

Module-6





Content

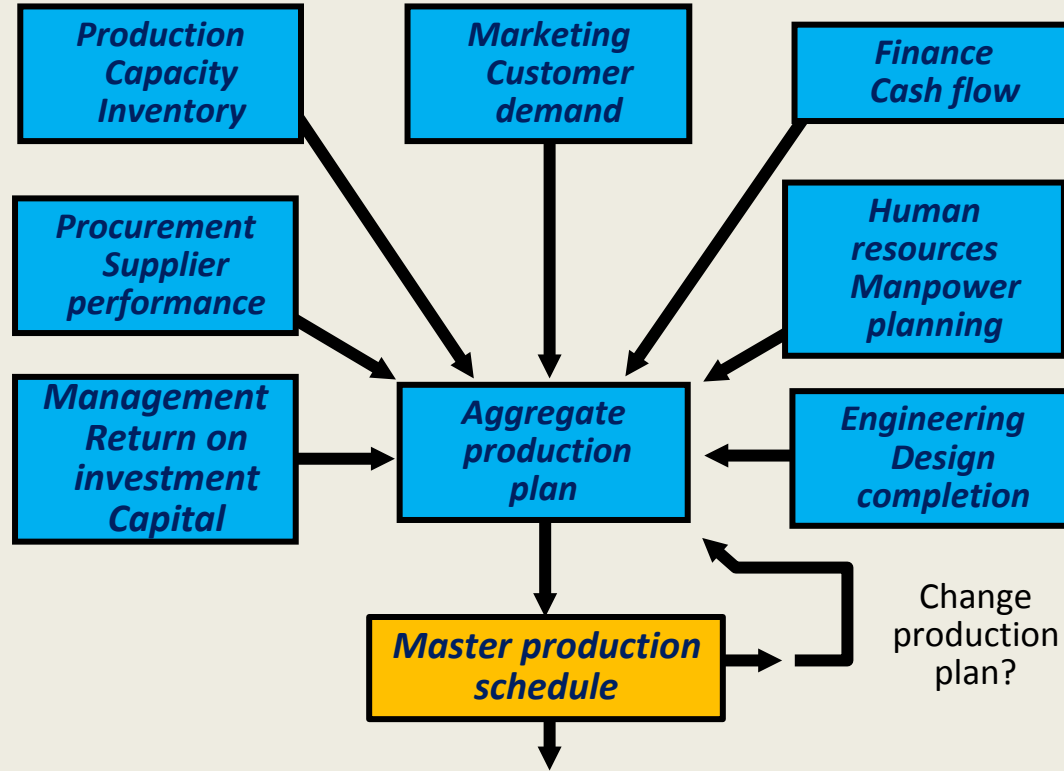
- 6.1. Material Requirement planning(MRP) and Manufacturing Resource Planning (MRP-II) - general concepts, types of demands, Inputs to MRP, MRP objectives, outputs of MRP, Estimation of planned order releases. Benefits and Limitations of MRP II
- 6.2. Enterprise Resource Planning (ERP): Evolution, features, purpose of modeling an enterprise, information mapping, generic model of ERP, Modules in ERP, Methodology of implementation, critical success factors of ERP, Case studies of success and failure of ERP implementations, ERP packages



MATERIAL REQUIREMENT PLANNING MRP-I

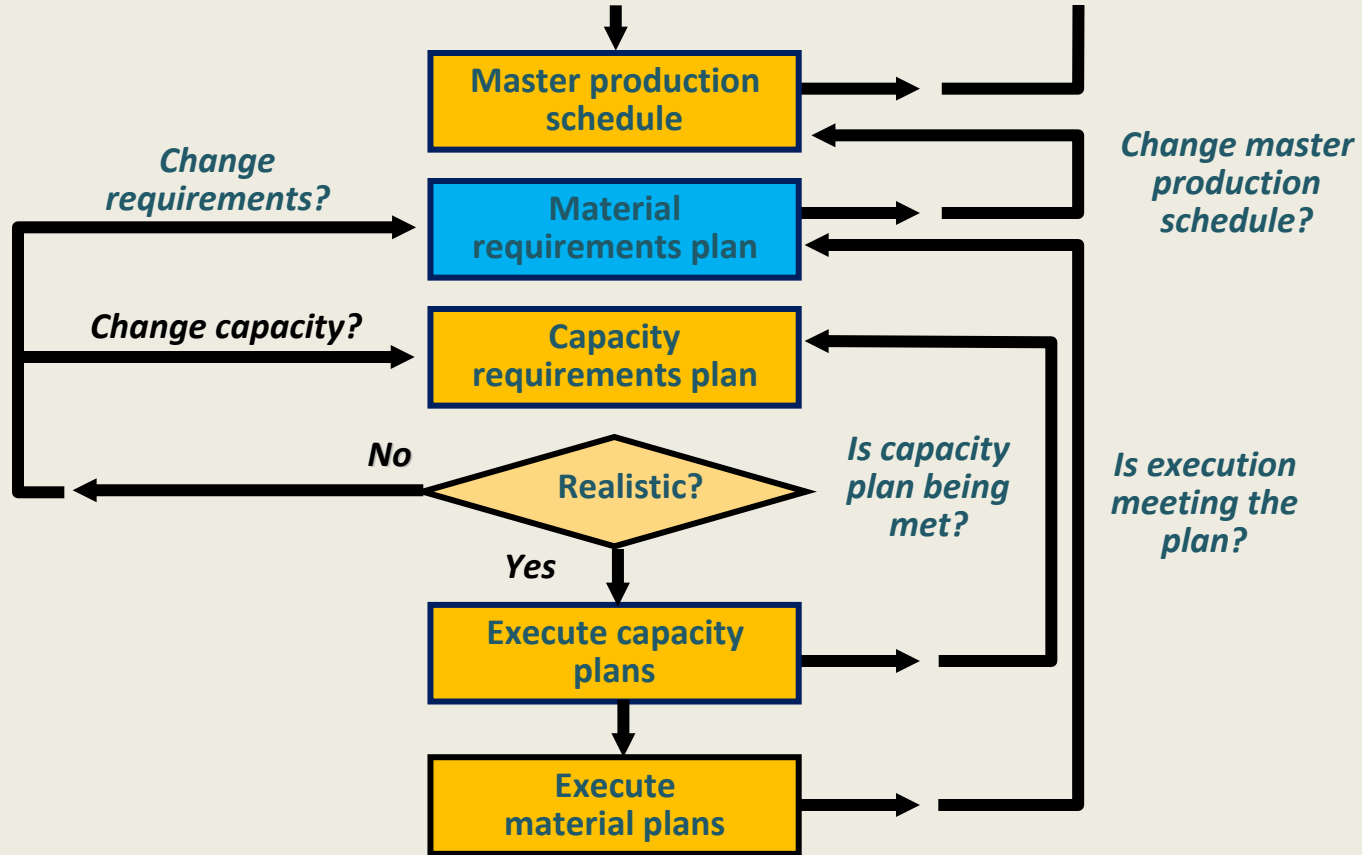


Production Planning process





Production Planning process



General Concepts



- Success of production/ operation department in any organization depends upon an efficient production plan.
- One of the key essential of a production plan is material and resource requirement planning system. This plays a pivotal role in assembly-line production.
- Material requirement planning is a system based approach, which organizes all required production material.
- MRP-I is an information system for production planners based on inventory management. It generates various types of reports as its outputs that are of immense significance for the production planners.

Introduction

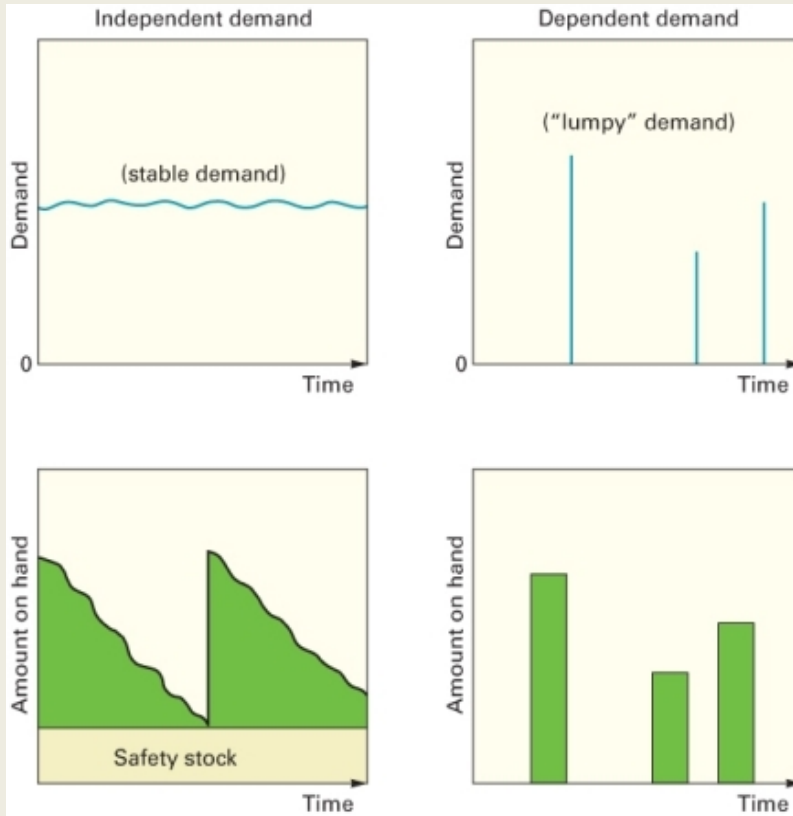


The basic components of MRP-I are as follows:

- MRP-I provides information that all the required raw material and products are available for production.
- It ensures that inventory levels are maintained at its minimum levels. Moreover, it ensures that material and product are available whenever production is scheduled, therefore, helping in matching demand and supply.
- It provides information of production planning and scheduling but also provides information around dispatch and stocking.



