communication services, web services/and database services.

2. Application support such as setting up Market/malls and stores, and associated inventory and financial management.
3. Security technologies for identification of persons, valid transactions, secure communications, and secure web pages, catalogues/databases and other information stores.

The key components of online security are privacy and authentication. SSL is the most popular encryption technology used to ensure privacy during online purchases. Encryption utilizes public key infrastructure to encrypt and decrypt sensitive information. Digital signatures are used to authenticate the identity of web sites so that consumers can be sure they are giving their payment information to the company they intend to. Firewalls are used to decrease the risk of Internet hackers gaining access to a company's private networks and sensitive information:

E-Commerce Security Technology

The unique nature of the threats to e-commerce companies requires new technologies and systems to provide a secure transaction environment. Due to the openness of many of the networks that comprise the Internet, it is relatively easy to have your privacy invaded (e.g., it is relatively easy for cable-modem users to view the e-mail of neighboring cable-modem users on the same system by downloading free software to their computer. Although no site on the Internet is ever 100 per cent secure, several technologies can be employed to help reduce the risk to companies and their customers when conducting e-commerce transactions.

Passwords

Password protection may be the most common security measure found in computing today. Logins and passwords are used to identify who is trying to access a site or part of a site. When attempting to access a secure area, customers are presented with a screen that requests a user ID or login and a password (the password protects secure accounts). Upon supplying the appropriate password for that user ID, the customer is allowed to access confidential information pertaining to his or her account (e.g., order status, shipping address, and payment information). By setting up and using art account, customers are prevented from having to reenter their name, address, and payment information every time they place an order.

There are two primary drawbacks that tend to make passwords less secure than other security methods:

- First, people are not always diligent about keeping passwords secret. Users can share their passwords with "friends," write down their passwords in places where they can be found, or choose passwords that are easy to guess.
- Second, many websites allow for login-information to be sent in an unencrypted manner. Because of this, a hacker with sniffing software (software that allows a hacker to read packets moving between a site and its users) could inspect packets going to the server and steal user passwords.

Encryption

Since so much personal information (e.g., names, addresses, and credit card information) is sent across the Internet during e-commerce transactions, there is a need to ensure that this information is kept private while it is being communicated between the customer and the site. Encryption technology encodes and decodes information transmitted over the Internet so that-only the sender and intended recipient can read the information. This is accomplished through the use of complex mathematical formulas. Well-designed encryption software uses formulas so complex that it would take most powerful computers years to figure out how to decode the messages (although with processor power increasing exponentially, there is a need to keep improving and upgrading encryption standards). This is why encryption is not used for every transaction on the Internet. The processing load of making the calculations to encrypt all data sent to a server would make those servers run too slowly for practical use. Instead, encryption use is reserved for the transmission of sensitive data, such as credit-card number.

Public key Infrastructure (PKI)

You might be wondering if a third party who steals encrypted information could just use any piece of encryption software to decrypt the stolen information. This cannot happen. Encryption software uses pieces of additional software called keys to ensure that only the creators and intended recipients of encrypted information are able to access it.

For encrypted data to be transmitted from one computer to another, a set of two keys is required. One of the keys is called a public key and the other is called a private key. The public key is used for encrypting data that will be sent to a computer that has the corresponding private key. This private key is used for decryption of data sent to it from a computer that has encrypted the data with its corresponding public key. Any user who wants to be able to receive encrypted data from other users can use a set of these keys to accomplish the task.

For example, if you wanted all of your friends to send you e-mail in encrypted format, you would simply get a set of keys (one private key and one public key) and distribute a copy of the public key to each of the friends you want to have send you encrypted e-mail. Your friends would then use their encryption software with your public key to encrypt their e-mail to you, and e-mail the message to you. You would use your private key (which only you possess) to decrypt your friends' messages and read them. However, if you wanted to be able to send one of these friends' encrypted replies to her messages, then your friend would have to get a set of keys for herself and send you a copy of her public key. Only then could you encrypt messages to send to her. Therefore, for two parties to carryon encrypted communication back and forth each has to have a set of two keys (one public and one private) for a total of four keys altogether.

Managing Secure Transactions

Although SSL makes the process of sending order information in a secure manner easy for customers, there are many things that have to happen behind the scenes when an order is placed on the Web. To process the payment, the credit-card number for the order must be authorized by the cardholder's bank. Secure Electronic Transaction (SET) is a protocol that facilitates the secure authentication of credit-card transactions on the Web as well as other payment processing issues such as debit-card transactions and credits back to credit cards.

- **Securing Companies from External Attack**

Consumers are not the only ones who need to be protected from unscrupulous interests on the Internet. Companies need to protect themselves against the threat of a worldwide base of hackers who can damage a company's reputation and profitability. These attacks can range from virus attacks to stealing customer credit-card information from internal company databases.

- **Screening Routers**

Most routers today can do more than just identify the best path for a packet and pass it on. Routers can also be setup to screen packets as well. Routers set up for this purpose are known as “screening routers.” The primary difference in their function is that they not only look at whether they can forward a packet, but -also check to see whether they should forward a packet. This determination is made based on rules that the network administrator sets according to the company’s security policy. For example, if users inside of a company need Web access but do not need FTP access, a screening router can be configured to prevent all FTP traffic from traveling between the Internet and the company’s internal network. This setup would, prevent any employees from accidentally downloading a virus via FTP. It would also prevent an employee from setting up an Internet-accessible FTP server on her PC that could allow hackers to see sensitive files.

- **Proxy Servers**

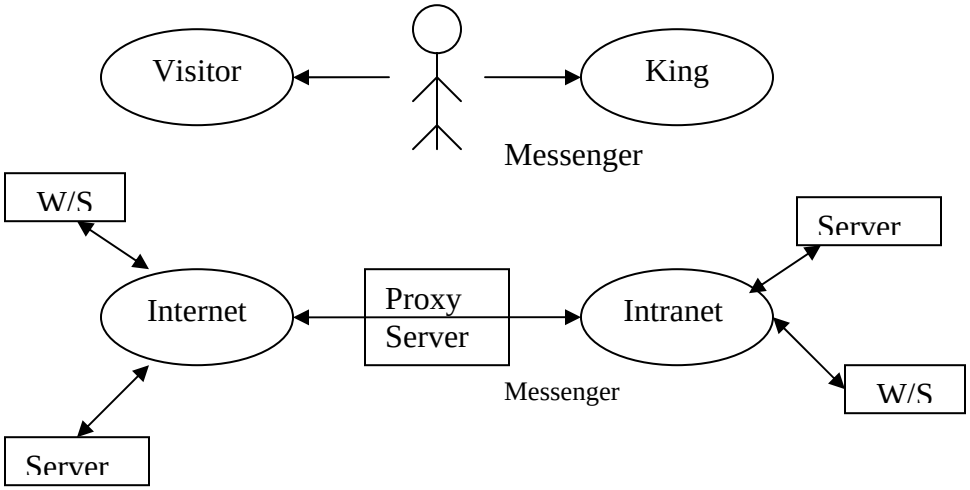

Figure 11.6: Proxy Server

The primary purpose of a proxy server (also called a gateway) is to forward packets on behalf of PCs on a company’s internal network to the Internet. When using a proxy, if a computer on the company’s network wants to request something from the Internet (e.g.., a webpage), instead of directly contacting the server it wants to access, it request for the information from the proxy server. The proxy server then contacts the site on the Internet and makes the request for the information as if it were requesting the information for itself. After receiving the information, the proxy-server forwards it on to the appropriate computer on the internal network. The true identity of the computer requesting the information is never transmitted across the Internet. To computers

on the Internet, all requests for information from proxy-server users appear to be coming from the proxy server itself. This has an important security benefit because it prevents the identities (IP addresses) of individual computers inside a company's network from being "published" to the Internet whenever a computer on the internal network accesses the Internet This anonymity makes it more difficult for hackers to access computers on the internal network, keeping the network more secure.

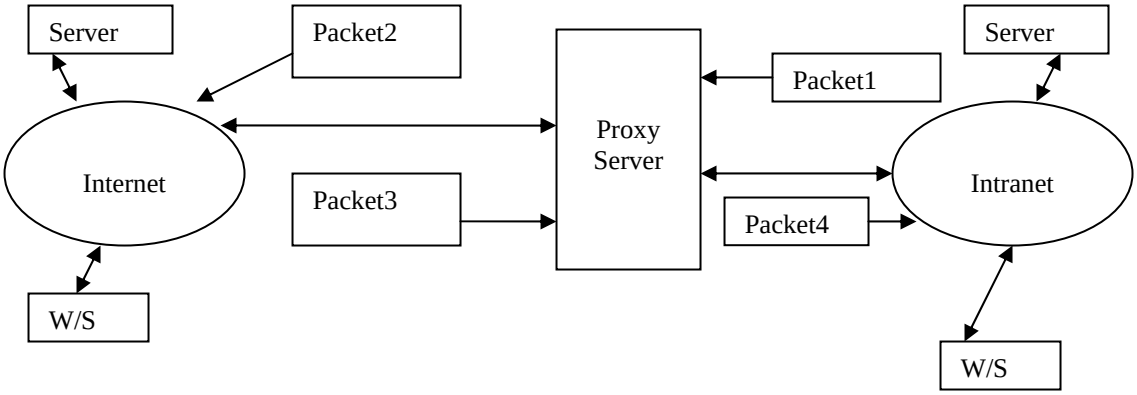

Figure 11.7: Working of Proxy Server

Proxy servers provide other benefits beyond security. Many proxy servers support caching (temporary local storage) of recently requested information. This means that if several people in a company use the same website often, the proxy server will automatically store a copy of the viewed pages for that site on its local hard disk. When a user makes a request for a page that is cached, the proxy server will send a copy of the page from its local hard disk over the company's fast local network instead of going out onto the Internet and pulling the page down again. This saves users time, since obtaining the document is faster over the local network, and it also preserves Internet bandwidth, since the most frequently used pages will not require frequent re-downloading from the Internet. Another benefit of using proxies is that they increase scalability. Because individual computers on the company's local network are not directly accessing the Internet, they do not need to have globally unique IP addresses. Only the proxy server needs to have such an address, because (according to other computers on the Internet) only the proxy server is making requests. This simplifies adding new users to the internal network, since addresses for computers on the local network need to be unique only to the local network, not worldwide.

- **Firewalls**

A key piece of infrastructure used to keep hackers out of a. company's internal network is the firewall. A firewall is essentially a computer (or specialized compliance) that sits between the Internet and anything a company wants to protect such as a Web server or the company's internal network. A firewall functions similarly to antivirus software for PCs, except that instead of looking on a hard disk for malicious content, it looks at packets coming over a network connection, while they are in transit. Firewalls perform what is known as stateful inspection. This means that rather than just looking at source and destination information, or the type of service the packet is used for (such as FTP or HTTP), the firewall actually looks more closely inside the packet to determine whether or not it could be harmful. If a packet looks dangerous, the firewall will prevent it from passing into the company from the Internet. Firewalls can be actual computers with specialized software running on them, or they can be specialized pieces of hardware (like some routers that are designed to perform firewall functions very quickly.

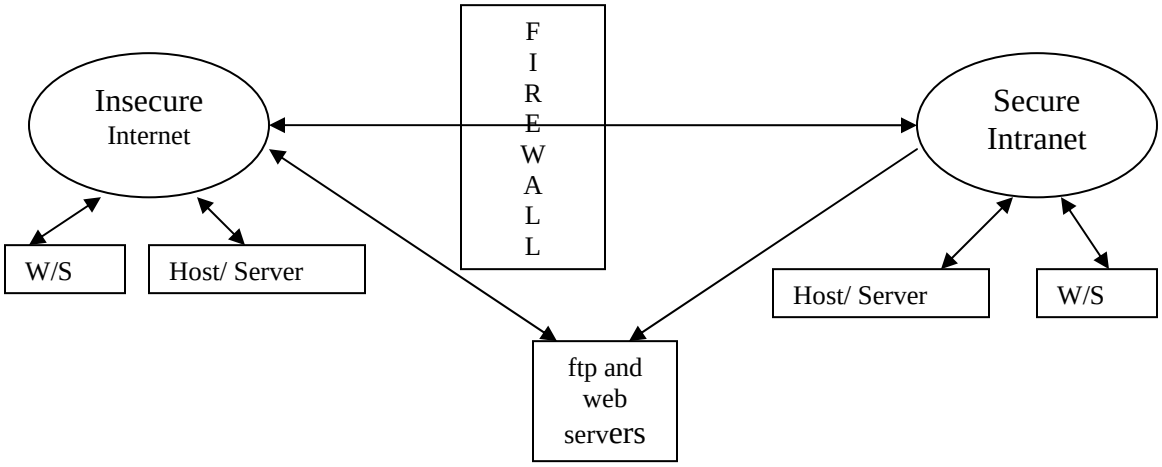

Figure 11.8: Working of Firewall

11.8 FUTURE AND GROWTH OF E-BUSINESS

The next generation of e-business is no longer focused on simply providing new channels for buying the same products and services as before; it is now based on developing new forms of relationships between the major players. It is a more mature approach to the application of new technologies and working practices.

