

DIRECTORATE OF DISTANCE AND CONTINUING EDUCATION
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ENTERPRISE RESOURCE PLANNING (ERP)



ENTERPRISE RESOURCE PLANNING (ERP)

UNIT-1

Definition of enterprise

Enterprise resource planning – evolution of ERP systems – material requirement planning – manufacturing requirement planning – Trends – Systems and technology background – ERP systems background – Objectives – Benefits and challenges in ERP – ERP data input – ERP output capabilities – technology – enabled Vs. clean sheet re-engineering – specialties in ERP systems – Tangible and Intangible benefits – Major ERP vendors.

UNIT-2

Business processes

ERP software changes – Designing ERP systems – Choosing standard models – Artefacts and processes for ERP systems – Client – Server architecture for ERP – Application architectures – Cross functionalities – Application integration.

UNIT-3

Introduction to BPR

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UNIT-4

Choosing an ERP system Implementing – Big bang vs. phased – Identification of modules – developing guiding principles and detailed project plan – Legacy system analysis –picture Mapping into ERP – Project team training – To Be design – user

acceptance – Detailed design – Customization – Construction and testing, production system development.

UNIT-5

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Enterprise resource planning – evolution of ERP systems – material requirement planning – manufacturing requirement planning – Trends – Systems and technology background – ERP systems background – Objectives – Benefits and challenges in ERP – ERP data input – ERP output capabilities – technology – enabled Vs. clean sheet re-engineering – specialties in ERP systems – Tangible and Intangible benefits – Major ERP vendors.

Unit I

Enterprise resource planning (ERP) is a platform companies use to manage and integrate the essential parts of their businesses.

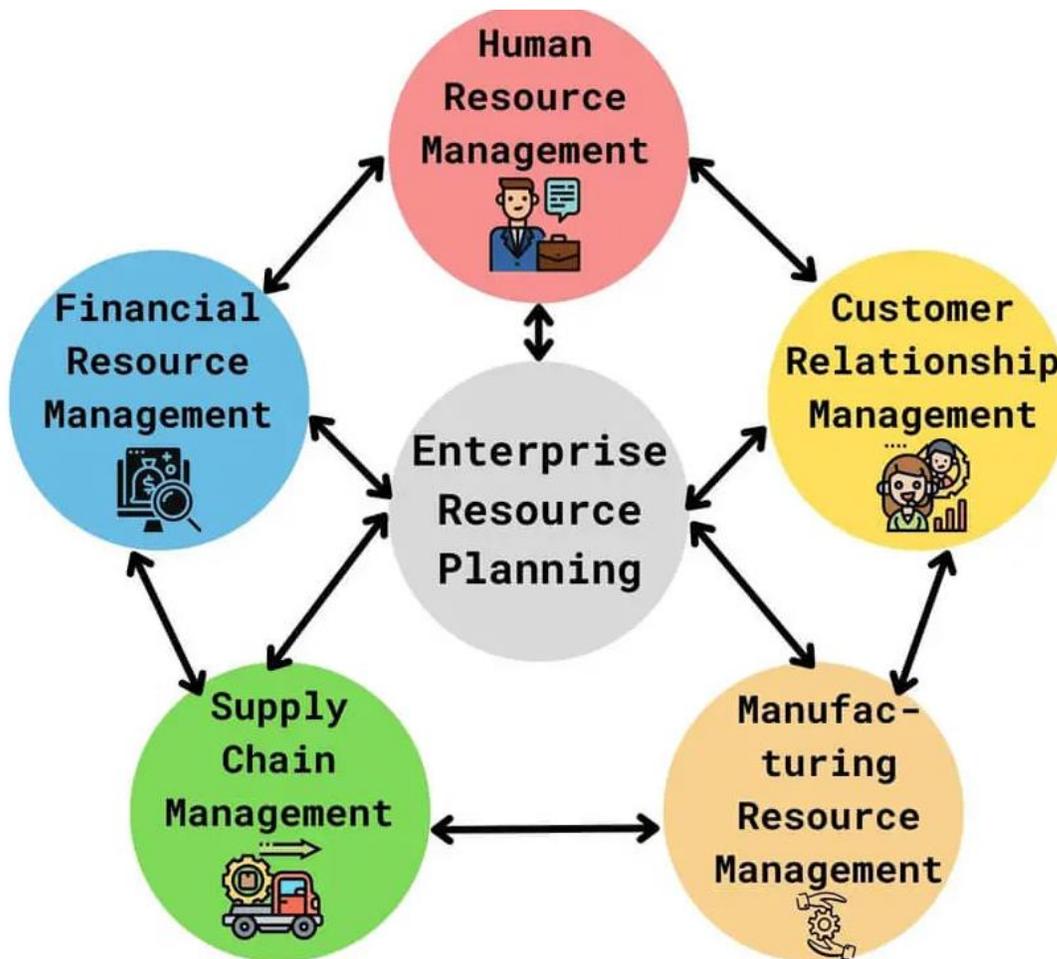
(ERP) is a system that integrates all the departments and functions of a company into one cohesive unit.

It allows for the flow of data between all business areas, which helps to improve efficiency and decision-making.

It is implemented in many ways, including on-premise, cloud-based, or hybrid systems.

Enterprise Resource Planning (ERP) software is a comprehensive business management solution that enables companies to manage their core business processes in one system. ERP integrates all aspects of a company's operations into a cohesive system, from accounting and financials to sales and marketing.

Many ERP software applications are critical to companies because ERP software applications help them implement resource planning by integrating all the processes needed to run their companies with a single system.



This can be a huge advantage for businesses that manage complex operations or multiple locations.

The best way to explain it in layman's terms is to give an example.

Imagine you are the owner of a small business. You have a shop and sell clothes. You also have a website where people can buy your clothes online. To run your business, you need to manage two different types of resources: physical resources (e.g., the stock of clothes in your shop) and digital resources (e.g., the website where people can buy your clothes).

Enterprise resource planning systems allow to manage physical and digital resources using a single system. This is done by integrating different applications into a single system.

For example, it might include an application for managing your shop's stock, an application for managing your website's content, an application for managing your human resources (e.g., employees), etc.

Evolution of ERP:

ERP is made to automate any task. With ERP, it is easy to manage every department under one single database. This consumes not much time and is easy and fast way to do work with.

Example:

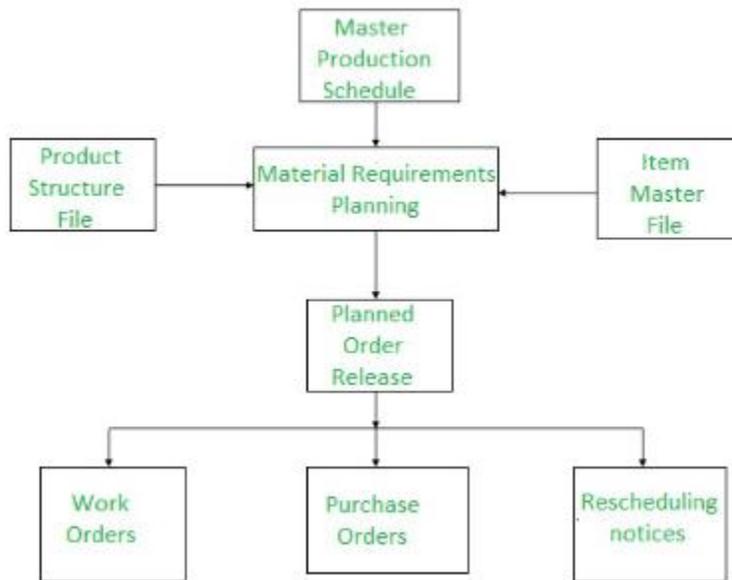
Any enterprise's planning, manufacturing, sales and marketing efforts are put under one management system and then it combines to one single database system.

Evolution of ERP System:

1. Material Requirement Planning (MRP) –

Developed in 1970s, Material Requirement Planning is widely used approach for production planning and scheduling in industry. It is the approach embedded in many commercially available software applications.

The function of MRP is to provide material availability i.e, it is used to produce requirement quantities on time. This process involves monitoring of stocks and demand, leading to automatic creation of procurement proposals for purchasing or production. The main objective of MRP is to determine which material is required, quantity required and by when it is required.



2. Manufacturing Resource Planning (MRP II) –

Developed in 1980s, Manufacturing Resource Planning is an expansion of closed loop MRP for managing an entire manufacturing company. This system provides information that is useful to all functional areas and encourages cross-functional interactions.

It supports sales and marketing by providing and orders promising capability. It is a broad-based resource co-ordination system involving other areas of a firm in planning processes, such as marketing, finance and HR.

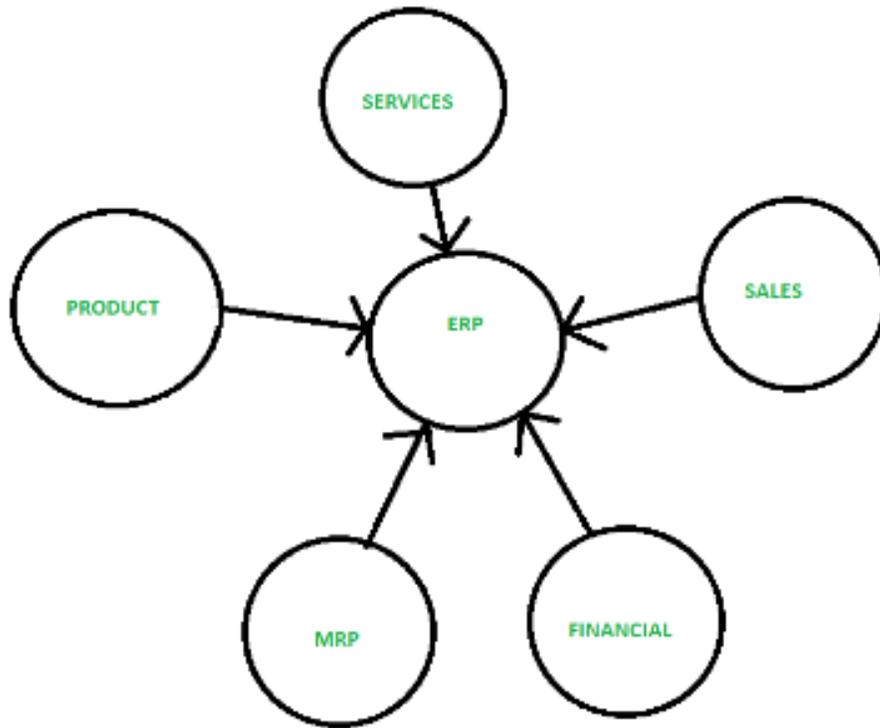
Manufacturing Resource Planning (MRP II)



3. Enterprise Resource Planning (ERP) –

Developed in 1990s, Enterprise Resource Planning is foundation system for domestic and global operations, supporting most or all functional areas in their daily operations. is one of more common categories of business software, especially with large-scale businesses.

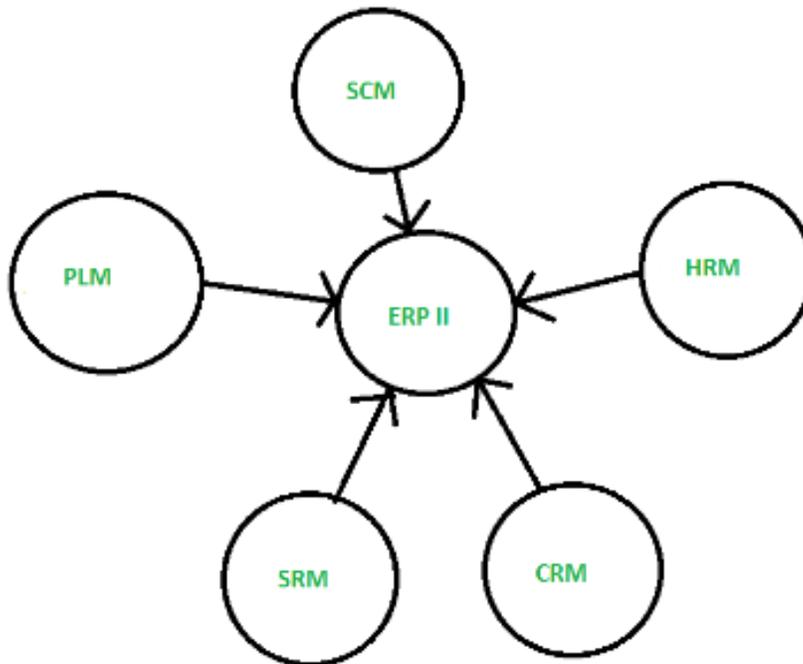
It is a business strategy and a set of industry-domain-specific applications that build customer and shareholder communities' value network system by enabling and optimizing enterprise and inter-enterprise collaborative operational and financial processes. ERP at its core is an effective way of centralizing information and workflow processes through data management. Because ERP keeps all of your workflow data in one place.



4. Enterprise Resource Planning (ERP II) –

Developed in 2000s, ERP II is name now use to describe ERP. Basically, it is successor of ERP. It is a business strategy and set of collaborative operational and financial processes internally and beyond enterprise.

These new business models reflect an increased business focus on internal integration. It's domain is in all sectors and segments. Data in this is internally and externally published and subscribed. It includes departmental modules, CRM, SCM and other stakeholders' modules. Its emphasis is on intangible assists.



Database systems

ERP systems use relational database management systems (RDBMS) to store enterprise data.

In an ERP system too, a database system is used to collect and store transaction data of an organization. The database software manages this data efficiently and provides features to maintain the integrity of the data.

Modern database systems provide many features such as structured query language to directly access the data from the database, transaction mechanism to enable concurrent access of database, stored procedures to enforce business logic, triggers to initiate actions, security to limit access of features of the database.

ERP software developers should be proficient in using various interface tools of the database software.

ERP Developers have many choices of the ERP-friendly database technologies.

The database is the significant part of the ERP solution that holds data.

The most recommended and widely used DBMS for developing ERP software is MSSQL.

Because of its Data security, integrity and proven track record and also open source. Another database which is also used is PostgreSQL, as it has powerful tools including server management studio and server profiler.

PostgreSQL

PostgreSQL is the most open-source database technology used in the ERP development. Organization decided to opt for the open-source technologies for the ERP project, PostgreSQL is the right choice because it easily integrates with the rest of the system. It also includes many indexing techniques, full-text search, and Elastic search capabilities, which most ERP users prefer to use.

MSSQL

Microsofts SQL is a popular ERP database for storing and retrieving data. MSSQL ensures availability and restorability, low cost of installation, enhanced performance, and better security features.

Oracle SQL

Oracle SQL saves data, upgrades it and retrieves it when needed with high speed. Oracle SQL automates backup and allows easy accessibility of data and it eliminates manual tasks.

Developers and architects should start considering other alternatives for persistence data in relational databases especially developing ERP applications from scratch.

An ERP software system is often one of the most significant investments a company will make. This solution is a major financial and practical decision that can impact all parts of the business, like human resources, accounting, manufacturing, marketing and more. Before selecting a new system, buyers should research current solutions and ERP trends coming down the pipeline.

Background of ERP:

Enterprise Resource Planning (ERP) systems were **born in infancy in the early 1960s**. It was a joint effort between J.I. Case, the manufacturer of tractors and other construction machinery, and their IT partner IBM. This further led to the creation of software known as Materials Requirements Planning (MRP).

A History of ERP

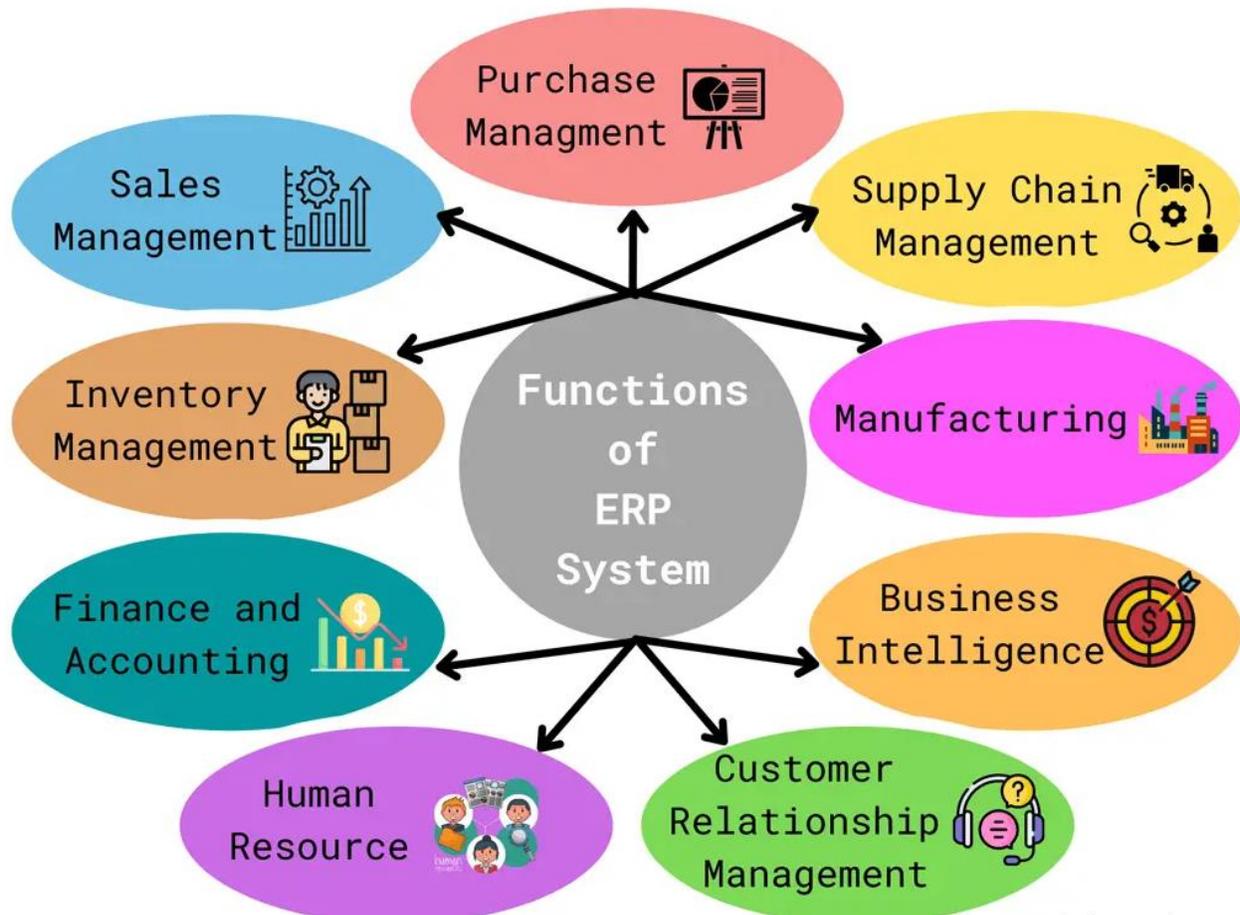
Gartner initially used the term ERP in 1990. However, the business management software and applications used in the manufacturing sector have evolved in recent decades as industry demand varies. ERP had its roots in the early 1960s when large American corporations began using specialized software to manage their complex businesses. The first generation of enterprise resource planning software was designed for manufacturing companies and focused on streamlining manufacturing resource planning and improving inventory management.