Types of Demands



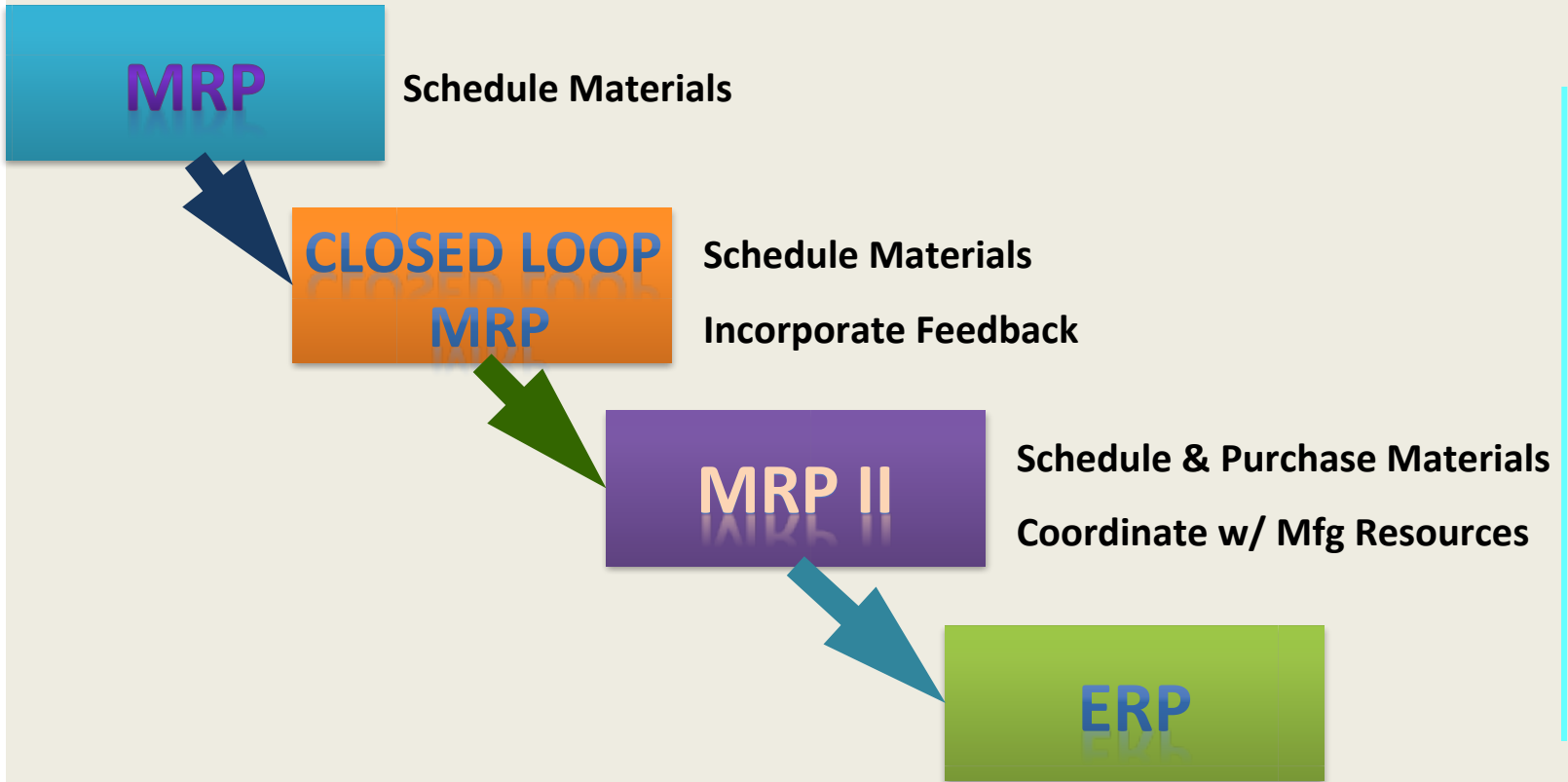
Independent Demand:

- Demand for final products.

Dependent Demand:

- Demand for the items that are sub assemblies or component parts to be used in production of finished goods.
- For any product, all components of that product are dependent demand items.
- Given a quantity for the product, the demand for all parts and components can be **calculated**.

MRP – ERP Evolution





What is MRP?

- It is a production planning process that starts from the demand for finished products and plans the production step by step of subassemblies and parts.
- Materials Requirements Planning (MRP) is a set of techniques that takes the Master Production Schedule and other information from inventory records and product structure records as inputs to determine the requirements and schedule of timing for each item.



Objectives of MRP-I

- MRP-I is processed with production planning and inventory control system, and its three objectives are as follows:
 - Primary objective is to ensure that material and components are available for production, and final products are ready for dispatch.
 - Another primary objective is not only to maintain minimum inventory but also ensure right quantity of material is available at the right time to produce right quantity of final products.
 - Another primary objective is to ensure planning of all manufacturing processes, this scheduling of different job works as to minimize or remove any kind of idle time for machine and workers.

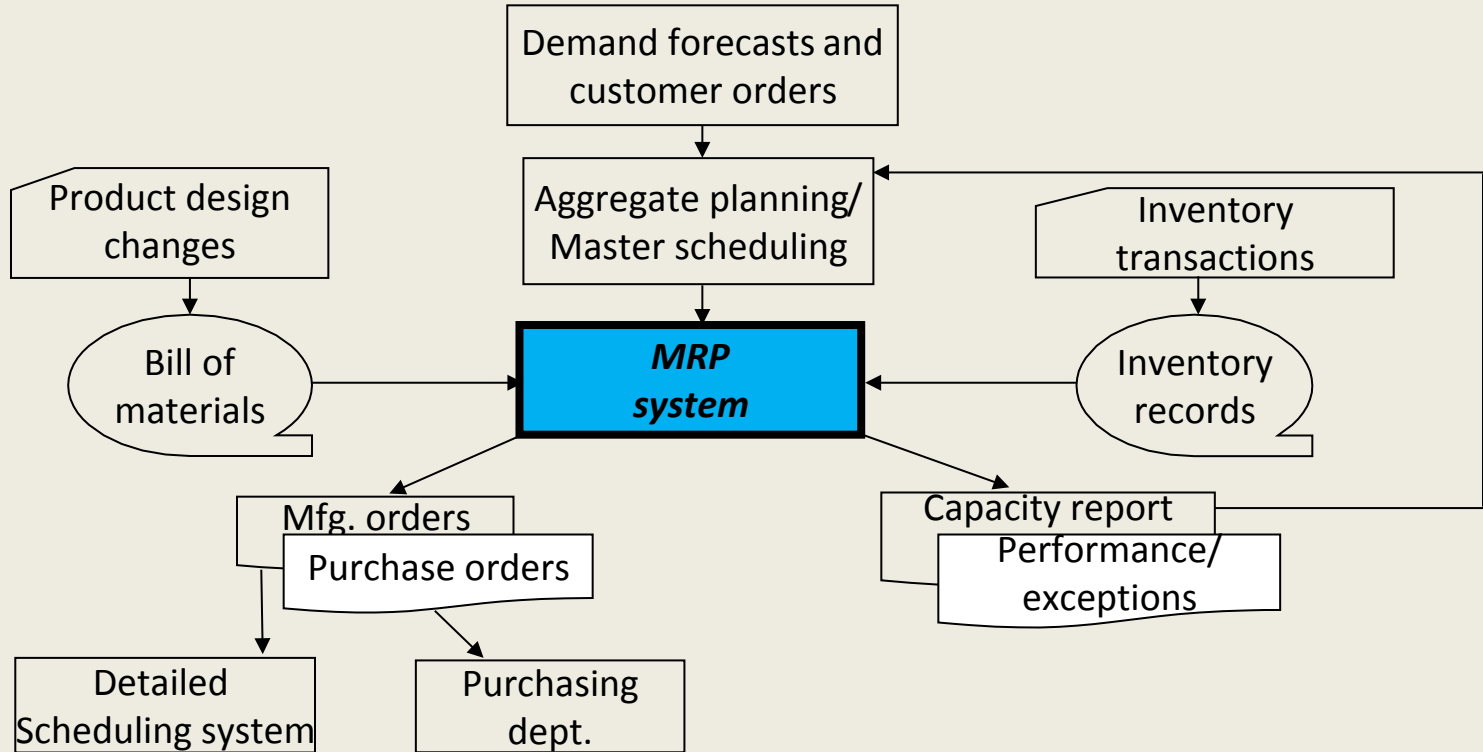
Inputs to MRP

- Master Production Schedule (MPS)
- Bills of materials (BOM)
- Inventory status file
- Lead time





MRP- INPUTS & OUTPUTS



MRP inputs and outputs



Outputs of MRP

1. Full MRP Report- Gross Requirements, Scheduled Receipts, Projected Available, Net Requirements , Planned Order Receipts, Planned Order Release
2. MRP Action Report - This contains the exceptions that materials planners must take action on, including rescheduling existing orders and releasing new orders.