The fundamental difference between this wave of change and the developments that proceeded, it lies in the growing drive towards further integration of partnerships, processes and systems across an increasingly connected economy.

This involves:

- Seamless integration of front and back office functions with customer and supplier facing activities.
- Transparent connection to online business exchanges.
- Real-time visibility to movement of goods.
- Seamless integration of non-ERP applications with the ERP backbone.

The growing number of B2B connections and the new forms of interaction being developed as a direct result impact the evolution of e-business. The drive towards integrated capabilities is seen as a strategic necessity for enterprises intending to profit form the collaborative economy. Also efficient e-business supply chains are crucial to gaining competitive advantage. The obvious benefits include reduced inventory and improved cash flow. And you can also gain more-satisfied customers and greater control of inventory and manufacturing processes.

The growth of the “connected economy” is gaining momentum as enterprises begin to participate in collaborative processes and are faster to respond to changing requirements. The emerging trends are:

- Traditional business relationship, especially those between “client and supplier” are starting to be replaced by the concept of an all-e4mbracing Web-based service management. In this ecosystem, wide and flexible range of businesses can come together in constantly changing alliances to deliver precisely formulated services.
- In the connected economy, it is essential that all partners clearly understand and consistently execute their core competencies. . The need for closer and more effective inter-enterprise connections requires complementary partner-to partner collaboration.
- Enterprises outsource anything which is not core to their continued competitiveness and leadership in their specialized area of competence. This, in turn, is a major driver of

ecosystem development, since it reinforces the need for closer and more effective inter-enterprise connections.

11.9 SUMMARY

E-commerce means buying and selling over digital media E-business in addition to encompassing E-commerce includes both front and back office that forms the engine of the modem business.

Supply Chain is a process umbrella under which products are created and delivered to customers; it is coordination of material, information and financial flows between and among all participating enterprises.

Customer retention is a driver of profitability therefore customer relationship management requires focus not only on customers but also on the services provided to them. Customer can be tied up to a company through all the phases of customer relationship management.

The base of internet user is increasing very fast rate and the percentage of the internet users for banking activities is also increasing day by day. The security is main aspect in this regard but technology improvements such as public key, encryption, firewalls, proxy server, SET etc. are providing the safer mode and platform for safe business transaction over the internet.

11.10 KEYWORDS

E-Business: Doing business electronically.

Supply Chain Management (SCM): A network of facilities and distribution options that performs the functions of procurement of materials, transformation of these materials into intermediate and finished products, and the distribution of these finished products to customers.

Push Supply Chain: In the ‘push’ supply chain model, manufacturing decisions are made based on demand forecast, which are often long-term.

Pull Supply Chain: In a ‘pull’ supply chain manufacturing is fully demand-driven, which means that the production process begins after an order from a customer is received.

Customer Relationship Management (CRM): It refers to one point contact between the supplier and the buyer.

E-Auctioning: Auctioning on the Internet.

E-Banking: E-banking allows customers to access their accounts and execute orders through a simple to use web site.

Internet Banking: It refers to systems that enable bank customers to access accounts and general information on bank products mid services through a personal computer or other intelligent device.

Encryption: Encryption technology encodes and decodes information transmitted over the Internet so that-only the sender and intended recipient can read the information.

Secure Electronic Transaction (SET): It is a protocol that facilitates the secure authentication of credit-card transactions on the Web as well as other payment processing issues such as debit-card transactions and credits back to credit cards.

Proxy Servers: The purpose of a proxy server (also called a gateway) is to forward packets on behalf of PCs on a company's internal network to the Internet.

Firewalls: A firewall is essentially a computer (or specialized compliance) that sits between the Internet and anything a company wants to protect such as a Web server or the company's internal network.

11.11 SELF ASSESSMENT QUESTIONS

1. What is E-business? What are its important categories and components? Explain in detail.
2. Write a detailed not on internet banking.
3. Enlist the various security and privacy issues in E-business.
4. What are the various stages in Internet Banking?
5. Write a detailed note on (a) SCM (b) CRM.

11.12 SUGGESTED READINGS

- Daniel Amor, "The E-business @evolution : Living and working in an international world", Pearson Education, New Delhi
- Willium J. Buffam, "E-Business and IS solutions: An Architectural Approach to Business Problems and opportunities", Pearson Education, New Delhi
- Marcia Robinson, "E-Business : Roadmap for Success", Pearson Education, New Delhi
- Kenneth C. Landon, "E-commerce :Business, Technology, Society", Pearson Education, New Delhi

- Samantha Shurety, “E-Business with Net. Commerce”, Pearson Education Asia, New Delhi
- Kienam, “Managing Your E-commerce Business”, Prentice Hall of India, N. Delhi
- Napier, “Creating a winning E-Business”, Vikas Publishing House, New Delhi
- “E-business”, magazine (January & September 2004 issues) ICFAI press
- Leon Alexis, “Enterprise Resource Planning”, TMH
- Parag Diwan, “Enterprise Resource Planning”, Pentagon Press

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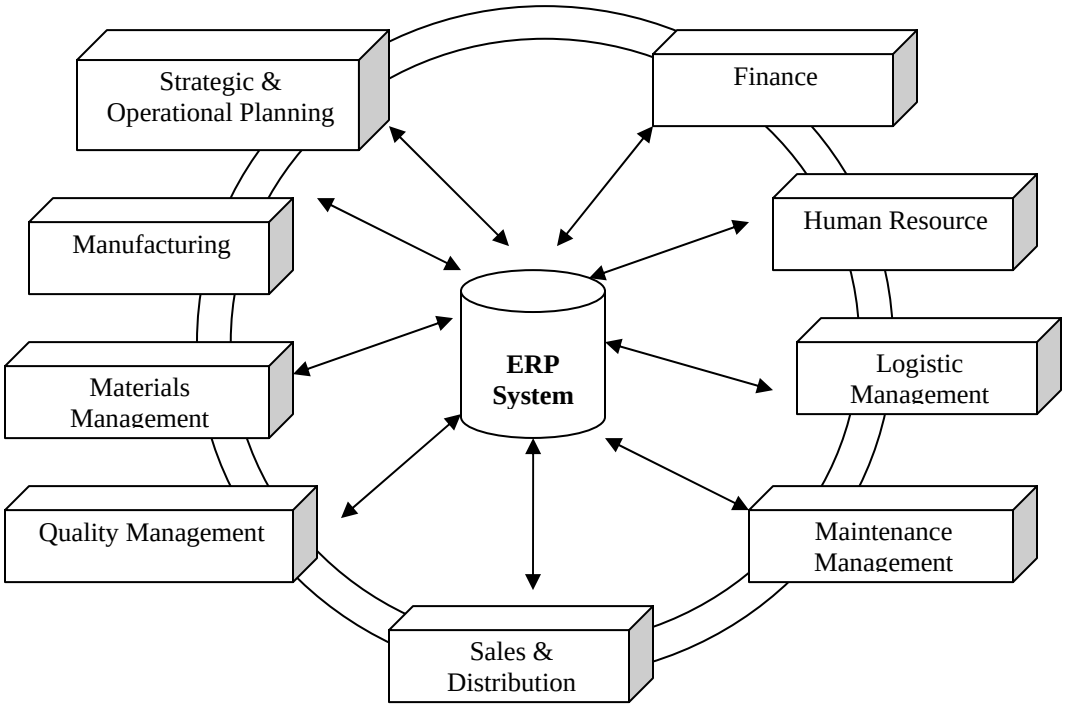
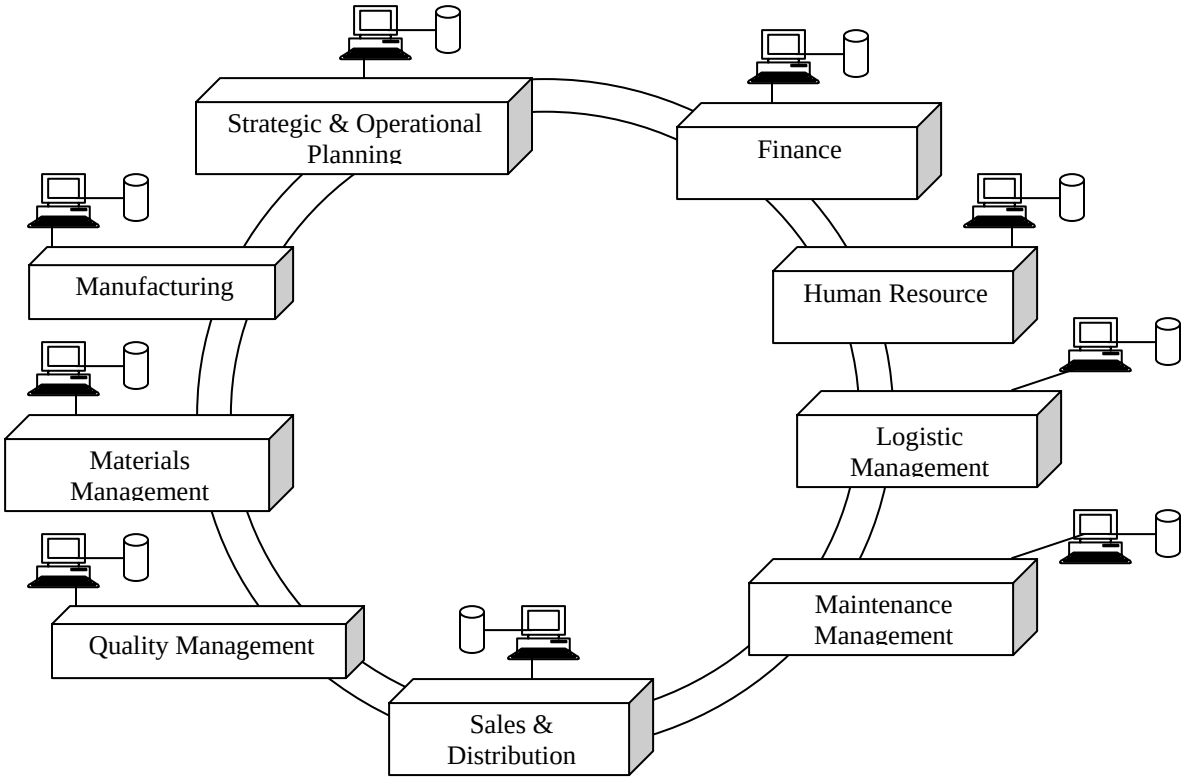


Figure 1.1: Information Integration through ERP System


Strategic & Operational Planning
Finance
Manufacturing
Human Resource
Materials Management
Logistic Management
Quality Management
Maintenance Management
Sales & Distribution