The future

The pace of the digitization of businesses will accelerate. As a result, companies using digital technologies in all aspects of their business will fundamentally change their operation. As a result, companies also demand robust ERP systems.

Global ERP software will surpass the US\$77.40bn mark and grow 10.2% between 2019 and 2024.

Features of ERP



ERP systems typically include the following characteristics:

An integrated system

Operates in (or near) real time

A common database that supports all the applications

A consistent look and feel across modules

Installation of the system with elaborate application/data integration by the Information Technology (IT) department, provided the implementation is not done in small steps[29]

Deployment options include: on-premises, cloud hosted, or SaaS

Objectives:

The objective of the ERP Business Transformation Strategy is to modernize and integrate business processes and systems.

This “leapfrog” into the future will empower staff and students to access information and provide services through an intuitive and integrated interface, and ultimately aims to:

1. Improve Service Experience.
2. Enhance Competitiveness.
3. Modernize Business Processes and Systems.
4. Automate Business Solutions.
5. Increase Operating Efficiency.
6. Provide Access to Standardized College Data.

Functional areas

An ERP system covers the following common functional areas.

In many ERP systems, these are called and grouped together as ERP modules:

- Financial accounting: general ledger, fixed assets, payables including vouchering, matching and payment, receivables and collections, cash management, financial consolidation
- Management accounting: budgeting, costing, cost management, activity based costing
- Human resources: recruiting, training, fostering, payroll, benefits, retirement and pension plans, diversity management, retirement, separation
- Manufacturing: engineering, bill of materials, work orders, scheduling, capacity, workflow management, quality control, manufacturing process, manufacturing projects, manufacturing flow, product life cycle management

- Order processing: order to cash, order entry, credit checking, pricing, available to promise, inventory, shipping, sales analysis and reporting, sales commissioning
- Supply chain management: supply chain planning, supplier scheduling, product configuration, order to cash, purchasing, inventory, claim processing, warehousing (receiving, put away, picking and packing)
- Project management: project planning, resource planning, project costing, work breakdown structure, billing, time and expense, performance units, activity management
- Customer relationship management (CRM): sales and marketing, commissions, service, customer contact, call center support – CRM systems are not always considered part of ERP systems but rather business support systems (BSS)
- Supplier relationship management (SRM): suppliers, orders, payments.
- Data services: various "self-service" interfaces for customers, suppliers and/or employees
- Management of school and educational institutes.

GRP - ERP use in government

Government resource planning (GRP) is the equivalent of an ERP for the public sector and an integrated office automation system for government bodies. The software structure, modularization, core algorithms and main interfaces do not differ from other ERPs, and ERP software suppliers manage to adapt their systems to government agencies.

Both system implementations, in private and public organizations, are adopted to improve productivity and overall business performance in organizations, but comparisons (private vs. public) of implementations shows that the main factors influencing ERP implementation success in the public sector are cultural.

Best practices

Most ERP systems incorporate best practices. This means the software reflects the vendor's interpretation of the most effective way to perform each business process. Systems vary in how conveniently the customer can modify these practices.

Use of best practices eases compliance with requirements such as IFRS, Sarbanes-Oxley, or Basel II. They can also help comply with de facto industry standards, such as electronic funds transfer. This is because the procedure can be readily codified within the ERP software and replicated with confidence across multiple businesses that share that business requirement.

Connectivity to plant floor information

ERP systems connect to real-time data and transaction data in a variety of ways. These systems are typically configured by systems integrators, who bring unique knowledge on process, equipment, and vendor solutions.

Direct integration—ERP systems have connectivity (communications to plant floor equipment) as part of their product offering. This requires that the vendors offer specific support for the plant floor equipment their customers operate.

Database integration—ERP systems connect to plant floor data sources through staging tables in a database. Plant floor systems deposit the necessary information into the database. The ERP system reads the information in the table. The benefit of staging is that ERP vendors do not need to master the complexities of equipment integration. Connectivity becomes the responsibility of the systems integrator.

Enterprise appliance transaction modules (EATM)—These devices communicate directly with plant floor equipment and with the ERP system via methods supported by the ERP system. EATM can employ a staging table, web services, or system-specific program interfaces (APIs). An EATM offers the benefit of being an off-the-shelf solution.

Custom-integration solutions—Many system integrators offer custom solutions. These systems tend to have the highest level of initial integration cost, and can have a higher long term maintenance and reliability costs. Long term costs can be minimized through careful system testing and thorough documentation. Custom-integrated solutions typically run on workstation or server-class computers.

Implementation

ERP's scope usually implies significant changes to staff work processes and practices. Generally, three types of services are available to help implement such changes: consulting, customization, and support.

Implementation time depends on business size, number of modules, the customization, the scope of process changes, and the readiness of the customer to take ownership for the project. Modular ERP systems can be implemented in stages. The typical project for a large enterprise takes about 14 months and requires around 150 consultants. Small projects can require months; multinational and other large implementations can take years. Customization can substantially increase implementation times.

Besides that, information processing influences various business functions e.g. some large corporations like Walmart use a just in time inventory system. This reduces inventory storage and increases delivery efficiency, and requires up-to-date data. Before 2014, Walmart used a system called Inforem developed by IBM to manage replenishment.

Process preparation

Implementing ERP typically requires changes in existing business processes.[45] Poor understanding of needed process changes prior to starting implementation is a main reason for project failure. The difficulties could be related to the system, business process, infrastructure, training, or lack of motivation.

It is therefore crucial that organizations thoroughly analyze processes before they deploy ERP software. Analysis can identify opportunities for process modernization. It also enables an assessment of the alignment of current processes with those provided by the ERP system.

Research indicates that risk of business process mismatch is decreased by:

Linking current processes to the organization's strategy

Analyzing the effectiveness of each process

Understanding existing automated solutions

ERP implementation is considerably more difficult (and politically charged) in decentralized organizations, because they often have different processes, business rules, data semantics, authorization hierarchies, and decision centers.[49] This may require migrating some business units before others, delaying implementation to work through the necessary changes for each unit, possibly reducing integration (e.g., linking via master data management) or customizing the system to meet specific needs.[50]

A potential disadvantage is that adopting "standard" processes can lead to a loss of competitive advantage. While this has happened, losses in one area are often offset by gains in other areas, increasing overall competitive advantage.[51][52]

Configuration

Configuring an ERP system is largely a matter of balancing the way the organization wants the system to work with the way it was designed to work. ERP systems typically include many settings that modify system operations. For example, an organization can select the type of inventory accounting—FIFO or LIFO—to use; whether to recognize revenue by geographical unit, product line, or distribution channel; and whether to pay for shipping costs on customer returns.[50]

Two-tier enterprise resource planning

Two-tier ERP software and hardware lets companies run the equivalent of two ERP systems at once: one at the corporate level and one at the division or subsidiary level. For example, a manufacturing company could use an ERP system to manage across the organization using independent global or regional distribution, production or sales centers, and service providers to support the main company's customers. Each independent center (or) subsidiary may have its own business operations cycles, workflows, and business processes.

Given the realities of globalization, enterprises continuously evaluate how to optimize their regional, divisional, and product or manufacturing strategies to support

strategic goals and reduce time-to-market while increasing profitability and delivering value. With two-tier ERP, the regional distribution, production, or sales centers and service providers continue operating under their own business model—separate from the main company, using their own ERP systems. Since these smaller companies' processes and workflows are not tied to main company's processes and workflows, they can respond to local business requirements in multiple locations.

Factors that affect enterprises' adoption of two-tier ERP systems include:

Manufacturing globalization, the economics of sourcing in emerging economies
Potential for quicker, less costly ERP implementations at subsidiaries, based on selecting software more suited to smaller companies

Extra effort, (often involving the use of enterprise application integration) is required where data must pass between two ERP systems[55] Two-tier ERP strategies give enterprises agility in responding to market demands and in aligning IT systems at a corporate level while inevitably resulting in more systems as compared to one ERP system used throughout the organization.

Customization

ERP systems are theoretically based on industry best practices, and their makers intend that organizations deploy them "as is". ERP vendors do offer customers configuration options that let organizations incorporate their own business rules, but gaps in features often remain even after configuration is complete.

ERP customers have several options to reconcile feature gaps, each with their own pros/cons. Technical solutions include rewriting part of the delivered software, writing a homegrown module to work within the ERP system, or interfacing to an external system. These three options constitute varying degrees of system customization—with the first being the most invasive and costly to maintain. Alternatively, there are non-

technical options such as changing business practices or organizational policies to better match the delivered ERP feature set. Key differences between customization and configuration include:

Customization is always optional, whereas the software must always be configured before use (e.g., setting up cost/profit center structures, organizational trees, purchase approval rules, etc.).

The software is designed to handle various configurations and behaves predictably in any allowed configuration.

The effect of configuration changes on system behavior and performance is predictable and is the responsibility of the ERP vendor. The effect of customization is less predictable. It is the customer's responsibility, and increases testing requirements.

Configuration changes survive upgrades to new software versions. Some customizations (e.g., code that uses pre-defined "hooks" that are called before/after displaying data screens) survive upgrades, though they require retesting. Other customizations (e.g., those involving changes to fundamental data structures) are overwritten during upgrades and must be re-implemented.

Advantages of customization include:

Improving user acceptance

Potential to obtain competitive advantage vis-à-vis companies using only standard features.

Customization's disadvantages include that it may:

Increase time and resources required to implement and maintain

Hinder seamless interfacing/integration between suppliers and customers due to the differences between systems

Limit the company's ability to upgrade the ERP software in the future

Create overreliance on customization, undermining the principles of ERP as a standardizing software platform

Extensions

ERP systems can be extended with third-party software, often via vendor-supplied interfaces.

Extensions offer features such as:

- product data management
- product life cycle management
- customer relations management
- data mining
- e-procurement

Data migration

Data migration is the process of moving, copying, and restructuring data from an existing system to the ERP system. Migration is critical to implementation success and requires significant planning. Unfortunately, since migration is one of the final activities before the production phase, it often receives insufficient attention. The following steps can structure migration planning:

- Identify the data to be migrated.
- Determine the migration timing.
- Generate data migration templates for key data components
- Freeze the toolset.
- Decide on the migration-related setup of key business accounts.
- Define data archiving policies and procedures.

Often, data migration is incomplete because some of the data in the existing system is either incompatible or not needed in the new system. As such, the existing system may need to be kept as an archived database to refer back to once the new ERP system is in place.

Advantages of Implementing ERP:

1. Reality check:

When enterprises consider ERP systems, it forces a reckoning in several ways. First, they must account for the hardware and software systems that are already in place. As many enterprises discover, different business and support units throughout the organization may have circumvented central IT protocol and acquired their own applications and systems. Purchases made in such a disorganized fashion by what is known as shadow IT result in inefficiency and lack of interoperability.

2. Lower IT costs.

To be clear, these don't come immediately. A new ERP system is a major investment and its implementation is always time consuming. However, one unified ERP system is less costly than disparate systems for human resources, financial management, and supply chain management. Ultimately, there is savings on software licenses, training, and support.

3. End-to-end visibility.

One of the sexiest features of ERP is that it allows high-level decision makers real-time snapshots of business operations. This includes an integrated view of areas such as inventory, shipping, supply chain management, manufacturing, sales and financials. All this data provides actionable business intelligence. If daily inventory levels are showing a pattern, then the supply chain

can be adjusted so the right levels of the right products are in the right place and at the right time. The availability of this data on a single dashboard can also encourage collaborative efforts and it gives great insight to workflow efficiencies and employee productivity.

4. Planning and reporting.

Improved visibility means that accurate reports, reflecting activity across the enterprise, can be generated quickly. Because multiple business units can see the same data, managers are literally on the same page. That reduces communication errors caused by duplicated spreadsheets and emails, as well as pointless finger-pointing. Reporting tools, particularly those for financial reporting, are typically baked into ERP software. Many ERP systems also offer business intelligence applications that let organizations take a deeper dive into their data.

5. Data security.

Data security can be a blessing or a curse. While having a central repository for data can be nerve-wracking, ERP systems and service providers that host them often have better data security in place than enterprises that host their own on-premise ERP systems.

6. Streamlined Business Processes

It integrates all core business processes into a single system, which eliminates data silos and allows companies to make connections across different departments. This streamlined workflow results in faster and more efficient operations.

7. Improved Decision Making

The Enterprise resource planning system provides real-time data analytics so that business owners and managers can make informed decisions based on accurate information.

8. Increased Efficiency and Productivity

It automates routine tasks, saving employees time and focusing on more challenging projects with more significant potential for growth.

9. Cost Savings

ERP systems are often more affordable than implementing and maintaining individual software applications for each department. In addition, it can help businesses reduce waste and optimize their inventory levels, which leads to increased profits.

Today ERP solutions provide rich features for a business. However, what each firm considers to be the best value of these systems can be varied according to the company's needs.

Challenges of Implementing ERP:

1. Data security

When it comes to data security, ERP can be a blessing or a curse. On one hand, all your data is in one place where you can keep an eye on it. On the other hand, all your data is on one place where cybercriminals can look. If your ERP system is hosted in the cloud by a third party, which most of them are, you may not have complete control over your sensitive data. At the very least, the company hosting the software has access to your data.

2. Total cost.

While ERP systems can result in lower per-capita IT costs, particularly for things like training, the upfront costs are almost always higher. The software itself will cost well into the five figures at a minimum. The cost of implementation -- when you factor in the cost of ERP consultants for project management and new IT hires -- can be more than three times that of standard, stand-alone applications. The cost of maintenance either offered as automated updates by vendors (for a fee) or performed by in-house staff, is another chunk of change. On-premises ERP software vendors may charge annual maintenance fees of 15% to 25%, including security patches. Maintenance fees for cloud-based applications are typically included in the subscription fees.

The cost of ERP software varies depending on the solution you choose (cloud or on-premise) and how many modules you need, and if any customization is required, it can be expensive. Therefore, you should also consider factors in the implementation costs, which may include training employees or data migration services, etc., into your budget when deciding whether it suits your business.

3. Customization.

This can be costly. Most enterprises only consider ERP software in the first place because the applications are modular, allowing users to pick and choose which ones they want, knowing that they can be snapped together. However, one size seldom fits all, and some customization is often needed. If you host your ERP system on-premises, you have more opportunity to customize it. But dedicating the IT manpower to do this can be challenging. Those hosting on-premises ERP software sometimes choose to pay for platform-as-a-service to facilitate customization.

4. Data migration.

It's the single biggest challenge for most enterprises. Whether your data is paper-based or in digital form, it will take time and money to move that data, clean it up to remove obsolete or duplicate items, and conform it to the new format. Data security during and after the migration process carries great risk.

5. Timeframe

The solution implementation process can often be lengthy, especially if you integrate it with existing systems or make significant changes to your business. Therefore, it is essential to set realistic timeframes and goals for implementation and ensure everyone involved knows their expectations so that the process goes as smoothly as possible.

6. Complexity

ERP systems are complex and challenging, especially for employees unfamiliar with them. Therefore, you should provide adequate training and support to help employees make the most of its features and functionality and ensure they understand how it can benefit their role within the organization.

Otherwise, employees may struggle to use it, resulting in employees doing their work manually or using a separate system, etc., defeating the purpose.

7. Customization

It can be customized to meet your unique requirements, but that generally comes at an additional cost.

Therefore, you should think carefully about what software would need to do to benefit your business and whether or not the company can customize the software accordingly before deciding whether it is right for you.

8. Scalability

It can be scalable, but that doesn't necessarily mean it will be a good fit for your business if it expects to grow soon. Therefore, you should consider its scalability before deciding and ensure it can accommodate your future growth plans.

ERP data input:

Enterprise resource planning systems ultimately result in the reengineering of organizational processes. For example, in many legacy systems data is gathered at the loading dock, filtered through accountants, and then entered into the system. However, ERP systems are designed so that their usage can be pushed to the point of data generation, often in operations. As a result of this reengineering (see Hammer 1990), there are a number of changes in the process, including who gathers the data, how it is gathered (actually gathering more data, bypassing paper and entering data straight to a computer-based environment), gathering the data where it is generated, removing accountants and replacing them with information gatherers from operations, and changing when the data is generated to correspond to a process focus.

ERP Output Capabilities:

With ERP systems, information is made available to particular users in the form of specific reports. In addition, there are other approaches to generating data from the system, including database queries. Recently, ERP reporting capabilities have begun to evolve as ERP vendors have tried to increase the accessibility and ease of use of the ERP software.

Enterprise resource planning systems can generate a wide range of standard reports that are designed to meet standard decision-making concerns. The reports that

are available depend on the particular module of interest. For example, financial modules produce classic financial reports, including income statements and balance sheets

Technology in ERP:

ERP is an integrated system which incorporates an organization's tasks in a uniform way. According to the report by Statista, more than 94% of the companies claim that their data security centers have improved using ERP technologies.

The role of information technology in ERP is immense. Following is the list of ERP technologies that are used in the ERP development projects.

- **Databases**
 - Postgre SQL
 - MSSQL
 - ORACLE SQL
- **Programming Technologies**
 - .NET and ASP.NET
 - Java
 - Ruby
 - Python
 - PHP
 -
- **Frontend Technologies**
 - JavaScript
 - Angularjs
 - React

Business Process Reengineering

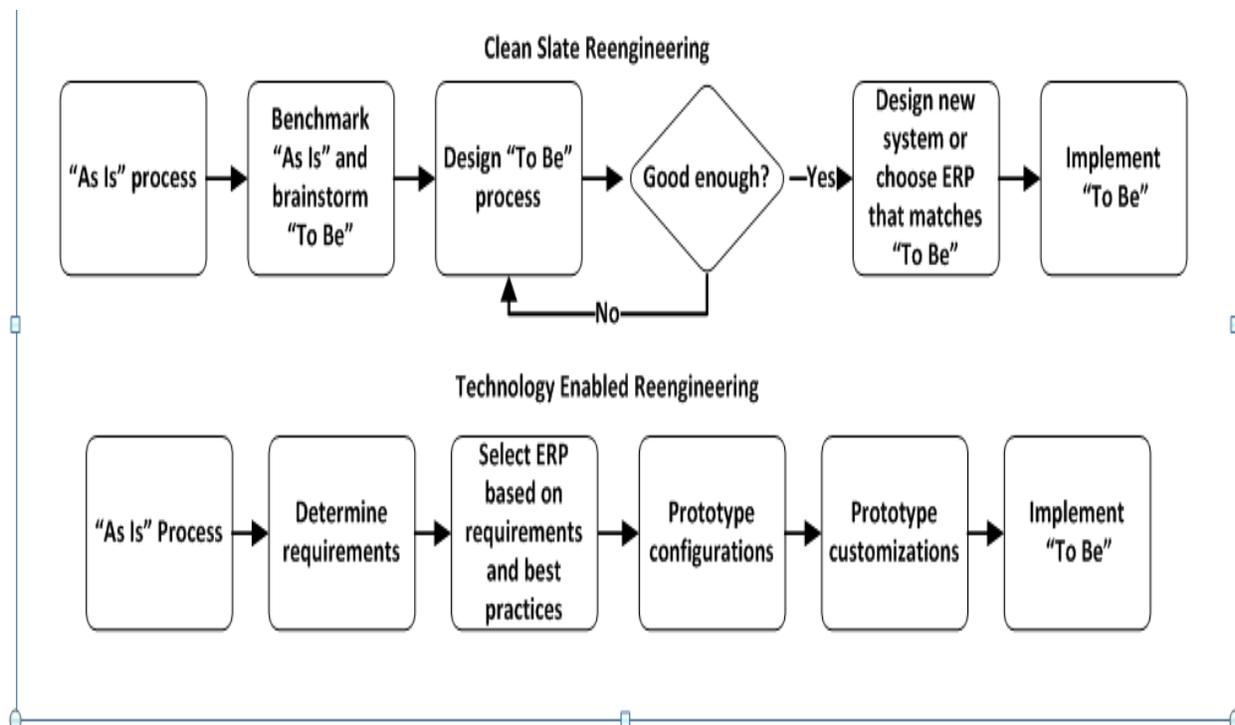
- Business Process Reengineering is the fundamental, radical, redesign in business processes to achieve dramatic improvements in key measures of performance such as cost, quality, speed, and service
- The focus of BPR is not on how a process is done, but WHY it is done
- BPR means change in:
 - Process
 - Roles and Jobs
 - Organizational Structure
- Fundamental
 - Need to understand why an organization does what it does – question all of the rules and assumptions that exist
- Radical
 - Radical redesign means disregarding all existing structures and procedures, and inventing completely new ways of accomplishing work. Reengineering is about business reinvention, begins with no assumptions and takes nothing for granted
- Dramatic
 - Not looking for marginal or incremental improvements or modification
 - Goal is dramatic improvements in performance
- Processes
 - Focus on the way the organization adds value – through cross-functional business processes
 - Move away from function view; task based thinking

The fundamental, dramatic redesign in business processes that an organization undertakes to achieve breakthrough performance in key measures of cost, quality, speed, and service.