Broadly it can be given as:

- **Primary reports**
 1. Work orders
 2. Purchase orders
 3. Action notices or rescheduling notices
- **Secondary reports**
 1. Exception reports
 2. Planning reports
 3. Performance Control reports
- **Inventory transaction**



Dependent versus Independent Demand

Item	Materials With Independent Demand	Materials With Dependent Demand
Demand Source	Company Customers	Parent Items
Material Type	Finished Goods	WIP & Raw Materials
Method of Estimating Demand	Forecast & Booked Customer Orders	Calculated
Planning Method	EOQ & ROP	MRP



MRP Input- Bill Of Material

- A listing of all of the raw materials, parts, subassemblies, and assemblies needed to produce one unit of a product.
- BOM Shows way a finished product or parent item is put together from individual components.
- Parent item shown at highest level or level zero , Parts that go into parent item are called level 1 components and so on.
- Production planners explode BOM to determine the number, due dates, and order dates of subcomponents.



MRP Input- Master Production Schedule

- Based on actual customer orders and predicted demand.
- Indicates when each ordered item will be produced in coming weeks, and in how much quantity.
- It is a plan specifying timing and quantity of production for each end item.
- MPS inputs come from sales and marketing .
- MPS covers about 1-3 months into the future.



MRP Input – Inventory Status File

- Detailed information regarding the quantity of each item, available in hand, on order to be released, for use in various time periods.
- MRP system using inventory master file is used to determine the quantity of material available for use in a given period.
- If sufficient items not available , the system includes the item on the planned order release report .
- Also known as Inventory Master File



MRP Input – Lead Time

- The time required to purchase, produce, or assemble an item
 - For production – the sum of the order, wait, move, setup, store, and run times
 - For purchased items – the time between the recognition of a need and the availability of the item for production



MRP Output

- 1. *Gross Requirements*** It is the total demand for this item for this period. Both internal and external demands are included in this demand.
- 2. *Scheduled Receipts*** It is the total open or committed, supply orders for this item that includes both manufactured and purchased orders.
- 3. *Projected Available*** The projected on-hand inventory for this item at the end of each period is shown by this output. This is calculated by MRP by starting with the projected value available at the end of the previous period, then subtracting the gross requirements for the period being planned and adding the scheduled receipts for the period being planned. The calculation for this period gets completed when the resulting projected available is greater than the specified safety level.



MRP Output

4. **Net Requirements** It is the projected shortage, after subtracting gross requirements and subsequently adding scheduled receipts for a period. The basic quantity for Planned Order Receipts is formed by this output. All Net requirements are filled by MRP for eliminating all potential shortages.
5. **Planned Order Receipts** These are the quantity that is expected to be received into the stockroom during the period that is the Planned Order Release quantity less any yield or shrinkage.
6. **Planned Order Release** The Planned Order Release quantity is calculated by MRP by increasing the Net Requirements to compensate for yield losses, then comparing that quantity to the minimum order quantity for this item, and further increasing the quantity again to a multiple of the Order Multiple quantity for this item.



Numerical- MRP

Speaker Kits, Inc., packages high fidelity mall order. Components for components for the top-of-the-line speaker line

- speaker kit, “Awesome” (A), include 2 standard 12 inch speaker kits (Bs) and 3 speaker kits with amp-boosters (Cs).
- Each (B) consists of 2 speakers (Ds) and shipping boxes each with an installations kit.
- Each of the three 300-watt speakers kits (C) has 2 speaker boosters (Fs) and 2 installation kits (Es).
- Each speaker booster (F) includes 3 speaker (Ds) and 1 amp-booster (G).

The total for each Awesome is 4 standard 12-inch speakers and twelve 12-inch speakers with the amp-booster. As we can see , the demand for B,C,D,E,F and G is completely depends on the master production schedule of A-the Awesome speaker kit. Develop s gross requirement plan for demand of 50 Awesome speaker kit. Given the following on-hand inventory and lead time .

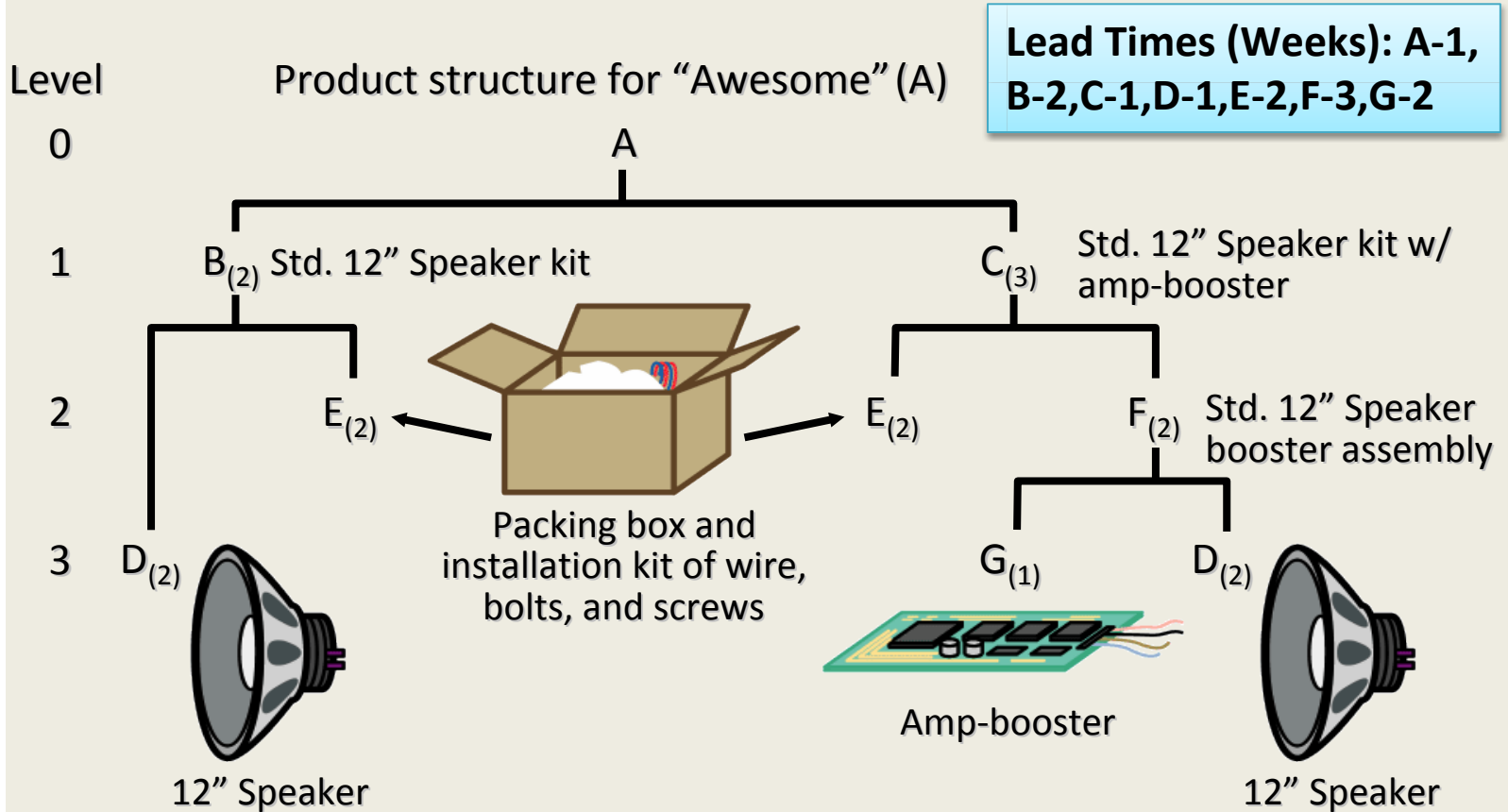


Numerical- MRP

Item	On-hand	Lead Time
A	10	1 week
B	15	2 weeks
C	20	1 week
D	10	1 week
E	10	2 weeks
F	5	3 weeks
G	0	2 weeks