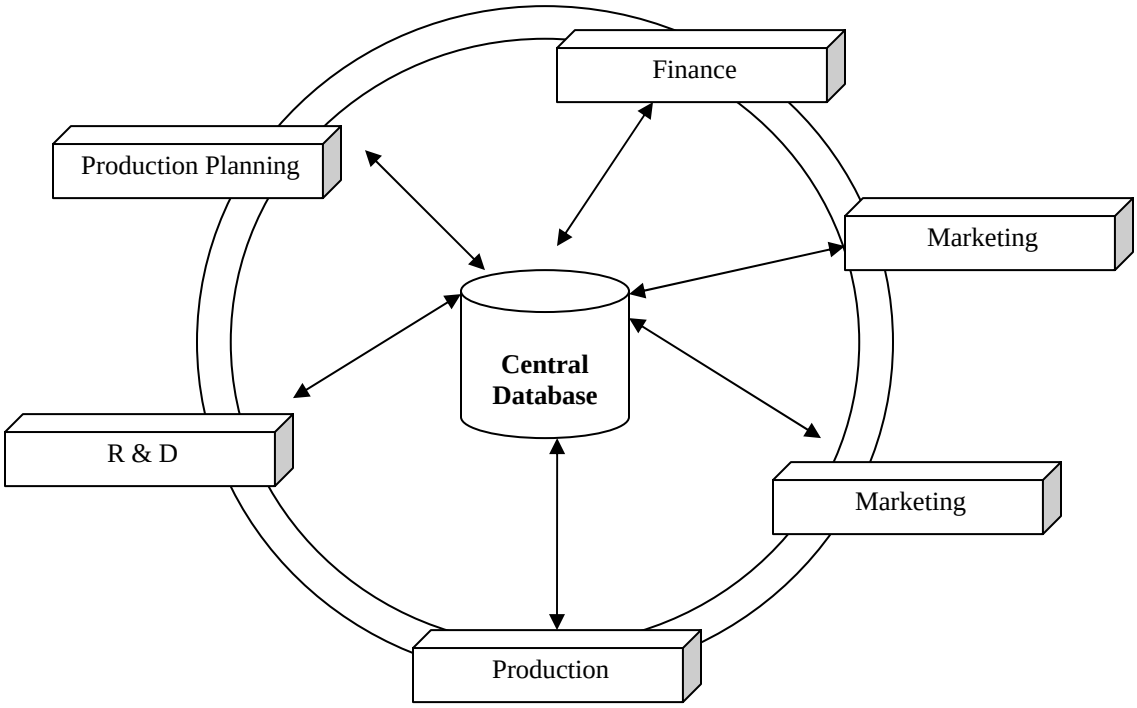
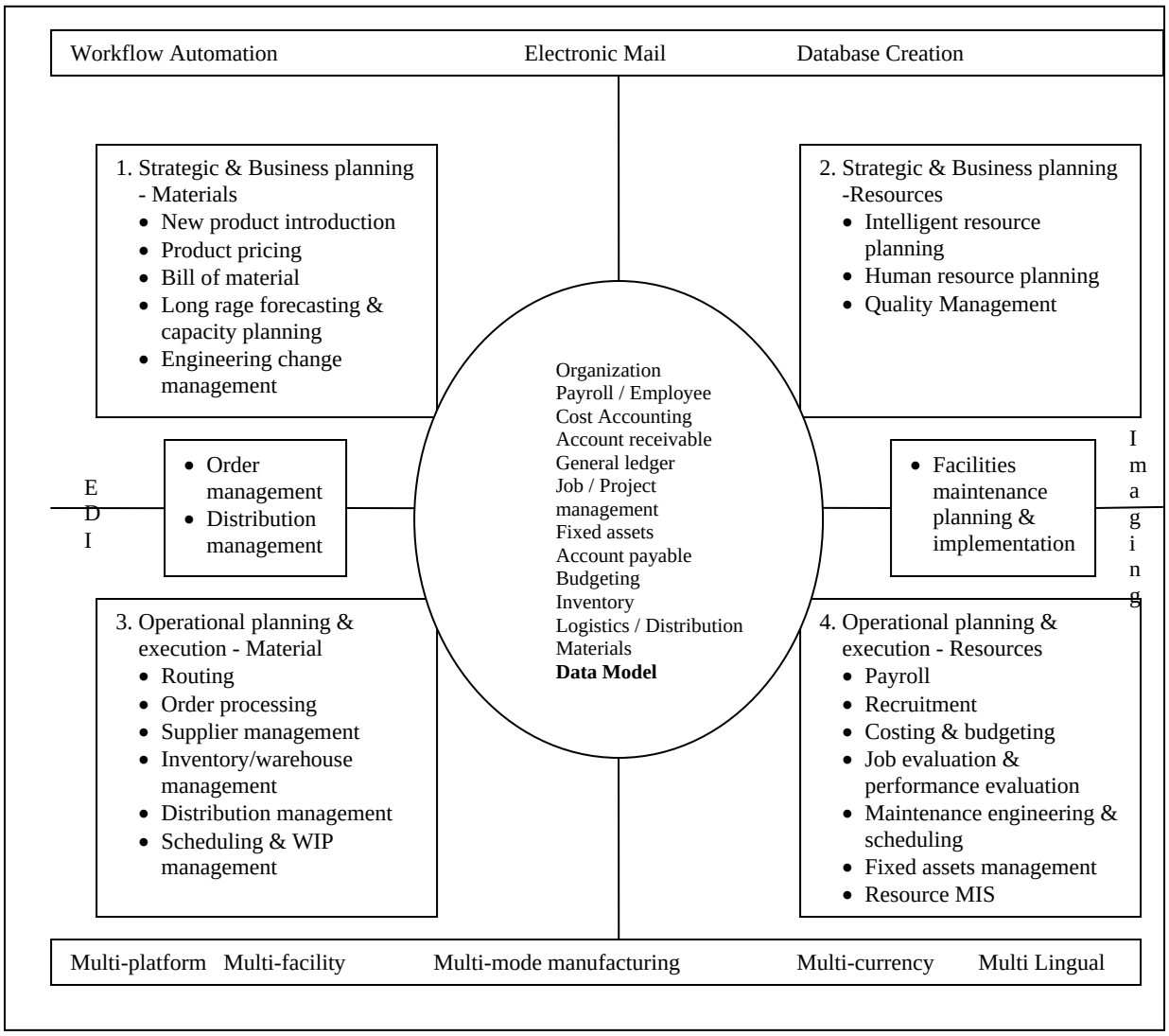
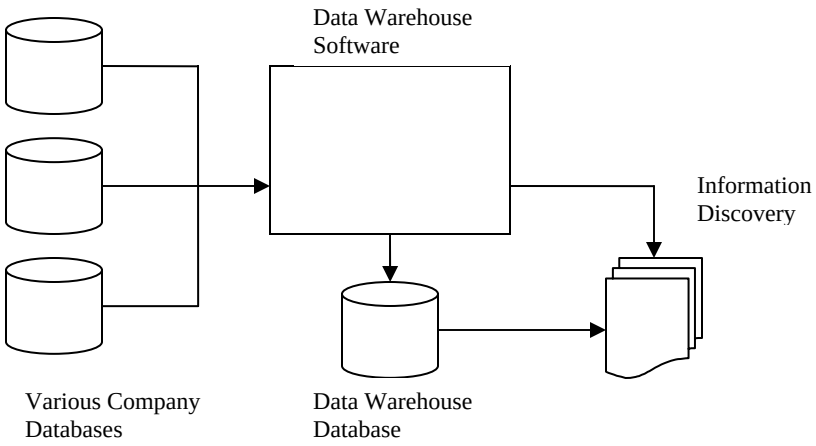
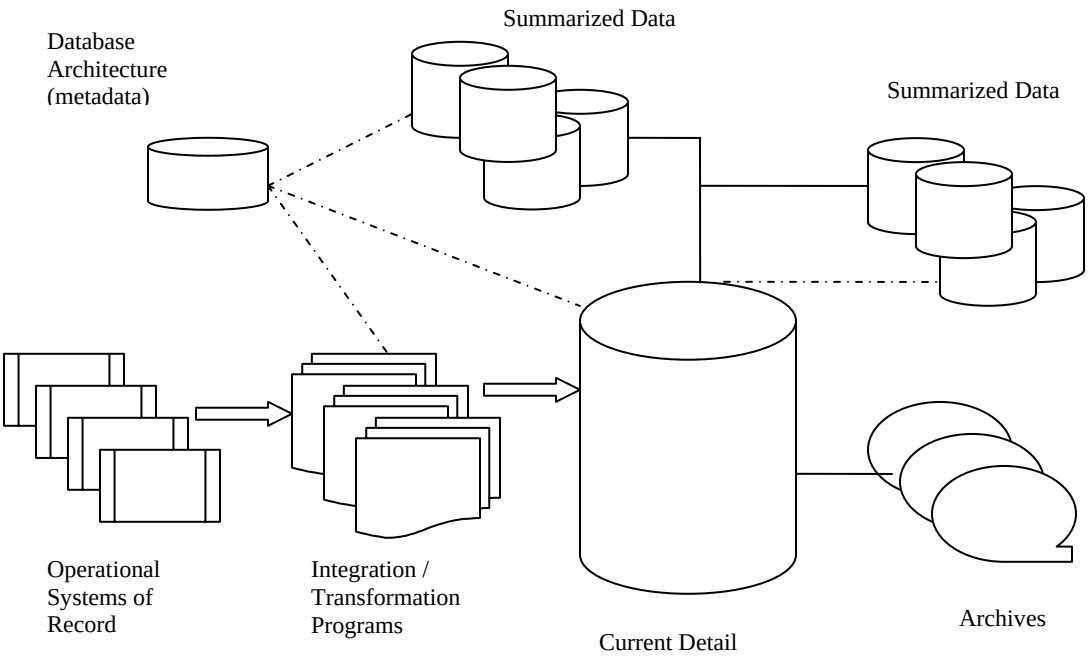
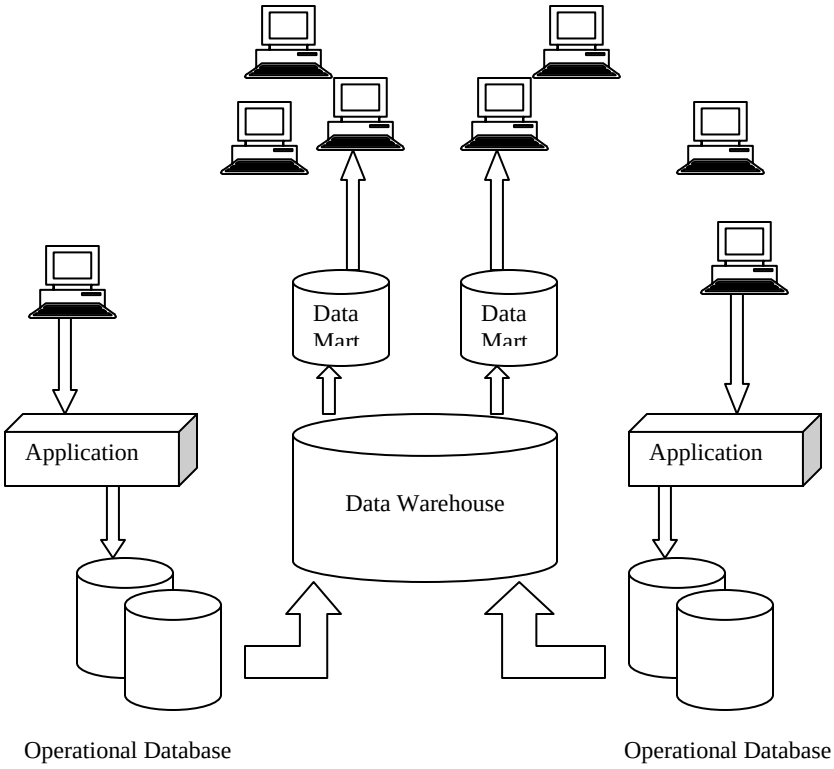