In BPR, companies do not change core competencies but instead optimize their business processes in order to make them more efficient and customer-centric.

Two types of ERP

- Clean slate reengineering – starting over from scratch and completely redesigning a process
 - “As is” process – current process being analyzed
 - “To be” process –future design of the new business process
- Technology enabled
 - using technology, such as an ERP system, as the means for transformation
 - Also known as **constrained reengineering** because the technology imposes constraints on the resulting business operations



Business Process Reengineering can be termed a 'clean-slate' initiative as it involves starting from scratch, with an entire gamut of changes in the human, technological, and organizational dimensions of an organisation.

Clean Slate Reengineering vs. Technology-Enabled Reengineering

Clean Slate Reengineering

Advantages:

- Not constrained by a particular tool
- Not constrained to a limited set of processes
- Evolution is not limited by a particular technology
- Can result in unique processes (which gives a competitive advantage)
- Encourages a free flow of ideas

Disadvantages

- Costly
- Excess time and resources (makes it difficult for smaller companies in an industry to afford)

Technology-Enabled Reengineering

Advantages

- ERP provides the tool and structure to facilitate change

Roadmaps lead to less time

- ERP bounds the design which eliminates difficult decisions
- Design is feasible and we know it works (it's been proven)
- Less risk
- Designs likely can be implemented in a timely manner because they are focused on specific processes
- Fewer overhead costs
- Disadvantages
- Constrained by a technology, evolution limited by that technology, limited by certain best practices in that technology
- Not unique – no competitive value perhaps (which incidentally is why orgs may customize); other companies have access to the design

Factors for Reengineering Success

- Scaling up and down
- Think outside the functional box
- Look at other companies for similar solutions to similar processes
- Recognize that a process is just one aspect of success
- Deliver sooner rather than later
- Consider the competition
- Remembering the employee

Business Process Improvement

- Gradual improvement to business processes over time

Why Reengineer?

- Historical 'reality' for organizations (post WWII):
- High level of demand: organizations are order takers
- Management (and IT!) focus – efficiency and control of operations
- Modern 'reality' since 1990s:
- Hyper-competitiveness
- Globalization
- Very demanding customers
- Management and IT focus: Innovation, responsiveness/speed, quality and service.

BPR Benefits

- Cost Reductions / competitiveness
- Improved customer satisfaction
- Improved agility
- Increased profitability
- Industry stature / reputation

BPR Issues

- Advocates report failure rates of 50% to 70%
- Lack of management understanding and support
- Unrealistic expectations
- Resistance from employees
- Cost
- Job losses
- Tradition and culture
- Time requirements
- Risks to managers – shift in power structure
- Need for retraining

How do you figure out what processes to reengineer?

- What's broken the most?
- What process has the greatest impact on the customer?
- Which of the processes are most susceptible to successful redesign? (feasibility and scope)

How do you know if process is broken (or at least in major trouble?)

- Extensive information exchange, data redundancy, and re-keying of data into multiple systems
- Paper and forms
- Excessive inventory, buffers, and other assets
- High ratio of checking and control to value adding
- Reworking and iteration
- BPR Best Practices
- Organize around processes, not tasks or functional areas.
- Combine multiple tasks and assign a single point of contact for each process.

EMPOWERMENT

- An important feature of BPR is integrating activities and assigning business process responsibility to one individual – a ‘generalist’.
- Allow people to make decisions: Avoid decision hierarchies that require workers to go through layers of management for decisions about the work they are doing.
- Perform process steps in their natural order. Rather than following a linear sequential set of tasks, perform process activities as needed, sometimes in parallel.
- Do a cost/benefit on controls and other checks.
- Only use those checks and controls that are cost-effective.
- Centralize data “one version of the truth”. This allows companies to capture and store data only once, yet disperse as needed.

- Treat geographically dispersed resources as though they were centralized
- Self service
- Put the decision point where the work is performed and build controls into the process
- Capture information once and at the source

Reengineering/Redesign Choices

- Technology Enabled (Constrained) Reengineering
- Choices are a direct function of the software
- Not altering software makes time and cost lower
- Clean Slate Reengineering
- “Start from scratch” with no assumptions or constraints
- Brainstorming / thinking outside the box / applying models from different industries
- Software must be made to fit the “needs” of the firm
- Costs in terms of time and dollars is generally greater

Technology Enabled (Constrained) Reengineering

- A particular technology (or portfolio of technologies) is chosen as a tool to facilitate reengineering.
- Thus, reengineering choices are a function of the technologies chosen.
- The technology drives the reengineering.

- Very often – technology is ERP software
- ERP provides the tool and structure to facilitate change
- Proven and based on best practices
- Forces change to happen
- ERP bounds the design
- Design is feasible and we know it works (it's been proven – in other companies)
- Cheaper than clean slate
- Designs likely can be implemented in a timely manner
- Less risky

Clean Slate Reengineering

- Process design starts with a clean slate – no assumptions are made regarding technology
- Also referred to as “green field”.
- Theoretically, there are no limits no limits
- Provides freedom from tools constraints
- Avoids tool biases by using a portfolio of tools
- Not limited by the constraints of a single software package
- Provides freedom from predefined structures

- Can develop own unique, leading-edge processes
- Not limited to the ‘configuration options’ within a single software package
- Permits immediate use of new technology
- Don’t have to wait for the software company to ‘catch up’ with an advance
- Competitive advantage:
- Allows an organization to develop innovative software that is not available through existing ERP software
- May be the only option:
- For some firms in ‘niche’ industries, clean slate reengineering is the only option

Clean Slate Advantages vs Technology Enabled Advantages

Clean Slate	Technology Enabled
Not constrained by tool	Focus on ERP best practices
Not limited by “best practices” as defined by vendor	Tools help structure reengineering process
Retain competitive advantages	Tools focus reengineering
Not subject to vendor changes	Process bounded, thus easier
May be only way to implement advanced technology	Know design is feasible
May have unique features where best practices inappropriate	Greater likelihood that cost, time objectives met Agility Software available

Which Approach is best?

Depends on

- Firms Size
- Available Resources
- Time Pressure
- Strategic Gain
- Uniqueness of solution
- Today – most common approach is technology-enabled
- Clean slate (or hybrid) used on an exception basis

SPECIALITIES OF ERP:

Enterprise resource planning (ERP) software ranks high among the most comprehensive, powerful data management solutions. For many businesses, ERP is an ideal solution for data analysis, automation and full-scale infrastructure integration. Selecting the right ERP software solution amongst a sea of bells and whistles is overwhelming, but don't worry; here's a list of the core ERP features every system should offer.

1. Integration:

This ERP functionality is a significant part of what makes this solution different from other types of software. While many standalone solutions boast their ability to integrate with other systems, there's nothing like a suite of applications built to work together. Integration ensures the numerous capabilities offered by ERP systems work together harmoniously.

2. Automation:

When someone asks, “What does ERP software do?” the answer will likely include automation. ERP automates tedious tasks, including order entry, payroll, accounting, invoicing, reporting and more. Automation cuts down on the hours your staff spends on these processes, allowing them to focus on important assignments. Optimizing your employees’ time ensures more effective workdays.

3. Data Analysis:

Since an ERP system collects and processes data from different business functions, it makes sense to capitalize on that information through analysis. Put simply, this ERP software feature finds trends and patterns in your processes to reflect on task effectiveness and provide forecasts for future business decisions.

4. Reporting:

Many use the terms “reporting” and “analysis” synonymously when discussing ERP software. While this isn’t typically an issue, it’s still valuable to distinguish between the two. You can think of ERP reporting capabilities as the tools or means to convey analysis to an end user. These tools often include customizable dashboards, Gantt charts, pie charts, bar graphs and other visual representations.

5. Customer Relationship Management:

The integration of ERP and CRM tools lets you store customer information, including contact details, order history, personal data, purchase orders and billing information in a centralized location. An integrated CRM enables you to access billing information and customer addresses when processing shipments.

Tangible Benefits:

Cost Savings and Greater Efficiency:

Process automation within the system reduces time, effort and resources spent on daily, repetitive tasks, freeing up employees to focus on more meaningful work. Cloud ERP also eliminates the redundant effort and promotes the adoption of industry best practices on a company-wide level to further boost productivity, and unification of business software cuts down on IT-related expenses.

Better Supply Chain Management:

Cloud-based ERP can greatly improve a supply chain by linking supplier systems, automating key functions, and boosting responsiveness. This can lead to better demand forecasting, precise inventory management, efficient procurement and opportunities both for cost reduction and product innovation.

Improved Data Quality and Accessibility:

As a single source for all business data, often collected, consolidated, organized, and analyzed through automation, cloud ERP systems improve data accuracy and reliability. Fine-grained access permissions can be set by user and job function, too, controlling data accessibility precisely so employees see everything that is needed to perform their job function and nothing else.

Increased Automation:

It linked and automated because all data flows into a single system or record. Sales orders can automatically flow into the financial system without manual re-keying, for instance, and your ERP system can trigger both a work order and an inventory check.

Reduced inventory and stock obsolescence:

With complete, real-time visibility over all aspects of operations, including those with suppliers and customers, inventory levels can be refined and managed with greater precision. Increased tracking from greater operational visibility can also cut down on stock obsolescence and other wastage.

Intangible Benefits:

Easier Reporting and Planning:

Reports can be generated automatically for any part of the business, including financial, sales, operational, inventory, procurement, administrative and elsewhere. Analytics engines within cloud ERP systems also can analyze operational data and deliver predictions for improved planning and forecasting.

Enterprise-Wide Integration:

Cloud ERP systems integrate various functions and business processes across an organization and store them in a single database. This enables employees in different divisions to use the same data for different needs. It also unifies operations. An example of this unification is having a new order initiate a credit check, check product availability, update a distribution schedule, and send an invoice.

Standardized and Simplified Business Processes:

Because systems and data are linked between departments, cloud ERP systems simplify business processes and bring greater synergy across an organization through standardization. Businesses also benefit from best practices that are built into the system, focusing on differentiating elements instead of reinventing standard processes that are uniform across an industry.

More Complete Organizational Visibility:

With all business activity stored and accessed through a single system, businesses greatly improve transparency and operational visibility. Data access logging, precise worker output, machine failure rates, inventory levels, and production output can be monitored on a daily basis or even in real-time.

Better Regulatory and Security Compliance:

Cloud ERP facilitates regulatory and security compliance processes by combining secure and validated data with built-in reporting and tracking capabilities. It also assists with producing information and spotting exceptions around federal, state and local regulatory requirements.

MAJOR ERP VENDORS:

1. Oracle: Coming on strong with two cloud ERP products:

Why they're here:

Oracle sits at No. 2 in market share but is aggressively coming after market leader SAP with two cloud-native offerings. Oracle NetSuite ERP, the result of Oracle's purchase of NetSuite in 2016, is targeted mostly at midrange businesses. Oracle Fusion Cloud ERP, built by Oracle from the ground up, is a broad platform that can accommodate the largest global enterprise. Gartner puts Fusion Cloud ERP in the top leadership position in its latest Magic Quadrant for product-centric ERP.

Power moves:

In late 2021, Oracle announced its biggest acquisition ever, the \$28.3 billion purchase of electronic healthcare records company Cerner Corp. The move gives Oracle a major foothold in the fast-growing healthcare industry.

By the numbers:

Oracle's annual cloud ERP revenue is roughly \$5 billion. Chairman and CTO Larry Ellison predict it could hit \$20 billion in five years.

2. SAP: The battleship is turning around:

Why they're here:

German juggernaut SAP is the runaway market leader with annual revenue approaching \$30 billion. But most of SAP's massive installed base is still running on-premises ERP. The challenge facing SAP is how to compete against the upstart cloud-only ERP vendors and convince S4/HANA customers not to jump ship, but to jump to the SAP cloud.

Power moves:

In late January, SAP bought a majority stake in privately held US fintech firm Taulia. The move will help SAP expand its presence in supply chain financing.

By the numbers:

The number of acquisitions SAP has made over the years.

3. Microsoft: A vertically integrated offering from desktop to cloud:

Why they're here:

Microsoft has become an ERP powerhouse with its broad line of Dynamics products targeted mostly at small to midsize businesses, and available in on-prem or cloud iterations. The obvious advantage that Microsoft has is its ability to integrate ERP business processes with other productivity tools in the Microsoft arsenal, such as Office,

Teams, Outlook, Power BI, the SQL Server database, and, of course, the powerful analytics available in the Azure cloud.

Power moves:

Microsoft recently purchased Orions Systems, a leader in the real-time analysis of video and image content. The technology enables Microsoft to expand the capabilities of Dynamics 365 for brick-and-mortar retailers.

By the numbers:

Dynamics revenue grew 29% year-over-year, while Dynamics 365 (cloud-based) revenue jumped 45%, according to the company's latest earnings report.

4. Workday: Shaking up the ERP market:

Why they're here:

Workday started out as a SaaS-based Human Capital Management (HCM) application, but the company has filled out its portfolio to include financial management and enterprise planning primarily for service-based rather than product-based organizations. Workday execs like to talk about killing off the term "ERP" altogether and replacing it with "enterprise management cloud."

Power moves:

In 2021, Workday bought VNDLY, a company that helps organizations manage contractors and other third parties.

By the numbers:

\$510 million: The amount Workday spent to buy VINDLY.

5. Sage: Carving out a low-cost, high-value niche:

Why they're here:

Sometimes viewed as the low-cost alternative to Oracle and SAP, the Sage Group is hoping to kickstart revenue growth after treading water at around \$2.5 billion over the past few years. The company has built out its own cloud platform and is expanding its product lines beyond accounting and payroll for small businesses, where Gartner rates Sage Intacct a visionary. Under the Sage X3 brand, the company is moving to supply chain management, manufacturing, and sales.

Power moves:

In late 2021, Sage bought Brightpearl, which features both ERP and CRM software specifically for retailers.

By the numbers:

\$300 million. The amount Sage paid for Brightpearl.

6. Infor: Banking on deep industry-specific knowhow:

Why they're here:

With annual revenue north of \$3 billion and a market share in the 5-6% range, Infor is in the top tier of ERP vendors. It offers the full breadth of ERP offerings across industries and, as a legacy vendor, has made the transition to cloud. Infor differentiates itself with industry-specific ERP modules and a multi-tenant cloud platform hosted on AWS. Infor's CloudSuites is rated as a leader by Gartner in the category of ERP for product-centric enterprises.

Power moves:

In 2020, Infor was purchased by Koch Industries, and is now a subsidiary of the \$110 billion conglomerate.

By the numbers:

\$13 billion: The amount of money Koch Industries paid for .

UNIT-2

BUSINESS PROCESSES

Business processes

ERP software changes – Designing ERP systems – Choosing standard models –

Artefacts and processes for ERP systems – Client – Server architecture for ERP –

Application architectures – Cross functionalities – Application integration.

UNIT-2

Business Process:

A process is a series of tasks that are completed in order to accomplish a goal. A business process, therefore, is a process that is focused on achieving a goal for a business. If you have worked in a business setting, you have participated in a business process. Anything from a simple process for making a sandwich at Subway to building a space shuttle utilizes one or more business processes.

Processes are something that businesses go through every day in order to accomplish their mission. The better their processes, the more effective will be the business. Some businesses see their processes as a strategy for achieving competitive advantage. A process that achieves its goal in a unique way can set a company apart. A process that eliminates costs can allow a company to lower its prices (or retain more profit).

REASONS FOR ERP SOFTWARE CHANGES:

- **Business growth** — if your business is growing rapidly, you may find your ERP software is unsuitable for your current needs. Staying on an old version of ERP means missing out on access to new features and new functionality.
- **An outdated system** — tech moves fast and what once worked for you, may not necessarily work a few years down the line. If your ERP system is outdated and

ignorant of recent developments, you could find your ploughing more time and resources into mitigating the issues

- **Neglected customers** — with our growing dependence on technology, customers expect more from your business. Past ERP systems don't allow for the same level of customer visibility, which could essentially be handing your competitors an edge.
- **No remote or mobile access** — remote workforces are becoming more common, while we're also becoming increasingly dependent on mobile technology. ERP software that can only be accessed from HQ is no longer feasible — you need to provide a seamless transition across both devices and locations.
- **Lack of real-time information** — many of us take real-time information for granted, but older ERP systems do not offer this benefit. Rapid access to real-time data is essential; if you don't have access to the information you need, it could be time to change.
- **Rising costs** — as ERP software ages, associated costs can rise, especially if the software is no longer supported by the developer.

ERP software design:

Application architecture is the science of designing an application to achieve certain goals such as performance and scalability. We know that an ERP application consists of data entry forms, business rules, validations, menus, security routines and other data access routines.

Partitioning the application by grouping all the entities logically based on certain guidelines is application design resulting in Application Architecture. The benefits of such design are:

- The performance of the application is better, the applications will be scalable by being able to incorporate future requirements
- By partitioning an application into logical groups also called as layers results in a cohesive code. Such cohesive code is preferred because similar type of code are placed together and can be managed easily
- The layered based approach provides abstraction allowing modifications at one level without impacting or with minimal impact on other layers

Accordingly four layers are developed for the ERP software. They are Data Layer, Data Access Layer, Business Layer and Presentation Layer

Presentation Layer:

In the Presentation Layer, the code responsible for displaying user interface of the entire application is located.