Bill Of Material for given example



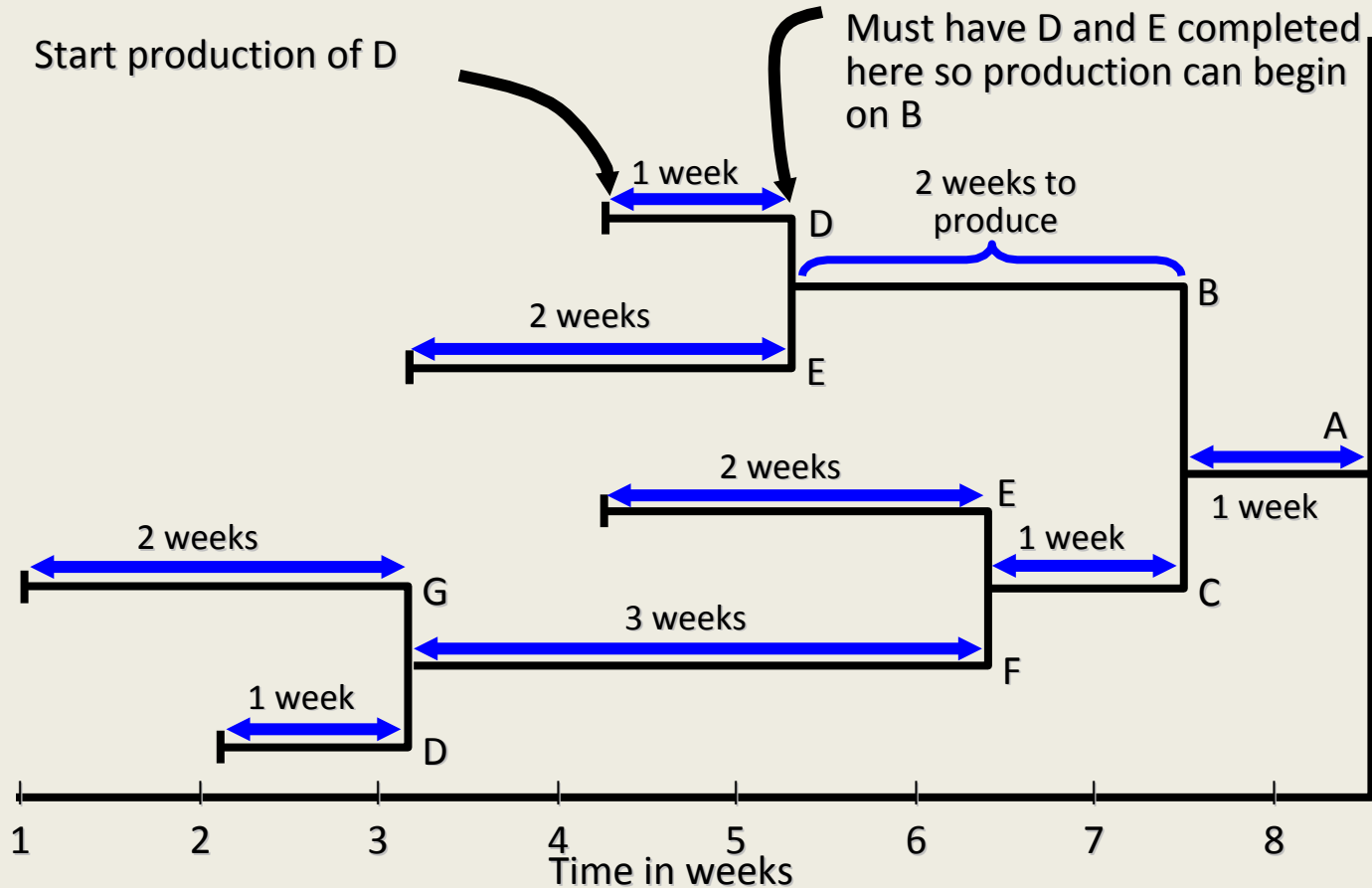


Bill Of Material for given example

- Part A: 1 = (1)(50) = 50
- Part B: 2 x number of As = (2)(50) = 100
- Part C: 3 x number of As = (3)(50) = 300
- Part D: 2 x number of Bs
- + 2 x number of Fs = (2)(100) + (2)(300) = 800
- Part E: 2 x number of Bs
- + 2 x number of Cs = (2)(100) + (2)(150) = 500
- Part F: 2 x number of Cs = (2)(150) = 300
- Part G: 1 x number of Fs = (1)(300) = 300



Time-Phased Product Structure





Determining Gross Requirements

- ◆ Starts with a production schedule for the end item – 50 units of Item A in week 8
- ◆ Using the lead time for the item, determine the week in which the order should be released – a 1 week lead time means the order for 50 units should be released in week 7
- ◆ This step is often called “lead time offset” or “time phasing”
- ◆ From the BOM, every Item A requires 2 Item Bs – 100 Item Bs are required in week 7 to satisfy the order release for Item A
- ◆ The lead time for the Item B is 2 weeks – release an order for 100 units of Item B in week 5
- ◆ The timing and quantity for component requirements are determined by the order release of the parent(s)
- ◆ The process continues through the entire BOM one level at a time – often called “explosion”
- ◆ By processing the BOM by level, items with multiple parents are only processed once, saving time and resources and reducing confusion
- ◆ Low-level coding ensures that each item appears at only one level in the BOM



Gross Requirements Plan

		Weeks								Lead Time
		1	2	3	4	5	6	7	8	
A	Required Date								50	1 week
	Order release date							50		
B	Required Date							100		2 week
	Order release date					100				
C	Required Date							150		1 week
	Order release date						150			
D	Required Date					200	300			2 week
	Order release date			200	300					
E	Required Date						300			3 week
	Order release date			300						
F	Required Date			600		200				1 week
	Order release date		600		200					
G	Required Date			300						2 week
	Order release date	300								



Net Requirements Plan

Lot Size	Lead Time (Weeks)	On hand	Safety Stock	Allocated	Low Level code	Item Identification		1	2	3	4	5	6	7	8
Lot for Lot	1	10			0	A	Gross Requirement								50
							Scheduled Receipts								
							Projected On hand	10	10	10	10	10	10	10	10
							Net Requirements								40
							Planned Order receipts								40
							Planned Order releases							40	

Net Requirements Plan



Lot Size	Lead Time	On hand	Safety Stock	Allocated	Low Level code	Item Identification		1	2	3	4	5	6	7	8
Lot for Lot	2	15			1	B	Gross Requirement				2A=2X40 → 80A				
							Scheduled Receipts								
							Projected On hand	15	15	15	15	15	15	15	15
							Net Requirements								65
							Planned Order receipts								65
							Planned Order releases						65		
Lot for Lot	1	20			1	C	Gross Requirement				3A=2X40 → 120A				
							Scheduled Receipts								
							Projected On hand	20	20	20	20	20	20	20	20
							Net Requirements								100
							Planned Order receipts								100
							Planned Order releases							100	



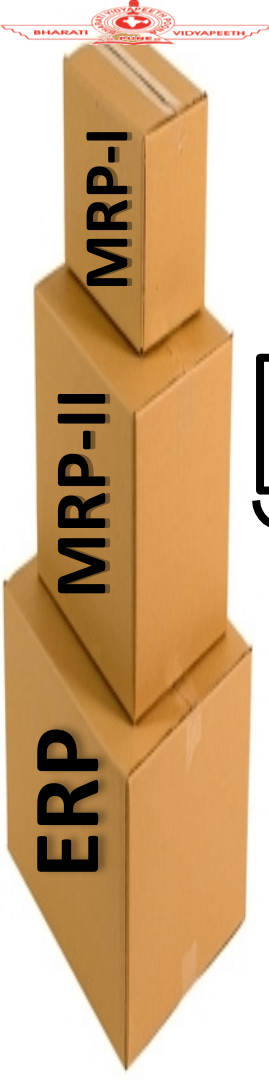
Net Requirements Plan

Lot Size	Lead Time	On hand	Safety Stock	Allocated	Low Level code	Item Identification		1	2	3	4	5	6	7	8
Lot for Lot	2	10			2	E	Gross Requirement		2B=2X65 →			130B	200C ←		
							Scheduled Receipts						3C=2X100		
							Projected On hand	10	10	10	10	10			
							Net Requirements					120	200		
							Planned Order receipts					120	200		
							Planned Order releases			120	200			Total 320	
Lot for Lot	3	5			2	F	Gross Requirement			2C=2X100 →			200C		
							Scheduled Receipts								
							Projected On hand	5	5	5	5	5	5		
							Net Requirements						195		
							Planned Order receipts						195		
							Planned Order releases			195					



Net Requirements Plan

Lot Size	Lead Time	On hand	Safety Stock	Allocated	Low Level code	Item Identification		1	2	3	4	5	6	7	8
Lot for Lot	1	10			3	D	Gross Requirement	2F=2X195 → 390F				130B			
							Scheduled Receipts					2B=2X65 ←			
							Projected On hand	10	10	10	10				
							Net Requirements			380		130			
							Planned Order receipts			380		130			
							Planned Order releases		380		130				
Lot for Lot	2	0			3	G	Gross Requirement	1F=1X195 → 195F							
							Scheduled Receipts								
							Projected On hand								
							Net Requirements			195					
							Planned Order receipts			195					
							Planned Order releases	195							

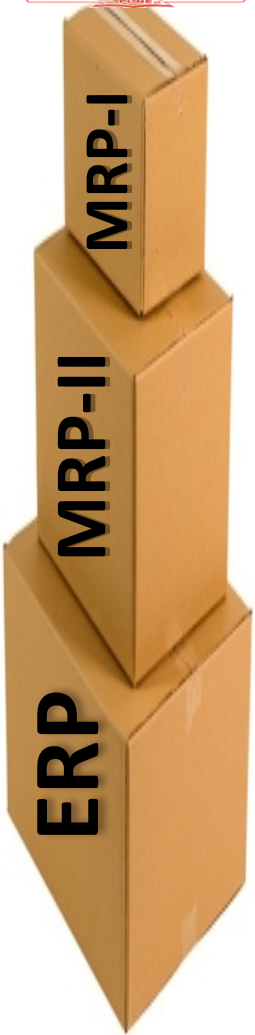


Net Requirements Plan

The logic of net requirements

$$\underbrace{\left[\begin{array}{c} \text{gross} \\ \text{requirements} \end{array} \right] + \left[\begin{array}{c} \text{allocations} \end{array} \right]}_{\text{total requirements}} - \underbrace{\left[\left[\begin{array}{c} \text{on} \\ \text{hand} \end{array} \right] + \left[\begin{array}{c} \text{scheduled} \\ \text{receipts} \end{array} \right] \right]}_{\text{available inventory}} = \text{net requirements}$$

MRP-I: Inter dependency of Business Function



- Material planning not only benefits operation department but is also beneficial to the other department of organization.
 - They are as follows:
 - Material planning is useful in determining cash flow requirement based on material requirements and final dispatch schedules.
 - It helps procurement team in scheduling purchase of necessary material.
 - It helps the sales team in determining delivery dates for final products.