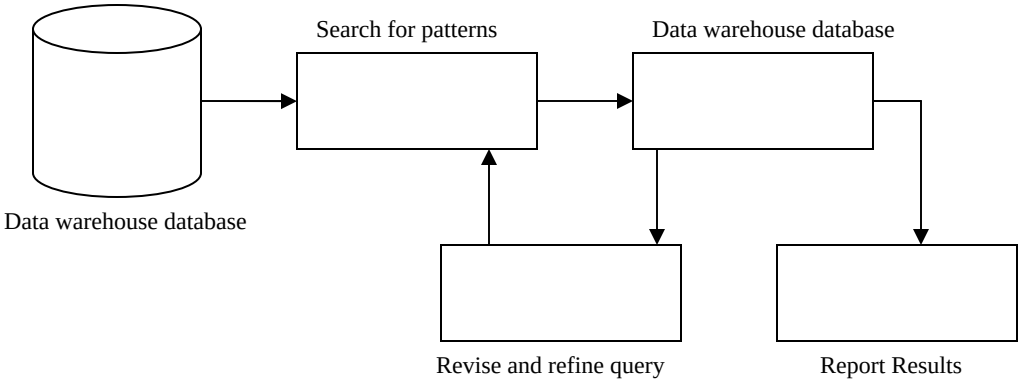
Figure 1.3: Modern Enterprise

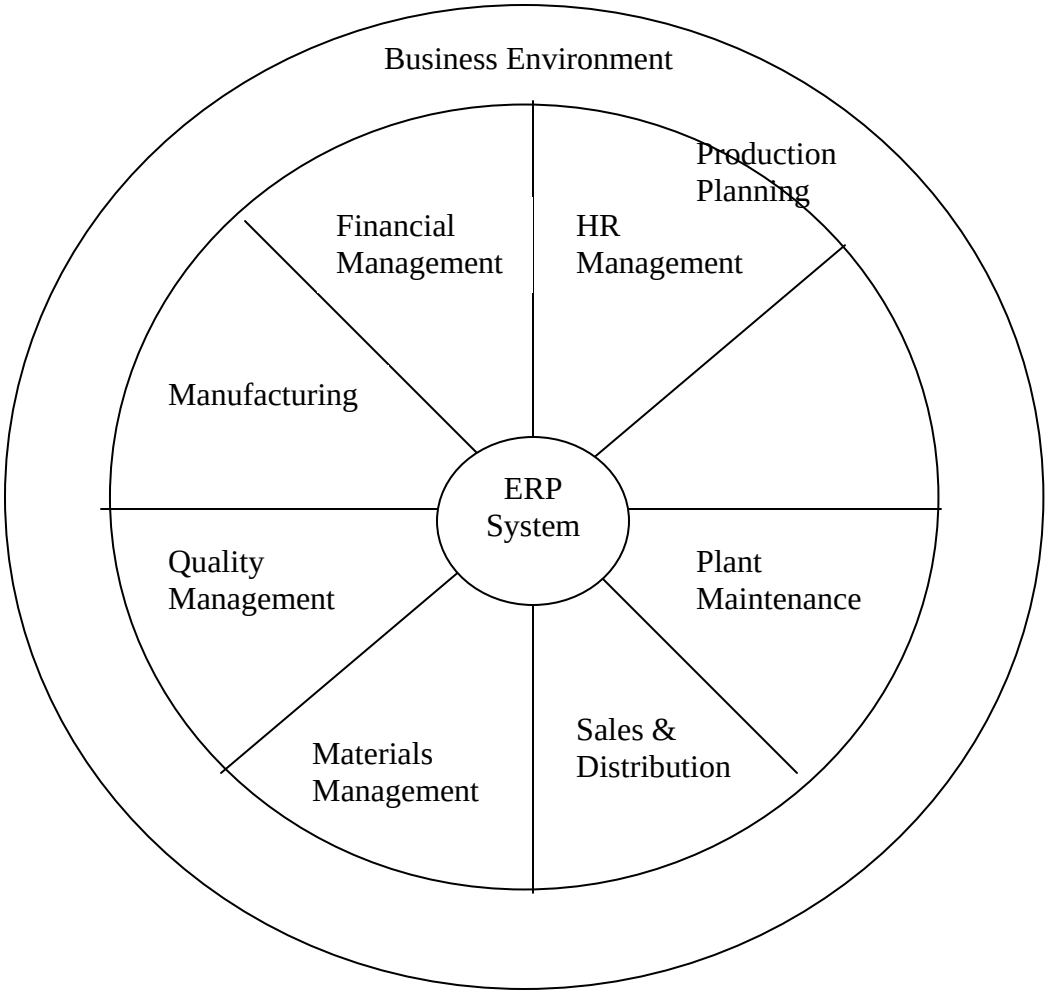

Workflow Automation
Electronic Mail
Database Creation
1. Strategic & Business planning - Materials
New product introduction
Product pricing
Bill of material
Long rage forecasting & capacity planning
Engineering change management
2. Strategic & Business planning -Resources
Intelligent resource planning
Human resource planning
Quality Management
Organization
Payroll / Employee
Cost Accounting
Account receivable
General ledger
Job / Project management
Fixed assets
Account payable
Budgeting
Inventory
Logistics / Distribution
Materials
Data Model
EDI
Order management
Distribution management
Facilities maintenance planning & implementation
Imaging
3. Operational planning & execution - Material
Routing
Order processing
Supplier management
Inventory/warehouse management
Distribution management
Scheduling & WIP management
4. Operational planning & execution - Resources
Payroll
Recruitment
Costing & budgeting
Job evaluation & performance evaluation
Maintenance engineering & scheduling
Fixed assets management
Resource MIS
Multi-platform
Multi-facility
Multi-mode manufacturing
Multi-currency
Multi Lingual

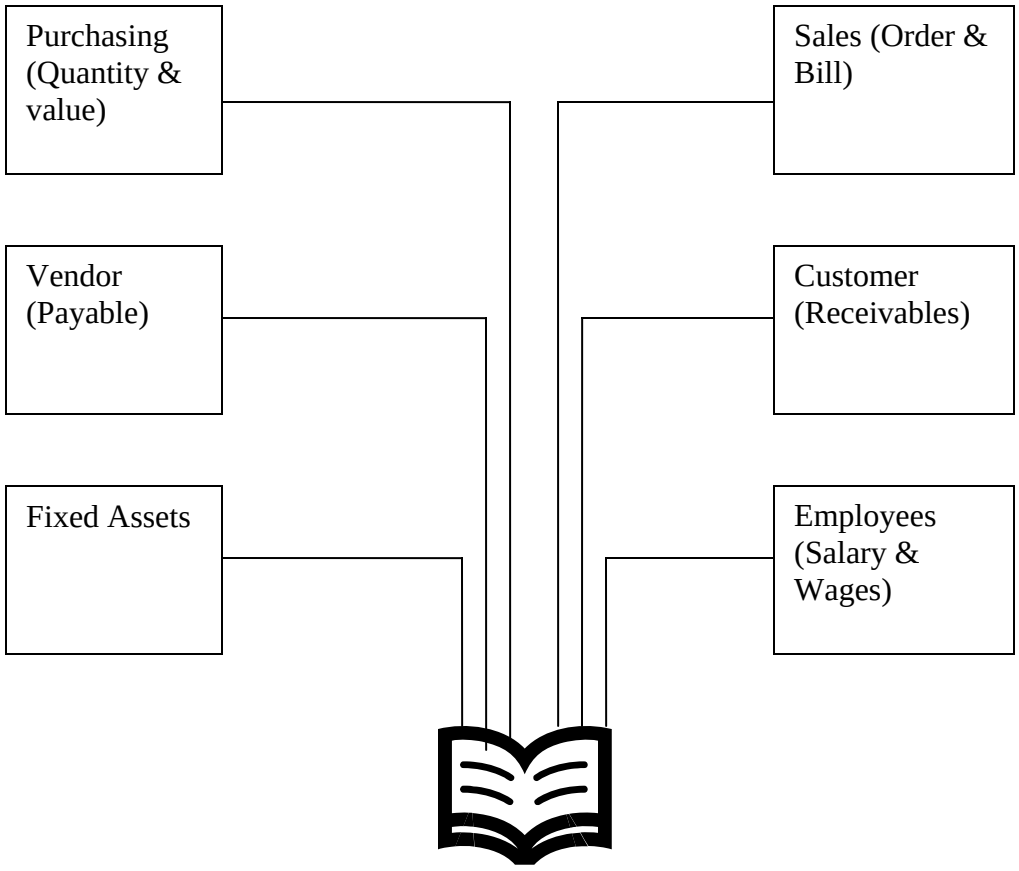

Data Warehouse
Software
Information
Discovery
Various Company
Databases
Data Warehouse
Database

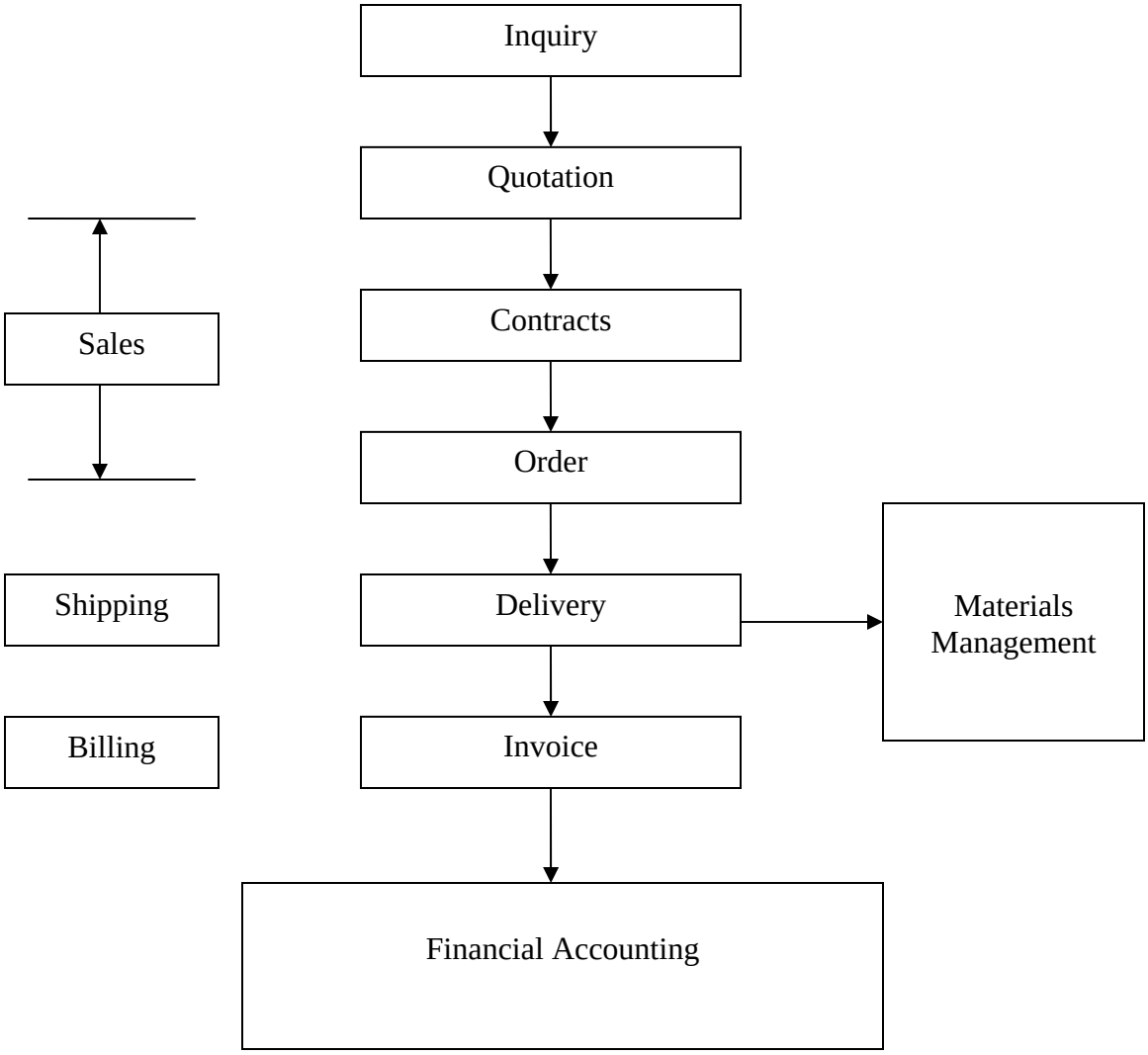

Summarized Data
Database
Architecture
(metadata)
Summarized Data
Operational
Systems of
Record
Integration /
Transformation
Programs
Current Detail
Archives

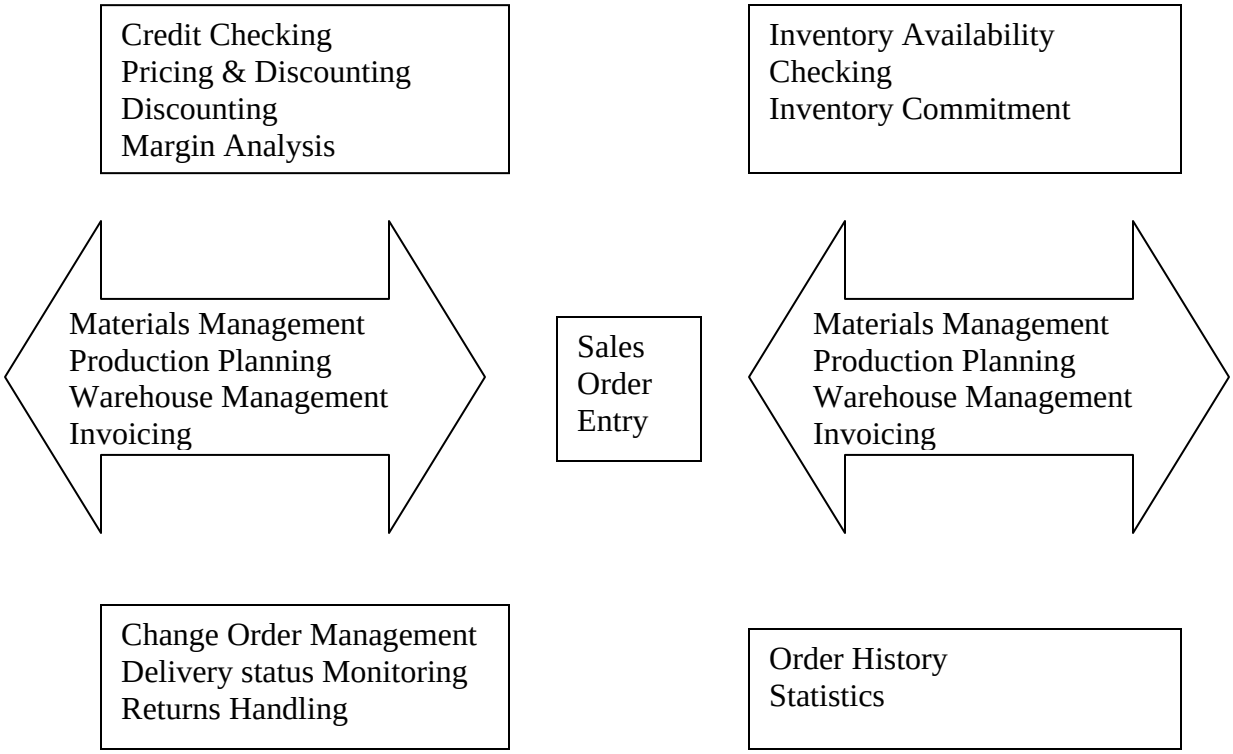

Data
Mart
Data
Mart
Application
Data Warehouse
Application
Operational Database
Operational Database

