Extract from the Book **"ERP Demystified" by Alexis Leon**,

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Part 1: Introduction:

1. **What is an Enterprise?** An enterprise is a group of people with a common goal, which has certain resources at its disposal to achieve this goal. In traditional approach , the organization is divided into different nits based on the functions they perform. These departments function in isolation and have their own systems of data collection and analysis. In enterprise way the entire organization is considered a system and all departments are its sub system, each sub system knows what others are doing , why they are doing and what should be done to move the company towards common goal. If the information that is generated is accurate, timely and relevant, then the systems will go a long way in helping the organization to realize its goals

2. **What is ERP?** ERP integrates the information system of an organization and automates most of the functions. The activities supported by ERP system include all core functions of an organization, including financial management, human resource management, and operations. Increasingly, ERP vendors are offering "bolt-on" products , such as business Intelligence (BI), Product Life Cycle Management (PLM), Advance Planning and Scheduling (APS),Customer Relationship Management, Supply Chain Management etc

3. **Why ERP ?** Today having an ERP is not a luxury, but a necessity. Having a properly implemented ERP system and a fully trained workforce that knows how to use system in best possible way is a must for survival in this brutally competitive world. **Caution**: Selecting an ERP System that is best suited for the organization and implementing and operating it in most efficient manner is a very difficult task and chances of failure are very high

4. **How?** The enterprise has to identify a consulting firm that possesses all attributes necessary to conduct the implementation project successfully. An ERP project consists of a group of people , the company employees, the implementation consultants, package vendors, the hardware vendors, the communication experts and so on. Success of the project of this magnitude and scope depends largely on each party playing its role well, because the roles are singular in nature. The appropriate architecture , customization features, installation procedures and level of complexity that is needed in ERP Solutions will vary depending on the size and nature of the company

5. **Strategy ?** The most important and critical activity the company management is to do is to designate the right people to lead the project. These individuals must acquire a reasonable degree of knowledge about the ERP package. Finally it is the company that should motivate its employees to change and learn new technologies and prepare them to assume their new responsibilities. I short , the company should create an environment where the ERP system can grow thrive and produce the dramatic benefits it is capable of. The selection of packages that are constructed so as to enable minimum processes and whose customized portions are guaranteed also for new versions is important in this respect

6. **Roadmap for successful ERP Implementation? :** Most important phase is Gap Analysis, which is the step of negotiation between the company requirements and functions a package possesses.

Define Company objectives and targets, and making these known and recognized throughout the entire company. Next , the manner in which the company management is involved in the project and the speed of decisions is important. Last is selection of experienced (it is better not to limit this to package implementation) consultants and integrators. Unfortunately, in present state of affairs , getting experienced persons could be difficult . This is because there are few experienced persons and too many projects. So the best way to solve this problem is to select employees with the right aptitude, commitment and functional knowledge and train them and make them work along external consultants. This will leave the company with enough in house consultants and integrators, when the vendor's staff and external consultant leave the scene

7. **The role of CIO?** The core step is the gap analysis, and how to eliminate redundant business processes .Gaining the approval of company management to eliminate unwanted and redundant business processes, to integrate the various business functions, and to ensure effective information flow between various business functions, decides the success or failure of the ERP implementation. Put simly,information system must become central-as a strategic weapon-to business reform, designed from a managerial perspective and having persuasiveness in respect to business areas. For this to happen there should be change in attitude of all the people- mangers and EDP professionals

8. **The main advantages of ERP packages?** They are 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. Other direct benefits of an ERP system are business integration, flexibility, better analysis and planning capabilities and use of latest technology

9. **ERP is the most important tool for Business Process Reengineering ?** BPR is the analysis and re-design of workflow within and between enterprises.ERP provides perhaps the primary tool for guiding efforts ,so much so that ERP is often called the electronic embodiment of reengineering

10. **ERP enforces "Best Practice Business Processes" in Organizations?** ERP systems are based on so called best practice business processes- the best ways of doing processes. For example consider SAP's mySAP business suite. It incorporates over a thousand of best practices. mySAP business suite enables companies to succeed in today's economy.SAP best practices contains industry specific, cross industry and generic best practices. This means that any firm that installs mySAP ERP, has access to wide range of best practices . further more ,new business practices are being added l the time

11. **Usefulness of Knowledge of ERP ?** It is useful not just in one organization, it is useful around the world. Thus , as the use of ERP package software grows, there is more mobility among personnel in information systems. IT professionals and consultants armed with knowledge about such a package can now take that knowledge from one firm to another. The professional actually becomes more and more valuable with each implementation of the software

12. **ERP implementation is very costly ?** The average cost of ownership for an ERP implementation $15 million (Rs 75 crores approx). These estimates includes software, hardware, professional services and internal staff cost for the full implementation , plus two years of post implementation support

13. **Reasons of failures ?** wrong product selection, flawed implementation, employee resistance, poor employee training, lack of management support

14. **ERP Market size**: The market was $16.67 billion in 2005 and forecasted to be over $21 billion in 2010.Major portions of ERP solutions were financials and HR, more recently supply chain

management applications are used in Government, Banking /finance, health, retail, distribution and education/ administration. In countries like China and India ERP are now being sold into real estate and construction markets. Now ERP Packages that suit the needs of organizations of all sizes are available

Chapter 4. **Justifying ERP Investments:**

15. **Quantifiable benefits** involve reductions in inventory and in material, labor and overhead costs, as well as improvements in customer service and sales . Improved planning and scheduling practices typically lead to inventory reductions to the order of 20% or better. It provides on going savings of the inventory carrying costs (interest, cost of warehousing, handling, obsolescene , insurance, taxes, damage and shrinkage) also. At 10% interest , the carrying cost s can be between 25-30%. Improved manufacturing practices lead to fewer shortages, labor savings may be 10% reduction in direct and indirect costs. Improved procurement practices lead to better vendor negotiations for prices, say 5% or more reduction.ERP Systems provide negotiation information , such as projected material requirements by commodity group and vendor performance statistics. Improvements in customer service can lead to fewer lost sales and actual increase in sales, say 10% or more. Improved collectionsprocedures can reduce the number of days of outstanding receivables, thereby providing additional available cash

16. **The intangible benefits of ERP:** With a common database from ERP , accounting no longer requires duplicate files and redundant data entry. Financial reports can be easily customized to meets the needs of various decision makers. Financial projections can be based on detailed ERP calculations for future requirements. ERP systems help establish realistic schedules for production and communicate consistent priorities so that every one knows the most important job to work on at all times.ERP helps sliminate many crisis situations , so that people have more time for planning and quality. It offers several advantages to the MIS function. Other factors are lower implementation and systems management costs, lower production and business transaction costs, lower cost of reporting, lower personnel costs, lower business process change and enhancement costs by using the modeling tools to manage the business process and change part of implementation project.

17. ERP success would include , particularly in the long term , payback factors that are harder to quantify and therefore , more often left out of ROI equation, which have equal importance. It is the right combination of technology , architecture, functionality and active customer support that provides maximum payback potential

Chapter 5- **Risks of ERP**

18. Many managers understand the risks involved with new software and put all their effort into minimizing them. What many fail to realize is the high risk associated with existing applications that will be retained – the most onerous of these being bad data in current system. One of the best hedges against risk is the use of a proven methodology, which will ward off risk, but a contingency plan is still absolutely necessary

19. Organizations have faced disaster unless the process is handled carefully. Example are Harshey Foods installation of SAP AG, they were three months late, thus missed busiest business season of 1999, sales dropped by12.4%. Whirlpool also had problems in its SAP implementation, others were Dow Chemicals, Boeing, Dell Computer, Apple Computer etc. the only that differentiates successful and flawed or failed implementations is the way in which risks were anticipated , handled and mitigated

20.   There are three basic sides to ERP management , **People (69%), Processes (18%) and Technology (13%),** and risk of ERP by them are mentioned in brackets. The sheer size of and complexity of ERP implementations makes managing these projects difficult. People- employees, management, implementation team , consultants and vendors –are most crucial factors that decides the success the success or failure of ERP system. Implementing an ERP system is a change and it is human nature to resist change. It is very important therefore , that users be won over before implementing the system. The main people issues are change management, internal staff adequacy, project team, training, employee relocation and re-training , staffing (including turnover), top management support, consultants, cost of ownership, discipline, resistance to change

21.Chapter 6- **Benefits of ERP**

?? Improved integration as they have ability to automatically update data between related functions and components, leading to better decision making

?? Reduction of lead time to correct supplier's delivery and making inventory management more efficient and effective

?? Improved resource utilization for reducing forced outages, Renovation etc
?? Improved Supplier Performance: the quality of raw materials (coal & oil) or components and capability of the vendor to deliver them in timeare of critical importance for the success of the organization
?? Increased flexibility to capitalize on opportunities while they are available. To create a flexible organization that can adapt to the changes in environment rapidly.
?? Reduced Quality Costs: range of 20% of the cost of units sent out. It includes internal failure costs, external failure costs, appraisal costs and prevention costs. ERP provides tools for Total quality managementprogramswithin an organization
?? Better analysis and planning capabilities
?? Improved information accurqacy & decision making capability
?? Use of Latest technology such as open systems, client / server technology and internets / intranets

Part II : ERP and Technology

Chapter 7: ERP and related Technologies

22.   The technologies when integrated with ERP system, will enable companies to do business at internet speed. Technologies related to ERP are

1.   Business Process Re-engineering (BPR)
2.   Data warehousing
3.   Data Mining
4.   On- line Analytical Processing(OLAP)
5.   Product Life Cycle Management (PLM)
6.   Supply Chain management
7.   Customer relationship Management
8.   Geographical Information Management
9.   Internets and Intranets

23. **Chapter 8: Business Intelligence**

?? **Business Intelligence** is a broad category of applications and technologies for gathering , providing access to, and analyze data for the purpose of helping enterprise users make better business decisions. The term implies having a comprehensive knowledge of all the factors that effect organization's business

?? The ultimate objective of business intelligence is to improve the timeliness and quality of the information. BI reveals following

1. The position of the firm in comparison to its competitors
2. Changes in customer behavior and spending patterns
3. The capabilities of the firm
4. Market conditions, future trends, demographic and economic information
5. The social, regulatory and political environment
6. What other firms in market are doing

?? BI information is regarded as the second most important resource a company has (a company's most valuable assets are its people

?? BI system to work effectively, enterprises must address the following technical issues: security and specified user access to the warehouse , data volume (capacity), how long data will be stored9data retention0 and performance targets

?? ERP systems use the business intelligence generated using data mining , OLAP, multidimensional analysis and other data analysis techniques for a variety of applications like demand forecasting, production planning, product design, retailing, CRM, credit card management etc

24- Chapter 9. E-Commerce and E- Business

Electronic Commerce integrates communications, data management, and security services, to allow business applications within different organizations to automatically interchange information. E-commerce is a multidisciplinary field that includes technical areas such as networking and telecommunications , security and storage and retrieval of multimedia information, business areas such as procurement, purchasing, production , marketing, billing and payment, and supply chain management.It also includes legal aspects like information privacy, intellectual property , taxation, contractual obligations etc. It includes financial aspects like EDI transactions, credit card payments, and credit card processing etc

E-Business , in addition to encompassing E-commerce , includes both front and back office applications that form the engine for modern business. E-business is over all strategy and E-commerce is an extremely important facet of E-business. Companies should develop strategies that are build around Internet, WWW, IT, E-commerce and should re organize / reengineer the business processes to make maximum benefit out of these driving forces