MRP-I : Implementation



- Implementation and success of material resource planning dependent on following factors:
 - Acceptability of by top management about advantages and benefits
 - Proper training and participation of all workers and personnel
 - Precision and accuracy of input data for accurate and reliable results



Advantages of MRP-I

1	Reduced Inventory Levels	13	Improved Productivity
2	Reduces inventory associated costs	14	Simplified and Accurate Scheduling
3	Reduced Freight Cost	15	Reduced Purchasing Cost
4	Reduced Component Shortages	16	Improve Production Schedules
5	Improved Shipping Performance	17	Reduced Manufacturing Cost
6	Improved Customer Service	18	Reduced Lead Times
7	Less Scrap and Rework	19	Higher Production Quality
8	Improved Communication	20	Improved Plant Efficiency
9	Material tracking becomes easy	21	Reduction in Excess Inventory
10	Reduced Overtime	22	Improved Supply Schedules
11	Improved Calculation of Material Requirements	23	Improved Competitive Position
12	Smoothens capacity utilization and allocates correct time to products as per demand forecast	24	Ensures that economic order quantity is achieved for all lot orders

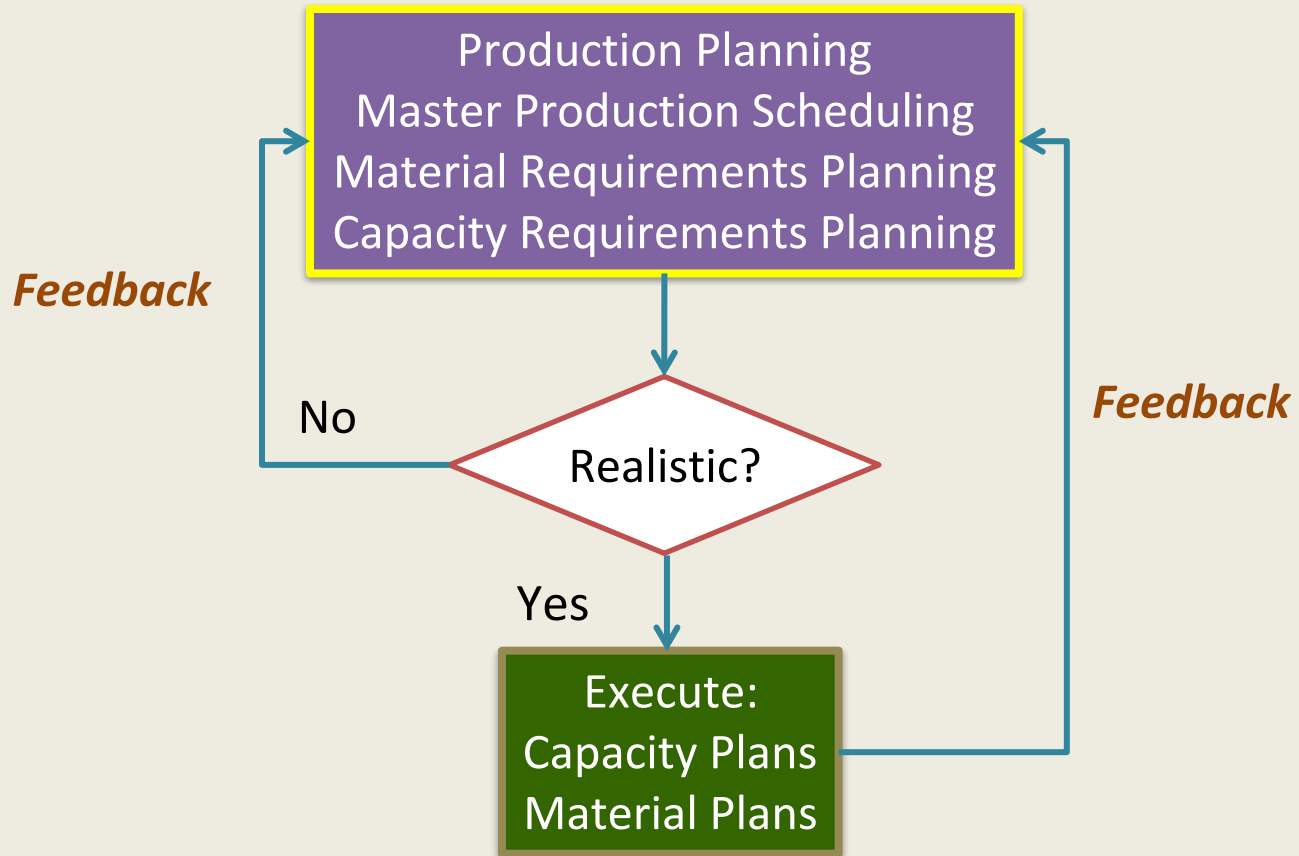


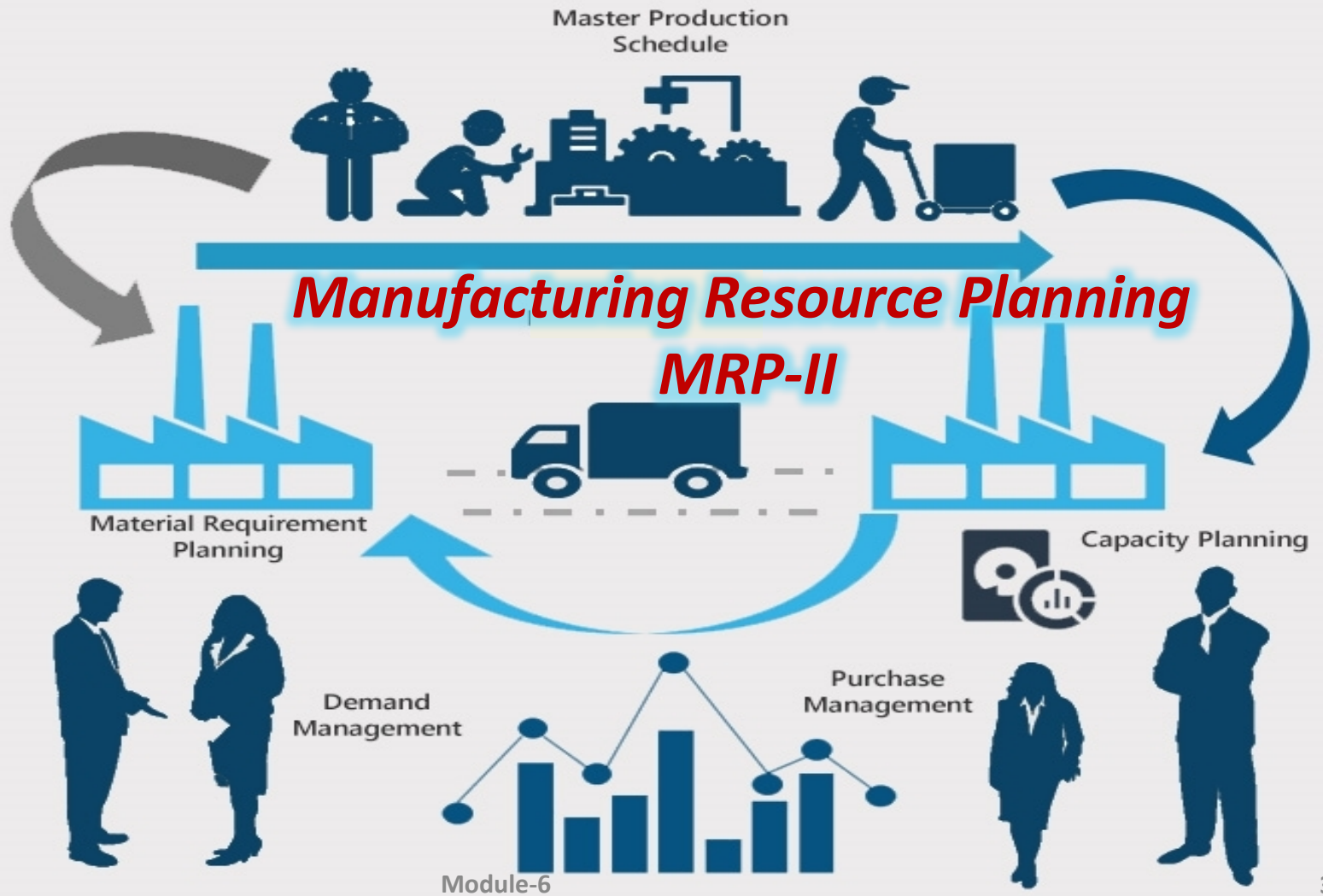
Disadvantages of MRP-I

1. Material planning is highly dependent on inputs it receives from other systems or department. If input information is not correct than output for material planning will also be incorrect.
2. Material planning requires maintenance of robust database with all information pertaining inventory records, production schedule, etc. without which output again would be incorrect.
3. Material planning system requires proper training for end users in order to get maximum out of the system.
4. Material resource planning system requires substantial investment of time and capital.

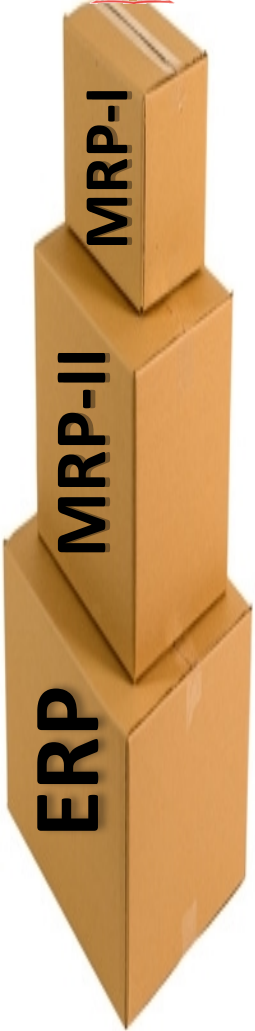


Closed-Loop MRP





MRP-II



- Manufacturing resource planning (MRPII) is defined as a method for the effective planning of all resources of a manufacturing company. Ideally, it addresses operational planning in units and financial planning .
- Manufacturing Resource Planning (MRP II) embeds additional procedures to address the shortcomings of MRP.
- It attempts to be an integrated manufacturing system by bringing together other functional areas such as marketing and finance.
- The additional functions of MRP II include forecasting, demand management, rough-cut capacity planning (RCCP), and capacity requirement planning (CRP), scheduling dispatching rules, and input/output control.
- MRP II works within a hierarchy that divides planning into long-range planning, medium range planning, and short-term control.