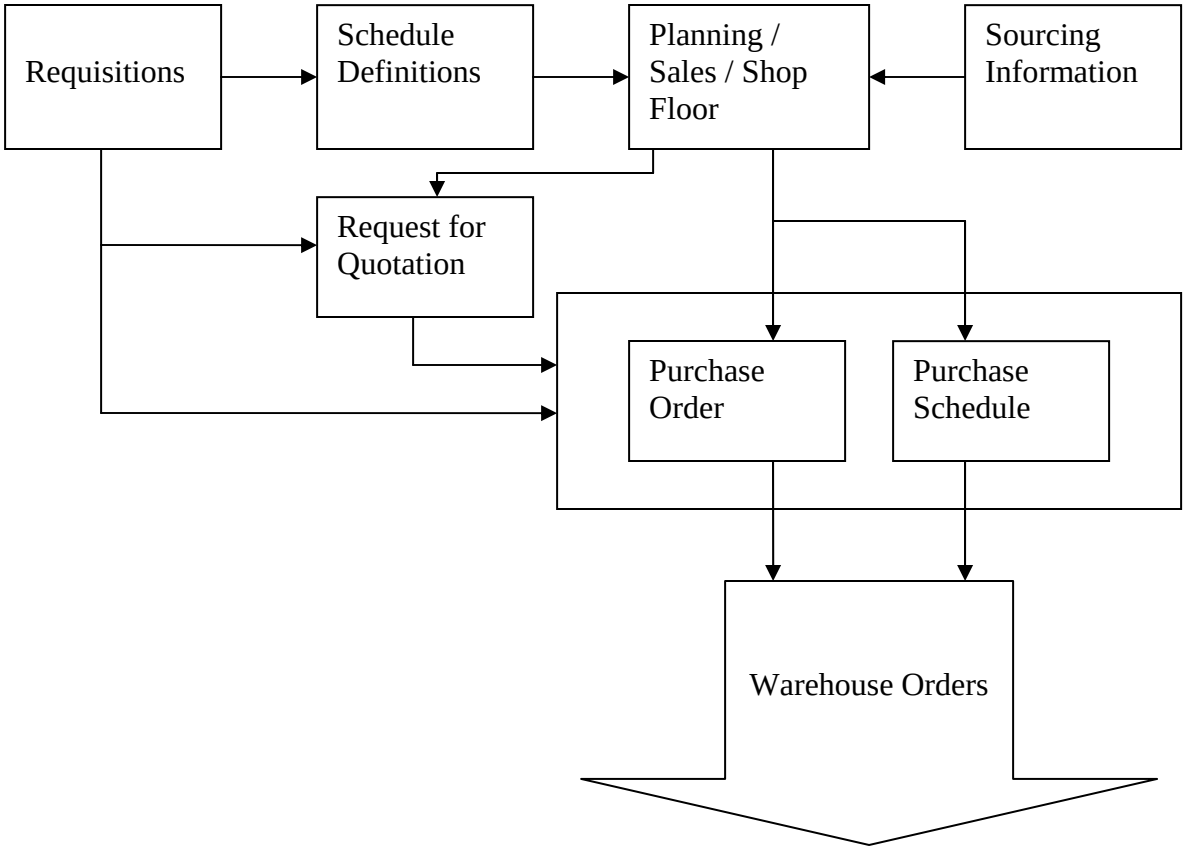

Search for patterns
Data warehouse database
Data warehouse database
Revise and refine query
Report Results

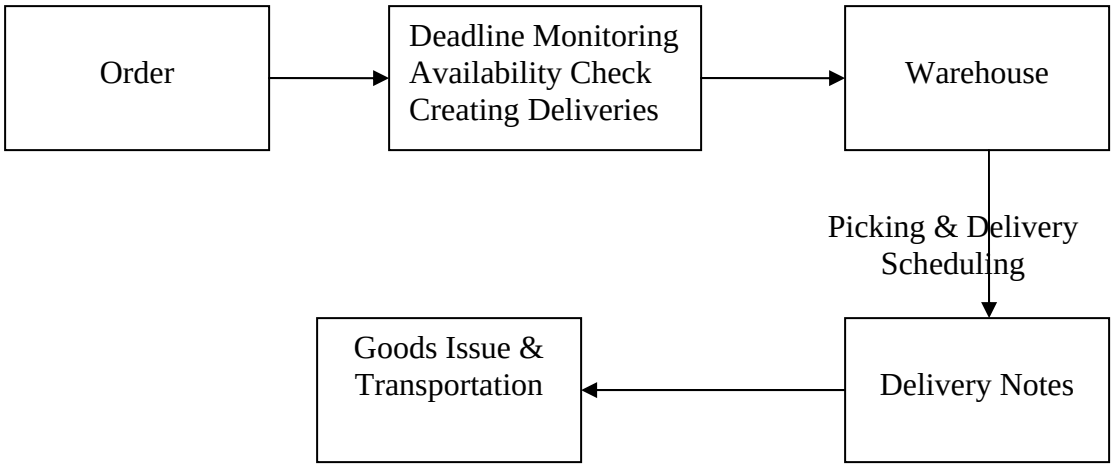

Business Environment
Production Planning
Financial Management
HR Management
Manufacturing
ERP System
Quality Management
Plant Maintenance
Materials Management
Sales & Distribution

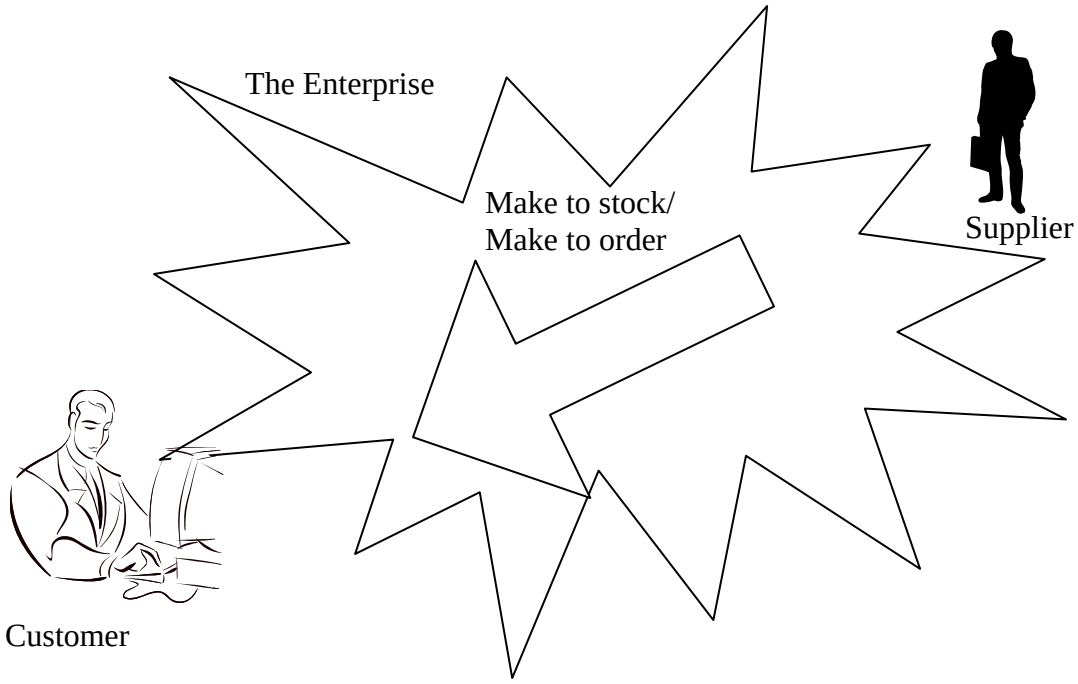

Purchasing (Quantity & value)
Sales (Order & Bill)
Vendor (Payable)
Customer (Receivables)
Fixed Assets
Employees (Salary & Wages)
General Ledger

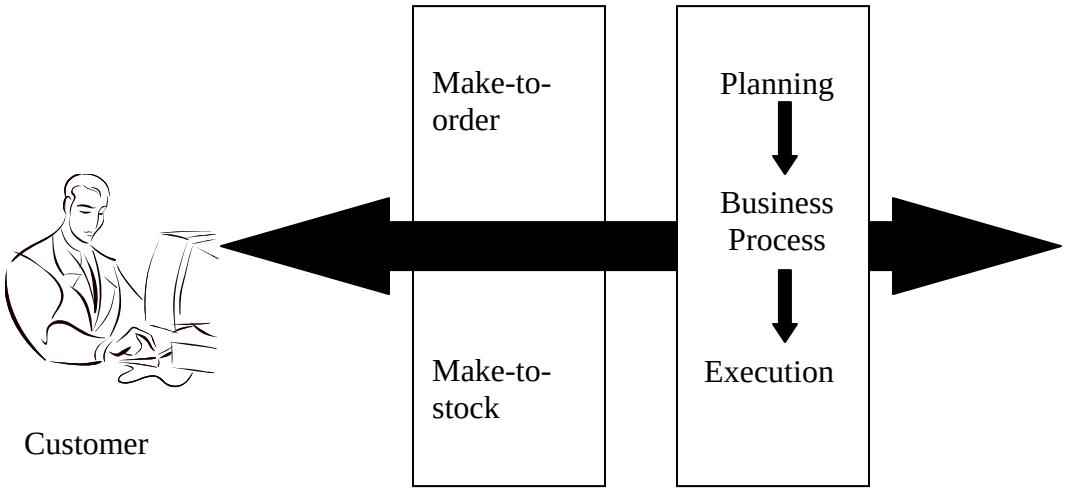

Inquiry
Quotation
Contracts
Order
Delivery
Invoice
Financial Accounting
Sales
Shipping
Billing
Materials Management

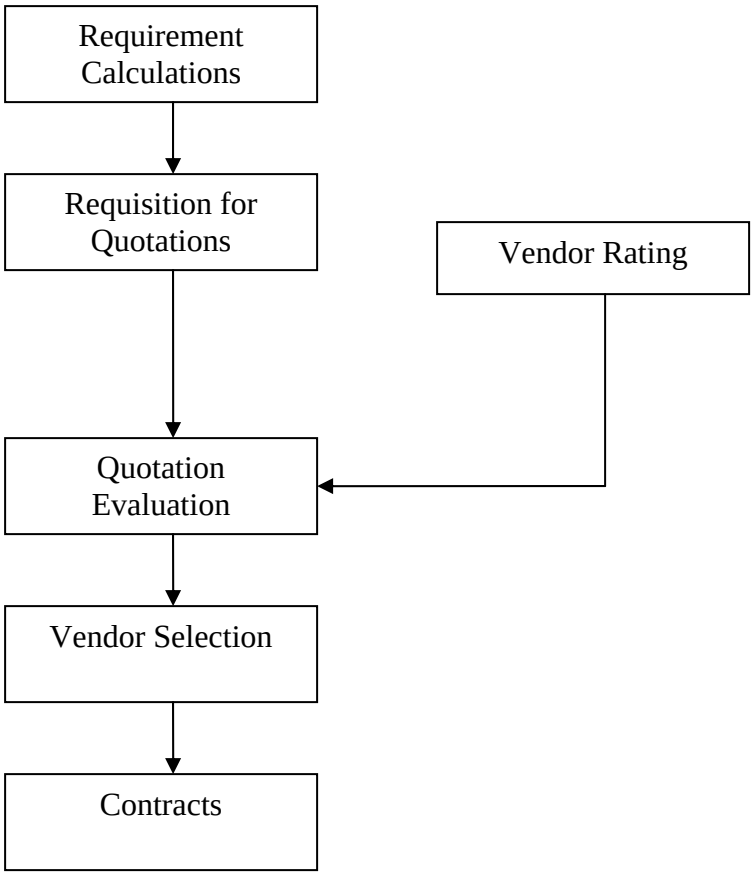

Credit Checking
Pricing & Discounting
Discounting
Margin Analysis
Inventory Availability
Checking
Inventory Commitment
Materials Management
Production Planning
Warehouse Management
Invoicing
Sales
Order
Entry
Materials Management
Production Planning
Warehouse Management
Invoicing
Change Order Management
Delivery status Monitoring
Returns Handling
Order History
Statistics