25. Chapter 10-Business Process Reengineering (BPR)

"Business Reengineering is the fundamental rethinking and radical re-design of business processes to achieve dramatic improvements in critical, contemporary measures of performance such as cost , quality service and speed" by Dr Michael Hammer

BPR-the different phases: The tasks that experts agree upon to successfully perform BPR, can be grouped in to 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.   Reengineer the process
6.   Blueprint the new business system
7.   Perform the transformation

25.1 Phase 1: **Begin organizational Change**: the first step is to take a long hard look how the organization operates. The purpose of analysis should be to determine whether dramatic changes are possible during BPR or marginal changes by TWM , kaizen etc is needed, which involves lesser risk. Next step is to look for harmful operating procedures, if, any within the organization. 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. Because an organization BPR can potentially require significant changes throughout an organization, it must begin with a communication compaign to educate all those who will be impacted by this change. Communication to all levels of personnel must remain active from start to finish to keep every one 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 that is strong enough to stop any re engineering work. In order for change to be embraced , every one must understand where the organization is today , what it needs to change , and where it should be in order to survive, thrive and beat the competition

25.2 Phase 2: **Build the Reengineering organization:** Major activities of the phase are , establish a BPR organization structure, establish the roles for performing BPR and choose the personnel who will reengineer it. One of the most important members of reengineering effort is the **executive leader.** He must be a high level executive who has necessary authority to make people listen and motivational power to make them follow. Without the commitment of substantial time and effort from top management, no BPR project can overcome the internal forces and will never reach implementation.The executive leader usually appoints process owners. A process owner is responsible for a specific process and the reengineering effort focused on it. The reengineering team must be small, usually five to ten people and as they will be ones who diagnose the existing process, and oversee the redesign and implementation. In some BPR initiative it is helpful to institute a steering committee, which can control the chaos by developing an overall reengineering strategy and monitoring its progress. Lastly a reengineering specialist or consultant can be an invaluable addition

25.3 Phase 3: **Identify BPR Opportunities.** This phase consists of following activities

??   Identify core/ high level processes
??   Recognize potential change enabler
??   Gather performance metrics within industry
??   Gather performance metrics out side industry
??   Select processes that should be reengineered
??   Prioritise selected processes
??   Evaluate pre existing business strategies
??   Consult with customers for their desires
??   Determine customer's actual needs
??   Formulate new process performance objectives
??   Establish key process characterstics
??   Identify potential barriers to implementation

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 level of organization

25.4 Phase 4: **Understanding the Existing Process-** main activities of the phase are

??   Understanding why current steps are performed

- ?? Model the current process
- ?? Understand how technology is currently used
- ?? Understand how information is currently used
- ?? Understand current organization structure
- ?? Compare current process with the new objectives

Modeling current process helps to better understand the esisting process, but also helps with planning migration from the old to the new process and executing the physical transformation of personnel, organizational structures, information requirements, and 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 output, cost, throughput , cycle time, bottleneck etc)

25.5 Phase 5: **Re-engineer the Process**- major activities in this phase are

- ?? Ensure the diversity of 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

The reengineering team should consist of designers and implementers and include both insiders and outsiders of existing process. Have people who will be future process owners or those responsible for future process. Brainstorming sessions are most successful when the following BPR principles are considered

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

During the brainstorming session s, the Reengineering team must consider technologies that are considered enablers of reengineering, e.g.

- ?? ERP systems
- ?? Supply chain integration technologies
- ?? Business intelligence technologies
- ?? Internet Technologies
- ?? Distributed computing platforms
- ?? Client/ server architecture
- ?? Work flow automation technologies
- ?? Groupware

It may be found at this stage that a new process simply will not fit into the current organization without a new process – oriented organizational structure

25.6 Phase 6: **Blueprint the New Business System**- activities of the phase are

- ?? 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. 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 , we need to create "to be" models to illustrate how the work flow 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 redesigned organizational structure. This chart will show the new process flow along with 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 th new process should be defined. The redesign may require an entirely different culture or atmosphere , than what is prevalent in the organization.

25.7 Phase 7: **Perform the Transformation**- the activities of the 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 structure
- ?? Asses current skills and capabilities of workforce
- ?? Map new tasks and skills requirements to staff
- ?? Re-allocate workforce
- ?? Develop a training curriculum
- ?? Educate the staff about the new process
- ?? Educate the staff about new technology used
- ?? Educate management on facilitation skills
- ?? Decide how new technologies will be introduced
- ?? Transition to new technologies
- ?? Incorporate process improvement mechanism

25.7.1 Migration strategies include:

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

Successful transformation depends on consciously managing behavioral as well structural change, with both sensitivity and employee attitudes and perceptions, and a tough minded concern for results. An educational pyramid is an effective way to transfer knowledge of team building, self mastery, and subject matter knowledge. Systems training is essential to understanding the use of new information systems and how to take advantage of their capabilities. Facilitation training for management is critical to develop their abilities to listen , allow mistakes, handle disputes among process experts, and transition to 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 new processes. Finally , a structured on – the job training program is instrumental in providing continuity of the new process during periods of personnel turn over or conflicts

25.8 Challenges faced by Re-engineering efforts

?? Resistance
?? Tradition
?? Time requirements
?? Cost
?? Skepticism
?? Job losses

25.9 Guidelines for maximizing Chances for BPR Success

?? Realize that not every company needs to reinvent itself and needs BPR
?? Expect strenuous resistance and manage it properly . Sell the change by constantly stressing the positive aspects of the change and the benefits to be derived by the employees and the company
?? Surround the project with a sense of urgency , since projects tends to die unless the need to change is urgent and is constantly re-emphasized
?? Get the management to fully support the project and have them make it clear that every one is expected to support the project
?? Keep the lines of communication with employees open to prevent damaging and inaccurate rumors and misunderstandings
?? Create an atmosphere of trust and cooperation .Allay fears and provide assurances that the company is genuinely concerned about employees
?? Make sure the people who are effected by or are going to use the new system are involved in the change process
?? Staff the project with the best people and provide them with resources they need to be successful
?? Design the system with customer's point of view , not from that of company . Eliminate processes or steps that add no value to the customer
?? Make sure employees are adequately trained an how to use the new system
?? Be prepared to change company's culture and its organizational structure , and re-organize the information system function
?? Go for small success at first. Go for more dramatic projects once you have gained some experience in BPR

Observing these guidelines is time-consuming and expensive

26. Chapter 11: Data Warehousing

Data warehouse is a collection of data to support the management decision making.It generally refers to combination of many different databases across an entire enterprise. The primary goals of a data warehouse are following

?? Provide access to the data of an organization
?? Data consistency
?? Capacity to separate and combine data
?? Inclusion of tools setup to query , analysis and present information
?? Publish used data
?? Drive business reengineering

Data is characterized as subject oriented, integrated, Non-volatile and Time variant.

Major component of data ware house architecture are

?? Summarized data (lightly summarized and highly summarized)
?? Operational systems of record
?? Integration/ transformation programs
?? Database architecture or metadata
?? Archives

The heart of a data warehouse is its current detail, where the bulk of data resides, current data is typically two to five years old. A system of record is the source of the data that feed the data warehouse. Even the best quality data can not usually be copied , as it is, into a data warehouse. Integration and transformation programs convert them from application specific data into enterprise data by following functions

?? Re-formatting, re-calculating , or modifying key structures
?? Adding time elements
?? Identifying defaults values
?? Supplying logic to choose between multiple data sources
?? Summarizing , tallying, and merging data from multiple sources

Data warehouse archives contain old data (normally over two years old) of significant , continuing interest and value to enterprise and with low incidence of access. Archive data is mostly used for forecasting and trend analysis. Metadata is data about data, different tool vendors will use their own meta data repository. To a data warehouse user metadata is like a "card catalog" of subjects available. Data warehouse system includes operational data, data warehouse software, data warehouse database and information discovery.a data warehouse is typically a blending of technologies, including relational and multi-dimensional databases , client/ server architecture , extraction/ transformation programs, graphical user interfaces and more. A well defined and properly implemented datawarehouse can be an invaluable competitive tool

Advantages of a data warehouse: many tangible and some intangible are following

?? More cost effective decision making
?? Better enterprise intelligence
?? Enhanced customer service
?? Business Reengineering
?? Information system reengineering

Structure of data warehouse consists of

?? Physical data warehouse
?? Logical data warehouse
?? Data mart

Ten mistakes to be avoided in a data warehouse project

?? Starting a ware housing project without the right sponsorship and top management support
?? Setting expectations that you can not meet and causing frustration to executives at the moment of truth
?? Promoting the value of their data warehouse with arguments such as "this will help managers make better decisions ", which can back fire
?? Loading the warehouse with information ' just because it was available'
?? Believing that data warehouse database design is the same as transactional database design
?? Choosing a data warehouse manager who is technology oriented rather than user oriented

?? Focusing on traditional internal record – oriented data and ignoring the potential value of external data and text , images , and – potentially –sound and video
?? Delvering data overlapping and confusing definitions
?? Believing the performance, capacity and scalability promises
?? Believing that once the data warehouse is up and running, your problems are finished

Some challenges facing data warehouse could be described as follows

?? Complex extract, transformation and load characterstics including source vs target, data transformations, transaction based loading
?? Immense volume of daily data
?? Load methodology (load control and ausditing)
?? Data warehouse recovery9 load recovery)
?? Data warehouse validation
?? Data warehouse read performance including database structural design and summarization
?? Metadata management

Uses of a data warehouse:

?? Standard reports and queries
?? Queries against summarized data
?? Data Mining
?? Interface with other data warehouses

It is important to note that data warehousing is a science that continues to evolve. Many of the concepts are still in their infancy. Further evolution of hardware and software technology will continue to greatly influence capabilities that are built into data warehouses

Chapter 12 : Data Mining

Data mining , the extraction of hidden predictive information from large data bases, is a powerful new technology with great potential to help companies focus on most important information in their data warehouses.Data mining tools predict future trends and behaviours, allowing businesses to make proactive , knowledge- driven decisions. Decision support wystems (DSS), executive information systems (EIS), and query/ report writing tools are used to produce reports about data , usually aggregating it through any number of dimensions. Multi dimensional tools make it easier for the user to formulate drill down queries

Data mining process: data mining uses a different model for the creation of information about data. It is called discovery model. Data mining uses methodologies that can sift through the data in search of frequently occurring patterns, direct trends, produce generalizations about the data , etc. discovery is similar to scooping out all the material in the lode and dumping it on a plain field so that all glittering stones are thrown up in the open. Diamonds are then separated from quartz by further inspection

Comparing the process of finding information in a collection of data to that of mining diamond in a diamond mine, we can say that "verification" is like drilling individual holes in a lode with the expectation of finding diamond. Finding diamonds in this way may be very inefficient

Data mining process elements include Data warehouse, search for patterns, review of results, revise and refine query and report results

Tasks solved by data mining: Given databases of sufficient size and quality , data mining technology can generate

- ?? Automated prediction of trends and behaviours
- ?? Automated discovery of previous unknown trends
- ?? Database can be larger in both depth and breadth i.e can have more columns and rows

Data mining techniques can yield the benefits of automation on existing software and hardware platforms, and can be implemented on new systems , as existing platforms are upgraded and new products developed

Chapter 13: On-line Analytical processing (OLAP)

Before the term OLAP was coined , these systems were often referred as decision support systems. OLAP systems enable managers and analyststo rapidly and easily examine performance data and perform powerful comparison and trend analysis, even on large data volumes. It is an integral part of data warehousing solutions. OLAP can be defined as the process of converting raw data in to business information through multi dimension analysis. For a data warehouse application a well designed metadata layer will provide a multi dimensional view of data.The key indicator of a successful OLAP application is its ability to provide information as needed , i.e. its ability to provide " just in time " information for effective decision making for future actions. The mediating role that an OLAP server provides with respect to various types of data bases and files in which the data may be stored and numerous type of front end packages that the end user may need. An OLAP server is connected with RDBMS, Hierarchical database, flat files, graphical interface, spreadsheet and statistical package. OLAP and data warehouse are complimentary. OLAP transforms data warehouse data into strategic information . OLAP ranges from basic navigation and browsing (often known as "slice and dice"), to calculation and more serious analysis such as time series and complex modeling. Key features of OLAP are multi dimensional views of data, calculation – intensive capabilities , time intelligence. Different styles of OLAP are multidimensional OLAP, hybrid OLAP, Desktop OLAP, Relational OLAP

Chapter 15: Supply Chain management (SCM)

SCM is track –proven technology applicable to just about every company regardless of industrial sector. It is also not majic. It is a series of complex calculations that optimize   enterprise plans within a given set of constraints , backed by fully integrated suite of financial, distribution and HRM . Powerful tools are available under the banner of supply chain planning (SCP) and advance planning systems (APS).Other functional developments have emerged . maintenance, repair and overhaul (MRO) can deal with large number of part numbers, small quantities of each part and a myriad of suppliers whether in hubs, multi site warehouses or different inventory accounts within one location . Replenishment systems can also be handled.