Working of MRP-II



- A Production plan is first developed from the business plan by specifying monthly level of production for each product line.
- Guided by the production plan, MPS evolved and disaggregate the production plan of specific product in weeks.
- Verify whether sufficient capacity available to meet the capacity requirements as per proposed master schedule.
- If yes, continue to create MRP and priority schedules for production.
- Analysis regarding detailed capacity requirements is then made to determine whether capacity is sufficient to produce specific component in scheduled periods, else revise MPS.
- Realistic schedule is developed based on available capacity.
- Now execute plans by generating purchase schedules and shop schedules.
- Through MRP interaction with various functional departments established.

Features



1. **Master Production Schedule (MPS):** It provides the detailed information about the manufacturing steps to be followed for the product planned. It specifies the stages in which the parts will move on the production line.
2. **Item Master Data (Technical Data):** It represents the specifications required for making the products, flow of materials on the shop floor, the plan made for its marketing at the dispatch. It also gives technical knowledge on the product mix for effective plant functioning.
3. **Bill of Materials (BOM):** It provides information like the final assembly of the product, material used for making the various parts, the quantity of each part to be manufactured. It also mentions the number of parts in the final product showing specifications and quality control aspects for the various parts during assembly.
4. **Production Resources Data:** It gives the procedures to be followed like type of tooling, type of tooling materials required and also machine specifications for production.



Features

5. Inventories and orders: It provides the statistics for inventory control management and ordering steps (duration) followed for production.
6. Purchasing Management: It represents the planning section to plan for the purchases to be made for a particular product and quantity within which it would be profitable for the organization.
7. Shop Floor Control: It is mainly concerned with the flow line or production line that straight away shows the status of the company at the planning stage. It is mainly required to control the quantity and quality of products during production.
8. Capacity Requirement Planning: It specifies the planning made, for the entire plant to decide the capacity that will give process specifications and also the rate of production that will make the plant capable for making profits.
9. Cost Management: It is mainly concerned with the financial costing of the materials, man hours, and machines, purchasing, marketing and sales. It's the main foundation upon which the manufacturing of the plant stands.

MRP-II objectives



The main objective of the MRP II (Manufacturing Resource Planning) system is to **identify the capacity problems of the production master plan**, and to facilitate the evaluation and execution of the appropriate modifications in the planner, to control, detect and correct the incidences generated in a way agile and fast.

Thus, it provides consistent data to all members in the manufacturing process as the product moves through the production line.

The MRPII is defined by its different approaches (Production Planning, Master Production Programming, Material Requirements Planning, Production Activity Control) in different time horizons.

In short, we can say that the **MRP II is a system of planning and control of the production totally integrated of all resources for the manufacture of the company** (production, marketing, finance and engineering) based on a computer support that answers the question **“What would happen if..?”**.

MRP-II Modules



- Business Planning
- Purchasing
- Forecasting
- Inventory Control
- Order Entry And Management
- Shop Floor Control
- Faster Production Scheduling
- Distribution
- Requirement Scheduling
- Service Requirement Planning
- Capacity Requirement Planning
- Accounting

Benefits of MRP II



- It provides centralized information for the activities carried out in the plant.
- The entire product planning can be made with respect to the data given at the customer level.
- It receives the customer requirements right from the input data and processes the same for designing stages.
- It exactly plans the quantity and type of materials required during production by coordinating with purchase department.
- It decides the number of man-hour rates for manufacturing the product.
- It gives the exact period of production for complex parts, so that the maximum estimation for a particular process can be decided.

Limitations of MRP II

- Initial investment for the setup of the operational activities is costly.
- It is a very lengthy and time consuming process.
- There must be a fully dedicated staff for planning the activities and timely execution of the same.
- The initial processes of MRP-I must be full proof for timely execution of data.



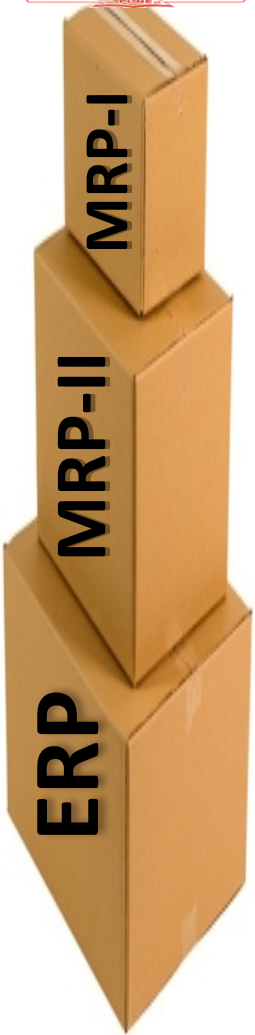


Introduction



- An extension of the MRP system to tie in customers and suppliers
- Allows automation and integration of many business processes
- Shares common data bases and business practices
- Produces information in real time

Evolution of ERP



- The term Enterprise Resource Planning (ERP) was coined in 1990's to describe the latest developments in resource planning.
- In the light of the increasingly complex requirements of a global manufacturing environment, ERP introduced among other things, extensive multi-site management and communications functionality to the realm of resource planning.
- However, there is a tendency within the operations management field to consider ERP as a natural extension of MRP II.
- ERP systems expand the concept of MRP II, and the key difference between MRP II and ERP is that while MRP II has traditionally focused on the planning and scheduling of internal resources, ERP strives to plan and schedule supplier resources as well, based on the dynamic customer demands and schedules.

Evolution of ERP



- The modular functionality commonly found in ERP system includes enhanced functionality of all of the modules of MRP II systems, as well as "Electronic Data Interchange" (EDI), Engineering change control, Project Management and control, and service control.
- The typical ERP system can be called as an umbrella system. Practically, among the most important attributes of ERP is its ability to; automate and integrate an organizations business processes, share common data and practices across the entire enterprise and produce and access information in a real-time environment.

Features of ERP

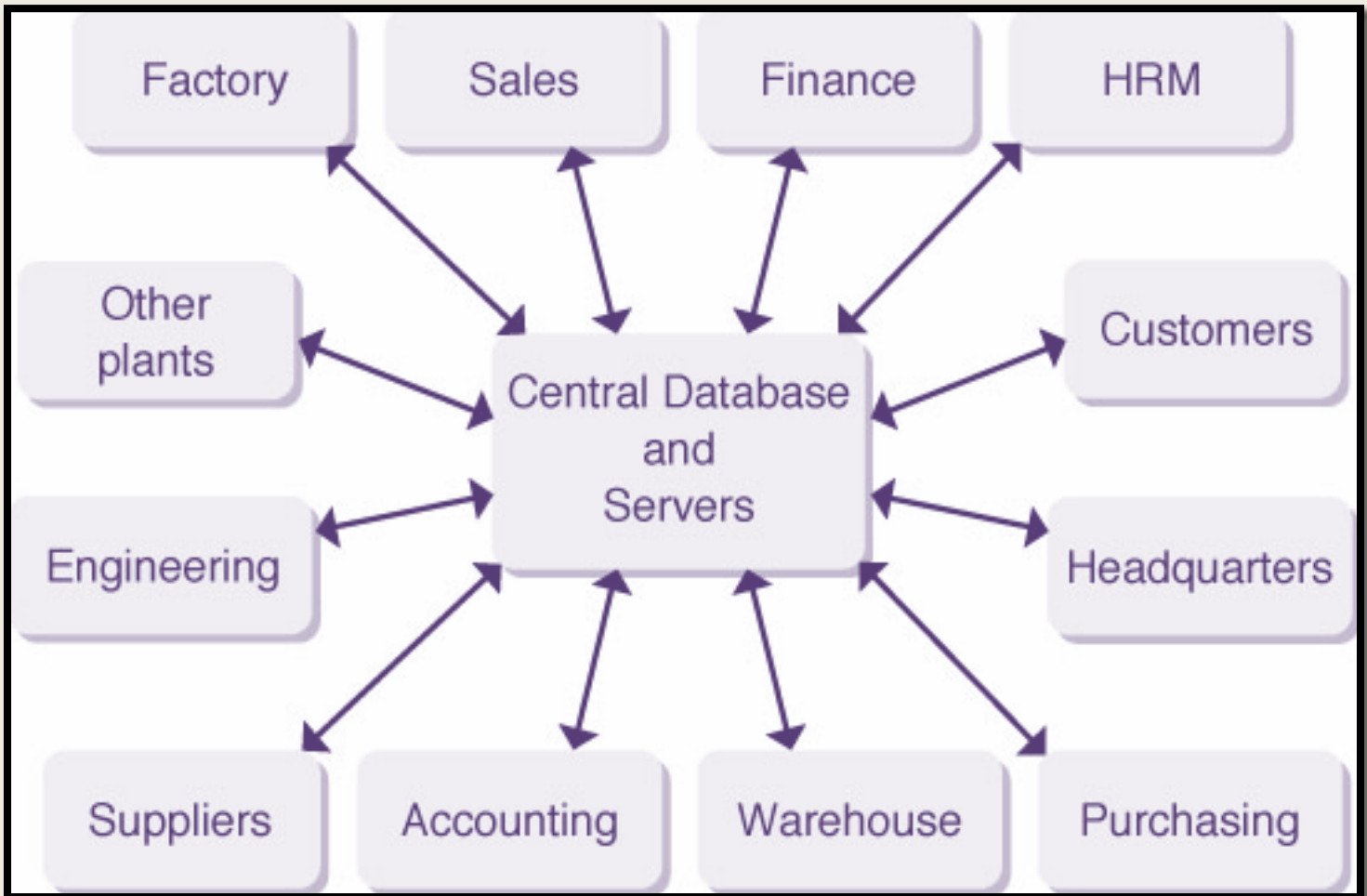
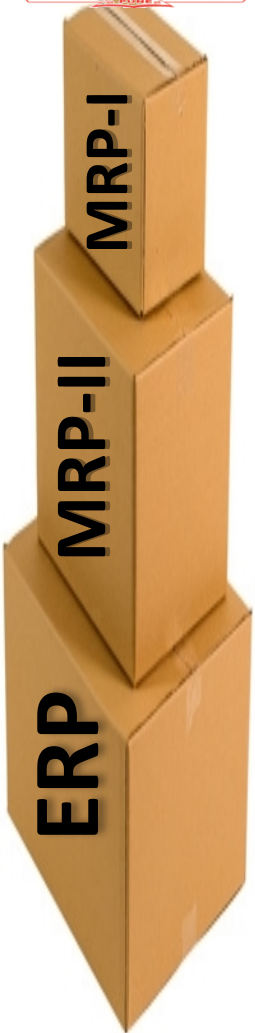