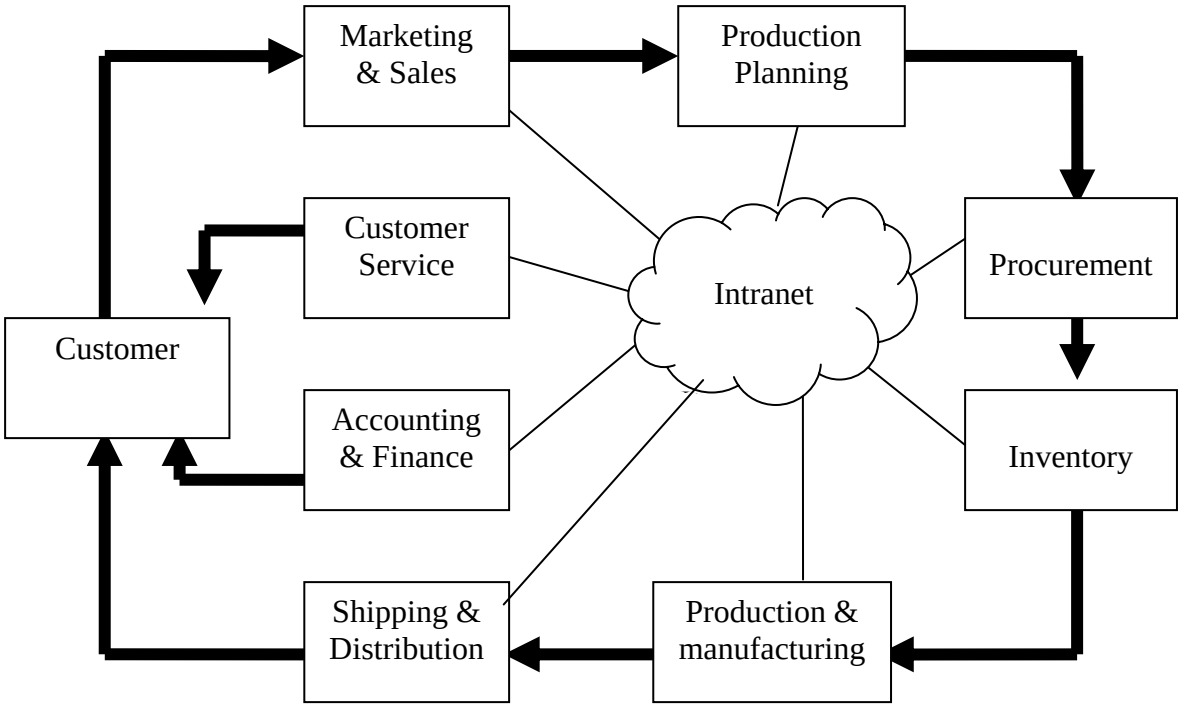

Requisitions
Schedule Definitions
Planning / Sales / Shop Floor
Sourcing Information
Request for Quotation
Purchase Order
Purchase Schedule
Warehouse Orders

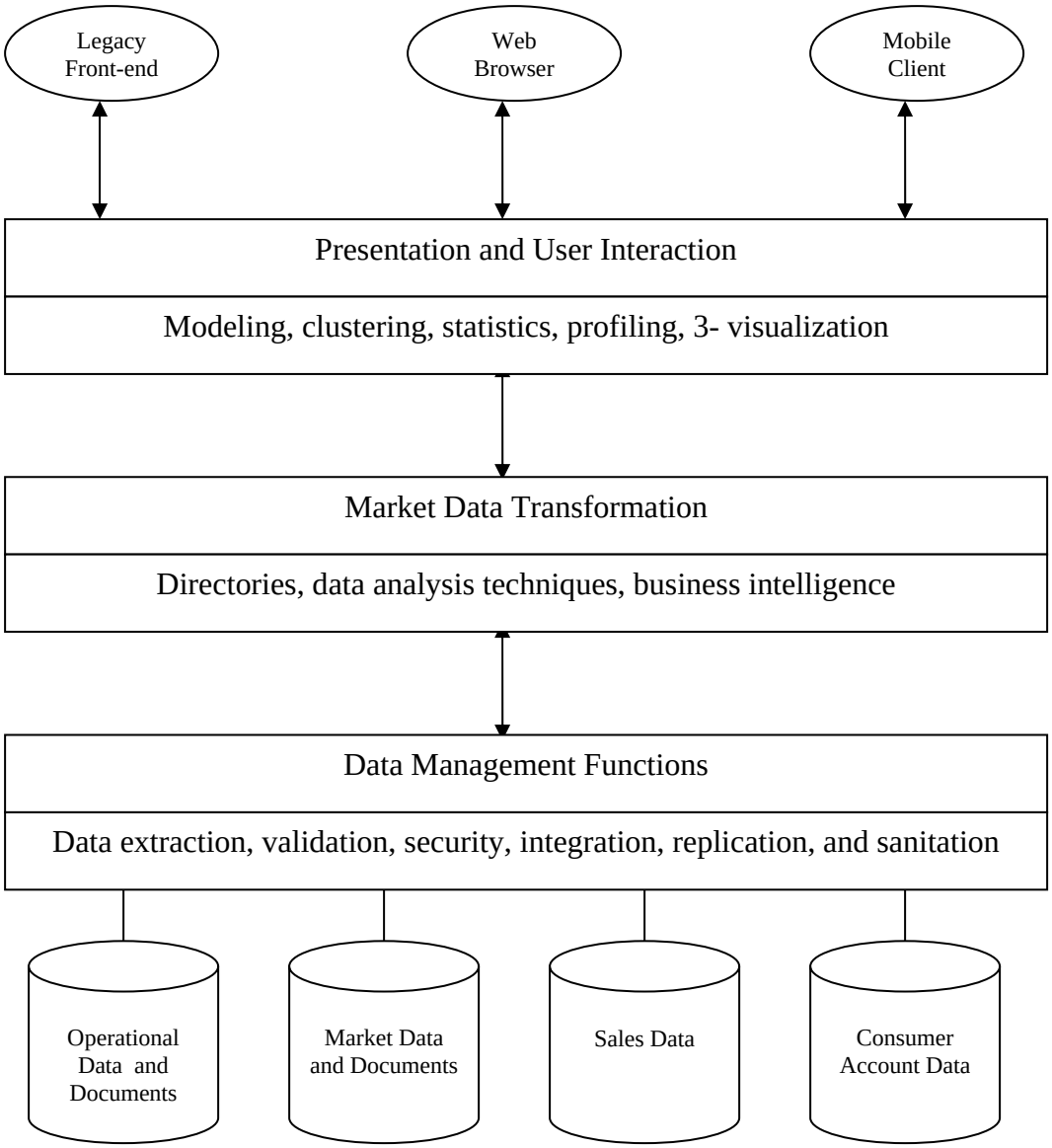

Order
Deadline Monitoring
Availability Check
Creating Deliveries
Warehouse
Picking & Delivery
Scheduling
Goods Issue &
Transportation
Delivery Notes


The Enterprise
Make to stock/
Make to order
Supplier
Customer

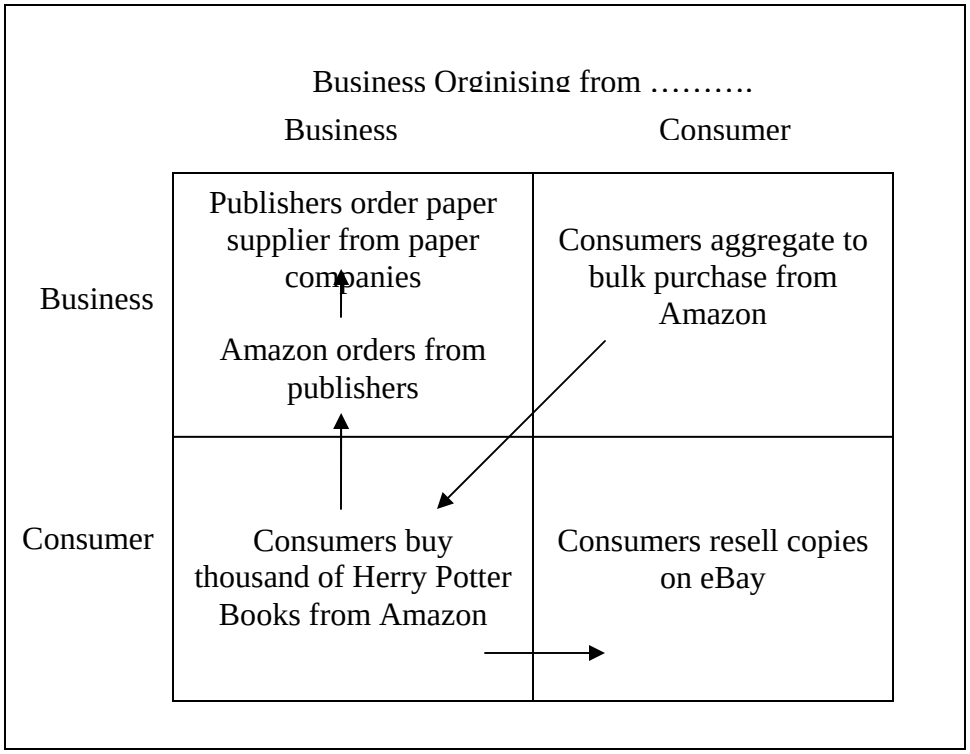

Make-to-order
Make-to-stock
Planning
Business Process
Execution
Customer

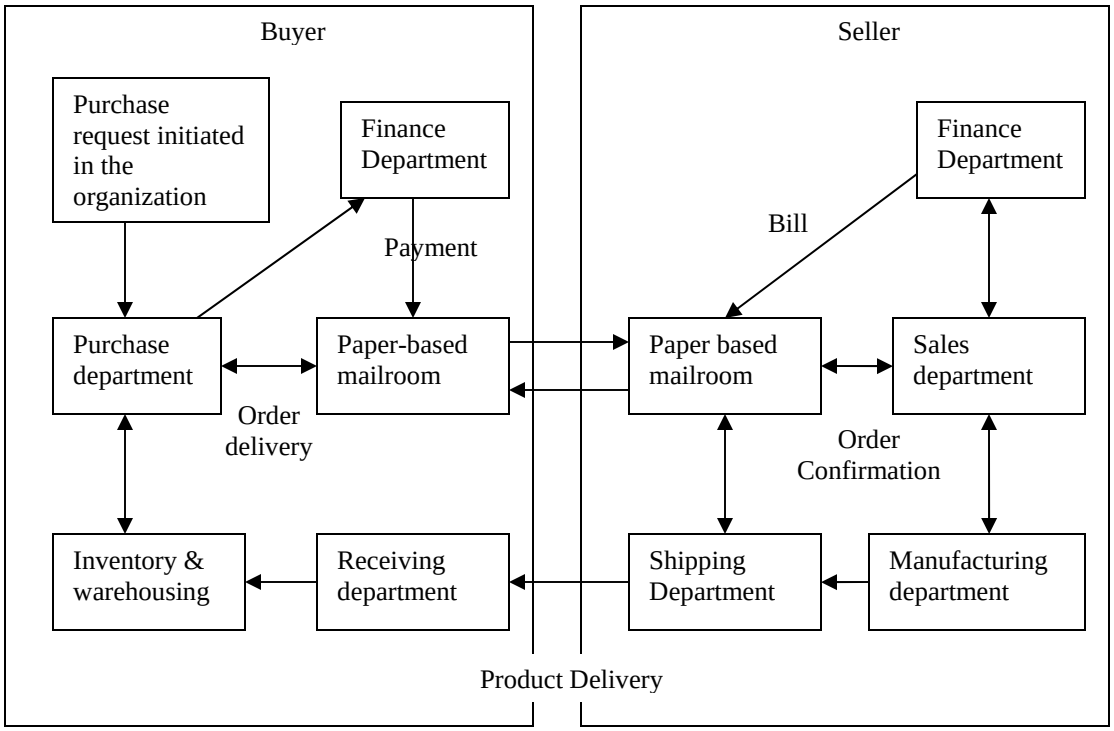

Requirement Calculations
Requisition for Quotations
Vendor Rating
Quotation Evaluation
Vendor Selection
Contracts