The SCM encompasses all activities relating to the supply chain. This includes vendor selection, negotiation, relations and performance. To increase efficiencies , companies are also focusing on core competencies and filling the gaps with strategic outsourcing partnerships . Business benefits of SCM are

- ?? Faster response to changes in supply and demand
- ?? Increased customer satisfaction (equity holders and purchaser, employees etc)
- ?? Compliance with regulatory requirement
- ?? Improved cash flow
- ?? Higher margins
- ?? Greater synchronization with business priorities

Chapter 16: Customer Relationship Management

Gartner Inc defines CRM as " A business strategy , the outcomes of which optimize profitability , revenue and customer satisfaction by organizing around customer segments, fostering customer –satisfying behaviors , and implementing customer centric processes. By definition then CRM technologies enable

greater customer insight, increased customer access, more effective interactions and integration throughout all customer channels and back office enterprise functions". CRM must be seen as a combination of people , processes and systems rather than as narrowly defined IT application. There are three fundamental components in CRM –operational,analyticaland collaborative

Chapter 17: Advanced Technology and ERP Security

ERP Bolt-ons: Open architecture is necessary for the addition of valuable bolt-ons to ERP systems. Bolt - ons provide organizations the means to do many specialized tasks. Another source of value comes from accessing data oriented products, especially for data entryBolt-on is ERP jargon for third party applications. More specifically , a bolt-on is an artificially intelligently , comprehensive execution system providing very specific functionality or technology to complement ERP software. The usual means of connection to other organizations with ERP systems is through software components. Some examples where bolt-on software is used are product data management, product life cycle management, customer relations, e-procurement, order tracking, warehouse management, data mining systems, etc. These products enhance the capabilities of the ERP systems. Some of them fcus on internet and intranet communication

Middleware: Middleware is an enabling engine to tie applications together. It can be divided into data oriented products (supporting ERP integration through sharing data sources) and messaging oriented vendors (supporting direct data sharing between programs without the need for data files or data base)

Data oriented vendor products extract and transform data and then exchange data files between ERP packages and other applications. Middleware software can transform data into standard formats readable by source and host systems.

A major change in ERP systems has been the emergence of Web delivered ERP. JD Edwards has designed an ERP product for that mode of delivery. SAP's mySAP.com also is oriented to web delivery ands all vendors have moved that way. The data transformation features are now available for multimedia documents including engineering drawings , scanned documents and audiovisual products .Middleware can support many forms of data acquisition. This includes barcode data collection and radiofrequency data collection. When Web systems are used ,the term web portal applies to software providing user – friendly access to data. Portals can act as middleware , giving organization members the ability to find technical information about engineering specifications, status information about promised shipments, and data about product prices and availability. Portals provide user friendly access to data

Portals enable ERP vendors to maintain a presence in a dynamic market. ERP vendor portals can focus attention on products. Portals are offered by third party vendors too. A Portal provides a unified interface to various data sources

Computer Crimes: The balance between making data available to the users that need it and denying it those who should not access is not easy to achieve.

It is a fact that both businesses and governmental agencies loose huge amounts of money every year to computer criminals. More than half the organizations reported attacks from from employees and other insiders. Greed , financial worries and personal problems motivate these people to commit the crime.Some are former employees seeking revenge .Some are corporate or international spies seeking classified information. Now many organizations are reporting outside (internet) attacks. Types of computer crimes range from pirating software and stealing information , to sabotaging systems. Criminals use viruses, worms , logic bombs, and Torjan horses to destroy computer hardware and software.

Security and ERP: Computer systems involve a new level of of detailed complexity , providing many opportunities to obtain key competitive information . this is stored in on computers and with advent of

networks , is in most cases accessible by networks.There are many threats to the security of information found on ERP systems.Threats across all three forms of access include theft , damage, copying, unauthorized access to information, natural disasters or accidents, sabotage etc. The most common forms of security threats to ERP are those form of tappings or hacking. A digital certificate sign-on can act as one security measure with log on to a directory protocol permitting access to authorized ERP application. The ability to maintain ERP security in a Web environment is mandatory, given that all ERP vendors are responding to provide Web products

In a distributed and networked environment, security is much more problematic. Passwords are most common tool for restricting access to computer system. Most computer users choose words that are easy to guess thus making the job of unauthorized user easy.

Many data thieves do their work without breaking into computer system; they intercept messages as they travel between computers and networks.

Many organizations use **firewalls** to keep the internet networks secure while allowing communication with the rest of the internet.

To protect transmitted information many organizations use **encryption software** to scramble their transmissions. When a user encrypts a message by a secret numerical code called encryption key, the message can be transmitted or stored as an indecipherable garble of character. The message can be read only after it has been reconstructed with a matching key.

Audit control software is used to monitor and record computer transactions as they happen , so auditors can trace and identify suspicious computer activity. Effective audit control software forces every user, legitimate or otherwise , to leave a trail of electronic footprints. Of course , this kind of software is of little value unless someone in the organization monitors and interprets output

Backups: are protection against sabotage, human errors , power losses, machine failures, fire flood, lightening, and earth quakes etc.For many systems , data and software are backed up automatically on disks or tapes usually at the end of each working day.

Computer crimes by authorized Users: An employee with access to company's money management via computer has an opportunity for embezzlement. Disgruntled employees present a particular problem. An employee on way out may sabotage the data on his computer, deleting customer records, bills owed, and so on. To prevent it check his references,do not give two weeks notice but two weeks pay in lieu of it.keep employees list up-to-date, do not give more access than necessary

Computer crimes by unauthorized Access: hackers are not only great at computer programming , analysis, and psychology. These criminal may get the passwords from unsuspecting employees claiming they are auditors, maintenance professionals, technical support personnel etc. other techniques is cracking the password by using variety of toolsand techniques. They start with your personal data, like mpet name, date of birth , spouse's name children's name and so on

Defending against malicious programs: buy or dowmload anti virus software and update them regularly

Part 3: ERP Implementation

Chaptr 18: To be or Not to be

Why organizations go in for ERP:

Technological Reasons:

- ?? Desire to outsource software maintenance and development
- ?? Need for adopting clean slate approach in order to achieve improved software system
- ?? Need for common technology platform and increased standardization in technology used
- ?? IT cost reduction

Desire to replace the ageing IT architechture or technology Business reasons:

- ?? Globalization and desire to move to a standardized IT and organizational blueprint to deal with merger / acquisition
- ?? Desire to adopt best practices business models and new ways of doing business , and to conduct BPR
- ?? Need for increased flexibility and agility in doing business
- ?? Data visibility and integration aiding managerial decision making and operations
- ?? Pressure from value chain and need for electronic networking and collaboration

Chapter 19: Implementation Challenges

Challenges faced before, during and after implementation, as per survey in 2004 by IT toolbox (www.ittoolbox.com) following is opinion on main challenges to successful implementation (in percentage) of 375 IT & business professionals

Implementation challenge	Percent of sample
Inadequate definition of requirement	46.5
Resistance to change (Lack of buy in)	43.9
Inadequate resources	43.1
Inadequate Training and Education	36.2
Lack of Top Management Support	32.4
Unrealistic Expectations of benefits and ROI	30.6
Miscalculation of Time and effort	27.7
Poor Communications	27.4
Software- business Incompatibility	23.1
Poor project design and management	16.8
Poor ERP package selection	6.4
Other	4.0

1. **Inadequate Requirements Definitions:** the requirement definitions should clearly specify the issues and problems that the ERP system is supposed to solve , the additional capabilities expected out of the system and so on. It will help in selection of proper ERP package, with areas where functional process customization is needed.
2. **Resistance to Change:** implementation of ERP is a change and it is human to resist change. *ERP is first an attitude, then a system.* So if employees are not convinced about the importance of ERP and benefits of using an ERP tool and system they will not be cooperative. There is misconception that it will increase their workload., it will hinder creative work etc. Management must educate users about ERP.To reduce resistance create champions, who are well respected potential user of the technology.. The champion becomes the expert user , facilitator, and trainer of the tool.
3. **Inability to achieve Organizational Understanding: "**understanding an architecture" indicates that the organizational legacy systems and the ERP are documented and articulated as a digital blueprint illustrating commonalities and interconnections among the component metadata.
4. **Inadequate Resources:** ERP implementation is a costly affair that requires a variety of resources –money, people and software, hardware and so on. There will be many items that will be missed

during the preparation of the budget but will consume money during the implementation. The long implementation period (usually 8-20 months) will escalate many costs. Another resource that is always in short supply is skilled and motivated personnel from the organization

5. **Getting of Top management Support:** The roles of top management in IT implementation include developing an understanding of the capabilities and limitation of IT, establishing reasonable goals for IT systems, exhibiting strong commitment to the successful introduction of IT and communicating the IT strategy to all enployees

6. **Lack of organizational readiness:** i.e the preparedness of the organization for a new system of functioning

7. **Inadequate Training and Education:** ERP projects seem to have a six month learning curve at the beginning of the project. At a minimum , every one who uses ERP system needs to be trained on how they work and how they work and how they relate to the business process early in the implementation process

8. **Inaccurate expectations are the norms:** Most ERP implementations today result in cost and schedule overruns. As per study by www.standishgroup.com 10% ERP implementation succeed with full functionality, within forecast time and cost frames and 55% are implemented with cost and time overruns and remaining 35% are cancelled. **Cost overruns average 178% , while schedule overruns average 230%.** On an average the ERP are implemented with only 41% functionality

9. **Poor package selection:** The choice of the package involves important decisions regarding budgets, timeframes, goals and deliverables that will shape the entire project

10. **Poor Project management:** a project scope that is too broad or ambitious can cause severe problems. Customization increases the scope of an ERP project and adds time and cost to an implementation

11. **Customization Issues:** There are four basic choices to customization (a) modify the ERP to match the organizational processes and or data structures (b) modify the organizational processes and or data structures to match ERP (c) perform some chice of choice (a) and choice (b) . choice (d) ignore the problem

12. **Long Payback Period:** Another statistic not well understood is that, the return on investment (ROI).For most organizations runs almost three years. A metagroup (www.metagroup.com) study indicated that the median annual savings from the new ERP average $1.6 million /annually on a (roughly) $30 million investment one year after implementation is complete

13. **Poor communication and cooperation:** Communication is the oil that keeps every thing working. ERP systems requires a corporate culture that emphasizes the value of sharing common goals over individual pursuits and the value of trust between partners, employees, managers and corporations

14. **Poor quality Costs:**As per survey by PwC two troubling facts about organizational data quality (a) only 15% of the companies are very confident of the data received fromother organizations (b) Only one in three ompanies are very confident about quality of their data. Poor quality data can be fatal to ERP projects

15. **Hidden implementation Costs;** There are many items that are missed or that will consume more money than allotted while preparing the implementation budget. If the company does not have sufficient reserves to bear additional expenditure, the implementation will have to be left unimplemented

16. **Improper Integration:** Organizations face many challenges in ERP integration – the challenges of integrating various functional ERP modules , the challenge of integration with other eBusiness software applications and challenge of integration with legacy systems

17. **Improper operation / use:** Best ERP solution implemented but if its resources are not utilized to the fullest , the whole initiative goes to waste

Chapter 20: ERP Implementation (Transition) Strategies

The most important factor that decides the success of an ERP implementation is the transition strategy e.g. Big bang or Phased or Parallel or Process Line or hybrid. The three pillars of ERP implementation are People , Process and Technology.