The common code placed in this layer is windows forms, web forms, user controls and server controls. Examples are data entry forms for the finance module, data entry form for the manufacturing module and similarly for all other modules. Note that Windows Forms are used for client interaction in desktop applications and web forms are for browser-based interaction.

Also note that an application developed based on the layered approach includes code for interaction between different layers. The code which provides interaction between the presentation layer and business layer is located in this layer.

Basic validations which are implemented at the user interface level are also

located in this layer. Some examples are checking for blank fields, negative numbers and valid dates etc.

Business Layer:

In the Business Layer, the code that implements the business functionality of the application is located. The business logic of an ERP application is implemented by using components.

Business components encapsulate the business logic, also called business rules. These rules constrain the behavior of a business concept to match the needs of a particular company. For example, the business rule that determines whether a given expense account can be allowed a certain amount is encapsulated in the related component of the application.

Business processes are the activities that occur in a business. Examples are Order Processing, Bill of Materials, Issue of Work Order, creating Invoice etc. These business processes are encapsulated in the business components.

One business component may interact with one or more business components to implement a business process. These business processes can be implemented using either c# or vb.net.

The Business Layer also includes code responsible for accessing the Data Access Layer to retrieve, modify and delete data to and from the data layer and move the results to the presentation layer.

Data Access Layer:

The Data Access Layer provides access to databases such as SQL Server, Oracle etc. The .NET technology used to provide data access functionality is ADO.NET.

The ERP application we are developing accesses data stored in the Sql server database, which is a relational database.

The code in this data access layer exposes the data stored in the database to the business layer.

Data Layer:

Data Layer is the database or the source of the data. The popular databases are SQL Server, Access database and Oracle or can be XML. In the data layer, always use stored procedures.

It is strongly recommend that you use stored procedures for everything you can. We recommend Stored procedures because they are fast and easier to modify. For example, if you need to extract data from two tables instead of one table, you can do that by modifying the relevant stored procedure. The .NET application code need not be changed.

Designing an ERP (Enterprise Resource Planning) system is a complex process that involves various stages and considerations. Here are some key steps that you should keep in mind when designing an ERP system:

Define your requirements: Before you start designing your ERP system, you need to clearly define your requirements. This involves understanding your business processes, the types of data you need to manage, the number of users, and the features you require in the ERP system.

Choose the right ERP solution: Once you have defined your requirements, you need to choose the right ERP solution that meets your needs. There are many ERP

systems available in the market, so you need to evaluate them based on factors such as functionality, scalability, flexibility, user-friendliness, and cost.

Plan the implementation: After selecting the ERP system, you need to plan the implementation process. This involves creating a project plan, allocating resources, and defining the timeline for the implementation.

Customization: While implementing the ERP system, you may need to customize it to meet your specific requirements. This may involve adding new modules or features, or modifying existing ones.

Integration: An ERP system should be integrated with other systems that your organization uses, such as CRM (Customer Relationship Management) systems, SCM (Supply Chain Management) systems, and financial systems. This ensures that data flows seamlessly across systems, and reduces the need for manual data entry.

Testing: Before going live with the ERP system, you need to thoroughly test it to ensure that it works as expected. This involves testing different scenarios, data migration, user acceptance testing, and performance testing.

Training and support: After the ERP system is implemented, you need to provide training to your employees so that they can use the system effectively. You also need to provide ongoing support to ensure that any issues are resolved quickly.

In summary, designing an ERP system requires careful planning, evaluation, customization, integration, testing, and ongoing support. It is a complex process that requires expertise in both technology and business processes.

ERP (Enterprise Resource Planning) systems typically come with a variety of standard models or modules that can be used to manage different aspects of a business. The specific modules needed for a particular business will depend on its size, industry, and unique needs.

That being said, some of the standard ERP modules that are commonly used across many businesses include:

Financial Management: This module is used to manage all financial transactions of a business, including accounting, invoicing, payroll, and financial reporting.

Supply Chain Management: This module is used to manage the flow of goods and services from suppliers to customers. It includes features like inventory management, procurement, and order management.

Human Resource Management: This module is used to manage all aspects of employee information, including hiring, performance management, benefits administration, and compliance.

Customer Relationship Management: This module is used to manage interactions with customers, including sales, marketing, and customer service.

Manufacturing: This module is used to manage the manufacturing process, including production planning, scheduling, and inventory management.

Project Management: This module is used to manage projects, including resource allocation, project planning, and task management.

Business Intelligence: This module is used to gather and analyze data from various parts of the ERP system and present it in a way that can inform decision-making.

When choosing standard ERP models, it's important to consider the specific needs of the business and how each module can be customized to meet those needs. It's also important to consider the integration of each module with the other modules to ensure a seamless flow of data throughout the system.

STANDARD MODELS OF ERP:

1. Finance:

The finance and accounting module is the most important ERP module because it allows businesses to understand their current financial state and future outlook. Key features of this module include tracking accounts payable (AP) and accounts receivable (AR) and managing the general ledger. It also creates and stores crucial financial documents like balance sheets, payment receipts and tax statements.

2. Procurement:

The procurement module, also known as the purchasing module, helps an organization secure the materials or products it needs to manufacture and/or sell goods. Companies can keep a list of approved vendors in this module and tie those suppliers to certain items, helping with supplier relationship management. The module can automate requests for a quote, then track and analyze the quotes that come in.

3. Manufacturing:

The earliest version of ERP, material requirements planning (MRP) systems, were designed for manufacturers, and manufacturing remains a key piece of ERP. Today, ERP systems typically have a production management or manufacturing execution

system (MES). The manufacturing module helps manufacturers plan production and make sure they have everything they need for planned production runs, like raw materials and machinery capacity.

4. Inventory Management:

The inventory management module enables inventory control by tracking item quantities and location down to individual SKUs. This module offers a complete picture of not only current but also incoming inventory, through an integration with the procurement tool. This piece of software helps businesses manage inventory costs, making sure they have sufficient stock without tying up too much cash in inventory.

5. Order Management:

An order management module tracks orders from receipt to delivery. This piece of the ERP feeds all orders to the warehouse, distribution center or retail store after customers place them and tracks their status as they're prepared, fulfilled and shipped to the customer. The order management module prevents orders from being lost and boosts on-time delivery rates to keep customers happy and cut unnecessary expenses for expedited shipping.

Enterprise Resource Planning (ERP) systems are designed to integrate various business functions and processes into a single, comprehensive system. The artifacts and processes involved in ERP systems can vary depending on the specific ERP software being used and the needs of the organization. However, some common artifacts and processes for ERP systems include:

Artifacts:

- Business process maps: These are visual representations of an organization's business processes, which help to identify inefficiencies and areas where ERP systems can be implemented.
- Data models: These models outline the data that is needed for the ERP system to function, including data sources, data flows, and data relationships.
- System requirements: This outlines the specific requirements that the ERP system must meet in order to be effective for the organization.
- User manuals: These provide guidance to users on how to use the ERP system effectively.

Processes:

- Configuration: This involves setting up the ERP system to meet the specific needs of the organization, including configuring modules, setting up security and permissions, and defining workflows.
- Data migration: This is the process of moving data from legacy systems into the ERP system, ensuring that all data is accurate and up-to-date.
- Testing: This involves running tests on the ERP system to ensure that it is working as expected and that all data is accurate.
- Training: This involves training employees on how to use the ERP system effectively, including training on specific modules and workflows.

Overall, artifacts and processes for ERP systems are critical for ensuring that the system is effective and that it meets the needs of the organization. Effective implementation and use of ERP systems can help organizations streamline their operations, reduce costs, and improve overall efficiency.

Client server architecture:

The notion of client-server architecture can be understood by the analogy of ordering a pizza for delivery. You call the store to order a pizza and someone picks up the call, takes your order, and then delivers it.

Simple, right?

Yes, this analogy pretty much answers the fundamental principle of client server architecture.

Two factors that are Involved :

- A server is the one who provides requested services.
- Clients are the ones who request services.

Client server architecture example:

- **Mail servers:**

Email servers are used for sending and receiving emails. There are different software that allow email handling.

- **File servers:**

File servers act as a centralized location for files. One of the daily life examples to understand this is the files that we store in Google Docs. The cloud services for Microsoft Office and Google Docs can be accessed from your devices; the files that you save from your computer, can be accessed from your phone. So, the centrally stored files can be accessed by multiple users.

- **Web servers:**

Web servers are high-performance computers that host different websites. The server site data is requested by the client through high-speed internet.

Application architecture:

Application architecture is a structural map of how an organization's software applications are assembled and how those applications interact with each other to meet business or user requirements. An application architecture helps ensure that applications are scalable and reliable, and assist enterprises identifies gaps in functionality.

In general, application architecture defines how applications interact with entities such as middleware, databases and other applications. Application architectures usually follow software design principles that are generally accepted among its adherents but may lack formal industry standards.

Technology and industry standards:

Larger software publishers, including Microsoft, typically issue application architecture guidelines to help third-party developers create applications for their platform. In its case, Microsoft offers an Azure Application Architecture Guide to help developers producing cloud applications for Microsoft Azure public cloud computing platform. It provides a range of cloud services, including those for compute, analytics, storage and networking. Users can choose from these services to develop and scale new applications, or run existing applications, in the public cloud.

Benefits of application architecture:

- Reduces cost by identifying redundancies, such as the use of two independent databases that can be replaced by one;

- Improves efficiency by identifying gaps, such as essential services that users can't access through mobile apps;
- Creates an enterprise platform for application accessibility and third-party integration;
- Allows for interoperable, modular systems that are easier to use and maintain;

Cross functionalities of ERP

An Enterprise Resource Planning (ERP) system is a software application that helps organizations manage their business processes, such as accounting, procurement, human resources, inventory management, and customer relationship management, in an integrated and automated way. The cross-functionalities of an ERP system refer to the ability of the software to integrate and streamline these various business processes across different departments or functions within an organization. Here are some examples of cross-functionalities of ERP:

Financial management: The financial management module of an ERP system integrates financial information across all departments and provides real-time visibility into the organization's financial performance. This module typically includes functionality for accounts payable, accounts receivable, general ledger, cash management, and financial reporting.

Supply chain management: The supply chain management module of an ERP system streamlines the flow of materials, goods, and services from suppliers to customers. This module includes functionality for inventory management, procurement, order management, and logistics.

Human resources management: The human resources management module of an ERP system helps manage employee information, such as payroll,

benefits, performance management, and training. This module also helps automate the recruitment process and track employee progress.

Customer relationship management: The customer relationship management module of an ERP system helps manage customer interactions, such as sales, marketing, and customer service. This module includes functionality for lead management, sales forecasting, order management, and customer service.

Production planning and control: The production planning and control module of an ERP system helps manage the production process, including planning, scheduling, and monitoring of production activities. This module also helps with quality control and material management.

Overall, the cross-functionalities of an ERP system enable organizations to better manage their business processes, improve efficiency, reduce costs, and make better decisions based on real-time data.

Enterprise Resource Planning (ERP) integration refers to the process of connecting different software applications and systems used by an organization to manage different business functions, such as finance, human resources, and supply chain management, among others. The integration of ERP applications helps organizations to streamline their operations, reduce costs, and improve efficiency.

Key steps involved in integrating ERP applications:

- ❖ **Assess the existing software systems:** The first step in ERP integration is to evaluate the existing software applications and systems used by the

organization. This will help identify any gaps in the current systems and determine the requirements for integration.

- ❖ **Develop an integration strategy:** Once the requirements have been identified, the next step is to develop an integration strategy that outlines the goals, scope, timeline, and budget for the integration project. This should also include a plan for data migration, testing, and training.
- ❖ **Choose an integration method:** There are several methods for integrating ERP applications, including point-to-point integration, middleware-based integration, and API-based integration. The choice of method will depend on the organization's needs, budget, and IT infrastructure.
- ❖ **Configure the ERP system:** The next step is to configure the ERP system to enable integration with other software applications. This involves setting up data mapping, defining data formats, and establishing communication protocols.
- ❖ **Test and deploy the integration:** Before deploying the integrated system, it is important to conduct thorough testing to ensure that all components are working correctly. Once the testing is complete, the integrated system can be deployed.
- ❖ **Provide training and support:** After deployment, it is important to provide training and support to end-users to ensure that they can effectively use the integrated system.

Overall, integrating ERP applications can be a complex and time-consuming process, but it can lead to significant benefits for organizations in terms of improved efficiency, cost savings, and better decision-making.

UNIT-3

Introduction to BPR

Definition and principles and BPR – Role of IT in BPR – IT support for BPR – Strategic alignment of IT and BPR – Process engineering – Enterprise business processes – BPR and organizational restructuring – Organizational systems – Business process integration

INTRODUCTION TO BPR

DEFINITION OF BPR:

Business Process Reengineering is the radical redesign of business processes to achieve dramatic improvements in productivity, cycle times, quality, and employee and customer satisfaction.

Principles of business process reengineering:

The first principle states that the tasks performed by different people can be combined into one specialized task. Taking an example, the redesign of a manufacturing company with separate divisions performing different functions in a sequence.

One determines the customer requirement the other passes in the information, and the third convey this to various plants and warehouses.

These sequential based activities led to errors, rework, and delays. When a company re-engineers, it eliminates the assembly line approach.

Involve those people in the process who face the output:

This principle states that the work should be done by the individual getting the output, i.e., the consumer. Today, this can be observed as the “self-service”.

For example, if a customer is facing any problem, he has to fill in the data himself instead of any office doing it for him. It pushes the work to the consumer.

Merging data collection and processing units:

This principle has matured and is visible in the concept, division of labor. This means the data handling must be done by the same person who is collecting the data. This reduces the number of errors by eliminating external contact for a process.

For example, a company has a structure wherein one department collects the information while the other records it. Here, the shared database will have many errors while translating the information from one department to another.

Shared databases to interconnect dispersed departments:

The advances in information technology allow the company to connect separate units that are geographically dispersed by using a shared database.

Centralized databases provide economies of scale in addition to providing flexibility and quick responses to the customers as there are better agreements between the vendors.

Bridging the processes which are running on similar lines:

According to Hammer, the processes of the activities must be integrated rather than the end results. The parallel functions must be coordinated using communication networks, shared databases.

These parallel activities must be linked continuously and coordinated at the process execution. This will eliminate the high costs and delays in the outcome of the process.

Decision making should also be a part of the work performed:

There must be decision aiding-technology to cut unnecessary controls and to keep a check in the process. Hammer states the decision should be made by the person who is doing the work.

Role of Information System in Business Process Reengineering (BPR):

Business process reengineering concepts comes from management theories and introduce in 18th century. The purpose of business process reengineering is to make the business in best condition. The companies use the reengineering process to make the business in best position and to achieve the company goals. Business process reengineering means not only change but structural change. What kind of structural change in the organization, managing system, employee responsibilities, reward system, and information technology.

Many organizations want to change the management of the organization but they not identified which part of work is to be changed. But the business process reengineering (BPR) is the concept of management and that has been formed by practical experience. BPR is not only impact inside the organization but also the external supplier and customer as well. BPR is help to increase the organization financial report and customer satisfaction and also find out the way how to create the high productivity with the short amount. The key driver of the BPR is cost reduction, high speed, and quality.

Information technology is a technology which use to store, determine and process the data which use in the specific organizations to examine the data and processed the data. And through the information we improve our knowledge and know how to do the work. The information system develops a strategic approach to change the process. Information technology is the component of the BPR and promotes the companies process.

Principles of ERP include:

ERP, or Enterprise Resource Planning, is a business management software that allows organizations to integrate various processes and functions into one unified system. The principles of ERP include:

Integration: The key principle of ERP is integration, which allows various business processes and functions to be integrated into one system. This eliminates the need for multiple software applications and reduces duplication of effort.

Modularity: ERP systems are modular, meaning that individual modules can be added or removed as needed, depending on the organization's specific requirements.

Centralization: ERP systems centralize data, making it easier for different departments and teams to access and share information. This helps to streamline business processes and improve collaboration.

Automation: ERP systems automate many routine tasks and processes, reducing the need for manual intervention and saving time and resources.

Real-time data: ERP systems provide real-time data on business processes and performance, allowing organizations to make informed decisions and respond quickly to changing circumstances.

Scalability: ERP systems are designed to be scalable, meaning they can grow and adapt to meet the changing needs of an organization.

Security: ERP systems are built with security in mind, ensuring that data is protected and access is restricted to authorized personnel.

By following these principles, organizations can implement an ERP system that meets their specific requirements, improves efficiency, and helps to drive growth and success.

IT (Information Technology) plays a crucial role in ERP (Enterprise Resource Planning) systems. ERP systems are complex software applications that integrate various business functions and processes such as finance, human resources, inventory management, supply chain management, and customer relationship management.

BPR (Business Process Reengineering) is an approach used by organizations to optimize their business processes for maximum efficiency and effectiveness.

Focus on outcomes: BPR is outcome-oriented, meaning that it focuses on the end result of a process rather than the individual steps that make up the process.

Re-think from scratch: BPR requires organizations to re-think their business processes from scratch, rather than just tweaking or modifying existing processes.

Eliminate non-value-added activities: BPR aims to eliminate non-value-added activities and steps in a process that do not contribute to the end result.

Simplification: BPR emphasizes simplification of processes, reducing complexity, and minimizing the number of steps required to complete a process.

Technology enablement: BPR leverages technology to streamline and automate processes where possible.

Empowerment: BPR promotes employee empowerment by giving them more responsibility, decision-making authority, and accountability.

Customer focus: BPR emphasizes customer needs and satisfaction, ensuring that processes are designed to deliver maximum value to the customer.

Continuous improvement: BPR is an ongoing process that requires continuous improvement, monitoring, and refinement.

Overall, BPR is a strategic approach that requires a fundamental re-thinking of business processes in order to achieve significant improvements in efficiency, effectiveness, and customer satisfaction.

Role of IT in ERP

IT is responsible for the implementation, customization, and maintenance of the ERP system. IT teams work with business users to identify their requirements and configure the ERP system accordingly. They also ensure that the ERP system is integrated with other software applications used in the organization.

In addition, IT teams are responsible for ensuring that the ERP system is secure and that data is protected from unauthorized access. They implement security protocols and regularly update the system to address any vulnerability. IT teams also provide training and support to end-users, ensuring that they are able to use the ERP system effectively.

Overall, IT plays a critical role in the success of ERP systems. Without IT support, it would be difficult to implement, maintain, and use an ERP system effectively, which would have a negative impact on the organization's operations and productivity.

Role of IT in BPR

The role of Information Technology (IT) in Business Process Reengineering (BPR) is critical. IT can be used to enable and automate business processes, which can increase efficiency, reduce costs, and improve customer satisfaction. IT can also provide real-time information that can be used to make better decisions and improve overall business performance.

Here are some specific ways that IT can support BPR:

Process Analysis: IT can be used to collect data on existing business processes and analyze them to identify inefficiencies and areas for improvement.

Process Automation: IT can be used to automate manual and repetitive tasks, reducing the need for human intervention and improving process efficiency.

Process Integration: IT can integrate disparate systems and applications to create a seamless flow of information across the organization, reducing data silos and improving overall communication.

Data Analytics: IT can provide real-time data and analytics that can be used to make informed decisions, identify trends and patterns, and optimize processes.