- ERP can be highly customized to meet specific business requirements
- Enterprise application integration software (EAI) allows ERP systems to be integrated with 1. Warehouse management 2. Logistics 3. Electronic catalogs 4. Quality management
- ERP systems have the potential to
 - Reduce transaction costs
 - Increase the speed and accuracy of information
 - Facilitates a strategic emphasis on JIT systems and integration



Features of ERP

- ERP provides multi-platform, multi-facility, multi-mode manufacturing, multicurrency, multi-lingual facilities. **
- It supports strategic and business planning activities, operational planning and execution activities, creation of Materials and Resources.
- ERP covering all functional areas like manufacturing, selling and distribution, payables, receivables, inventory, accounts, human resources, purchases etc.
- ERP performs core activities and increases customer service, thereby augmenting the corporate image.
- ERP bridges the information gap across organizations.
- ERP provides complete integration of systems not only across departments but also across companies under the same management.
- ERP is the solution for better project management.
- ERP allows automatic introduction of the latest technologies like Electronic Fund Transfer (EFT), Electronic Data Interchange (EDI), Internet, Intranet, Video conferencing, E-Commerce etc.
- ERP eliminates most business problems like material shortages, productivity enhancements, customer service, cash management, inventory problems, quality problems, prompt delivery etc.
- ERP provides intelligent business tools like decision support system, Executive information system, Data mining and easy working systems to enable better decisions.





Purpose of modeling an enterprise

- Organizations today face twin challenges of globalization and shortened product life cycle.
- Globalization has led to unprecedented levels of competition. To face such competitions, successful corporations should follow the best business practices in the industry.
- Shortened life cycles call for continuous design improvements, manufacturing flexibility, super-efficient logistics control and better management of the entire supply chain.
- All these need faster access to accurate information, both inside the organization and the entire supply chain outside.

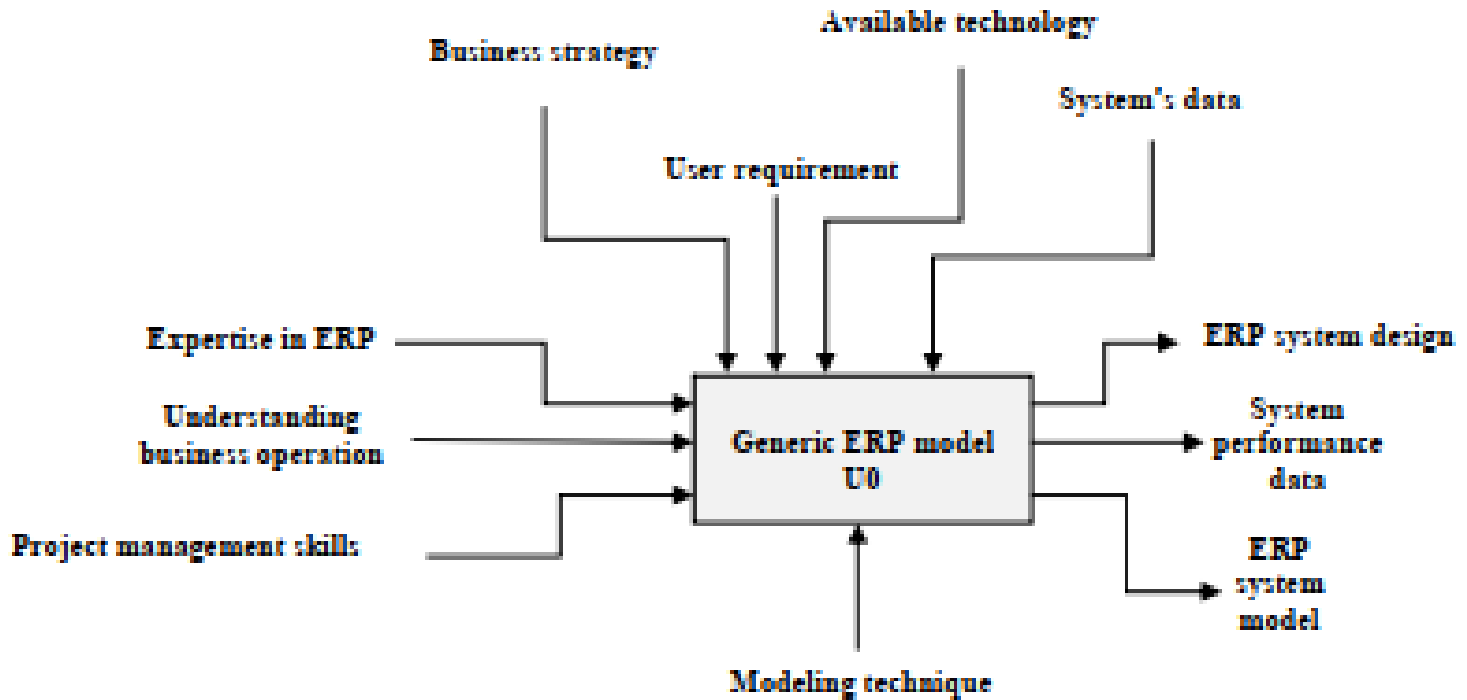


Purpose of modeling an enterprise

- The organizational units such as finance, marketing, production, human resource development etc. need to operate with a very high level of integration without losing flexibility.
- ERP system with an organization-wide view of business processes, business need of information and flexibility meet these demands admirably.
- One of the developments in computing and communication channels is providing tighter integration among them.



Generic Model of ERP





Modules in ERP

1. Manufacturing and Logistics modules
2. Finance module
3. Human resources
4. Supply chain management (SCM)
5. Customer relationship management (CRM)



Manufacturing and Logistics modules

- ***Production Planning:*** Performs capacity planning and creates a daily production schedule for a company's manufacturing plant.
- ***Materials Management:*** Controls purchasing of raw materials needed to manufacture products. The main sub-system of material management modules are:
 1. Pre purchasing activities
 2. Purchasing
 3. Vendor evaluation
 4. Inventory management
 5. Invoice verification and material inspection

Finance module



- The accounting and finance module is divided into four main parts.
 1. General Ledger - Recording all business transactions
 2. Accounts Receivable - s. It is also an integral part of purchasing
 3. Accounts Payable - Records and administers the accounting data of customers
 4. Asset Accounting - managing and supervising fixed assets

Human Resource Module



- This can be used as an independent module. It is used for integrating the
 - Recruitment process
 - Payroll
 - Training
 - Performance evaluation process

The module handles the history of the employee, tracks the employees laid off and aids in



Sales Module

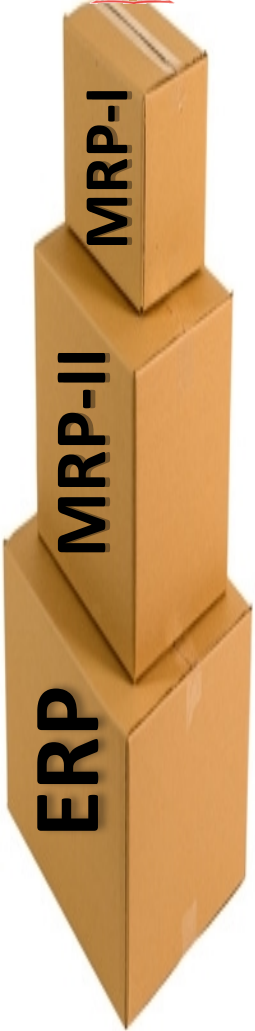
- Sales module implements
 - functions of order placement
 - order scheduling
 - shipping and invoicing.

Plant Maintenance Module



- Preventive maintenance control
- Equipment tracking
- Component tracking
- Plant maintenance calibration tracking
- Plant maintenance warranty claims tracking

Methodology of implementation



1. **Identifying the Needs:** Some of the basic questions, which are to be answered, are
 - Why should an ERP package be implemented?
 - Will it improve profitability?
 - Can the delivery times of products be reduced?
 - How does it improve customer satisfaction in terms of quality, cost, delivery time and service?
 - Will it help to reduce cost of products?
 - How can it help to increase business turnover and at the same time reduce manpower?
 - Will it be possible to reengineer the business processes?