Phased implementation: Independent modules of ERP are installed in each unit while integration of ERP modules takes place at a later stage.This has been most commonly used methodology of ERP implementation. Interface programs are common in their use for the phased approach. Implementation last a long time , greater than 18 nomths

Parallel Implementation: this approach keeps both legacy system and new ERP system active simultaneously for a length of time. It has good recovery options in case something goes wrong. It is adeally suited for mission critical situations that can not survive a major malfunction of ERP system

Chapter 21: Implementation Life Cycle

There are no clear separating lines between these phases and in many cases one phase will start before the previous phase is complete. Different phases of the ERP implementation are pre-evaluation screening, package evaluation, project planning phase, gap analysis, re-engineering, customization, implementation team training, testing, going live, end user training, post implementation.

Pre-evaluation screening: There are hundreds of ERP vendors- of all sizes and shapes- all claiming to have the solution that is ideal for the organization.. It is better to limit the number of packages that are evaluated to less than five.Getting help from external consultants and most importantly finding out what package is used by similar companies

Package evaluation: Important points to be kept in mind while evaluating ERP software include functional fit with the company's business process, degree of integration between the various components of the ERP system, flexibility and scalability, complexity, User friendliness, quick implementation, ability to support multi-site planning and control, Technology- client/ server capabilities , database independence, security.Availability of regular updates, amount of customization required, local support infrastructure, availability of reference sites. Total costs, including cost of licence , training , implementation, maintenance, customization and hardware requirements

Project Planning Phase: The implementation team members are selected and task allocation is done. This phase will decide when to start the project , how to do itand when project is supposed to be completed

Gap analysis: This is arguably most crucial phase in the success of the ERP implementation. Put very simply , this is the process through which companies create a complete model of where they are now and where they want to be headed. The trick is to design a model , which both anticipates and covers any functional gaps. It has been estimated that even the best ERP package, custom tailored to companies needs meets only 80% of the functional requirements. The remaining 20% of these requirements present a problematic issue for the company's BPO. One of the most affordable ,albeit painful , solutions entails altering the business to "fit' the ERP package

Re-engineering: It is in this phase that human factors are taken into account

Customization: The company needs to know which processes have to change in the process of implementation. SAP for instance , has pre configured industry specific templates that can be tweaked for each individual company(Accelerated SAP or ASAP solution) . Sage MAS 500 ERP system provides a set of customization tools which includes a software development kit and customizer

Implementation Team training: How to implement it. For the company to be self sufficient in running the ERP system, it should have a good in-house team that can handle the various situations.Select employees with the right attitude-people who are willing to change, learn new things and not afraid of technology – and good functional knowledge

Testing: In this phase we test real case scenarios. The system is configured and now you may come back with extreme case of system overloads, multiple users logging on at the same time with the same query, users entering invalid data , hackers trying to access restricted areas and so on. The test cases must be designed specifically to find weak links in the system and these bugs should be fixed before going live

Going Live: This is the phase where ERP is made available to the entire organization. On the technical side the work is almost comlete:data conversion is done , databases are up and running and on the functional side , the prototype is fully configured and tested and ready to go operational. Once the system is "live" the old system is removed and the new system is used for doing business

End User Training: on how to use the system. This phase starts much before the system goes live. The participants should be given overall view of the system and how each person's action affect the entire systemIn addition to to these general topics , each employee is trained on the job or task that he / she is supposed to performance the system goes live

Post implementation (O&M) : Once the implementation is over the vendors and hired consultants will go. There should be enough employees who are trained to handle the problems that might crop up. There should be people within the company who have the technical prowess to make the necessary enhancements to the system as and when required. The system must be upgraded as and when new versions or new technologies are introduced. Here , the organization should think in terms of the incremental benefits of the enhancements because with any upgrade or enhancements

ERP implementation needs to change the way people have been doing things and lots of procedures are introduced for the functioning of ERP. Resistance to ERP implementation is natural because it is human nature to resist change. Making people accept ERP and implementing it is difficult because of the myths surrounding ERP, such as ERP causing additional work and more documentation. To reap full benefits of the ERP system system , it should get project-wide acceptance.ERP poject is complex and lengthy project that equires a vast amount of resources (money, personnel, hardware, software, communications network, etc). 'It is do-it –right-the- first-time' kind of project

Chapter 22: Pre-implementation Tasks-Getting Ready

I.T. personnel's understanding of the new technology is an absolute requirement for a successful ERP implementation. Everyone from Boardroom to the stockroom needs to clearly understand their role and responsibilities for implementation. Careful and meticulous planning and preparation is required for the success. In the planning session it will be determined what must be done, who will do it, how it will be done, when it will be done, cost of doing it, and the services and materials required to do it

Creating Core Team: Determine the structure of the ERP team, assign ERP core team members to modules and phases, determine their percentage participation, adjusting percentage equivalents, and calculating full time equivalents

Establishing the educational & training needs: Education includes giving information about ERP basics, best practices, need and benefits, different modules and how they function, and such general topics . The training imparts information specific for the company in that they will teach the users how to use the ERP system specifically for the business .

Establishing the data conversion/ migration strategy:

Almost all functional module will require information from legacy system. The two primary methods of converting data are manual and electronic. When performing this step it may be helpful to have an entity diagram and file structure of ERP system

Establishing interfaces: can be developed using electronic methods or ERP team members or clerical staff. It is best to have company employees with strong knowledgebase of the legacy ERP system , working together with knowledgeable ERP application consultants to fully understand the critical interface points

Identifying Constraints: All the constraints of the project should be identified and documented . Some examples of business activities or problems include lack of people, data integrity problems, people unwilling to change

Chapter 23: Requirements Definition

Requirements definition is the process of capturing and documenting the user requirements and specifications. The main tasks that are performed in this phase are to understand the current system by discussing it with users and studing documentation available. The main areas that asre studied are organization objectives, activities, procedures , rules and standards, files and interfaces and so on.every existing system , whether manual or computerized, will have some problems or inadequacies. That is why it is being re-designed or replaced with a new ERP system. The existing system, problems and constraints are documented for future refrence and findings are discussed with the client or user.ITtoolbox(www.ittoolbox.com) conducted an survey of 375 IT& business professional. The survey asked one of the question "What do you see main challenges to successful ERP implementation ?"46% participants indicated that inadequate definition of requirements. Requirements definition is the statement of needs by a user that triggers the development of a program or a system. Requirement is a user need or a necessary feature, function or attribute of a system that can be sensed from a position external to that system to that system. Requirements are specifications of what should be implemented. They are descriptions of how the system should behave or of a system property or attribute. Functional requirements are documented in a requirements definition document(RDD) , which describes as fully as possible the expected external behavior of the software system. The non functional requirements include standards, regulations, quality attribute goals, performance objectives, business rules and external interface requirements. Requirement Engineering is a collaborative activity and interdisciplinary. The requirement engineer needs to mediate between the domains of the user and software engineering.The requirement engineer gets inputs from management, marketing, technical support , users, regulatory agencies, hardware engineering, system engineering, development team, customers, legal department etc.Requirement activities focus on understanding what we intend to build.

Requirement definition process: Understand the current system (manual or computerized) with a view to examining its inadequacy and identifying problem areas. It is done by discussing with users and studying documentation available. It includes organization objectives, activities, procedures, rules and standards, files and interfaces etc. the aim is to identify the processes , establish what they do and define what they do and define the key issues that need to be addressed. There are formal tools and techniques available that are used by business analysts to define requirements. These include the use of data flow diagrams , entity relationship (ER) diagrams etc.Once the user requirements have been defined , the next step in this phase is the preparation of the requirement definition document (RDD)

Why requirement definition? The list of requirements are created and classified into various categories like vital, essential , and desirable. Statuary requirements that should not be overlookedare identified. Conflicting requirements are collated and set aside for determining what to do.. This list becomes useful device when discussing requirements with vendors

Chapter 24: Implementation Methodology

Strategy: Option is available for those organizations having multiple sites to implement first at one site as pilot project. Implementing ERP in a pilot project is a good idea because it will give implementation team a feel for the issues in an actual implementation, the peculiarities of the organization, its work environment and so on. When incremental approach is used , all ERP modules are not implemented in one step. The different modules are introduced one by one.

Plan: the implementation plan documents the who, what, why, where, when, and how of the project. The plan provides a guide to the project and is used to monitor progress. Specialized packages are available such as Microsoft Project . These capture a lot of detail about the project, enable different views of the project such as time scale or critical path, and facilitate the reporting of many different issues, e.g. costs, resource usage and overdue activities

Cost: The total cost of ERP ownership includes the cost of packaged software, hardware, professional services (for ongoing maintenance, upgrades and optimization) and internal costs. The cost of packaged software depends on the scope of implementation (the number of ERP modules and the number of end users), complexity of software and ERP vendors. Implementation of ERP systems routinely requires purchase of new computer hardware, systems software, network equipment and security software. Implementation equires the services of many professionals for customization, integration, data conversion, data migration, testing and training. In identifying where the costs are likely to arise, consideration should be given to hardware,operating system, database licence fee, core software license fee, additional module license fee, additional seat license fee, third party software license fee, integration of third party software, software customization, project management, consultancy, training, living and travel expenses, software maintenance or warranty renewal and upgrades. For cost a long term perspective should be taken, a meaningful time horizon is five years. It is common to provide yearly maintenance cost to be 10% of the initial cost outlay

Performance Measurement: We know about three performance related measures-costs, time and benefits, one more is deliverables. The use of deliverables provides the opportunity to assess the effectiveness of what is being done

Problem resolution: It is desirable that there is an agreed procedure for recording issues and their resolution

System Issues: Tasks will be identified on the project plan but those involved will normally be the IT systems personnel.