Process Optimization: IT can be used to simulate and test different scenarios to identify the best approach to process improvement and optimization.

Overall, IT plays a vital role in BPR by providing the tools and capabilities necessary to analyze, redesign, and optimize business processes. By leveraging IT in BPR efforts, organizations can increase their agility, improve their competitiveness, and deliver better outcomes to their customers.

The Nature Of IT Support for BPR:

- ❖ Integrated enterprise models
- ❖ Analysis (problem-solving capability)
- ❖ Software functionality
- ❖ Visualization and Communication
- ❖ Intended Users

Integrated Enterprise Models:

An enterprise model is a computational representation of the structure, processes, information, resources, goals, and constraints of a business, government activity, or other organizational system. It can be both definitional and descriptive, spanning what is and what should be. The role of an enterprise model is to achieve model-driven enterprise design, analysis, and operation.

Analysis:

A necessary first step is the precise definition of the analysis tasks performed by different tools in the environment and the ways in which they interact. This specification is independent of the algorithms used to solve the tasks - we are specifying the problem and what constitutes a solution to the problem. In this way will define the functionality of each tool; this will require the definition of what is the appropriate input to each tool and what is the correct output. The specifications of these tasks for the tools will serve as competency questions for the different ontologies that are being designed. Each advisor is a constraint-based problem solver - given a set of goals and constraints, a tool searches for a solution that optimizes the goals and satisfies the constraints. Tools also have the ability to generate more than one solution, thereby the enabling the consideration of alternatives and trade-offs.

Software Functionality:

These are the capabilities of the tools that are independent of the reasoning tasks required for analysis. They deal with properties of the implemented ontologies and analysis tasks, and can be roughly categorized as follows:

- Tool integration environment
- Enterprise model management tools
- Enterprise model construction
- Project management tools

Communication:

Tools to support BPR must facilitate communication of the properties of an enterprise design or redesign. Minimally, there must be annotated enterprise models. We must also be able to extract multiple pieces of the model in order to explain their interaction.

Ability to produce summaries of the intelligence gathered to support various types of communicating and reporting but retaining linkages to the sources of data.

Another aspect of BPR is that the customers (subjects of the BPR endeavour) are learning about their enterprise through the process of modelling the enterprise. The BPR tools should therefore support this learning process for the customers.

Visualization:

The first objective is the development of a zymology that depicts terms and concepts in the associated enterprise models. The zymology should be precise and general enough to support visual programming for performing the modeling task.

For those tasks that require multiple enterprise models, the primary issue will be the design of graphical interfaces that capture the dimensionality of the

interdependencies and the possibility of merging the visualizations of the relevant models.

Intended Users:

How do the requirements for BPR tools depend on the intended use of the tools? This question has two aspects.

The tool may vary with the kind of user -- external consultant, internal consultant, manager, and employee.

The difference in the tool can include any of its properties, including the analysis tasks, software functionality, and visualization.

Process engineering:

A process engineer is a professional who designs, implements and optimizes industrial processes in the manufacturing industry. Process engineering is similar to chemical engineering, but a process engineer focuses more on the mathematical and physical aspects of production. In this article, we discuss what a process engineer is, what duties and responsibilities they have and the skills and qualifications they require to succeed in their job role.

Enterprise business process:

Enterprise process management, also known as business process management, is **a method that organizes and implements all of the activities in an organization in a structured way**. This aligns them with organizational goals and maximizes integration across different functions and processes.

ORGANISATIONAL STRUCTURE:

Business Process Reengineering is a process-oriented business transformation, in which the organizational structure is based on the processes leading to what the customers need. It requires the organisation to undergo radical change with the goal of drastically improving quality, speed, costs and services. A great help here is the creative use of information technology systems, which give employees access to the information they need, wherever they are. Modern information and communication technology can enable you to better support your business processes, making data from various systems available to those who need it regardless of department or system.

Business Process Integration:

Business Process Integration (BPI) is essential for businesses looking to connect systems and information efficiently. BPI allows for automation of business processes, integration of systems and services, and the secure sharing of data across numerous applications. Overcoming integration challenges allows organizations to connect systems internally and externally. Moreover, BPI allows for the automation of management, operational, and supporting processes. This gives businesses an edge over competitors as they can spend less time concerned about the challenges of integration and more time and energy on driving new business.

Previously, business process integration software was only available to large enterprise companies that could afford it. Today, businesses of all sizes need a efficient integration solution to streamline processes between marketing, sales, customer service, and supply chain management, etc. Integration among administrative, operational, and support processes increases productivity by simplifying regular enterprise functions.

IT support for BPR

IT support can play a critical role in Business Process Reengineering (BPR) projects. BPR aims to improve organizational processes by analyzing, redesigning, and automating workflows to achieve greater efficiency, productivity, and quality. IT support can contribute to BPR projects in the following ways:

Technology assessment: IT support can assess the organization's current technological capabilities and identify areas for improvement. This can involve evaluating hardware, software, network infrastructure, and security systems.

Process automation: IT support can help identify opportunities for process automation and recommend software solutions to streamline workflows. They can also help integrate different software tools to work together seamlessly.

Data analysis: IT support can help collect, store, and analyze data to identify bottlenecks, inefficiencies, and areas for improvement in the current process. They can also help develop dashboards and reports to track key performance indicators (KPIs).

User training: IT support can train users on new software applications and tools to ensure that they are used effectively to support the new process. This can involve developing user manuals, providing training sessions, and offering ongoing support.

Continuous improvement: IT support can help monitor the new process and identify areas for further improvement. This can involve collecting user feedback, analyzing data, and recommending changes to the process or software applications.

Overall, IT support can play a crucial role in BPR projects by leveraging technology to improve organizational processes, reduce costs, and increase productivity.

Strategic alignment of IT and BPR

Strategic alignment of IT and BPR (Business Process Reengineering) refers to the process of aligning information technology and business process reengineering initiatives to achieve common goals and objectives.

IT and BPR are two closely related areas that can significantly impact an organization's success. IT is responsible for providing the technology infrastructure necessary for an organization's operations, while BPR focuses on reengineering business processes to improve organizational performance.

To achieve strategic alignment between IT and BPR, organizations must develop a shared understanding of the goals and objectives of both initiatives. This involves identifying how technology can support business process reengineering efforts and how business process reengineering can leverage technology to achieve its objectives.

One way to achieve strategic alignment is to involve IT in the BPR process from the beginning. This can help IT teams to understand the organization's business processes and identify areas where technology can be used to improve process efficiency and effectiveness. It also allows BPR teams to leverage IT expertise to ensure that technology solutions are aligned with business needs.

Another key aspect of strategic alignment is to ensure that both IT and BPR initiatives are aligned with the overall organizational strategy. This requires a clear understanding of the organization's goals and objectives and how IT and BPR can contribute to achieving them. It also involves ongoing communication and collaboration between IT and BPR teams to ensure that both initiatives are moving in the same direction.

In summary, achieving strategic alignment between IT and BPR requires a collaborative approach, clear communication, and a shared understanding of goals and objectives. When done successfully, it can lead to significant improvements in organizational performance and competitiveness.

Process Engineering

Process engineering is a branch of engineering that focuses on designing, optimizing, and controlling industrial processes. The goal of process engineering is to develop efficient and cost-effective processes that can be scaled up to industrial production levels.

Process engineers typically work in manufacturing plants, refineries, chemical plants, and other industries that produce large quantities of goods. They use their knowledge of chemistry, physics, mathematics, and other scientific principles to develop and improve processes, including mixing, reacting, separating, and purifying materials.

The process engineering design process involves a number of steps, including conceptual design, feasibility analysis, process modeling, equipment selection, and process optimization. During the conceptual design stage, process engineers develop a

basic understanding of the process and its requirements. Feasibility analysis involves evaluating the technical and economic viability of the process.

Process modeling is used to simulate the process and predict its behavior under different conditions. Equipment selection involves selecting the appropriate equipment, such as reactors, mixers, and separators, for the process. Process optimization is used to refine and improve the process over time, with the goal of increasing efficiency, reducing costs, and improving product quality.

Process engineering is a critical aspect of many industries, including chemical manufacturing, food processing, pharmaceuticals, and energy production. With the increasing demand for sustainable and environmentally friendly processes, process engineers play a key role in developing new and innovative processes that are both efficient and environmentally responsible.

Enterprise Business Processes

Enterprise Business Processes refer to the set of interconnected activities that are performed by an organization to achieve its business goals. These processes involve various departments within an organization, and they are typically designed to optimize efficiency and effectiveness.

Some examples of enterprise business processes include:

Procurement Process: This process involves sourcing materials, goods, and services required for the organization's operations.

Production Process: This process involves converting raw materials into finished products or services that the organization provides.

Sales Process: This process involves identifying potential customers, marketing the organization's products or services, and closing sales deals.

Human Resource Process: This process involves managing the organization's workforce, including recruitment, training, performance evaluation, and compensation.

Financial Process: This process involves managing the organization's financial resources, including budgeting, accounting, and financial reporting.

Supply Chain Process: This process involves managing the flow of goods and services from suppliers to customers, including logistics, inventory management, and transportation.

Customer Service Process: This process involves providing after-sales support to customers, including resolving complaints, providing technical assistance, and answering customer inquiries.

Effective management of enterprise business processes can improve organizational efficiency, reduce costs, and enhance customer satisfaction. To achieve this, organizations may employ various techniques, including process mapping, automation, and continuous improvement methodologies such as Six Sigma and Lean.

BPR and organizational restructuring

BPR (Business Process Reengineering) is a methodology used to redesign business processes with the aim of improving efficiency, reducing costs, and increasing customer satisfaction. Organizational restructuring, on the other hand, involves changing the structure of an organization, often with the goal of improving its overall performance.

BPR and organizational restructuring can be closely related, as BPR may be a part of an overall restructuring effort. For example, an organization that is restructuring may identify areas where BPR can be used to streamline processes and increase efficiency. BPR can help to identify redundancies, eliminate waste, and improve the overall flow of work within an organization.

However, it is important to note that BPR and organizational restructuring are not the same thing. BPR is focused on improving specific business processes, while organizational restructuring involves making broader changes to an organization, such as changing reporting structures, merging departments, or redefining job roles. In some cases, organizational restructuring may not involve BPR at all.

It is important for organizations to carefully consider their goals and objectives when planning a restructuring effort that includes BPR. This can involve analyzing the current state of business processes and identifying areas for improvement, as well as considering the potential impact on employees and other stakeholders. Effective communication and change management strategies can help to ensure that the restructuring effort is successful and that employees are able to adapt to any changes that are implemented.

Organizational systems

Organizational systems refer to the structures, processes, and procedures that are put in place to facilitate the smooth operation and management of an organization. These systems are designed to support the achievement of organizational goals, improve efficiency, and enhance performance.

There are several different types of organizational systems, including:

- Structural systems: These systems refer to the formal organizational structure, including the hierarchy of positions and roles, reporting lines, and decision-making processes.

- Communication systems: These systems refer to the channels and methods used for communication within the organization, including email, meetings, memos, and other forms of communication.

- Information systems: These systems refer to the methods used to store, manage, and disseminate information within the organization, including databases, document management systems, and knowledge management systems.

- Performance management systems: These systems refer to the methods used to monitor and evaluate employee performance, including performance appraisals, goal-setting, and feedback mechanisms.

- Human resource systems: These systems refer to the processes and procedures used to manage employees, including recruitment, training, compensation, and benefits.

Overall, effective organizational systems are essential for the success of any organization, as they help to ensure that everyone is working towards the same goals, that resources are being used efficiently, and that the organization is able to adapt to changes in its environment.

Business Process Integration

Business process integration refers to the alignment and coordination of various business processes across different departments or organizations to achieve common goals. This can involve integrating different systems, processes, and technologies to improve overall efficiency and productivity.

Business process integration can involve several steps, including identifying the existing business processes, mapping them out, and identifying areas where integration could improve efficiency or eliminate duplication. Once these areas have been identified, new processes can be developed, and existing ones can be modified or replaced as necessary to achieve the desired outcome.

Common examples of business process integration include supply chain management, customer relationship management, and enterprise resource planning. By integrating these processes, businesses can streamline their operations, reduce costs, and improve customer satisfaction.

In recent years, the use of cloud-based technologies and APIs has made it easier for businesses to integrate their processes with those of other organizations, allowing for more seamless collaboration and communication. As a result, business process integration has become an increasingly important strategy for businesses looking to remain competitive in today's global marketplace.

UNIT-4

Choosing an ERP system Implementing

Big bang vs. phased – Identification of modules – developing guiding principles and detailed project plan – Legacy system analysis –picture Mapping into ERP – Project team training – To Be design – user acceptance – Detailed design – Customization – Construction and testing, production system development.

ERP SYSTEM IMPLEMENTING

BIGG BANG VS PHASE IDENTIFICATION OF MODULES

The big bang approach:

Pursuing the big bang approach can result in major rewards, but doing so is risky.

The pros

When a project team follows the big bang approach, the team configures the entire ERP system before go-live. The goal is to implement the entire ERP system and any supporting applications all at once, including migrating data and sunsetting the old systems right after go-live. The major benefit of this approach is that the project team completes the process in one phase, so employees can start using all the new functionality immediately.

With the big bang approach, the project team doesn't have to integrate old systems. Ideally, the team will only need to provide post go-live support as employees start using the new system and potentially discover issues.

The cons

However, the cons of a big bang ERP implementation are significant.

Pursuing the big bang approach results in a project with very large scope, which increases the risk for cost, timeline and resources.

With the big bang approach, employees must wait until the entire implementation is complete to use the new ERP system, so they can't give feedback about the system that could potentially help the project team.

If the project team discovers significant issues during a big bang implementation, the team may have to pivot and move to a phased approach. If this is the case, they would have to redo many planning exercises, including determining new timelines, budgets and resource requirements. These unexpected planning activities will also negatively affect the project timeline because team members will have less time for implementation work.

The phased approach:

The phased approach for an ERP implementation involves less overall risk but can still involve potential problems.

The pros

The phased approach brings several benefits to the ERP implementation process.

With the phased approach, the project team implements the ERP system in multiple phases, so company employees can access new functionality after each phase. Employees can give feedback about the new ERP system as the implementation progresses, which could potentially help the project team plan for future phases. For example, employees may ask the project team to implement certain functionality as soon as possible.

In addition, using the phased approach leads to smaller phase scope. The project team can more easily estimate the tasks and dependencies, budget, and required resources, and the smaller scope of the phases makes it easier to recover from unexpected issues.

Another advantage of the phased approach is that the project team depends on key resources for less time, which reduces the risk that a team member will leave the project before a phase is complete.

The cons

However, the phased approach has its disadvantages as well. While the phased approach helps reduce risk, the scope of one of the phases may still be very large. For example, the team may implement much of the new ERP system's foundational functionality during the first phase, which would include implementing many features to make the new ERP system viable. The scope of that phase would likely be sizable.

However, if the team implements too few features during the first phase, employees may feel dissatisfied with the new system, which could negatively affect adoption. Employees may also feel dissatisfied if the phased approach requires them to continue using old systems until the team has implemented needed functionality in the new ERP system.

In addition, the team may need to plan for and perform integration work to support old systems.

Guiding Principles in ERP :

Guiding principles are a set of heuristics that guide organizational decision making in a common direction. However, if defined during a one-off activity at the outset of a project they will be stowed away and forgotten. The real value of guiding principles appears when everyone involved in the project refers to them during day-to-day activities. Once defined and agreed upon with all key stakeholders, these principles should be:

- Part of organizational slide deck templates

- On big posters scattered throughout the office
- Re-stated and elevated by leaders during all-hands calls
- Integrated into the team's performance management process
- Integrated into the interviewing process to bring on aligned team members etc.

In short, these principles need to be the North Star that guides the team's actions as they wade through the murky waters of IT implementations. As humans typically forget half of all new learned concepts within days, your guiding principles should be repeated often to become second nature.

Enterprise Resource Planning (ERP) is a software system that is designed to manage and integrate all the core business processes of an organization. Developing guiding principles for ERP implementation is critical to the success of any organization. Here are some principles that can be used as a guideline for ERP implementation:

Clear Business Objectives: The implementation of ERP should be guided by clear business objectives. The organization should clearly define its goals, processes, and requirements before selecting an ERP system.

Strong Executive Support: Top management should provide strong support for the implementation of ERP. They should allocate the necessary resources and ensure that the project is given priority.

Standardization: Standardization is essential for the successful implementation of ERP. All business processes should be standardized across the organization to ensure consistency and accuracy.

Data Integrity: Data integrity is crucial for ERP success. Organizations should ensure that data is accurate, complete, and consistent across all systems.

Flexibility: ERP systems should be flexible enough to adapt to the changing needs of the organization. The system should be able to accommodate new business processes and changing requirements.

User Training: User training is essential for the successful implementation of ERP. Organizations should provide adequate training to all users to ensure that they are proficient in using the system.

Continuous Improvement: Continuous improvement is critical for the long-term success of ERP. Organizations should regularly review their processes and systems to identify areas for improvement and implement changes accordingly.

Change Management: Change management is critical for the successful implementation of ERP. Organizations should communicate the benefits of the new system to all stakeholders and manage the resistance to change.

Data Security: Data security is essential for ERP success. Organizations should ensure that data is secure and protected from unauthorized access or theft.

Return on Investment: Organizations should consider the return on investment (ROI) when implementing an ERP system. They should evaluate the costs and benefits of the system and ensure that it provides a positive ROI.

PROJECT PLANS IN ERP:

- Phase I: ERP Project Development
- Phase II: Data Conversion and Loading
- Phase III: Procedural Development
- Phase IV: ERP Implementation Preparation
- Phase V: Go-Live
- Phase VI: Post Go-Live

Phase I: ERP Project Development:

Once an ERP solution has been selected, the first phase of the implementation begins. The customer defines the team members who will be involved and responsible for a successful project. Likewise, ERP vendor defines their role. This can vary widely from one company to the next, depending on the level of support required.

Part of this phase in the ERP implementation project plan also includes network/hardware requirements and installation—unless a cloud-based SaaS model ERP is chosen such as InforCloud Suite Industrial.

Phase II: Data Conversion and Loading:

Every company implementing ERP software has an existing system. While some think they have no current system, they certainly do. It could be spreadsheets and manilla folders in file cabinets—that IS a system!

Phase II begins with the process of gathering critical data from the existing system, and then scrubbing and cleaning that data, so it's formatted in a manner that allows it to be loaded into the new ERP software. There are many data records that can be added, but typically the minimums are customers, vendors, and parts (both finished goods and raw materials). Ancillary data related to these three main categories are also included, such as contacts, bill to/remit to/ship to addresses, vendor pricing, customer pricing, bills of materials, etc.

Phase III: Procedural Development:

When discussing an ERP implementation timeline, this is the phase that will undoubtedly contain the most discussion and debate for how long the implementation should take.

In this phase, both the customer and ERP vendor teams will define the current policies and procedures in order to develop the roadmap for the new policies and procedures. Required documentation and reporting will also be part of this phase.

Building out the database to meet the new requirements, and initial simulation of the new processes through the individual departments takes place. Once the new procedures are proven and accepted, they will be documented and approved.