Methodology of implementation



2. **Evaluating the “AS IS” situation of the business:** To understand the present situation of the business, the various functions should first be listed.
- Total time taken by the business processes.
 - Number of decision points existing in the present scenario.
 - Number of Departments/Locations of businesses process.
 - The flow of information and its routing.
 - The number of reporting points currently available.



Methodology of implementation

3. ***“Would Be” situation: Deciding the desired_ Would Be’ situation:*** The concept of _Benchmarking’ is used to see that processes achieved are the best in industry. Benchmarking is done on various factors like cost, quality, service etc. This concept enables to optimize the processes to gain overall benefits.
4. ***Reengineering the business process:*** Reengineering of business processes is done to
 - Reduce the business process cycle time.
 - To reduce the number of decision points to a minimum.
 - Streamlining the flow of information and eliminating the unwanted flow of information.



Methodology of implementation

5. ***Evaluation of various ERP packages:*** Evaluation of ERP packages are done based on the following criteria:-

- Flexibility
- Comprehensive
- Beyond the
- Best business practices
- New technologies
- Other factors to be considered are:
 - Global presence of package.
 - Local presence.
 - Market Targeted by the package.
 - Price of the package.
 - Obsolescence of package.
 - Ease of implementation of package.
 - Cost of implementation.
 - Post-implementation support availability.

Methodology of implementation



6. **Finalization of the ERP package:** Finalization of the ERP package can be done by making a comparison of critical factors through a matrix analysis.
7. **Installation of Hardware and Networks:** This work is carried out in phased manner depending on the schedule of implementation and need of the hardware components.
8. **Finalizing the Implementation Consultants:** The factors of selection for consultants:
 - skill set
 - industry specific experience
 - cost of hiring consultants



Methodology of implementation

9. *Implementation of ERP package :*

- formation of team
- preparation of plan
- mapping of business process to package
- gap analysis
- customization
- development of user specific reports and transaction
- uploading of data from existing system
- test run
- user training
- Parallel run
- Concurrence from user
- Migration to the new system
- User documentation.
- Post-implementation support.
- System monitoring and fine tuning

Methodology of implementation



Phases:

- Planning
- Requirements analysis
- Design
- Detailed design
- Implementation
- Maintenance

Planning and Requirements Phases



- Planning
 - Needs assessment
 - Business justification
 - Tangible and intangible benefits
- Requirements analysis
 - Identify business processes to be supported
 - “Best practices” offered by vendors
 - Models of supported functions
 - Checklist of activities and factors



Design Phase

- Re-engineering business processes to fit software
 - Traditional SDLC defines new business requirements and implements conforming software
- Re-engineering versus customization
 - Re-engineering can disrupt organization
 - Changes in workflow, procedures
 - Customizing
 - Upgrading can be difficult

Alternative Designs



- “Vanilla”
 - Easy to implement
 - Follow vendor prescribed methodology
 - Employ consultants with specialized vendor expertise
 - Usually on time and on budget implementations
- Customized
 - Time and costs increase
 - Not easily integrated into new version



Alternative Designs

- Maintain legacy systems and add ERP modules
 - Support specific functions
 - Cost-effective
 - Organization doesn't get full benefit of ERP
 - Less disruptive
 - Lacks integration
- Outsourcing
 - External vendor operates
 - ASPs provide on time-sharing basis
 - Depends on reliability and stability of vendor



Detailed Design Phase

- Team selects the models, processes, and information to be supported
 - “Best practices” methodology provides models
 - Select applicable business processes
 - Discard inapplicable processes
 - Those processes that do not match the system will serve as foundation for re-engineering
 - Identify any areas not covered as candidates for customization
- Interactive prototyping
- Extensive user involvement



Implementation Phase

- Implementation
 - Address configuration issues
 - Data ownership and management
 - Security issues
 - Migrate data
 - Ensure accuracy
 - Build interfaces
 - Documentation review
 - User training
 - Reporting
 - Testing

Implementation Strategies



- Big bang
 - Cutover approach
 - Rapid
 - Requires many resources
 - Small firms can employ
- Mini big bang
 - Partial vendor implementation
- Phased by module
 - Module-by-module
 - Good for large projects
- Phased by site
 - Location-based implementation

Critical Success Factors of ERP



1. Clear understating of strategic goals
2. Commitment by top management
3. Excellent implementation project management
4. Great implementation team
5. Successful coping with technical issues
6. Organizational commitment to change
7. Extensive education and training
8. Data accuracy
9. Focused performance measures
10. Multisite issues resolved

Case studies

❖ Success Stories of ERP

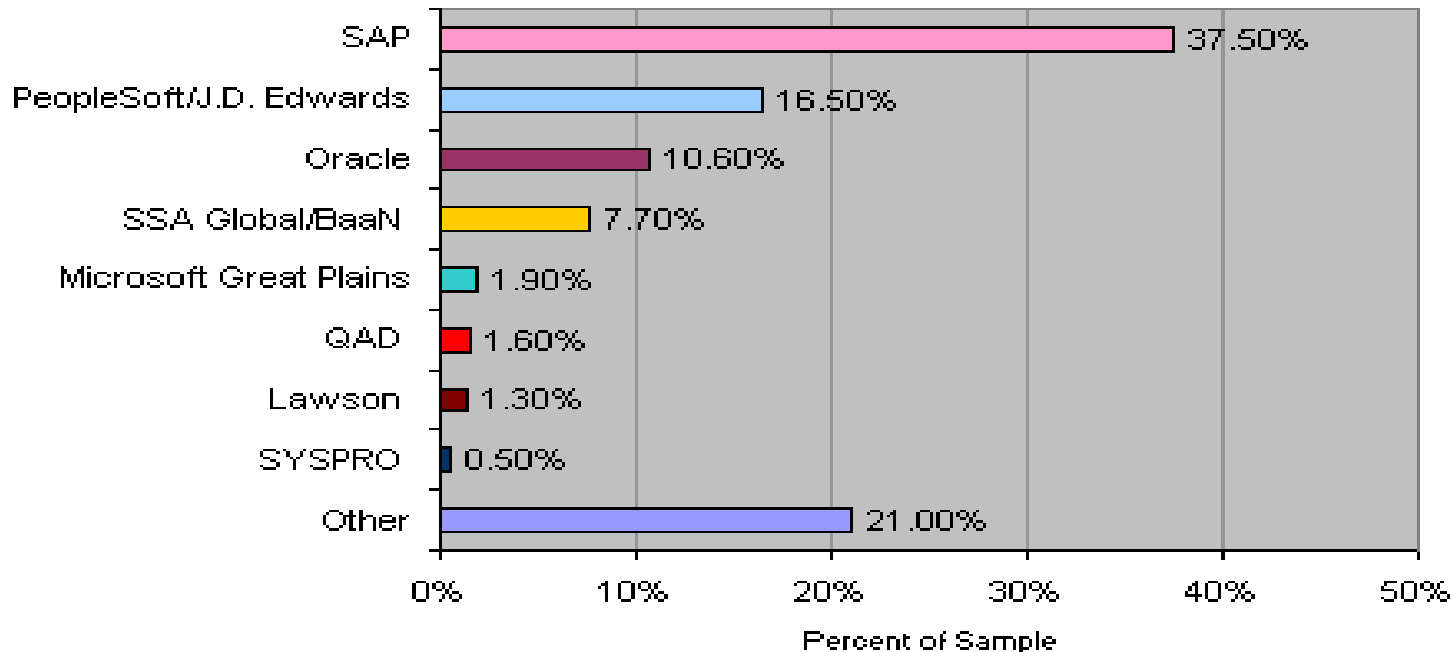
- Autodesk (computer aided design software maker)
 - Reduced delivery time from two weeks to less than 24 hours
- IBM Storage Systems Division
 - Reduced time to re-price – 5 days to 5 minutes
 - Time to ship a replacement part – 22 to 3 days
 - Time to complete a credit check – 20 minutes to 3 seconds
- Fujitsu Microelectronics
 - Reduced the cycle time for filling orders – from 18 days to 1.5 days
 - Time to close financial books – from 8 to 4 days





ERP packages

- ERP Packages used globally

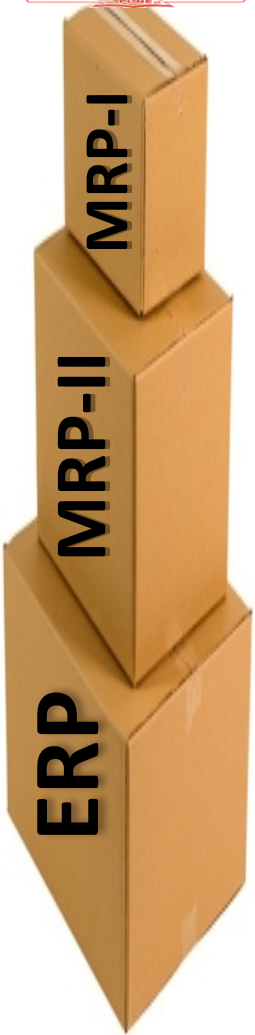


Advantages of ERP



- Provides integration of the supply chain, production, and administration
- Creates commonality of databases
- Can incorporate improved best processes
- Increases communication and collaboration between business units and sites
- Has an off-the-shelf software database
- May provide a strategic advantage

Disadvantages of ERP



- Is very expensive to purchase and even more so to customize
- Implementation may require major changes in the company and its processes
- Is so complex that many companies cannot adjust to it
- Involves an ongoing, possibly never completed, process for implementation
- Expertise is limited with ongoing staffing problems