ERP implementation Methodology by Vendors and Consulting firms: They range from vendor specific methodologies, such as " Accelerated SAP(ASAP)" to consulting firm product such as "The TotalSolutions"from Ernst & YoungLLP and the "Fast track workplan" from Delotite & Touche

ERP Implementation –The Hidden Costs: In addition to budgeting for software costs, financial executives should plan for consulting, process re-work (BPR), integration testing, etc. underestimate the price of teaching users their new job processes? Fail to consider data warehouse integration requirements? Need extra software to duplicate the old report formats? Brain drain and continuing maintenance. A successful training will account for a minimum 10-15% of the total budget.It will be a good idea to identify these would be trainers early on in the implementation and make them part of implementation team, so that they will have a hands-on experience and will know the 'big picture'. Huddle with HR early on to develop a retention bonus program and create new salary strata for ERP vetrens. ERP implementation team members should not be sent back to their previous job as they are too valuable.Just writing reports to pull information out of new ERP system will keep the project team busy for a year atleast. And it is in this analysis and insight – that companies make their money back on an ERP implementation

Chapter 25: Not all packages are created equal- package selection

Why many ERP implementation Fail:

ERP is first an attitude, second, a process; and only third a set of tools. Attitude refers to the feeling or mood of the people in the organization toward ERP. So the users of ERP are to be convinced about real benefits of using ERP. This can be done by ,educating people about its benefits and exposing the misconceptions about ERP **.**There should be good people who know ERP system and organizational business practices, the vendor should be good and the vendor's package should be one best suited for the company's needs. The maturity of an organization not only the skills set of the individuals , but also on the chemistry of the team.

ERP package evaluation and selection: More than 50 ERP packages are available , the features they offer vary, as do the technologies they support, the technologies they use,the architecture on which they are built and available platforms. Deciding which package is suitable for the organization is a difficult task. Each piece of marketing literature of the tool vendor s claims that their product is best among the lot and has all of the features that you will ever need. The most important factor to be kept in mind when analyzing the different packages is that none of them is perfect.The objective is to find package that is flexible enough to meet the company's needs. Or in other words , to find a tool that can be customized to obtain a "Good fit". It is generally accepted the most ERP packages are stronger in certain areas than in others and each is trying hard to add functionality in areas they have been lacking. For example , People Soft is strong in HR and less so in manufacturing; Baan , on the other hand , is historically stronger is manufacturing than in financial and so on. Many ERP packages are available in the market. Analysing all packages is not a viable solution.It is also very time consuming process . So it is better to limit the number of packages that are evaluated to less than five. So the company should do a pre evaluation screening to limit the number of packages.It is a better way to look around to find out how the different packages are performing in environments similar to yours. When the vendors arrive for their presentation , you should be thoroughly prepared; otherwise they will drown you in their hi-fi presentations and you will not have time to ask questions. The ERP packages come in all sizes and shapes, with all frills, bells and whistles, gizmos and gadgets that you can imagine. Some examples of selection criteria may be

- ?? The package should have multi language and multi currency support
- ?? The package should be international and should have installations in specified countries
- ?? The package should have at least "X" number of installation and out of which at least "Y" numbers should be in your business sector
- ?? The cost of the package with all necessary modules should be less than "Z" Rupees
- ?? The package should have the facility to do incremental module addition
- ?? The vendor should provide implementation and post-implementation support
- ?? The vendor should give a commitment on training the company employees on the package
- ?? The package should have the capability of interfacing with other systems that the company is dealing with
- ?? The package must be customizable and customization process should be easy
- ?? Vendor's policy and practices regarding updates, versions, etc should be acceptable

Another source from which the evaluation committee can get information about the tools is independent research agencies and companies. Prominent among them are AMR Research (WWW.amrresearch.com), Forrester research (www.forrester.com),Gartner Group (www.gartner.com) The International Data Corporation (www.idc.com) , The Butler group (www.butlergroup.com) Ovum (www.ovum.com, VNU (www.vnu.com). Once the committee has reached a decision on a package , it is good idea to visit a few companies that have installed the particular package and see it in action.Most critical factor that determines the success of any ERP implementation is the support of the people who use it

Chapter 26: ERP Project Teams

Many tricky technical , political, organizational, cultural, process oriented , risk related, and personnel issues need to be addressed in making the change and people need to be committed to the change. It makes a tremendous difference if people are told the reason why a particular change is made , how the new business process or procedure will improve the productivity and then given on using the system

The new roles of the staff need to be clearly defined. Because most processes are automated by the introduction of ERP system, many existing jobs will no longer be needed and many job profiles will change. This is important in order to secure the cooperation of the user, which is critical success factor for the ERP package. Users should be educated about the capabilities and limitations of the system. Many brave decisions need to be taken and resourceshave to be used , schedules have to be altered, and so on and for this one needs a senior person at the implementation team

People involved in the ERP implementation: Every implementation project needs a **sponsor** say CEO or MD. The executive committee or steering committee formulates long term goals, objectives and strategies regarding theimplementation of the ERP system in the company. The EC is headed by CEO or MD and includes the CIO, CTO, CFO and other senior level managers and departmental heads. The project manager is the person responsible for transmating the vision and goals in reality. The implementation team or the work team consists of selected employees from the company in addition to vendor representatives and consultants. Functional managers oversee the day to day operations of their respective functional areas, they shouldhave strong conceptual skills in understanding the overall ERP project and how it relates to the business. Functional participants have a limited role in the implementation of the project, they answer questions , and review the training programs and business process flowsthat are proposed in the new software. Consultants can act as project manager, team leader, team member,service representative and end user.. Consultant's success depends on computer litracy, conceptual skills, software knowledge, industry knowledge, maturity, problem solvingcapability,, communication skills and organizational skills They provide three general categories of services- management, application and technical. Package vendor are responsible for fixing any problems in the software that the implementation team encounters and as trainer to end users/ key users. End Users are the general mass of people who will use the new ERP system. Documentation and training programs are often prepared specifically for this group of people

Composition of ERP Team: The ERP implementation project needs people who can grasp new ideas quickly, who have an open mind to new technologies and concepts, and who love challenges. These people should have a never-say-die attitudeand should be capable of working as team. Those selected –the pioneers –will have greater demands made upon their time.They are likely to work long hours for many months, including week ends, to cover normal duties and also their project tasks. The continual intrusion into free time may affect family life and needs to be accomadated. As time passes , the team membersneed to be watched for loss of interest, resentment, or burnout and handled with care

Project manager: should have characteristics of can do attitude, communicator, knowledgeable about the business, credible within the company, diplomat and facilitator, improvious to criticism and resilent. He should ensure a smooth transition from the "as-is" to the "to-be" business operating environment

Project management team: is responsible for conducting the scheduled work, administering the project, communicating with the in house team and consultants. It should also ensure that the company personnel and the consultants are working together as a team and there is full cooperation between the two groups. They are also responsible to ensure that the consultants are transferring their knowledge to the in-house team and all documentation is done properly

Work teams: In case of projects with more than one work team, each work team will be allotted different areas of the ERP implementation, includes hired consultants and the in-house team. Consideration should be given to the teams work environment . the ideal set up is a dedicated room where

people can work undisturbed. This room, often called war room, a multi functional dedicated area where team members can come to train, hold meetings, perform testing and develop solution

Technical support team: tocreate an environment that is suitable for implementation of the software, usually team size s 3-4 members, it takes care of issues like data migration, data backup and recovery, hardware infrastructure and performance tuning of the databases

Administrative support team: usually team size will be 3-4 , to provide tables, conference rooms, telephones, stationary, filing cabinets etcetc

Implementation process: Once the project is underway, the plan can be updated on a regular basis and the "planned versus actual reports can be produced in varying detail and varying formats. Use project management software for actual and planned completion dates, expenses and so on. These software tools allow responsibilities to be assigned to different persons and so it is easy to find out who is lagging behind

Chapter 27: ERP Process Definition

Defining the process is very important in the implementation of ERP systems.This step ensures that the implementation will be consistenet with the vision statement. It spells out the new processes by which the company will be managed. It adds essential details to the vision statement and creates the detailed schedule necessary for effective project management. The process definition consists of two elements-One is to define processes for demand management , planning and scheduling while the other element addresses the finance and accounting side. Accounting and finance should be one of the biggest supporters of the ERP implementation. This process makes their job easier

Chapter 28: Vendors and Consultants

Developing an ERP package is a very complex and time consuming process,which needs a lot of skilled manpower and other resources. Vendors are the people who have developed the ERP packages. They are the people who have invested huge amounts of time and effort in research and development to create the packaged solutions. The ERP vendors spend crores of rupees in research and come up with innovations that make the packages more efficient, flexible, and easy to implement and use. Also with evolution of new technologies the vendors have to continuously upgrade their product to use the best and latest advancement in technology. So it is better to leave the ERP package development to the vendor.

Chapter 29: Dealing with Employee Resistance

Reasons for employee resistance:

1. **Fear of being redundant:** There is some truth in this fear. But what most people fail to hear and gossipmongers forget to tell is that the people who are doing manual jobs before computerization were able to get better jobs with higher salaries once they learned the new system and how to use the computers
2. **Fear of Failure:** that is fear of not understanding or being able to work within an automated environment. The companies should arrange through training program that will insure the employees have the knowledge and a confidence levelfor adapting and using new systems to the maximum benefit of the company
3. **Fear of the future:** The company may inform employees that ERP implementation is being done so the firm can compete and grow the business. It may be implemented to survive , thrive and become competitive.

Dealing with employee resistance:

1. **Training and education**
2. **Creating ERP champions:** One of the most efficient ways to transition to new technology is to find well-respected potential user of the technology. This should be a person who knows business well, embraces change, and respected in the organization. Train the user on the process and the technology, have this user evaluate the technology, and encourage this user to champion the merits of the technology to co-workers and management. The champion becomes the expert user , facilitator and trainer of the tool. He or she will also be the key in helping other employees understand and learn value of ERP and how it affects their jobs. So all the members of the implementation team and the pilot project team are potential champions
3. **Pilot Projects:** based on the experiences of the pilot project implementation, the implementation plan and the implementation guide will be revised and modified . The pilot project will warn the implementation team what could go wrong , how the potential pitfalls could be avoided, and so on. Also a successful pilot project is a morale booster for the implementation team and a good marketing tool
4. **Involve Employees in ERP Process:** Involving more employees more than just senior management in decision and implementation process will go to make people feel more ownership
5. **Address issues of fear, uncertainty and self esteem:** First thought in everybody's mind when ERP implementation is discussed is "what is in it for me?". The more they know about why the organization is selecting ERP, how it will benefit the company, and what it means to them and their job.
6. **Manage Expectations:** managing expectations of problems to be expected during the initial and final phases is the biggest challenge

Chapter 30: Contracts with Vendors, Consultants and Employers

Contracts are very important in an ERP implementation project- before, during and after implementation. The company should sign a contract with the package vendor, the hardware and peripheral vendors, the networking people, the consultants, the employees who are being trained in ERP package implementation (not the end users) or the employees who are part of the implementation team.