In phase III of the ERP implementation plan, end-user training begins. Until this point, the core implementation team has been developing and proving out the new processes. Now it's time to involve all other users in the system. End users may bring up weaknesses in the processes that may have been overlooked by the core implementation team. This is very normal.

Phase IV: ERP Implementation Preparation:

At this point, the new processes are in good shape, end-user training is complete, and new procedures are documented

Phase V: Go-Live:

Now it's time to load dynamic data. This is the data that changes and is transaction based, such as open WIP, inventory, customer orders, purchase orders, accounts receivable, accounts payable, trial balances, etc. Loading dynamic data is usually a two to five-day task prior to the go-live date, which should be an accounting period start day. Opening balances in the new ERP should match closing balances in the current system.

Phase VI: Post Go-Live:

ERP implementation success should be measured in years—not days, weeks, or months. Anyone can be successful immediately after going live on a new solution.

The true measure of achievement is how well the processes hold up over the years and withstand inevitable changes, such as employee turnover, business expansion and mergers, and other potentially unsettling events.

There's no perfect ERP implementation plan template.

Running daily, weekly, and monthly status reports to validate that the correct procedures are being followed is crucial to the continued success realized at the go-live time. Checking that the processes are still valid as time goes on and the business changes should be an ongoing effort.

LEGACY SYSTEM ANALYSIS:

A legacy ERP system is driven by outdated technology which was once innovative.

The purpose of legacy technology was to improve productivity and streamline day-to-day functions, but over time it has become ineffective and obsolete.

As technology rapidly advances, organizations are making the move to cloud ERP platforms.

Enterprise Resource Planning software plays a vital role in transforming business operations. But if legacy ERP system is not modernized, it may keep away the company from taking advantage of new opportunities.

Legacy ERP systems not only create loopholes and affect productivity, but they also increase costs.

Legacy systems are older information systems that are still in use by an organization, despite the fact that they may be outdated and difficult to maintain.

In the context of ERP, legacy systems can be a significant barrier to successful implementation, as they can impede the ability to fully integrate and leverage new ERP capabilities. Therefore, analyzing legacy systems is an important part of any ERP implementation process.

The analysis of legacy systems in an ERP implementation typically involves the following steps:

- ❖ Identification: The first step is to identify all the legacy systems that are currently in use within the organization. This includes not only software systems, but also

hardware and network infrastructure that may be outdated or incompatible with the new ERP system.

- ❖ **Assessment:** Once the legacy systems have been identified, they need to be assessed to determine their compatibility with the new ERP system. This involves evaluating the system's architecture, data structures, and interfaces to identify any potential issues or incompatibilities that may arise during the implementation process.

- ❖ **Integration:** After assessing the legacy systems, a plan can be developed for integrating them with the new ERP system. This may involve upgrading the legacy system, replacing it with a new system that is compatible with the ERP, or building custom interfaces to facilitate data exchange between the ERP and legacy systems.

- ❖ **Data migration:** As part of the ERP implementation, it will be necessary to migrate data from the legacy systems to the new ERP system. This can be a complex process that requires careful planning and execution to ensure that data is transferred accurately and without loss.

- ❖ **Testing:** Once the integration and data migration processes are complete, the legacy systems should be thoroughly tested to ensure that they are working properly and that data is flowing smoothly between the legacy and new systems.

- ❖ Overall, legacy system analysis is a critical step in any ERP implementation process, as it can help identify potential barriers to success and ensure that the new ERP system is fully integrated with existing systems and infrastructure. By carefully analyzing legacy systems, organizations can minimize disruption to their operations and ensure a smooth transition to the new ERP system.

MAPING IN ERP:

ERP mapping shows how your business processes are performed on a step-by-step basis. This documentation will provide a process map of how you'd like tasks to be performed - although, this is not necessarily how you perform them now in your current system.

A quick Google search will show you reams of ERP disasters where companies implementing expensive ERP systems have failed. All ERP systems have strengths and weaknesses, and all ERP systems have gaps. ERP failure has cost companies millions of dollars.

ERP systems are often designed to appeal to a large market so they're configurable, but that flexibility and configuration can take months - and that's before customization and modification. Without the process mapping process, we can miss out on functionality.

Mapping into ERP refers to the process of transferring existing business processes and data into an ERP system. This involves analyzing existing business processes and data structures and determining how they can be mapped into the new ERP system.

The process of mapping into ERP typically involves the following steps:

- **Analysis of Existing Business Processes:** The first step is to analyze the existing business processes and workflows to identify areas that can be streamlined or optimized. This involves identifying inefficiencies and areas where automation can be introduced.

- **Identifying Data Sources:** Once the existing business processes have been analyzed, the next step is to identify the data sources that will be used to populate the ERP system. This includes data from existing software systems, spreadsheets, and other sources.

- **Defining Data Structures:** After identifying the data sources, the next step is to define the data structures that will be used to store the data in the ERP system. This involves creating a data dictionary and defining the relationships between the various data elements.

- **Mapping Data to the ERP System:** The next step is to map the data from the existing data sources to the data structures defined for the ERP system. This involves identifying the data elements that correspond to each field in the ERP system.

- **Testing:** After the mapping process is complete, the next step is to test the ERP system to ensure that the data has been properly mapped and that the system is functioning as expected.

Overall, mapping into ERP is a complex process that requires careful planning and execution. By properly mapping existing business processes and data into the new ERP system, organizations can streamline their operations and take advantage of the full range of features and capabilities offered by the ERP system.

PROJECT TEAM TRAINING:

Start forming the ERP Implementation Project Team even before **ERP selection**. There must be representatives from key business areas, who can pinpoint areas requiring business improvement. This will enable to have a clear vision and strategy for ERP Implementation and facilitate selecting the right **ERP Software** that caters to the specific business requirements.

Enterprise Resource Planning (ERP) is business process management software that helps organizations manage various operations such as accounting, procurement, inventory management, human resources, customer relationship management, and more. Implementing an ERP system requires specialized knowledge and skills, which is why training is essential for project teams involved in ERP implementation.

Guidelines for effective ERP training for project teams:

- Identify training needs: Before implementing an ERP system, it is essential to identify the training needs of the project team. This includes understanding the existing knowledge and skills of team members and identifying gaps that need to be addressed. This information can help in designing a customized training program that meets the specific needs of the team.

- Develop a comprehensive training plan: Once the training needs have been identified, it is important to develop a comprehensive training plan that covers all aspects of ERP implementation. This plan should include training on the software

itself, as well as any new processes and procedures that will be introduced as part of the ERP system.

- Use a variety of training methods: Different people learn in different ways, so it is important to use a variety of training methods to cater to the diverse learning styles of the project team. This could include classroom training, online training, workshops, and on-the-job training.
- Provide hands-on experience: Hands-on experience is essential for effective ERP training. This could involve setting up a sandbox environment where team members can practice using the ERP software in a simulated real-world environment.
- Include ongoing support: ERP training should not end with the initial implementation. Ongoing support is essential to ensure that team members continue to use the system effectively and efficiently. This could include providing access to training resources such as user manuals and FAQs, as well as offering refresher training courses as needed.
- Evaluate training effectiveness: It is important to evaluate the effectiveness of the training program to ensure that it is achieving the desired outcomes. This could involve collecting feedback from team members, analyzing system usage data, and monitoring key performance indicators to identify any areas that need improvement.

By following these guidelines, project teams can receive effective ERP training that prepares them to successfully implement and use the new system.

Design user acceptance in ERP:

To ensure user acceptance in ERP (Enterprise Resource Planning) design, several key considerations that there are to be kept in mind are:

- Involve users in the design process: Users are the ones who will be using the ERP system on a daily basis, so it is important to involve them in the design process. This can be done by conducting user research, focus groups, and usability testing to gather feedback and incorporate it into the design.
- Keep the design simple and intuitive: ERP systems can be complex, so it is important to keep the design simple and intuitive. Users should be able to easily navigate the system and complete tasks without feeling overwhelmed.
- Provide training and support: Even with a simple and intuitive design, users may still require training and support to use the ERP system effectively. Providing training resources, such as user manuals and online tutorials, can help users feel more comfortable with the system.
- Customize the system to meet user needs: ERP systems should be customized to meet the specific needs of the organization and its users. This can be done by tailoring the system to specific departments or roles, or by allowing users to customize their own workflows and dashboards.
- Communicate the benefits of the system: Users may be resistant to change, so it is important to communicate the benefits of the ERP system and how it will make their work easier and more efficient. This can help to increase user acceptance and adoption of the system.

By keeping these considerations in mind, ERP system could be designed that is more likely to be accepted and adopted by its users.

DETAILED DESIGN IN ERP:

Application architecture is the science of designing an application to achieve certain goals such as performance and scalability. ERP application consists of data entry forms, business rules, validations, menus, security routines and other data access routines.

Partitioning the application by grouping all the entities logically based on certain guidelines is application design resulting in Application Architecture.

The benefits of such design are:

- The performance of the application is better, the applications will be scalable by being able to incorporate future requirements
- By partitioning an application into logical groups also called as layers results in a cohesive code. Such cohesive code is preferred because similar type of code are placed together and can be managed easily
- The layered based approach provides abstraction allowing modifications at one level without impacting or with minimal impact on other layers

Accordingly four layers are developed for the ERP software. They are Presentation Layer, Business Layer, Data Access Layer and Data Layer.

Presentation Layer:

In the Presentation Layer, the code responsible for displaying user interface of the entire application is located.

The common codes placed in this layer are windows forms, web forms, user controls and server controls. Examples are data entry forms for the finance module, data entry form for the manufacturing module and similarly for all other modules. Note that Windows Forms are used for client interaction in desktop applications and web forms are for browser-based interaction.

Business Layer:

In the Business Layer, the code that implements the business functionality of the application is located. The business logic of an ERP application is implemented by using components.

Business components encapsulate the business logic, also called business rules. These rules constrain the behavior of a business concept to match the needs of a particular company.

For example, the business rule that determines whether a given expense account can be allowed a certain amount is encapsulated in the related component of the application.

Data Access Layer:

The Data Access Layer provides access to databases such as SQL Server, Oracle etc. The NET technology used to provide data access functionality is ADO.NET. The ERP application we are developing accesses data stored in the Sql server database, which is a relational database.

The code in this data access layer exposes the data stored in the database to the business layer.

Data Layer:

Data Layer is the database or the source of the data. The popular databases are SQL Server, Access database and Oracle or can be XML. In the data layer, always use stored procedures.

It is strongly recommended to use stored procedures for everything. Stored procedures are recommended because they are fast and easier to modify. For example, if you need to extract data from two tables instead of one table, you can do that by modifying the relevant stored procedure. The .NET application code need not be changed.

Customization in ERP (Enterprise Resource Planning) refers to the process of modifying or extending the functionalities of ERP software to meet specific business needs. This can involve adding new features, altering existing features, or integrating with other systems to achieve a more comprehensive solution.

ERP systems are designed to be flexible and adaptable, but customization may still be necessary to tailor the software to the unique requirements of a particular business.

Some examples of customization in ERP may include:

Adding new fields to capture unique data:

A business may need to capture specific data that is not already provided by the ERP system. In this case, a customization can be made to add new fields to the software.

Modifying workflows:

The standard workflows provided by an ERP system may not fit the business processes of a company. In such a case, the workflows can be customized to meet the specific needs of the organization.

Integrating with other systems:

ERP system has to be integrated with other software solutions that a company uses, such as CRM or HR systems. Customization can be done to facilitate the integration and provide a seamless experience for users.

Adding new reports:

Businesses may need to generate reports that are not available in the standard ERP system. Customization can be done to create new reports that provide the necessary information.

Customization in ERP should be approached with caution, as it can be expensive and time-consuming. It is important to evaluate the business needs and weigh the benefits against the costs before embarking on a customization project.

Additionally, customization can make upgrading to newer versions of the ERP software more difficult, so it is important to consider the long-term implications of any customization before implementation.

CUSTOMIZATION:

1) Understand the Slight Difference between Configuration v/s Customisation:

The configuration options can help you to change certain set-ups, behaviors, and features of ERP while customization implements or modify new features and alter functions as per the business needs. The configuration can be done easily to get minimal changes as per your requirements, but customization may take time, effort, and cost. Configuration can easily be done on the set-up side, but customizations do require coding.

2) Choose the Appropriate Solution:

It is always advisable to do thorough research before choosing ERP software to get the solution as per your business goals. It is pretty essential to get a clear vision of the requirements and outcomes you want to achieve to get software that appropriately fits your business needs.

3) Change Management Should Assess Need & Urgency of Customizations:

The change management team of your organization should have the authority to do a cost-benefit analysis before going into any kind of change or customization process. It helps streamline the gap between customization and configuration by suggesting a focused solution that your business can adapt. It

helps in the long-term assessment of the need and urgency of the changes which you require.

4) Project Management & Scope of Development:

The ERP development should involve internal management and project management teams to evaluate the scope of development in a timely manner. This process can guide teams to develop software as per the specific requirements that eliminate the possibility of significant customizations. However, some of the configurations can be possible as per the requirements.

5) Understand Scope of Configuration:

The configuration works towards changing the behavior and set-up of an ERP system that may revolve around changing currency types, time zones, finance, shipping, language, and customer-based needs. This can be changed as per the global business needs to facilitate smooth processes and transactions at the business end.

6) Understand the Scope of Customization:

Customization is often done as part of the change in an organization's business process or practice. It leads to changes in basic features and functionalities to accommodate new processes and workflows in software. Such working scenarios may take time as per the development and design needs, resulting in delayed implementation of your planned project time. As you work upon the existing ERP framework it may also require a lot of time to brainstorm flexible approaches for it.

7) Understanding Flexibility of ERP Framework:

It is always an arduous task to implement significant changes as a part of customization, but if the ERP framework accommodates changes in a simple way, this is quite a possible thing that developers can achieve in less time. These aspects can be discussed and brainstormed with the development team to see whether this approach saves time and cost or not. The open-source frameworks may make it possible to get a solution cost-effectively.

8) Cost, Time & Commitment:

It is crucial to identify whether your business can afford the costs and time specified in customization or configuration. Usually, customization takes more time than configuration, so the decision needs to be made as per these aspects.

CONSTRUCTION AND TESTING IN ERP

CONSTRUCTION:

In the construction industry, a construction ERP is a means for keeping a track of sub-contractors, building materials, human resources, plant and assets, and other running costs that don't appear on the daily balance sheet.

Ultimately a construction ERP gives the accuracy, control and visibility as to whether the project is going to be in profit, or make a loss.

1. Workflow visibility and streamlining :

Before Construction ERP systems, coordinating between multiple work sites took a lot of time and effort. If you wanted updates on a specific part of your business, you had to call or visit the site physically. And if there was an issue with one of your production partners, it could set back your entire business while you made endless phone calls and site visits. Fortunately, Construction ERP software has transformed workflow visibility. Now, even when you're in your office

headquarters, you can open a shared database from your Construction ERP solution to get real-time details as they happen.

2. Cross-department collaboration:

All departments are contributing to the same cloud-based financial model which means that there is no duplication of data, and no problems with importing information from several different applications.

Collaboration between departments is improved with all managers involved in the process, including on-site managers using mobile technology, responsible for ensuring that their data is up to date, timely and accurate.

With increased responsibility comes increased commitment to the task in hand. Bring commercial and financial teams together to work seamlessly whether you're onsite or back in the office.

3. Risk management and data security:

Hosting the financial model in the cloud minimizes risks and improves data security using the cloud server's built-in redundancy and data protection features.

It also protects companies against the practical difficulties of upgrading several separate financial, data and analysis applications as they evolve, or of migrating data to upgraded hardware systems.

4. Customizable solutions:

When properly implemented, Construction ERP software can be configured to cater for the needs of different sectors of the construction industry, from contractors or sub-contractors, to house builders, maintenance and service organizations and to civil engineering.

Within an organization, dashboards can be created to reflect the particular roles of managers, providing them with instant access to the information they need or prompts them with scheduled tasks and other project information.

5. Business intelligence and data analytics:

Most construction ERP software is accessible to managers and clients, who use the data to analyze the progress of a project and to provide current and forecasted reports on the projects financial status. As well as giving your on-site managers visibility of the data, so they can make critical decisions on the spot. The financial model is fully auditable and available for deeper inspection and analysis to help contractors and clients keep tabs on daily cash flow, pick up early signs of problems and deal with them, and provide the basis of accurate and focused financial reports.

The process of confirming the functionality of your ERP software solution during implementation is referred to as “ERP testing.” ERP testing is a quality assurance (QA) process that ensures the ERP system is properly implemented and operating prior to its full launch.

ERP testing at various phases of the installation process helps to avoid unpleasant surprises like the program crashing during go-live. It also reduces the number of bugs discovered after implementation.

TESTING:

ERP stands for Enterprise Resources planning. It’s a software system that basically increases the efficiency and productivity of a company’s employees by simplifying workflow and processes. Enterprise Resources planning is software that controls the core functionality of a company (for example. HR, payroll, finance, etc)

ERP Testing Types:

Types of ERP Testing are as follows:

1) Functional Testing:

Functional testing ensures that each and every module of the system is working as expected once all the company-related customization is done.

2) Performance Testing:

Performance testing may be needed to check how the software performs under load. In most organizations, the load on the system would be negligible since people may not log in to the software regularly, but there are some cases like when the hike letters are released or the last day investment declarations, in such cases as performance testing should be needed.

3) Security Testing:

ERP system contains employee-related data, thus it's very important to secure this data and to ensure that only an authorized person can access the sensitive data that took on a need basis. This will help to minimize the chances of data theft.

4) Regression Testing:

Every time a QA team has to run a check-up after the code changes to ensure that the already working functionality is not affected and the system works as expected.

5) Acceptance Testing:

This testing is the final check-up of the system before the release, its part of stakeholders or any other trusted individuals who can check out the first version of an ERP system that is ready for use.

Enterprise Resource Planning (ERP) systems are complex software applications that integrate various business processes and data into a single system. The construction and testing of ERP systems involve several steps to ensure that the system is functional, reliable, and secure.

Planning and Design: The first step in the construction of an ERP system is planning and design. The project team defines the system's objectives, requirements, and scope. The team also identifies the system's users, data sources, and integration points.

Configuration: The second step is configuring the ERP system. This step involves setting up the system's various modules, such as finance, human resources, and inventory management, according to the organization's requirements. The team also customizes the system to suit the organization's specific needs.

Testing: The third step is testing the ERP system. The team tests the system's functionality, performance, and security to ensure that it meets the organization's requirements. This step involves both manual and automated testing, including functional testing, integration testing, and security testing.

Data Migration: The fourth step is data migration. This step involves moving data from the organization's legacy systems to the new ERP system. The team must ensure that the data is accurate, complete, and consistent with the organization's requirements.

Training: The fifth step is training. This step involves training the organization's users to use the new ERP system. The team must develop training materials and provide hands-on training to ensure that users can effectively use the system.

Deployment: The final step is the deployment of the ERP system. The team installs the system on the organization's servers, configures it, and migrates the data. The team then conducts final testing and prepares the system for production use.

Overall, construction and testing of an ERP system requires careful planning, execution, and testing to ensure that the system meets the organization's requirements and performs as expected.