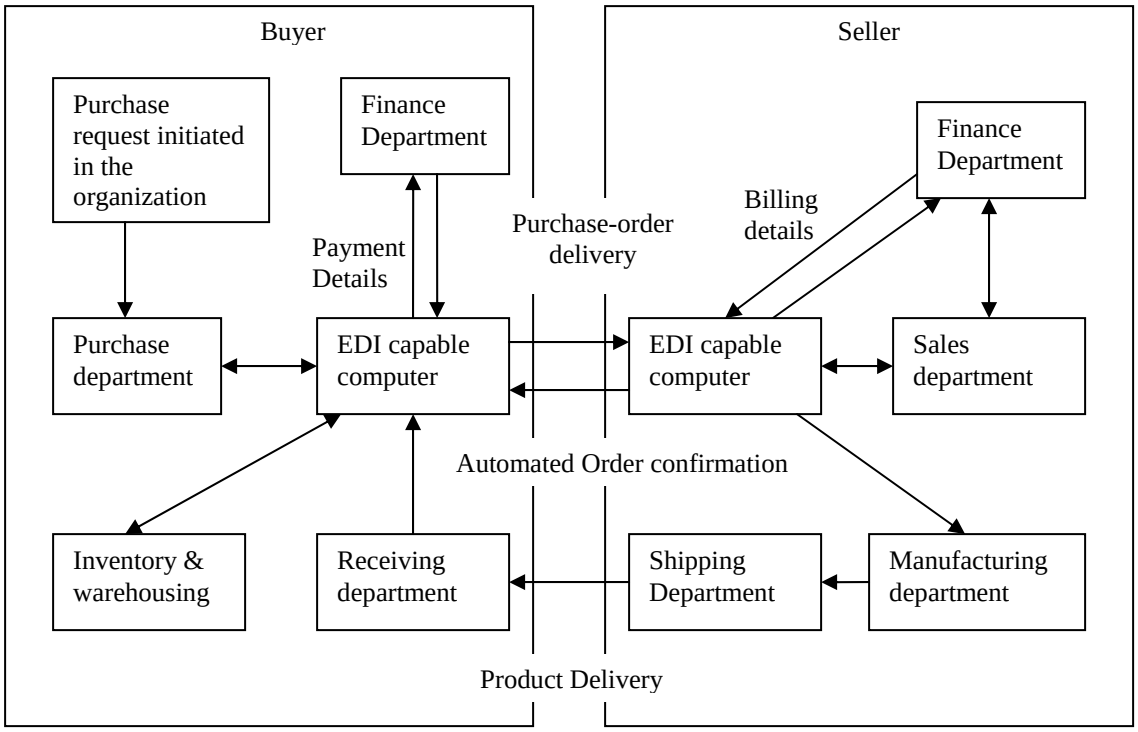

Marketing & Sales
Production Planning
Customer Service
Intranet
Procurement
Customer
Accounting & Finance
Inventory
Shipping & Distribution
Production & manufacturing

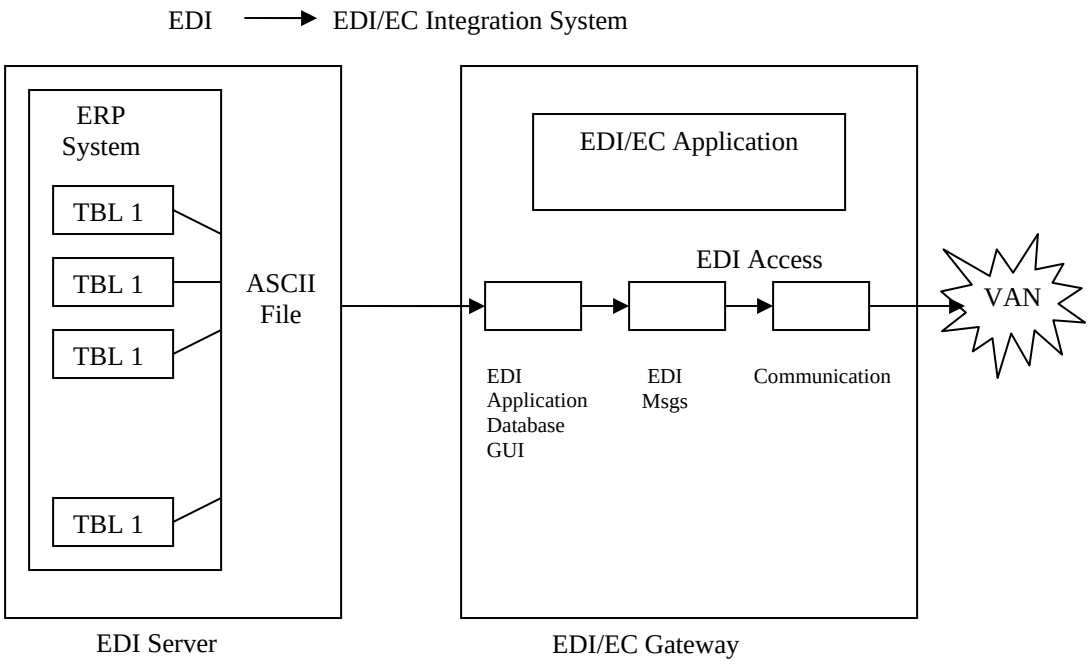

Legacy Front-end
Web Browser
Mobile Client
Presentation and User Interaction
Modeling, clustering, statistics, profiling, 3- visualization
Market Data Transformation
Directories, data analysis techniques, business intelligence
Data Management Functions
Data extraction, validation, security, integration, replication, and sanitation
Operational Data and Documents
Market Data and Documents
Sales Data
Consumer Account Data

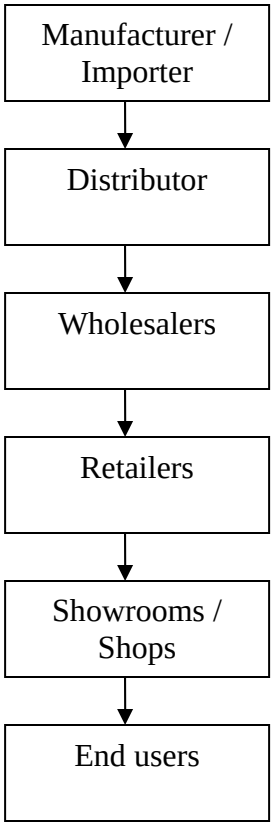
	Business Organizing from …….	
	Business	**Consumer**
Business	**B2B**	**C2B**
Consumer	**B2C**	**C2C**

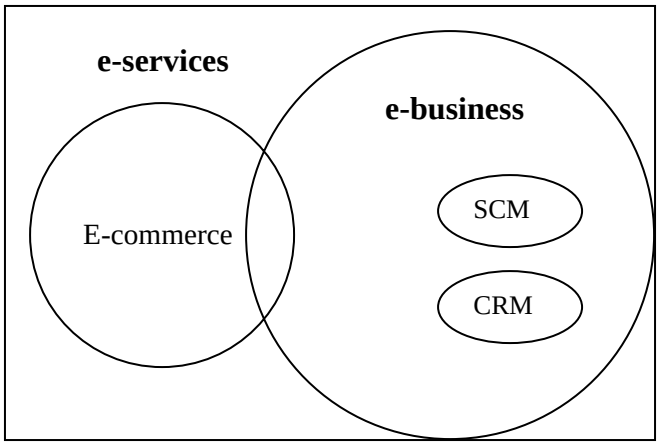

Business Orginising from …….
Business
Consumer
Business
Consumer
Publishers order paper supplier from paper companies
Amazon orders from publishers
Consumers aggregate to bulk purchase from Amazon
Consumers buy thousand of Herry Potter Books from Amazon
Consumers resell copies on eBay

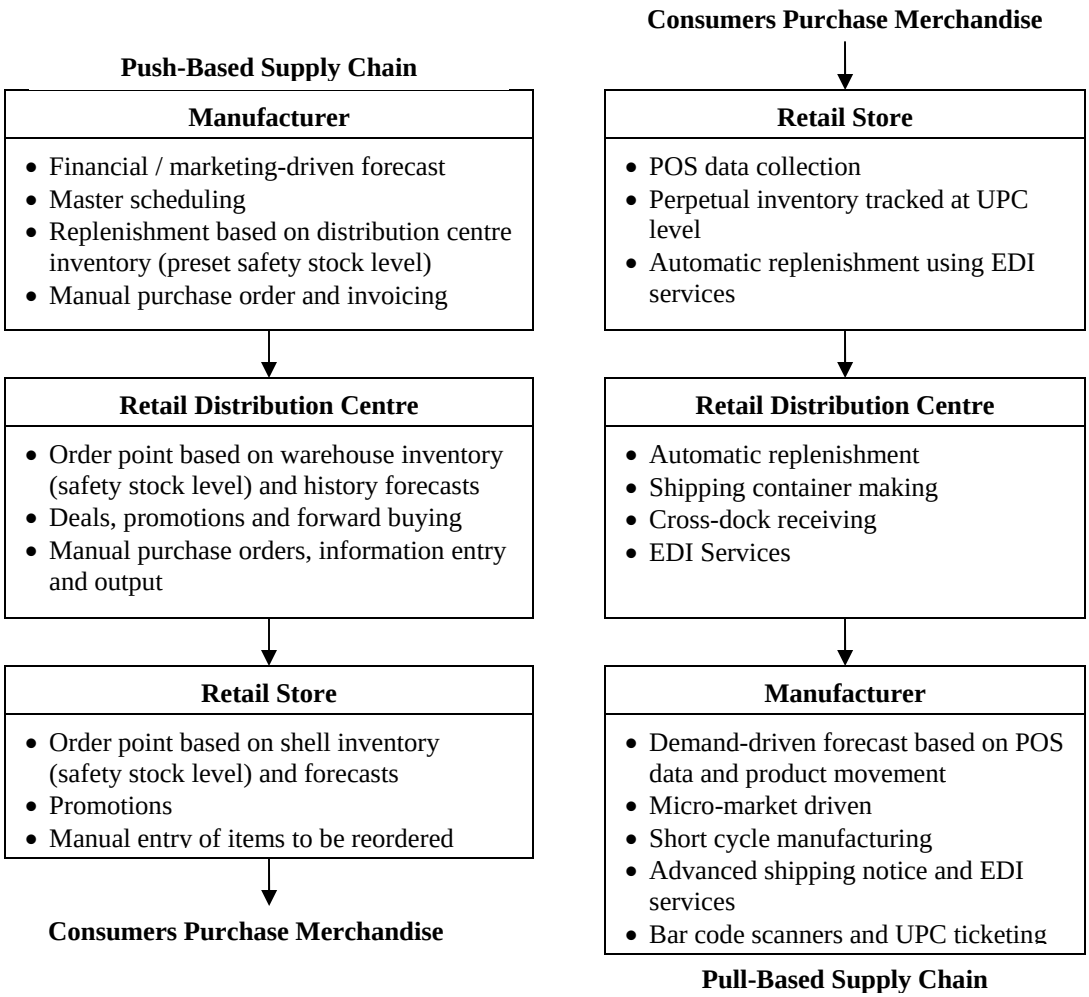

Buyer
Seller
Purchase request initiated in the organization
Finance Department
Payment
Finance Department
Bill
Purchase department
Paper-based mailroom
Order delivery
Paper based mailroom
Sales department
Order Confirmation
Inventory & warehousing
Receiving department
Shipping Department
Manufacturing department
Product Delivery