Contract with the package Vendor: The company's legal department should go through the contract and if they find the terms and conditions agreeable, then sign the contract. As the creator of the package , it is their intellectual property . The contract with the vendor should address – in adition to the source code and modification following points

Value of the contract and conditions of payment, List of deliverables(software, documents etc), mode of delivery and installation help, copy right and ownership issues,software license, third party software compatibility, integration or interfacing and integration support, Operating system, Hardware liability, conditions and concessions for acquiring complementary modules in the future or for increasing the number of end users, cost of implementation training, cost of end user training, annual maintenance fee, warranty and guarantee terms,Terms and conditions for receipt of new versions and upgrades, details of technical support – on-site, telephone etc, terms and conditions for customization, the profile of the vendors team who will be assisting the company in implementation, other specific responsibility assigned to the vendor, cancellation of the licence

Contract with the consultant: following should be included in the contract

? Profile of the consultant's team with resume of each member
? Consulting fee and payment condition
? The time schedule and the implementation budget
? The projected improvements in quantifiable terms and time required for showing the results
? Implementation methodology
? Terms and conditions of knowledge transfer and employee training

?   List of deliverables (repots, manual, knowledge bases, etc)
?   Other specific activities the consultant's are supposed to do
?   Reporting mechanism to the company management
?   Project monitoring and status reporting systems

Contract with the employees: The employees who are on the implementation team are trained on the ERP packageat the company expenses. Once they have acquired knowledge , completed the training and participated in the implementation their market value will jump exponentially. So it is natural that they will better and more lucarative job offers. But if these employees leave the company without any warning or without making any altetanative arrangements,, then company's performance will suffer. The main clause of the contract with the employee should be that they should not leave the company without enough notice and he can not leavethe company in the middle of the implementation project

Chapter 31: Training & Education

The formal approach to the training tends to involve the following stages

?   Define learning objectives-what will learner be able to do as a result of the training?
?   Determine the content-what skills and knowledge are to be developed?
?   Plan-when and how will the training be delivered? What resources, materials,facilities are required? How the content will be structured
?   Deliver the experience of the learner
?   Assess learner-has the learner met the objectives?
?   Review the effectiveness of the training session-what went wrong?what can be done better?

The training budget can be 10% or more of the total cost of the project. Users are trained how to use an ERP system is a mix of technology, processes and domain area content in order to provide a context for the system. It is always better to train on the concepts first and then show the end users how to use the system. Other formats used include training over the internet , computer based training , and self study.One approach that is consistently used involves designating a member (or group of members) of the organization as "super user or champions" ,who can then be responsible for training others. The variety of training formats available is amazing – on site training,web based virtual classrooms, computer –based training , knowledge warehouses, video courses, sef study books, context sensitive help screens etc.Pre implementation training is organized for the project team and the system administrators. The focus of the project team will be on understanding the functionality of the software. Training on such subjects as best practices, process mapping, training skills and documentation may be provided by the vendor. The end users and managers are trained during implementation and after implementation. Some areas that will be relevant to every one are ERP bascs, business processes, changed business procedures, automation of tasks by ERP, and fundamentals of computer usage like passwords, encryption, security etc

Chapter 32: Data Migration

Data migration is the process of translating data from one format to another. Data migration is the process of moving required (and most often very large) volumes of data from existing systems to new systems. Existing systems can be anything from custom built IT infrastructures to spreadsheets and standalone databases. Typically, data migration is done by a set of customized programs or scripts that automatically transfers data. Extracting and cleansing data from existing system can be the single largest task in the project. The wizards in data migration tools make tasks like loading the data from the existing system, reviewing for quality, accuracy and completeness and then importing the data directly into ERP database . Two primary methods are used for migrating data from the legacy systems to the new ERP database-manual and electronic. In electronic method, some type of database conversion process is used. This process can range anywhere from true source code development to complex copy utilities. We start with raw data in a legacy system such as inventory item master file. Using data migration tools and

programs , we come up with a migration strategy to export data to the new ERP system. The manual approach will use a non technical human resource to examine the data in on the legacy system and decide how to enter the information in ERP system

Chapter 33: Project Management & Monitoring

An ERP implementation Project is complex in nature, involves a lot of people, requires the coordinated effort of a number of groups, involves a lot of money and has a long completion period (typically 10-18 months) . Nine knowledge areas on which project management is based are

? Project integration management: Setting up a full time team who can understand what is expected from them. Preparedness is crucial but is often missing

? Scope management: 90% of ERP implementation end up over time and over budget due to among other factors, changes in project scope. A lack of understanding of the scope of the system may result in conflict between logic of the systemand the logic of the business

? Time Management: The length of implementation time is greatly affected by the scope of the project, i.e. more activity regarding modules, sites and functions means a longer process. Consultants to recommend a zero modification approach yhat has now a days become a de facto standard

? Cost Management: Total cost of implementing ERP system includes cost of licensing , training, implementation, maintenance , customization, and hardware requirements, cost of migrating data, network infrastructure etc. Like most software ERPs are priced on the functionality of the system and number of users who will access it

? Quality management: means the system has been implemented in an efficient way and the objectives are met

? Human Resource Management: to assemble the best possible team to plan,execute and control the project. Top management must be visible in their commitment to the project. Team morale is vital component for the success of the project

? Communication management: The higher the levels of communication and interaction in the implementation team , higher is performance of the team

? Risk management: to succeed the organization should have a risk mitigation plan as per details in chapter 5

? Procurement Management: When selecting the package, it is critical to get vendors to state the extent to which their products will meet each requirement. Selection process is defined in chapter 25

Project monitoring: Use a project management software (like MS Project)

Chapter 34: Post Implementation Activities

An ERP project represents much more than simply a project. Your up-front investment is large, but the life expectancy of the application should lie somewhere between 10 and 20 years. By retaining a sub set of your installation team, its members can enhance the ERP application , handle bottlenecks, tweak and improve the system, look for continual productivity gains-and learn. This sub set should be made up of both business and technical personnel. After the system goes live stabilization period lasts from three to nine months. When problems arise there should be a problem response mechanism which deals with them and which every one is aware of. The user help deskis a call center facility provided by the vendor, which allows the client to log problems that he can not resolve. In –house help desk needs to be set up to answer the queries of the user. Post go -live activities are following

? Data Conversion from legacy system to ERP system

? Bottleneck resolution: first , their location is likely to be different for different firms. Second, the cross functional nature of ERP process design is likely to generate bottlenecks, particularly where

different departments have different resources. Third, for those settings, where data gathering has been transferred from accounting to where the data is actually generated, there may be bottlenecks because of change in data input. Fourth, linkages to legacy systems and processes may drag down system performance.To detect bottlenecks-an internal ERP data analysis and an organizational analysis. Internal ERP analysis is based on an examination of ERP data; exception reports and transaction data can be analyzed for emerging and repeating problems

? Documentation and training are required prior to ging live

? Audit and review for comparison between plans and reality, at least on three dimensions viz. system design and implementation, planned and actual use, expected versus actual system capabilities

? Implementation compromises are deviations from a planned implementation- generally to save time or money

? Interfaces, Upgrades and Extensions: upgrades are required for additional features. Interfaces may be pursued after the implementation of ERP.Extensions include bolt in softwares e.g. Supply chain integration,sales force automation support

? Evaluating Success: after stabilization period,e.g. cost benefit analysis or balance score card approach. Timing is critical issue for evaluation of success

? Balance scorecard communicates a firm's multiple objectives from multiple perspectives, including financial, customer , learning and growth and internal business processes

? Post implementation review, after two months of go-live, provides an opportunity to learn from the implementation:

1. Does the software do what is expected of it?

2. What are the outstanding or emergent issues?

3. What can be learnt from the implementation ?

4. What could have been done better? How this can be used in future?

5. What timescale/ budget is required to deal with the remaining issues?

6. Has the project been a success?

Chapter 35: Success and failure factors of an ERP implementation

Success factors:

1. Project Planning: including setting project goals, business requirements, project teams, project cost estimates etc

2. Align the organization on the true destination, i.e. every one has same vision

3. Architectural design: for integrating ERP with other e business applications etc

4. Transition project goals to a way of life: includes preparing people for the critical shift , moving from team members to champions

5. Correctly define data requirements at analysis and design stage- appropriate level of data requirements is critical for an ERP to interact with other applications

6. Apply planning and program management practices throughout the program life cycle, including O&M phase

7. Achieve balanced people , process and technology changes across all areas: companies need the best -of –breed technology tools, the most effective work processes using world class practices and people who are trained and motivated

8. ERP must be driven by a business case: e.g. improved cash flow, faster hiring, reduced costs etc

9. Achieve executive direction for thousands of decisions to be made-both large and small

10. Focus on capabilities and benefits, not just on going live

11. Make ERP related decisions quickly: when an ERP project stretches more than 10-12 months , it is a risk- mostly because team members move on

12. Put the very best people on the implementation team

13. Phased approach: e.g. pilot project and short term milestones

14. Data Conversion: second generation ERP systems use RDBMS to store enterprise data

15. Organizational commitments: includes each functional department

16. Create a partnership between your software vendor(and implementation partners) and your stakeholders

17. Sell, sell and continue to sell ERP to your stakeholders long term benefits of the system

18. Build and leverage process expertise for greater core expertise

19. Adequately resource your project(especially in functional areas)

20. Define metrics and manage them e.g. set targets, establish budgets and make it happen- especially after going live

21. Communicate and manage expectations (of stakeholders)at go-live

22. Extend capabilities beyond the ERP foundation- e.g advance planning and scheduling to warehouse management to sales force automation etc

23. Ensure the project has sufficient budget / funds

24. Encourage functional ownership of the project- functional departments nust establish the rules that govern the system; learn how the system will handle business processes within their departments and be able to obtain information by on line enquiry or by creating their own reporting

25. Develop dependency –driven project schedules (predecessor and successor activities) that can be tracked and managed to provide early warnings and help avoid crises

26. Implement pre-project readiness assessment and overall project planning

27. Implement aggressive project management processes

28. Create a project organization structure to provide planning and quick response for decision making and issues management

29.   Make the best use of the external consultants and experts

30.   Teach (and motivating) the organization to use new capabilities

31.   Implementation review

32.   assign clear ownership of benefits: the owner may be the business unit leader, a project sponsor, a process owner or some one else

Failure Factors:

1.   ERP implementation is, at core , a people project- top HR issues are related to change management, training, and internal staff adequacy
2.   Employee resistance-if the employees are not educated and informed about the benefitsand assured security of their job
3.   Lack of top management commitment
4.   Inadequate training and education
5.   Inadequate requirement definition
6.   Inadequate resources
7.   A poor fit between the software and users procedures
8.   Unrealistic expectations of the benefits and ROI
9.   Poor ERP package selection
10.   Extensive customization
11.   Change Management
12.   Failure of accommodating evolution of business processes
13.   User acceptance
14.   Going live is not of the ERP journey
15.   Companies should anticipate a temporary dip in performance after going live

Part-IV: ERP in action (Ch 36 to 38)

Chapter 36: After ERP Implementation

ERP implementation is the start of a journey , it will not automatically produce results. This needs constant monitoring and management. As technology advances , new software with more features and capabilities. To stay competitive the organizations has to adapt to new new environments and new technologies. After the ERP implementation may need to be flatter, thus organizational restructuring becomes responsibility of top management

In every business function or department that is affected by ERP , there is need of one or more people who know the system and its relationship with departmental processes. It is these people who have to guide, motivate and help their colleagues by working along with them. It is imperative that the knowledge and experience gained during the implementation and after implementation is captured on an ongoing basis and made available to all, as per knowledge management techniques. Living with ERP system s(operating and maintaining them) , is totally different from installing them. It is worth remembering that the ERP system is merely a tool to facilitate activities within the business. There are strong similarities between kaizen and ERP implementation, as focus of both is upon management of change.