Product System Development :

The faster a discrete manufacturer can develop and get new products into the market, the more able it is to generate new business and dominate its competitors.

But any organization that's attempted to concept, manufacture, and launches a new product knows it's anything but simple. In fact, the process is complex, costs are great, risks are high, and success isn't guaranteed.

Fortunately, there are tools available to help manage and expedite the process—and actually speed the process—ensuring that concepts are sound, dates are hit, compliance is met, and profitability is probable. One of the most robust is an enterprise resource management (ERP) solution.

The underlying advantage of an ERP system during the new product development and launch processes is that it offers visibility into the entire the organization, providing a comprehensive and integrated view of all aspects involved

in manufacturing and selling a product—including the status of all activities in your supply chain. Consequently, you're able to rely on data and insights as you pursue new product development, rather than on gut instinct and guesswork.

The primary ways in which an ERP system optimizes the new product development process are as follows:

- **Concept validation**

If your new product doesn't align with customers' and prospects' needs, you'll have an expensive failure on your hands. An ERP system can be implemented with a CRM module capable of soliciting feedback during the concept stage. This can be a highly valuable step in which customers and prospects offer opinions of the concept's strengths and weaknesses, their suggestions for improvements, their likelihood to buy, and more.

- **Development**

The design and manufacturing of your product must be planned in exhaustive detail, with decisions like vendor and material selection critical in both product performance and cost. ERP systems store historical data about suppliers, materials, costs, product and part performance, and more, all of which can be referenced as you identify the most appropriate components and contributors for the project. In addition, the ERP system provides data that allow you to minimize prototyping costs. This stage of the new product development process can be minimized in terms of both time and cost when you use insights from all prototype iterations to reduce trial and error, getting you to the best solution sooner.

- **Scheduling**

Integrated, real-time management of project goals, milestones, compliance requirements and all associated tasks makes the process far more efficient than monitoring, tracking and managing these things manually and separately. All

information related to the product development and launch is reported into the ERP and can be leveraged to make the best decisions for development and launch. Program managers are able to spend their time identifying solutions instead of putting hours of clerical work into pulling the information they need from emails, files and conversations.

- **Tracking expenses and predicting revenue**

The costs that go into manufacturing a product aren't easy to track—often steps and activities are missed when calculating its true cost. Using an ERP solution, the project team sees all time, labor and other costs involved in the process, from start to finish. With this information the company can accurately pinpoint the price needed to ensure the right level of profitability.

Enterprise Resource Planning (ERP) systems are designed to integrate various business processes, such as accounting, inventory management, human resources, and customer relationship management, into a single system.

Product system development in ERP refers to the development and management of a system that handles the entire product lifecycle, from design to distribution.

There are several modules in an ERP system that can be used to manage product development, including:

Product Data Management: This module allows organizations to manage and maintain product data, such as specifications, bills of materials, and engineering changes.

Production Planning: This module enables businesses to plan and schedule production based on demand, capacity, and materials availability. It helps organizations to optimize their production processes and minimize waste.

Quality Management: This module ensures that products meet quality standards and regulatory requirements. It helps organizations to identify and correct defects early in the development process, reducing costs and improving customer satisfaction.

Inventory Management: This module enables businesses to track and manage inventory levels across multiple locations. It helps organizations to optimize inventory levels and avoid stock outs.

Sales and Distribution: This module manages the sales and distribution process, from order processing to delivery. It helps organizations to streamline their sales processes and improve customer satisfaction.

In summary, product system development in ERP involves leveraging various modules within the system to manage the entire product lifecycle, from design to distribution. This helps organizations to optimize their processes, reduce costs, and improve customer satisfaction.

UNIT-5

Introduction to SCM & CRM – Meaning – Need – Origin –Elements of SCM – Future trends in SCM - Purchasing issues in SCM – The role of purchasing in an organization – The purchasing process – Sourcing decisions – Roles of supply base – Supplier selection – CRM – CRM definition – Components of CRM – CRM concepts – Goals of CRM – CRM functions – Customer Experience Management – Back office and front office functions -Post implementation, issues and development SCM & CRM

UNIT-5

INTRODUCTION TO SCM AND CRM

CUSTOMER RELATIONSHIP MANAGEMENT (CRM):

CRM software is designed to move the sales process along and to keep customers happy. All departments can use the same database to record their interactions with customers, eliminating duplicate efforts. It can also record interactions by email, telephone and even social media. Advanced CRM software can also predict what clients are likely to buy based on past behavior.

The marketing department can use CRM to track marketing campaigns and to measure the return on investment by seeing how many people become customers from each campaign. Sales departments can use CRM to track their interactions with customers and prospects by seeing when they were contacted, what they've purchased or what they're inclined to purchase in the future. Customer service departments can use CRM to record their interactions with clients, such as problems they've had with products or services.

SUPPLY CHAIN MANAGEMENT (SCM):

SCM software tracks and executes company processes, including design, procurement, manufacturing, production, distribution, sales and order fulfillment. The result is that it can reduce company costs and risks in things like having too much or too little inventory. Advanced SCM software can also predict problems within the supply chain before they happen.

SCM software can be used across most departments, from accounting and customer service to manufacturing and shipping. Suppose, for example, sales tend to ramp up near the end of the year. SCM software can prompt you to order new inventory so it arrives before you run low on stock or even order it for you

automatically. It will then tell you where the orders are in shipment, when they arrive in the warehouse, where they are in production, when they're shipped and when they're expected to arrive at the customer's location.

NEED FOR SCM

Managing contractual obligations to assure a continuous supply and avoid a service company's delivery disruptions.

Strengthening supplier relations for systematic synergy with suppliers and different lines of business

Enterprise spending management to assure procurement happens through the right suppliers and reduces costs.

Managing risk and compliance to abide by the organizational as well as industry specific regulations and compliances

Establishing a single comprehensive supplier view and deriving insightful procurement analytics.

Customer Relationship Management leads to satisfied customers and eventually higher business every time.

Customer Relationship Management goes a long way in retaining existing customers.

Customer relationship management ensures customers return back home with a smile.

Customer relationship management improves the relationship between the organization and customers. Such activities strengthen the bond between the sales representatives and customers.

ORGIN OF SCM:

While the term 'supply chain' is attributed to newspaper 'The Independent' in 1905, the concept of a network of suppliers, producers/manufacturers and consumers had been around for a long time prior to that. 'Supply chain management' wasn't coined until the 1980s, so the field is still young compared to related areas such as procurement, logistics, and manufacturing, which all play a role in supply chain management.

Supply chain management generally refers to the management and optimization of systems and processes involved in getting a product from its raw material state to an end point, the consumer. According to the Council of Supply Chain Management Professionals, its aim is to "maximize customer value" while allowing a company to run profitably.

ORGIN OF CRM:

CRM originated in early 1970s when the business units had a manifestation that it would be advisable to become 'customer emphatic' rather that 'product emphatic'. Birth of CRM was because of this heedful perceptiveness.

The famous writer and management consultant Peter Drucker wrote; 'The true business of every company is to make and keep customers'. Traditionally every transaction was on paper and dependent on goodwill which created hindrance in clutching customers. People used to work hard in entertaining customers by presenting new products with astonishing services; they were ready to work overtime for grasping more and more customers for increasing business. This too resulted in customer satisfaction and loyalty up to some extent, but at the

end of the day there was no such bonding or relation between the two to carry on with future business smoothly.

ELEMENTS OF SCM:

Planning:

In an ideal world, effective SCM would allow a brand to meet customer demand precisely, providing exactly as much product as consumers are interested in purchasing, at the times and places that they want to purchase it. Working towards this ambitious aim requires extensive planning. Each resource involved in manufacture must be made available in the right quantities, at the right times, in the right places. This planning must be built on a foundation of reliable data. Choosing which metrics to use to measure the efficiency and effectiveness of a supply chain can be one of the most important SCM decisions that a brand makes.

Sourcing:

With data gathering underway and plans set out, brands must begin the process of selecting suppliers which are well positioned to bring those plans to fruition. This involves answering a number of questions. Is this supplier able to process materials in the quantity required to meet demand? Does that supplier have working connections to deliver their finished components to the product assembly site? Once the best candidates have been chosen, brands also need to be able to monitor their work and manage their brand-supplier relationship over time.

Making:

Many different materials, components, and processes are involved in the manufacture of a product, and consequently, quality control is a central factor. Good

SCM assesses the quality of raw materials before accepting them, implements processes to minimize errors on the production line, re-examines the quality of the final product and ensures that this quality will not be damaged during packing and shipping. Ensuring a high level of quality at every stage of manufacture not only results in satisfied customers, but also reduces the work that must be done further down the supply chain.

Delivering:

The logistics of supplying products to consumers is highly complex and involves processing orders, scheduling delivery, dispatching loads, invoicing customers, receiving payments, and countless other minute tasks. Good SCM works to coordinate these different logistical elements as precisely as possible, to ensure rapid delivery and minimize overproduction. Most products manufactured today are distributed along a number of different routes to market. The same product may be sold in a company's own stores, on its website, through other physical retail partners or via third party online retailers. Often this distribution will require outsourcing to haulage and delivery partners, increasing the need for careful monitoring and precise processes.

Returning:

However effective a company's SCM is, some challenges are unavoidable. Errors in quality control may result in defective products reaching the market. Shipping problems may create delays for the consumer. In the worst cases, large quantities of product may be damaged or lost, resulting in unfulfilled orders. Handling these problems is also a core part of SCM. A supply chain must be flexible enough to handle returns of defective products, address customer concerns about delays, and issue cancellations and refunds in a timely fashion where appropriate.

Enabling:

At each stage of the manufacture and distribution process, there are a number of support systems at work behind the scenes that must also be managed: finance, HR, IT, facilities, portfolio management, product design, sales and quality assurance. Effective SCM involves building the connections required, within a company and externally, to ensure that these enablers are properly resourced and maintained.

SCM, or Supply Chain Management, is the process of managing the flow of goods and services from the point of origin to the point of consumption. The elements of SCM include:

Planning and Forecasting: This involves analyzing data and making decisions on what products to produce, how much to produce, and when to produce them.

Sourcing: This involves finding and selecting suppliers who can provide the necessary raw materials, components, or finished goods needed to produce the product.

Procurement: This involves purchasing the raw materials, components, or finished goods from the selected suppliers.

Manufacturing: This involves converting the raw materials or components into finished goods.

Logistics: This involves managing the movement of goods and services from the point of origin to the point of consumption.

Inventory Management: This involves managing the level of inventory at each stage of the supply chain to ensure that there is enough stock to meet customer demand without excess inventory.

Transportation: This involves managing the movement of goods from one point to another, including transportation mode selection, carrier selection, and delivery scheduling.

Customer Service: This involves providing the best possible service to customers by meeting their expectations, resolving any issues they may have, and maintaining good relationships with them.

Collaboration and Coordination: This involves working closely with suppliers, distributors, and other partners in the supply chain to ensure that all elements of the supply chain are working together effectively.

By effectively managing these elements, SCM can help to reduce costs, improve efficiency, and increase customer satisfaction

Future Trends in SCM:

These are the top supply chain management trends as we move through the next few years:

1. Post-pandemic Resilience

Economic disruptions, school closures and variable lockdowns threw countless industries into upheaval. Supply chains worldwide are picking up the pieces and charting new territory. A Statista report shows a very volatile supply chain pressure index since the pandemic's onset.

According to McKinsey, companies need to uncover and address hidden risks while rethinking their short-term and outdated strategies to stay resilient.

Supply chain disruption damage goes beyond the value chains themselves. Value chains include everything from gathering raw materials to customers receiving their products.

2. Block chain

It makes sense to follow the demand for an increase in supply chain visibility with the growing popularity of block chain. Block chain's database structure can set supply chains up for success with end-to-end transparency. Before diving into this further, what exactly is block chain?

Block chain leverages chunks or "blocks" of data, whereas normal databases store their information in tables. These storage blocks eventually hit their capacities, and as data flows in, new blocks are created and chained to their predecessor.

3. Digital Supply Chain Twins

As social distancing becomes a new norm, making decisions based on real-time supply chain data through manual methods is less appealing. Combating this requires more than things like prescriptive analytics; real-time data from all physical fronts of your supply chain is necessary to avoid costly disruptions.

Digital supply chain twins continue to be among key supply chain trends. Digital supply chain twins faithfully recreate an entire supply chain and its processes in an easily accessible, digital environment.

Real-time information gathered from IoT (Internet of Things) devices can give decision-makers a crystal clear picture of everything from customer orders to individual items moving through the chain.

4. Supply Chain as a Service (SCaaS)

With value chains becoming more complex, handling all of your supply chain processes in-house is nearly impossible. Switching from manual processes to a digital environment, leveraging large amounts of IoT-enabled devices, analyzing data and maintenance will become necessary things that require skilled manipulation and maintenance.

Many companies won't have the right talent to carry out these tasks and will outsource many of these critical processes.

The benefits of SCaaS include better customer service, increased productivity and lower costs. SCaaS provides similar offerings with specific supply chain benefits like boosted asset management. Flexibility is a standout advantage, with resilience and agility at the forefront of the pandemic landscape.

5. Circular Supply Chains

Sustainability is rapidly becoming a front-runner in the world of supply chains. In the past, linear supply chains generated waste by disposing of leftover items after creating a product.

Instead of producing an item and returning to the beginning of the chain with brand new materials, circular supply chains recycle unused fragments back into their value chains. Long story short, circular supply chains promote a zero-waste environment.

Customers care about the ethics of their products. Often requesting specific details about how, with what and where manufacturing happens. Consumers aren't the only variables here either; governments often set boundaries that limit waste and push for reclamation.

6. Cloud-based Products

Cloud systems offer similar levels of functionality and security as their on-premise counterparts while reducing sunk costs and customization woes that plague traditional software.

When we spoke to Jim Tompkins, Chairman and CEO of Tompkins International, he gave us a few reasons for this growth. The biggest reason he gave above all else was that "people are over the fear of someone else controlling them."

In the past, many opponents of cloud-based software were worried about an outside party accessing their software, especially with complete control over their uptime and security. But as cloud-based systems gain popularity, vendors work to be reliable and trustworthy business partners.

PURCHASING ISSUES IN SCM:

1. Pandemic initiatives

Procurement has gained significant credibility in the way it has managed sourcing, supply chains, stakeholders, and suppliers during the pandemic. It is now time to revisit all category strategies and update them to reflect the changes that have taken place.

2. Risk management

The pandemic has highlighted the inadequacies of previous risk management activities. The focus now needs to be on a broader scope of risks. The top five concerns are:

- Financial stability of critical and high-spend suppliers
- Issues that may cause reputational damage concerns
- Breaches of GDPR and other data protection/security regulations
- Supply chain certainty
- Bribery and corruption.

3. Sustainability

Sustainability concerns have evolved into an increasing global interest in issues of economic, social and corporate governance (ESG). The top five issues are:

- Ethical and sustainable sourcing
- Prevention of bribery and corruption
- Human capital practices including modern day slavery
- Reduction of energy and water use
- Reduction of CO2 emissions.

4. Diversity

Diversity has been a hot topic in the US for some time, but more recently it is finding its way onto the agenda in the Europe and APAC regions. Procurement is supporting the business by establishing a level playing field for diverse suppliers to compete with other suppliers. This encourages innovation into the business. The current challenge is identifying those suppliers who meet the diversity criteria, particularly when there is no mandatory policy for suppliers to identify their diverse status within company reports and accounts, or other publicly-available business documents.

5. Working capital

Many organizations are adapting their policies for payment terms so agreements are optimized with suppliers. Rather than lengthening payment terms, options for supply chain financing and implementing an invoice discounting process are being negotiated. It is important to protect the supply base to ensure continuous trading. Resolving and agreeing terms through careful relationship management remains the most effective approach when seeking to maintain working capital.

6. Innovation

By building relationships with suppliers, procurement has a unique external perspective to tease out and encourage innovation. Some organizations have begun to implement a reduced or 'lite' version of their terms and conditions, which is more suitable for encouraging start-up suppliers in the market.

To embed innovation in the procurement process, action can be taken in the following four areas:

- Organisational alignment throughout the procurement process

- Early market engagement, with action that is transparent, honest and fair, as well as clear instructions on how to manage information, communication and intellectual property
- Early supplier engagement at the sourcing stage, building on information gained from the early market engagement activity
- Innovation support activities: pilot projects, inducements and rewards, risk sharing, briefings/seminars/workshops, and unsolicited proposals.

ROLE OF PURCHASING IN AN ORGANISATION:

1. Lower costs

This is by far the primary function of the purchasing department. A well-run department should allow you to achieve immediate savings by choosing a mix of suppliers who can provide the best prices and terms. In this process, relationships with suppliers who cannot provide the right level of quality at the prices required are terminated.

The purchasing department can also provide savings by taking advantage of warranties and discounts often forgotten by non-specialists.

Purchasing can also help you save by providing better transparency in how your company spends. This will, in turn, allow you to negotiate better contracts and free up your cash flow.

2. Reduce risk and ensure the security of supply

Supply chain management involves sharing and managing risks with suppliers. This can be done by moving the risks to the suppliers who are best able to manage it. Or it can be done through diversification of supply.

The purchasing department has to identify what goods and services are crucial to the company and take the appropriate steps to secure their supply chains accordingly. Often, this comes down to an economic decision, where higher risks can result in lower prices, or vice-versa.

3. Manage relationships

Purchasing is not only about sharing risk, it is also about sharing benefits.

Passing on risk to a supplier or outsourcing a service often requires more management of the supply chain, not less. The challenge of the purchasing department is to get the supplier interested in working with your business, getting them to invest in the long-term relationship.

The department also has to manage relationships within your company. It has to work with internal stakeholders such as marketing, finance, logistics and distribution to ensure that they are all aligned.

4. Improve quality

Purchasing departments can help to improve quality by establishing target performance levels for quality and then tracking performance against those targets. Critical to quality characteristics is a typical metric used to measure things such as durability, the look and feel of the product or the timeliness of delivery.

Some companies work closely with their vendors to develop their processes and assist them in improving quality.

5. Pursue innovation

Because the purchasing department is always in contact with a variety of outside businesses, it is in an ideal position to source innovative goods and services that can provide a competitive advantage to your business—an edge in either price, quality or convenience.

6. Leverage technology

Your purchasing department should identify technology solutions to address your supply chain problems. The purchasing department should also play an important role in the selection and implementation of ERP systems, inventory control systems and other technology that aims to improve the efficiency of your supply chain management.

The purchasing function plays a critical role in an organization's supply chain management. Its primary responsibility is to acquire goods and services from external sources to support the organization's operations.

The role of purchasing includes the following:

Sourcing: Purchasing identifies potential suppliers, evaluates them, and selects the best ones to provide goods and services. This involves analyzing supplier capabilities, negotiating contracts, and managing relationships with suppliers.

Cost management: Purchasing is responsible for ensuring that the organization obtains goods and services at the lowest possible cost without sacrificing quality. This includes managing supplier contracts, negotiating prices, and monitoring supplier performance to ensure compliance with agreed-upon terms.

Risk management: Purchasing is responsible for managing the risks associated with the procurement process, including supply chain disruptions, supplier bankruptcy, and legal and regulatory compliance issues.