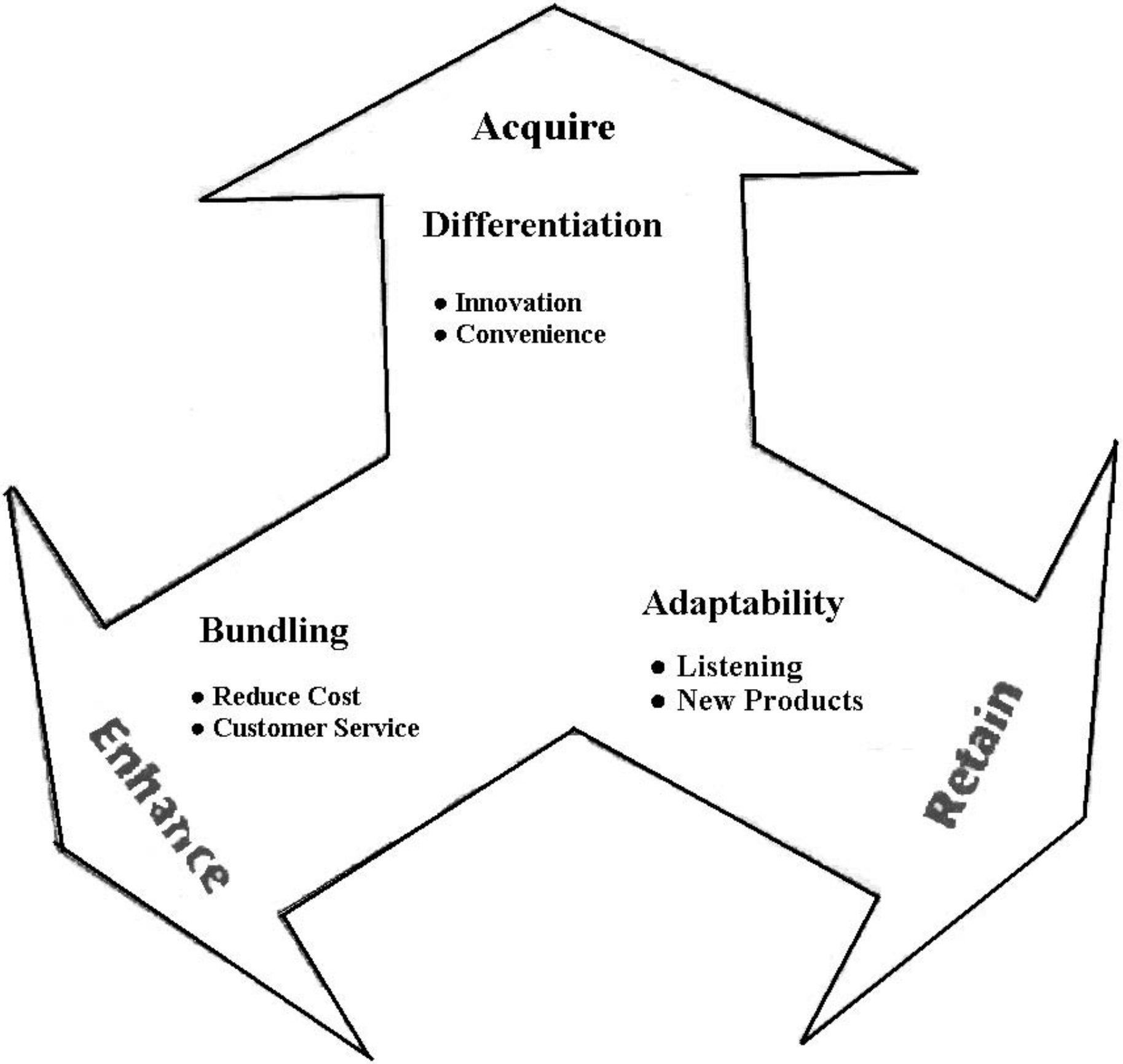

Buyer
Seller
Purchase request initiated in the organization
Finance Department
Finance Department
Billing details
Payment Details
Purchase-order delivery
Purchase department
EDI capable computer
EDI capable computer
Sales department
Automated Order confirmation
Inventory & warehousing
Receiving department
Shipping Department
Manufacturing department
Product Delivery

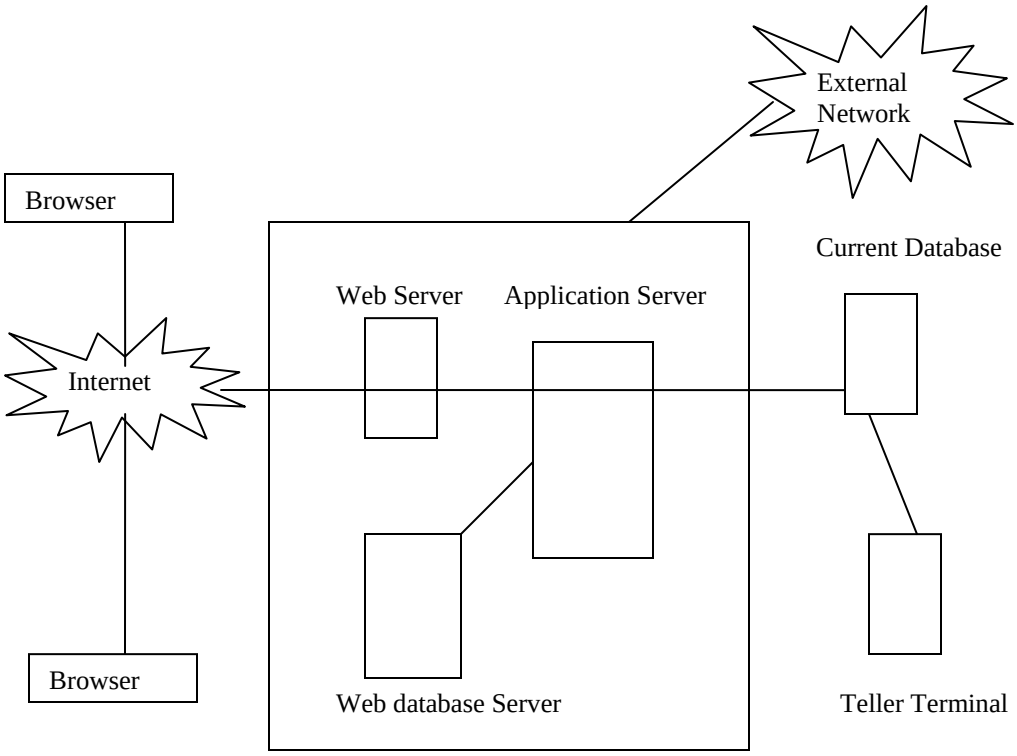

EDI
EDI/EC Integration System
ERP
System
TBL 1
TBL 1
TBL 1
TBL 1
ASCII
File
EDI/EC Application
EDI Access
VAN
EDI
Application
Database
GUI
EDI
Msgs
Communication
EDI Server
EDI/EC Gateway

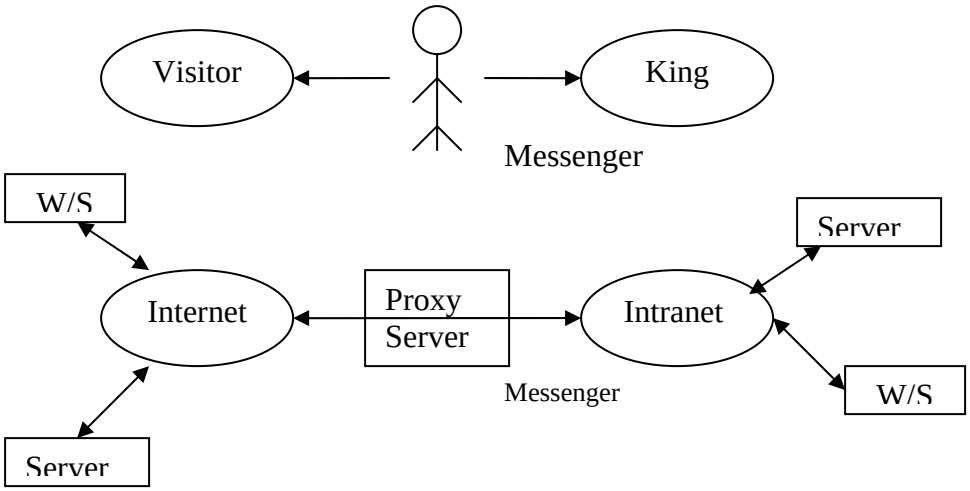

Manufacturer / Importer
Distributor
Wholesalers
Retailers
Showrooms / Shops
End users

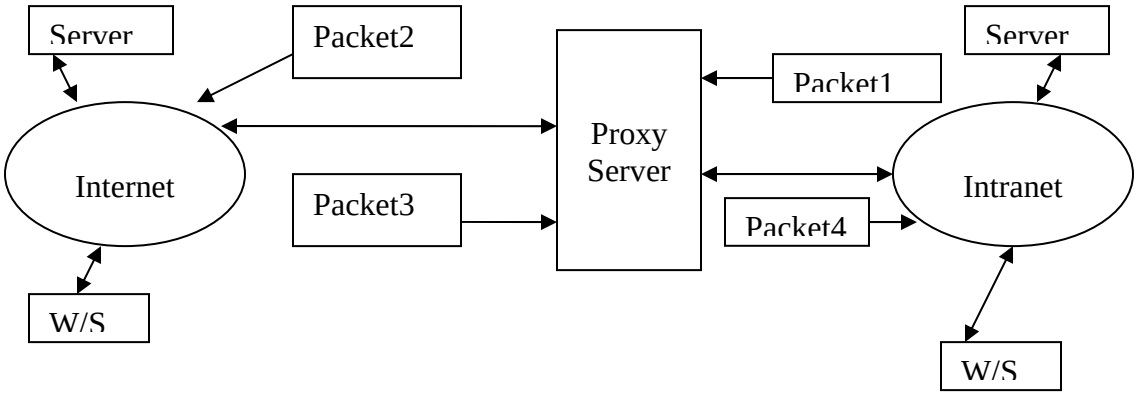

e-services
e-business
E-commerce
SCM
CRM

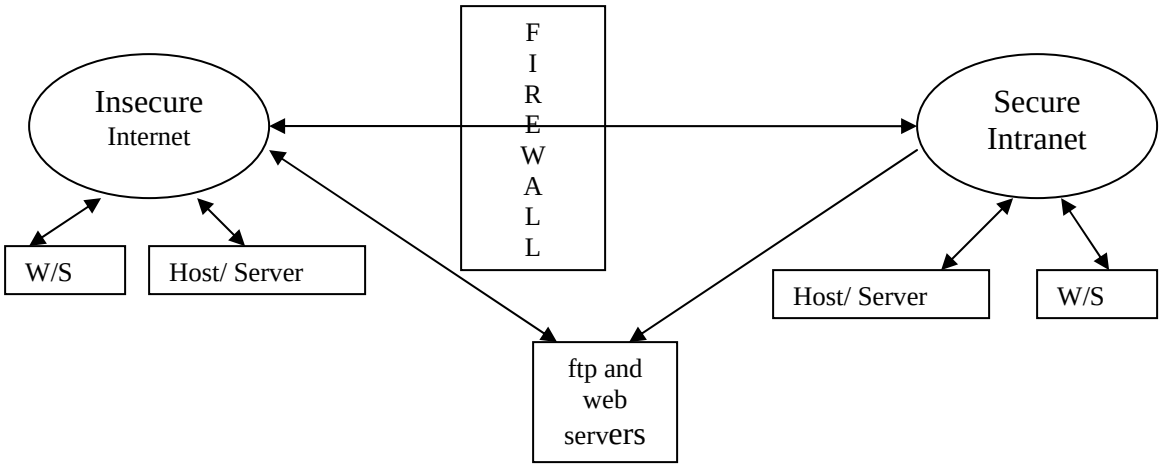

Push-Based Supply Chain
Manufacturer
Financial / marketing-driven forecast
Master scheduling
Replenishment based on distribution centre inventory (preset safety stock level)
Manual purchase order and invoicing
Retail Distribution Centre
Order point based on warehouse inventory (safety stock level) and history forecasts
Deals, promotions and forward buying
Manual purchase orders, information entry and output
Retail Store
Order point based on shell inventory (safety stock level) and forecasts
Promotions
Manual entry of items to be reordered
Consumers Purchase Merchandise
Consumers Purchase Merchandise
Retail Store
POS data collection
Perpetual inventory tracked at UPC level
Automatic replenishment using EDI services
Retail Distribution Centre
Automatic replenishment
Shipping container making
Cross-dock receiving
EDI Services
Manufacturer
Demand-driven forecast based on POS data and product movement
Micro-market driven
Short cycle manufacturing
Advanced shipping notice and EDI services
Bar code scanners and UPC ticketing
Pull-Based Supply Chain


Acquire
Differentiation
• Innovation
• Convenience
Retain
Adaptability
• Listening
• New Products
Enhance
Bundling
• Reduce Cost
• Customer Service


External
Network
Browser
Current Database
Web Server
Application Server
Internet
Browser
Web database Server
Teller Terminal


Visitor
King
Messenger
W/S
Server
Internet
Proxy
Server
Intranet
Messenger
W/S
Server


Server
Packet2
Server
Packet1
Proxy
Server
Internet
Intranet
Packet3
Packet4
W/S
W/S


Insecure
Internet
F
I
R
E
W
A
L
L
Secure
Intranet
W/S
Host/ Server
Host/ Server
W/S
ftp and
web
servers