Chapter 37: Operation and Maintenance of the ERP system An enterprise system is not a project ; it is a way of life and requires a life long commitment. The company should have a plan to relocate those people whose job has been taken over by ERP system. But ERP system will also make necessary to have specialists to manage and maintain these tools. Today's systems need database administrators, operation personnel, data entry operators and so on. The main aim of O&M phase is to ensure that the ERP system

achieves its projected benefits, the users are satisfied and there are no conflicts. The project manager (O&M phase) and ERP team can asses the strengths, weaknesses, opportunities and threats (SWOT). The weaknesses should be rectified through appropriate corrective actions. It is the job of the O&M project manager to ensure that all ERP team members and the members of the organization have access to the latest copy of the ERP plan. These documents could be hosted on the company intranet or on the internet. The access to these documents can be restricted or controlled using passwords and usernames.

Chapter 38: Measuring the performance of the ERP system Metrics helps us better control on our software projects and learn more about the way our ERP system and organization works. Following are some of the ERP related parameters that we can measure

- ?? Productivity improvements
- ?? Reduction in inventory costs
- ?? Reduction in material wastage
- ?? Personnel reduction
- ?? Financial close cycle reduction
- ?? IT cost reduction
- ?? Procurement cost reduction
- ?? Cash management improvements
- ?? Revenue/ profit increases
- ?? Transportation/ logistic cost reduction
- ?? Maintenance reduction
- ?? On time delivery improvement

Chapter 39: Maximizing the ERP system

Today , real time business has finally become cost effective because of the convergence of ERP applications , business intelligence and the internet. Companies have realized that to maximize the value of information stored in the ERP systems it is necessary to extend these ERP architecture to include more advanced reporting , and analytical and decision support capabilities. This is best accomplished through application of data warehousing , data mining, OLAP and other analysis, reporting and business intelligence tools and techniques. BI system provides on-line analytical processing (OLAP) and data mining tools. When we provide a web based interface to the information in business intelligence system , the internet becomes an enterprise information utility for employees, partners, suppliers and customers Part V: The Business Modules Most common modules are finance , manufacturing, production planning, sales and distribution, plant maintenance, quality management , materials management, HRM etc

Chapter 41: Finance

The finance module of most ERP systems will have the following sub systems

1. Financial Accounting: for company wide control and integration of financial information that is essential to strategic decision making.

    It provides ability to centrally track financial accounting within an international framework of multiple companies, languages, currencies and charts of accounts. For example , when raw materials from inventory into manufacturing, the system reduces quantity values in inventory and simultaneously subtracts values for inventory accounts in balance sheet. Most financial accounting modules comply with international accounting standards such as GAAP and IAS. They also fulfill local requirements of many countries

2. General Ledger: The GL is essential both to 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 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 GL supports all the functions needed in a financial accounting system. This includes flexible structuring of the chart of accounts at group and company level, distributed application scenarios, real time simultaneous update of sub ledgers and the GL, elimination of time consuming reconciliation , and parallel views of data in both GL and managerial accounting applications.

3. Accounts Receivables & Payables: These sub ledgers are integrated both with the GL and with areas in sales and distribution and materials management, where financial data originates. The sub module functions include internet integration, document management, 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 work flow integration, payment automation with EFT and check processing and document parking with various approval procedures

4. Asset Accounting: for company's fixed assets management. It is subledger to GL, providing detailed information on asset related transactions. Significant features include country specific charts of depreciation complying with local legal requirements. 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 work flow integration and interactive reporting

5. Legal Consolidation: Using different valuation methods , company can plan balance sheet strategies to suit its requirements. The sub system is closely linked to the financial accounting system, permitting direct data transfer from individual statements into the consolidated statements required by the law

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

7. Overhead cost Controlling: While cost monitoring and optimization may be quite advanced in production areas, transparency is often lacking in overhead cost areas. The sub system focuses on monitoring and allocation of the overheads

8. Cost center accounting: It analyses where overhead occurs within the organization. Costs are assigned to the sub areas of the organization where they originated. In particular , activity accounting permits the allocation of great many costs to products based on cost sources enabling assignments, which were not previously possible

9. Overhead Orders 10. Activity based costing: the module is a response to the growing need for monitoring and control of cross departmental business processes in addition to functions and products

11. Product cost controlling: It determines the costs arising from manufacturing a product or providing a service

12. Cost object controlling

13. Profitability analysis: is the last step in cost based settlement where revenues are assigned to costs according to market segment

14. **Investment management :** It facilitates investment planning and budgeting at a level higher than specific orders or projects

15. **Treasury module:** to manage company's short , medium and long term payment flows, and resulting risk exposure

16. **Cash management:** the sub system allows to analyze financial transactions for a given period

17. **Treasury management:** this component offers functions for managing financial deals and positions, from trading through to transferring data to financial accounting

18. **Market risk management**

19. **Funds management**

20. **Enterprise controlling**

21. **Executive information system**

22. **Business planning and budgeting**

23. **Profit center accounting**

Whatever the financial goals of the organization are , the financial application components of the ERP solutions work hand –in- hand to improve bottom line **Chapter 42: Manufacturing (Production)**

The term production or operation is often used interchangeably with manufacturing.If you view production as process , even services such as dry cleaning begin with resources-cleaning fluid, machines, presses and people-and end up with a product – clean clothes. So all business firms are involved in some type of production . The key concept in operations management is transformation or conversion of input

(resources) into output (goods or services).Competition in next millennium places increased emphasis upon time as expressed by speed, quality, service and global focus. Agility is the watchword. The manufacturing modules of most ERP vendors do not limit business 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. The manufacturing system should provide the foundation for creating concurrent business processes across the supply chain and achieving return on assets (ROA) improvement. The materials procurement sub system provides tools for implementing TQM programs within an organization. Original manufacturers may be defined independently from vendors so that the businesses can strictly adhere to quality assurance and control functions without preventing their buyers from seeking best possible price and delivery terms . ERP packages provide extensive cost information at several levels that helps businesses to identifying cost drivers and reduce product cost.

They support multiple inventory valuation methods so you can choose the costing method that best reflects your company's business.

Chapter 43: Human Resources

In today's organizations employees are viewed as human resources that need to be carefully nurtured, accommodated and developed. The various sub systems under HR module are following

1.   Personnel Management

2.   Personnel administration

3.   Employee master data: most systems have the facility to scan the original documents for optical storage. The HR IS displays graphical information such as organization charts or employees data

4.   Recruitment management for hiring right people with the right skills. These requirements are fulfilled only through effective automation of the entire recruitment process.

5.   Travel management to process the travel expenses, business trip from start to finish. It provides with self explanatory forms , statements, and an electronic approval process

6.   Benefits Administration provides capabilities and flexibility to effectively manage benefits programs for diverse employee populations. These systems can maintain an unlimited number of benefit types and individual plansthat are offered to the employees

7.   Salary Administration module assists in the salary review process also, by taking into account standard salary changes within the company as well as individual compensation exceptions

8.   Organizational management for accurate picture of organization's structure, no matter how fast it changes. You can also create multiple simulations for your organization as you explore your options for making adjustments in personnel. Accurately forecasting personnel costs provides your management team with a more complete cost picture to assist them in making informed decision

9.   Pay Roll Accounting:

10.   Time Management: is a powerful tool to administer and evaluate data related to the time that employees spend working. It manages work schedules efficiently and effectively

11.   Shift Planning

12.   Personnel development

13.   Training and Event management

Chapter 44: Plant Maintenance

Plant maintenance supports various options for structuring technical systems wit its object, type, and functional related views, and enables flexible data navigation. Data concerning the planning , processing and history of maintenance tasks is documented in the system and compiles with business verification requirements. It also forms basis for defining an optimum maintenance strategy in the sense of "Total Productive Maintenance". The major sub system are following

1.   **Preventive maintenance control: provides planning, scheduling, and** control facilities and equipment. Maintenance tasks can be tracked for each machine or piece of equipment by two user defined modes, as well as calendar day frequency. PM control enables organizations to lower repair costs by avoiding down time, machine breakage and process variability

2.   **Equipment Tracking: this history includes acquisition and** disposition information and associations between different pieces of equipmentto pin point operational dependencies

3. **Component Tracking: the component are typically sub sets of larger** equipment and deserve same amount of cost controlling scrutiny. It enables equipment managers to identify components with chronic repair problems. Planning component replacements, rather than waiting for component failures to occur reduces unscheduled down time. It includes repair/ exchange history and component service life

4. **Plant maintenance calibration tracking allows organizations to** leverage their investment in the plant maintenance module by providing for tracking of equipment calibration in support of ISO 9000requirements

5. Plant maintenance warranty claims tracking

Chapter 45: Materials Management

The MM 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 sub modules are

1. Pre-purchasing activities: It supports the complete cycle of bid invitation , award of contract and acceptance of the services.

Activities include maintaining a service master-database in which the description of all services are to be procured can be stored. The system also keeps a separate set of service specifications that an be created for each concrete procurement project or proposed procurement in the purchasing department. Set of service specifications may include both items with services and items with material. There are two ways of entering service specifications –planned and unplanned

2. Purchasing: This module is fully integrated with other modules in

the system and supports all phases of MM. It works side by side with cost accounting system, financial accounting, sales and distribution

3. Vendor evaluation: Information such as delivery dates, prices and quantities can be taken from purchase order and data from quality management such as result of incoming inspections or quantity audits.

Most of the vendor evaluation system offers a point based evaluation system based on certain selection criteria. The main criteria that are used are price, quality, delivery, service and support, replacement of returns, lead time , and so on.

4. Inventory Management: to manage stock on a quantity and value basis and plan, enter, and check any goods movement and carry on physical inventory. With every goods movement , the following values are updated

- ?? Stock value for inventory management
- ?? Account assignment for cost accounting
- ?? Corresponding GL accounts for financial accounting via automatic account assignment

5. Invoice Verification and material inspection: it provides link

between the materials management component and financial accounting, controlling and asset accounting components Chapter

46: Quality Management

The ISO 9000 series and a host of other international standards define the functions of quality management and the elements of a quality management system. 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 focus of attention. The integration of quality management in the ERP systems provide considerable advantages because only an integrated system can support all of the elements of a quality management system according to international standard. The module supports fulfills functions like

?? 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 selection, print shop papers for sampling, record results and defects, make the usage decision, and trigger the 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 the inspection lot, quality notifications for processing internal or external problems and initiating corrective actions to correct the problems, inspection lot processing and problem processing, quality management information system for inspections and inspection results and quality notification) Computer –integrated Quality management (CIQ) has following functions

?? Materials management(purchasing, inventory management ,warehouse management, material requirement planning,)

?? Production (work scheduling, shop floor control)

?? Sales and distribution (delivery, creation of quality certificates)

Chapter 47: Marketing

The marketing module enables organizations to maximize the efficiencies of marketing resources and empowers marketers to acquire and develop long term customer relationship. Marketers can analyze , plan , execute and measure all marketing activities. The marketing module supports critical marketing processes like:

?? Marketing resource management to analyze, plan, develop, implement and measure all marketing activities to maximize the efficiencies of your available resources and gain visibility and control into your marketing processes.