Supplier management: Purchasing manages relationships with suppliers, ensuring that they meet quality standards, delivery schedules, and contract terms. This includes

developing and maintaining long-term relationships with key suppliers to ensure a reliable supply of goods and services.

Inventory management: Purchasing is responsible for ensuring that the organization has the right level of inventory to meet demand while minimizing excess inventory costs. This involves forecasting demand, monitoring inventory levels, and coordinating with suppliers to ensure timely delivery of goods.

Overall, purchasing plays a critical role in ensuring that an organization's supply chain runs smoothly and that it can effectively meet its operational requirements.

Roles of Supply Base:

1. Increase Customer Service:

One of the most important supply chain roles and responsibilities is to manage customer service. The customers should always get what they are looking for.

Whether it is a product, a solution to their issues, or answers to their questions. The international supply chain management team as to assure that the customer service platform is accessible 24/7 so the customers will feel connected to the organization they would like to do business with.

2. Reduce Production Cost:

The first and most important thing managers have to do is to reduce the production cost of the items. It is done by:

- Introducing machines in the industry.

- Buy the raw materials directly from the factories or the wholesale markets.
- Reduce the number of rejected or failed items.
- Increasing the efficiency of the workforce.

3. Improve Quality of Products:

It is a fact that the production cost of the products has to be reduced but at the same time, the quality of the items has to be enhanced. It has to be assured that the raw material and manufacturing of the items in high-class because only then customers will be attracted. They have to be durable, reliable, and long-lasting, so they can give the best result in all supply chain management industries.

4. Improve Financial Position:

The company has to improve its financial status. It has to be assured that the customers will return to buy the products once again because they are satisfied with the previous items. The supply chain management has to work in such a way that

- The cash flow of the company will increase.
- The number of fixed assets will decrease.
- The profit leverage will increase.

It will make the customer believe that the company is progressing and showing positive results.

5. Development of Best Marketing Strategies:

The supply chain management team has to develop the best marketing strategies for the company to assure that its products will be present in the best possible way. Customers often decide whether they would buy a certain item or not by looking at the advertisements shared on different platforms.

Supplier selection in CRM

Supplier selection in CRM (Customer Relationship Management) involves choosing the most suitable vendors or suppliers to provide products or services for your business needs related to customer relationship management. Here are some steps to follow for effective supplier selection in CRM:

Identify your CRM needs: Determine what kind of products or services you require to manage customer relationships effectively. This may include software solutions, customer service training, or consulting services.

Create a list of potential suppliers: Look for vendors or suppliers who specialize in CRM and have experience in your industry. Research online, ask for referrals from colleagues, or attend industry conferences to identify potential suppliers.

Evaluate the suppliers: Evaluate potential suppliers based on their reputation, expertise, customer service, and pricing. Ask for references, check their reviews, and compare the pricing of different vendors.

Request proposals: Request proposals from a few selected vendors that meet your criteria. Make sure the proposals include all the features and services you need and a detailed breakdown of the costs.

Review and select a supplier: Review the proposals carefully and select the supplier that best meets your CRM needs and budget. Consider the quality of the products or services, the reputation of the supplier, and the level of support they offer.

Negotiate terms and contracts: Negotiate the terms and contracts with the selected supplier. Make sure the contract includes details of the products or services, pricing, delivery, and support.

Monitor the supplier's performance: Monitor the supplier's performance regularly to ensure they deliver the products or services as agreed. Set up metrics to measure their performance and provide feedback to improve their services if necessary.

By following these steps, you can select the most suitable supplier to meet your CRM needs and build strong relationships with your customers.

COMPONENTS OF CRM:

CRM stands for Customer Relationship Management, which refers to a set of practices, strategies, and technologies used by businesses to manage and analyze customer interactions and data throughout the customer lifecycle.

The main goal of CRM is to improve customer retention, drive sales growth, and enhance customer experience by developing more effective and personalized relationships with customers.

CRM systems typically include tools for managing customer data, automating sales and marketing processes, tracking customer interactions, and analyzing customer behavior and preferences. By using CRM, businesses can gain deeper insights into their customers, identify new opportunities for growth, and develop more effective marketing and sales strategies.

CRM stands for Customer Relationship Management and it is a set of strategies, technologies, and practices used by organizations to manage and analyze customer interactions and data throughout the customer lifecycle. The key components of CRM include:

Customer Data Management: This includes collecting, organizing, and storing customer data in a central database. The data can include customer contact information, purchase history, preferences, and other demographic data.

Sales Automation: This component helps automate sales processes such as lead generation, tracking sales opportunities, and managing sales pipelines.

Marketing Automation: This component helps automate marketing processes such as email campaigns, social media marketing, and other types of customer outreach.

Customer Service and Support: This component focuses on managing customer inquiries, support requests, and complaints through various channels such as phone, email, and chat.

Analytics and Reporting: This component involves analyzing customer data to gain insights and make informed business decisions. It includes data visualization, reporting, and forecasting.

Collaboration and Communication: This component helps teams within an organization collaborate and share customer information in real-time, improving efficiency and customer satisfaction.

Satisfaction

Customer satisfaction is the measure of a customer's perception of the quality of a product, service, or company.

Customer satisfaction is important because it acts as a purchasing guideline for the company and the customer. If a customer is not satisfied with the result of their purchase, they are more likely to purchase from another company.

Loyalty

Customer loyalty is the measure of repeat sales and referrals. It is based on how often a customer purchases from one particular company versus others that may be similar or better suited to their needs.

Loyal customers are more likely to be satisfied with their purchase and recommend the product to others. Thus, it is important because it provides a consistent source of revenue for the company.

Profitability

Profitability is a measurement of how much profit (or loss) a company makes during its operation. It can be calculated by total revenue minus total costs.

Profit is important because it allows companies to continue operations and stay profitable in order to grow and expand.

Without profit, companies would eventually not be able to pay employees, suppliers or taxes, and would eventually go out of business due to lack of funds.

Customer Retention

Customer retention is a measurement of how many customers remain loyal to one company over time.

Retained customers are less expensive for companies to retain than new customers who have to go through research and development, marketing campaigns, promotion costs, etc., all over again for new customers.

Overall, a CRM system provides organizations with a unified view of customer interactions and data, which can help improve customer satisfaction, increase customer retention, and drive revenue growth.

CONCEPTS OF CRM:

CRM stands for Customer Relationship Management. It refers to a set of practices, strategies, and technologies used to manage and analyze customer interactions and data throughout the customer lifecycle, with the goal of improving customer retention and driving sales growth. Here are some key concepts related to CRM:

Customer Data Management: This refers to the process of collecting, storing, and analyzing customer data, such as contact information, purchase history, and preferences.

Sales Force Automation: This refers to the use of technology to automate the sales process, from lead generation to sales closure.

Marketing Automation: This refers to the use of technology to automate marketing activities, such as email campaigns and social media advertising.

Customer Service and Support: This refers to the process of providing support to customers, such as answering questions and resolving issues.

Analytics and Reporting: This refers to the use of data and analytics to gain insights into customer behavior, preferences, and trends, and to track key performance metrics, such as customer satisfaction and sales growth.

Mobile CRM: This refers to the use of mobile devices, such as smartphones and tablets, to access and manage customer data and interactions.

Social CRM: This refers to the use of social media platforms to engage with customers and build relationships, and to gather insights into customer behavior and preferences.

Collaboration and Integration: This refers to the integration of CRM with other business systems and processes, such as ERP and marketing automation, to enable seamless data sharing and collaboration across departments.

1. Customer Behavior: This refers to the actions that your customers take when interacting or engaging with your brand. It also covers their engagement with your content.

You can use this concept to determine the actions that you need to take in order to engage them more effectively.

2. Relationship Marketing: This refers to the long-term relationship that you have with your clients.

3. Personalization: You can use personalization to make your clients feel special and appreciated by you. They can also get a better experience with your product or service by personalizing it for them.

4. Data: This refers to all kinds of data that you have on your customers. So, you can learn more about them and be able to deliver what they want from you and your product or service.

5. Processes: If there are processes that need improvement, you can use this concept, especially when it comes to leading, closing, and managing sales relationships properly.

6. Technology: This refers to all of the technologies used within your company regarding CRM. It includes software applications, hardware devices, and all other kinds of technologies that you might use.

GOALS OF CRM:

1. Improve the buyer's journey

The fundamental purpose of a CRM system is to improve the customer experience. Executing on this objective is the most sure-fire way to see positive results across your business. When you make improved customer satisfaction the main goal for your CRM, all other objectives work to support this goal.

One of the best ways to boost customer satisfaction is to offer a personalized experience. A CRM gives you unified customer profiles to understand all of your customers' needs. You can use these insights to tailor every interaction and how you approach your products and services.

With a CRM, all your customer data is easily accessible by the entire team so everyone can pick up on customers' histories and preferences faster. This helps you increase the speed at which you respond to customer inquiries to provide a more positive experience.

2. Improve operational efficiency

CRM software makes your sales process much more efficient as you can save a considerable amount of time by automating repetitive administrative tasks. Audience segmentation, email follow-ups, post-sale workflows, and invoicing are just some of the tasks and processes that a CRM lets you automate.

Modern CRMs can further consolidate customer information gathered across the organization, including sales, marketing, and customer service, into a single dashboard, everyone in your business can enjoy streamlined communication and smoother collaboration.

3. Increase customer retention

Your best customers are always your current customers. No matter your industry, it is always easier to encourage repeat purchases and/or expand contracts than it is to

win over new prospects. By adopting a CRM, you can boost retention to maximize the average lifetime value of your customers.

The software makes it easy to track each customer's interests and every interaction to gain a clear understanding of how to serve them best. As a result, campaigns can be aligned to each customer to encourage further loyalty.

For example, you can cross-sell and offer discounts based on previous purchases. Or, you could keep track of how long someone has been a customer and send them rewards when they reach key milestones to improve stickiness.

4. Lower your customer acquisition cost

Gaining new customers comes at a cost. With a CRM, you can get more return from every dollar spent on marketing to new customers to lower your average customer acquisition cost (CAC). There are several ways a CRM helps you achieve this.

To start, it can lower the cost needed to execute effective campaigns by automating repetitive tasks to free up time for your sales and marketing teams. The centralization of data afforded by a CRM also allows you to target potential customers with greater efficiency.

With a CRM, you will know exactly what stage of the purchasing process each prospect is in. You can use this to send marketing messages targeting their specific needs at that moment instead of sending generalized messages less likely to capture their attention.

5. Generate more sales

At the end of the day, your business needs sales to survive. A great way to increase sales is to ensure you direct your efforts toward selling to the right people. Not every lead will be a good fit for your business, and some will have a higher value than

others. With a CRM, your sales team can ensure their pipeline is full of highly qualified leads and prospects.

The data in a CRM system can be used to learn what your best customers have in common so that you can then prioritize the leads that share the same traits. This keeps the sales team focused on the best leads for the largest contract sizes. By doing so, you can close more deals with higher-value customers.

FUNCTIONS OF CRM:

1. Lead management

Generating leads is the first step in the sales cycle. CRM software helps capture lead details from multiple channels, including web forms, phone calls, social media platforms, and emails. Lead management functionality ensures that you don't lose any leads and that you score and qualify leads correctly. It also tracks the progress of leads through the sales cycle and helps decide on marketing initiatives for nurturing them.

2. Contact management

Contact management involves recording customers' details, such as name, phone number, address, and social media handle, in a searchable database. It also tracks and saves customer interactions in the contact database to build an integrated client profile. Contact management saves sales representatives the time and effort spent on remembering customer details or searching for them in multiple databases.

3. Email

Email is the most preferred channel for B2B communication. Email management offers the ability to send mass emails, track email conversations with clients, plan drip email campaigns, and send automated emails to clients for events such as birthdays or anniversaries. As per Software Advice call notes analysis, an option to integrate the CRM system with existing email applications, such as Outlook or Gmail, is highly desired by buyers.

4. Reporting and analytics

Reporting and analytics is required across all major business functions that CRM supports—sales, marketing, customer service, field service, ecommerce, and more. It helps track metrics such as profitability, rate of customer retention, and effectiveness of marketing campaigns. Reports and dashboards provide a high-level view (with drill-down options) of how a business is faring on different metrics. This feature also lets you share reports with different teams to make collaborative data-driven decisions.

5. Marketing

Marketing-related inquiries mainly revolved around the ability to segment and nurture leads, prepare and launch marketing campaigns, track campaign optimization, and support social media marketing. The marketing function covers aspects such as content marketing, marketing resource management, and automation. Marketing automation helps reduce costs and improve the efficiency of marketing initiatives.

6. Pipeline management

Sales pipelines help visualize the sales cycle and identify where in the sales funnel a particular deal is. They allow you to sort and filter deals and perform bulk actions, such as sending emails to select customers. If you sell different products, you can create multiple sales pipelines to compare sales volume across products. Pipeline

management helps tally sales with revenue and decide which deals to proceed with on priority and which ones to drop.

7. Workflow automation

Workflow automation allows you to create intelligent workflows using logic or rules, such as if-then-else, to automate repetitive tasks, including following up on leads, raising invoices, and sending emails. You receive notifications when tasks are completed as well as reminders if you need to input data manually. Workflow automation helps salespeople save time, avoid duplicate jobs, and ensure that the right actions are completed at each stage of the sales process.

8. Document management

Document management lets you create, access, edit, and share files with colleagues or clients directly from the CRM system. You can set document access and edit rights to improve security. Also, version history allows you to access the previous versions of any file.

Customer Experience Management (CEM) is the process of managing and improving the overall experience that customers have with a business or organization. It involves understanding the customer journey, identifying customer pain points and areas of satisfaction, and implementing strategies to improve the customer experience.

CEM encompasses a wide range of activities, including customer service, marketing, sales, product design, and customer feedback management. The goal of CEM is to create a positive and memorable experience for customers at every touchpoint with the business, leading to increased customer loyalty, retention, and advocacy.

Some key elements of CEM include:

Customer journey mapping: Understanding the various touchpoints a customer has with the business and identifying areas where improvements can be made.

Voice of the Customer (VoC): Gathering feedback from customers through surveys, reviews, social media, and other channels to understand their needs, expectations, and perceptions.

Personalization: Tailoring products, services, and communications to the individual needs and preferences of each customer.

Continuous improvement: Using customer feedback and data to constantly evaluate and improve the customer experience.

Overall, CEM is an essential aspect of modern business strategy, as it allows businesses to differentiate themselves from competitors by providing a superior customer experience that meets or exceeds customer expectations.

BACK OFFICE AND FRONT OFFICE FUNCTIONS:

BACK OFFICE:

The back office is the portion of a company made up of administration and support personnel who are not client-facing. Back-office functions include settlements, clearances, record maintenance, regulatory compliance, accounting, and IT services.¹² For example, a financial services firm is segmented into three parts: the front office (e.g., sales, marketing, and customer support), the middle office (risk management), and the back office (administrative and support services).

KEY TAKEAWAYS:

- The back office is the portion of a company made up of administration and support personnel, who are not client-facing.
- Back-office functions include settlements, clearances, record maintenance, regulatory compliance, accounting, and IT services.
- The term "back office" originated when early companies designed their offices so that the front portion contained the associates who interact with customers, and the back portion of the office contained associates who have no interaction with customers, such as accounting clerks.

FRONT OFFICE:

The front office represents the customer-facing division of a firm. For example, customer service, sales, and industry experts who provide advisory services are considered part of a firm's front office operations.

The functions of the front office generally generate the majority of revenue for a firm.

KEY TAKEAWAYS:

- On a conceptual level, the operations of many firms are divided into three parts: the front office, the middle office, and the back office.
- The front office is typically composed of customer-facing employees, such as the marketing, sales, and service departments.
- Because the front office has the most direct contact with clients, it is responsible for generating the bulk of revenues for the firm.
- The front office relies on the back office for support in the form of human resources, internet technology (IT), accounting, and secretarial functions.

Post Implementation issues of SCM & CRM

Supply Chain Management (SCM) and Customer Relationship Management (CRM) are two critical systems that businesses use to improve their operations and customer satisfaction. However, despite their many benefits, there can be post-implementation issues that businesses face when implementing these systems. Some of these issues include:

Post-implementation issues of SCM:

Integration Challenges: One of the primary challenges faced post-implementation of SCM is integration with other systems, such as Enterprise Resource Planning (ERP) systems. Integration can be complicated and time-consuming, and if not done correctly, it can lead to data inconsistencies and other operational problems.

Data Management Issues: SCM involves managing vast amounts of data, and post-implementation, it can be difficult to manage this data effectively. Organizations need to ensure that they have the necessary resources and tools to manage and maintain their SCM systems' data.

Supply Chain Disruptions: Despite having SCM systems in place, supply chain disruptions can still occur. Post-implementation, businesses need to be prepared to handle these disruptions quickly and efficiently to minimize their impact on operations and customers.

Post-implementation issues of CRM:

User Adoption: A significant post-implementation issue of CRM systems is user adoption. Users may be resistant to change and may not be familiar with the new system, leading to low adoption rates and decreased productivity.

Data Quality: CRM systems rely heavily on customer data to provide accurate insights and analysis. Poor data quality can lead to inaccurate reports and analysis, affecting decision-making and customer satisfaction.

Customization Challenges: Many businesses require CRM systems to be customized to meet their specific needs, which can be challenging post-implementation. Customizations may require additional resources and expertise, leading to increased costs and delays.

In summary, post-implementation issues of SCM and CRM can be challenging to overcome. Organizations need to be prepared to address these issues quickly and efficiently to ensure their systems' success and maximize their benefits.

DEVELOPMENT OF CRM:

A Customer Relationship Management (CRM) system is a digital platform that enables businesses to manage relationships with their prospects, leads, and customers. It is a combination of tools that helps companies acquire new customers and nurture the existing ones.

DEVELOPMENT OF THE SCM:

Supply chain management and its development is a strategic issue: **how supply chain logistics is built and what it requires in the long run**. On the other hand, the supply chain also has a tactical and operational nature, in which decisions on, among other things, procurement, production and distribution are made. Today, service business is increasingly being created in physical product supply chains.

The supply chain must ensure the best possible availability of products with the lowest possible logistics

Supply Chain Management (SCM) and Customer Relationship Management (CRM) are two important business functions that have undergone significant developments over the years.

SCM involves the coordination and management of activities involved in the production, distribution, and delivery of goods and services. The development of SCM has been driven by advances in technology, globalization, and increased customer demands for faster delivery times, lower costs, and better quality products. With the advent of the Internet, SCM has become more streamlined, efficient, and automated. Companies now use various software tools, such as Enterprise Resource Planning (ERP) systems, to manage their supply chain processes.

On the other hand, CRM involves managing customer interactions and relationships with the aim of improving customer satisfaction and retention. The development of CRM has been driven by the need to understand and anticipate customer needs, as well as the growing importance of customer loyalty and retention. Advances in technology have enabled companies to gather and analyze

customer data, which has led to the development of more sophisticated CRM systems. Today, companies use various tools, such as Customer Data Platforms (CDPs) and Marketing Automation software, to manage their customer relationships.

Overall, the development of SCM and CRM has been closely tied to the development of technology, and both functions have become increasingly important as companies seek to remain competitive in an ever-changing business environment.

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