?? Segment and list management sub-system helps you in managing enterprise customer and prospect data without the need of IT support

?? Compaign management is used to make the most dialog marketing by marketing by implementing inbound and outbound campaigns that are both multi channel and multi-wave. You can develop and execute the best marketing strategy, using constraint based optimization techniques to determine the optimum marketing mix

?? E-mail marketing, innovative thinking will uncover dozens of areas where e mail marketing programs can be used to drive revenues, improve customer satisfaction and streamline internal processes. It enables to drive efficiency and gain true ROI on campaigns, shorten compaign cycles, target right people with the rigt message, swiftly build personalized and content rich messages without being web guru, obtain immediately feedback, allowing to track compaign activity as soon

as the compaign is launched and track customer behaviors such as when they opened the e mail, how many times they viewed it ad whether they logged in to the corresponding web site

?? Trade Promotion management, to increase brand equity and achieve sales objectives, to lower costs for managing promotion processes and budgets. This sub system delivers powerful connectivity. The application enables a closed loop process that adds value to each of the five major steps in the trade promotion process: headquarter planning, field accounts planning, sell-in and negotiation ,retail execution, and validation, and pre and post evaluation and analysis

?? Lead Management: enables you to align marketing and sales organizations and extend lead management process to partner organizations in order to increase conversion rates.

?? Marketing analytics: to leverage a wide range of analytics, such as customer values, churn scores and satisfaction scores , to make profitable decisions. The application also helps to identify business challenges and opportunities and predict customer behavior , anticipate their needs, and create more relevant ,targeted messages

?? Web-based Marketing Surveys: the survey sub-system enables better communication between you and your customers. To capture information on the opinions and behavior of the people that matter to their business such as employees, customers, business partners and suppliers.

§ On line surveys – this sub system manages the entire survey cycle from building individual survey questions , to launching the survey either on a web site or via an e mail. It also minimizes the time spent collating and tabulating results into meaningful data

§ **Getting the right information at the right time- with on line** surveys the results are available as soon as the respondents complete the survey. This allows to react to mission critical responses decisively and immediately

§ **Multiple deployment options:** the survey sub system creates eachsurvey a separate hyperlink that can be placed on any web site to help drive traffic to the survey. You can also upload contact lists and data bases and send them a direct and unique link to the survey and track their individual response details.. Furthermore , via integration with e marketing you can actually place the survey an e mail so that your respondent never even has to leave his e mail application to answer your question

§ Instant results-Easy to understand reports are available and all results data can be downloaded to excel for further analysis if necessary

?? Self Service Portal : The self service portal form helps to meet the demands of today's customer by allowing them with access to information and answer s to their questions at their convenience. The robust , integrated application works with common internet browsers to give enterprises in the small to mid market a global support presence.

The FAQ feature, an on-line store of answer to your customer's most frequently asked questions, allow customers to help themselves to information at any time of the day and from any where in the world

Chapter 48: Sales ,Distribution and Service

Companies are focusing on core competencies and closer partnership and close partnerships over the whole supply chain. 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. Many vendors offer a

comprehensive set of best –of- breed components for both order and logistics management. Typically a sales and distribution module will contain following sub systems

? Master data management(data of products, customers, raw materials, suppliers)
? Order management (sales and purchase order management)
? Warehouse management (real time information about inventory levels and tools to manage the daily operational needs of single or multiple sites)
? Shipping (The delivery is central shipping document)
? Billing (ERP system supports the billing functions like issuing invoice on the basis of goods and services)
? Pricing (the module keeps the information about the prices of various items etc)
? Sales support (field sales people and the staff in sales office –can contribute to and access valuable information about customers, sales prospects competitors and their products and contact people)
? Transportation (inward and outward movement of goods, to provide basic functions like transportation planning and processing, freight calculation, freight settlement, customer freight calculation and freight invoicing, service agent selection etc)
? Foreign trade (entire logistics chain from import of raw material, finished and unfinished goods, to the sales of goods and the transfer of data to materials management and financial accounts)

Part VI: The ERP Market

The ERP market is a very competitive and fast growing , average rate @10% over next five years.SAP continues to be biggest player in the market with an estimated 43% of the market share, or about $12.5 billion in revenue in 2006, Oracle was second with 23.5% market share, or $ 6.7 Billion, third was sage group with 5% share, fourth Microsoft @4%, and fifth SSA global @3%.

The ERP market is entering another major technology transition phase.

Service Oriented Architecture (SOA) may have same disruptive effect that other technologies had on the market , such as the emergence of client server system had in 1990. ERP buyers have moved away from large , up-front purchases. Now most tend to license user seats and functional ERP modules incrementally as they deploy a product . Along with wide spread discounting , this has led to smaller average deal size. AMR says few other vendors will be able to match SAP's SOA strategy, which calls for all of the German ERP giant's applications to be moved to SOA by 2007 . SOA is now being used primarily for integration. Open integration standards, such as SOAP, etc are being used to enable integration. Vendors are simultaneously delivering on SOA , to provide internal integration frameworks for acquisitions and take market share from EAI vendors like SeeBeyond, TIBCO, webMethods and Vitria. The SOA is moving in to the main stream and will continue to be pervasive in new ERP system. Suites will become more componentized , allowing for deeper industry offerings and better business process support

AMR sees the continuation of the movement away from big-bang implementations toward a more tactical and piecemeal approach. ERP companies continue to focus much of their sales efforts on small (less than $50 million i.e. Rs 70 Cr) and mid size ($50m to $1 billion) companies. Revenue sources for ERP companies are License, Maintenance and Services. Share of License was $6.2 b out of total $21billion. Maintenance @7%per year , has been growth engine of this market.

The popular operating system for ERP software are Windows and Unix. Windows at $3.1 b had 43% share. Oracle dominated as most preferred database. As the technologies of eBusiness and ERP converge , effective ERP system will be critical component to an enterprise's success.

In Indian scenario small and medium sized businesses are major force that pushes growth . Inflexibility of earlier ERP systems from SAP, Oracle and PeopleSoft pushed the customization drive. Customers are

moving from a best-of-breed to a best-for-business approach, implying that they prefer extension of their existing ERP for applications like planning and optimization, business intelligence and knowledge management. This has resulted in ERP vendors introducing new technologies

ERP vendors needed to tailor their software to the need of specific industry verticals, such as textiles, auto ancillary, process foods, pharma, BFSI , Telecom While new trends spell money for Indian ERP companies like Ramco, 3i Infotech, Godrej Infotech, Eastern software Systems and Base Information , there are other drivers too

Over next five years, the ERP market is expected to reach Rs 1550 Cr($341m) as per IDC. Of this , the SMB potential in India for enterprise clas is projected to be Rs 728 Cr, i.e. 47% of market share

USP of Indian vendors ? They have adopted a micro vertical focus to gain market share . Plus Indian players have products that are cheap , can be implemented quickly , are flexible and need lower IT dependence and support. For one, 3i Infotech's , Orion Advantage , comes with all requisite hardware and software for less than Rs 10 Lakh. The computing resources required will be much less compared to that for other ERPs, primarily MNC products. RAMCO claims 12-15% market share in India. In 2006 , 60 SMBs deployed ERP systems. Of this SAP bagged 35 customers, with rest being cornered by Indian vendors

Pat VII: ERP – Present and Future

Chapter 59: Turbo Charge the ERP System

Today , real time business has finally become cost effective because of the convergence of three technologies – Enterprise Resource Planning applications , data warehousing and the internet. The latest versions of ERP packages allow customers to access their ERP data and applications over the internet and extranets with a user interface that allows HTML, Java and XML. The key factor is to remember any ERP system is a means to an end. It has to help organization manage complex business processes so it can improve profitability, increase productivity and run more efficiently

Business can optimize their investment in ERP system by closing the loop between the business intelligence system and ERP systemThe loop begins when the company discovers valuable information from ERP system ; it closes when the company feeds those discoveries back into ERP system to continually improve business processes. BI system for ERP can also issue alerts when certain events occur or thresholds are met , enabling your business to react more quickly to problems and opportunities

Chapter 60: Enterprise Application Integration (EAI)

EAI is the process of linking the applications and others in order to realize financial and operational competitive advantage. EAI is a business computing term for the plans, methods and tools aimed at modernizing , consolidating the business applications in an enterprise. Typically , an enterprise has existing legacy applications and databases and wants to continue to use them while adding or migrating to a new set of applications that exploit the internet , e commerce , extranet and other new technologies. EAI may involve developing a new total view of an enterprise's business and its applications, seeing how existing applications fit into the new view and then devising ways to efficiently re-use what already exists while addingnew applications and data. EAI can be used for different purposes

- ?? Data (information)integration
- ?? Process integration
- ?? Vendor independence

??   Common façade: an EAI system could front end cluster of applications , providing a single consistenet access interfaceto these applications and shielding users from having to learn to interact with different applications

Chapter 61: ERP and E-Business

Traditional ERP systems take care of internal value chain (i.e.within a company) whereas eBusiness establish the value chain across the market and industries . They use web based interface (corporate portals) with outside entities plus add on modules such as CRM, SCM etc in integration

Chapter 62: ERP, Internet, and WWW-ERP II

Web services serve as the bridge between e-procurement application and inventory system.As soon as re-order points are hit , a web service could be used to place a standard order with an external suppliers system. HTML and browsers gave people easy access to documents , web services including simple object access protocol (SOAP) , web services description language (WSDL) and universal description , discovery and integration (UDDI) will allow applications to connect with other applications, regardless of location or platform

With the advancement of encryption technologies and internet security , conducting business on internet is becoming safer.

ERP (1990-1999): It included Materials planning, Order entry, Distribution, General ledger, Accounting, shop floor control

Extended ERP (2000-2005) Scheduling, forecasting, capacity building, e-commerce, warehousing and logistics

So extending the ERP applications to internet and WWW is the next logical step for organizations.

Latest status is **ERP II (2005 onwards)** includes project management, knowledge management, workflow management, Human Resource management, Portal capability, Integrated financials, internet and www integration. C-commerce (C= collaborative) enables business partners from multiple companies to exchange information posted on e-commerce exchanges. Collaborative commerce also enables organizations to find new partners to solve one off design problems. C-commerce is about intellectual capital. ERP II promises to bridge gap ; new tools are available that link departmental communications , work processes, customer data and supplier capabilities into a centrally functioning system- all focused on driving the enterprise forward

Chapter 63: ERP and TQM

Both ERP and TQM share similar goals – customer satisfaction, productivity improvement , increased competitiveness, waste reduction, effort duplication and so on. ERP system will help in achieving these goals when used in conjunction with TQM. Effective use of TQM creates better performing ERP systems.TQM brings problem solving techniques and continuous improvement opportunities for all ERP systems. For those businesses that have not yet started TQM and ERP implementations, starting both simultaneously and treating these as integrated projects will organizations to attain best results

Chapter 64: Future Directions and trends in ERP

ERP industry watchers are agreed atleast on one point – one size does not fit all ; each organization is different and should have specific needs and requirements. So vendors must offer customized products if they want to survive. As larger enterpris4es become saturated with new generation client/ server ERP

systems, vendors are being forced to find new markets for their product suites to continue to drive their growth, focusing to small business clients, through a number of initiatives

?? Supplementing their direct sales force with re-seller channels
?? Lowering the entry price point of their software to make it financially viable
?? Straitifying their software offerings to appeal on the basis of reduced functionality
?? Improving the implementation methodologies for faster deployment
?? Porting the products to platforms such as Microsoft Windows

Shifting Revenue Models for vendors: Oracle gets 50% of its revenue from maintenance. The other format for recurring revenue , software as service (SaaS) is not working well for big players. Vendors use of variable revenue contracts is pretty clever. These contracts call for additional payment based on metrics of their customers usage. If the customer uses platform more, he pays more

The SOA factor: The need to implement service oriented architectures will continue grow as a factor in ERP purchase decisions