Enterprise Resource Management

Lesson 14

KEY CONCEPTS

■ Enterprise Resource Planning ■ Mobile ERP ■ Cloud ERP ■ Predictive Analytics

Learning Objectives

To understand:

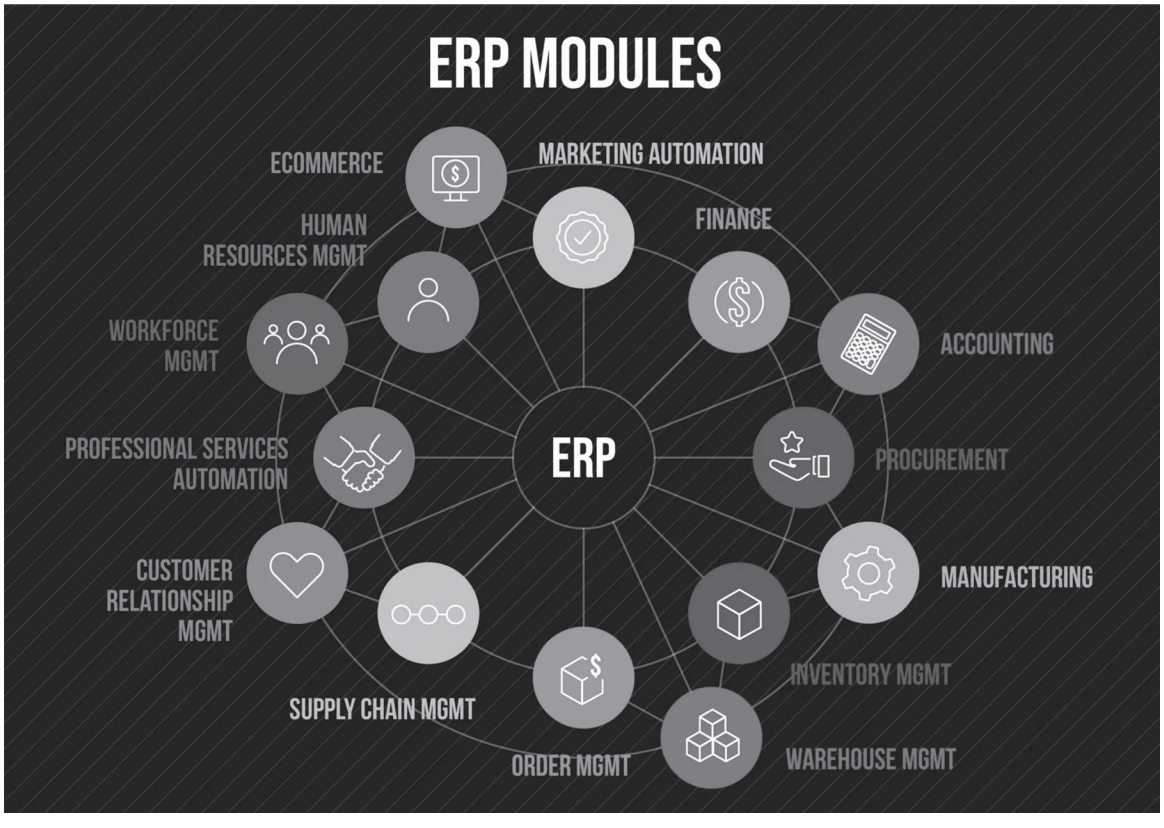
- The concept and meaning of Enterprise Resource Planning
- The advantages and disadvantages of Enterprise Resource Planning
- The functioning of an ERP system
- How to analyse the Before ERP and after ERP position of organisations
- The different types of ERP system modules
- The ERP related technologies
- The planning, evaluation and selection of ERP systems
- An overview of the recent trends in ERP

Lesson Outline

ENTERPRISE RESOURCE MANAGEMENT: INTRODUCTION

Enterprise Resource Planning ("**ERP**") is a type of software which is used by businesses and organisations to automate and manage the day-to-day business activities and operations such as manufacturing, accounting, procurement, supply chain operations, risk management and compliance management. ERP is a platform that is used by companies to manage and integrate the essential parts of their businesses. Many ERP software applications are critical to companies because they help them implement resource planning by integrating all the processes needed to run their companies within a single system.

Enterprise Resource Planning (ERP) is business process management software that allows an organization to use a system of integrated applications to manage the business and automate many back-office functions related to technology, services and human resources.



Source: https://www.stampli.com/blog/accounting/erp-modules-integrations/

ERP software typically integrates all facets of an operation — including product planning, development, manufacturing, sales and marketing — in a single database, application and user interface.

An ERP software system can also integrate planning, purchasing inventory, sales, marketing, finance, human resources, and more.

Key Takeaways

- ERP software can integrate all of the processes needed to run a company.
- ERP solutions have evolved over the years, and many are now typically web-based applications that users can access remotely.

- Some benefits of ERP include the free flow of communication between business areas, a single source of information, and accurate, real-time data reporting.
- There are hundreds of ERP applications a company can choose from, and most can be customized.
- An ERP system can be ineffective if a company doesn't implement it carefully.

UNDERSTANDING ENTERPRISE RESOURCE PLANNING (ERP)

It will be appropriate to state that an Enterprise Resource Planning (ERP) system works as the glue that binds together the different computer systems for a large organization. Without an ERP application, each department would have its system optimized for its specific tasks. With ERP software, each department still has its system, but all of the systems can be accessed through one application with one interface.

Significance of ERP

ERP applications also allow the different departments to communicate and share information more easily with the rest of the company. It collects information about the activity and state of different divisions, making this information available to other parts of the company, where it can be used productively.

ERP applications can help a corporation become more self-aware by linking information about production, finance, distribution, and human resources together. Because it connects different technologies used by each part of a business, an ERP application can eliminate costly duplicates and incompatible technology. The process often integrates accounts payable, stock control systems, order-monitoring systems, and customer databases into one system.

How ERP Works

ERP has evolved over the years from traditional software models that made use of physical client servers and manual entry systems to cloud-based software with remote, web-based access. The platform is generally maintained by the company that created it, with client companies renting services provided by the platform.

Businesses select the applications they want to use. Then, the hosting company loads the applications onto the server the client is renting, and both parties begin working to integrate the client's processes and data into the platform.

Once all departments are tied into the system, all data is collected on the server and becomes instantly available to those with permission to use it. Reports can be generated with metrics, graphs, or other visuals and aids a client might need to determine how the business and its departments are performing.

Before ERP and After ERP

In order to better appreciate the ERP process, let us look at the state of affairs which existed within organizations and companies before the ERP came into picture and how after introduction of ERP, companies are able to perform more efficiently and effectively.

Before ERP:

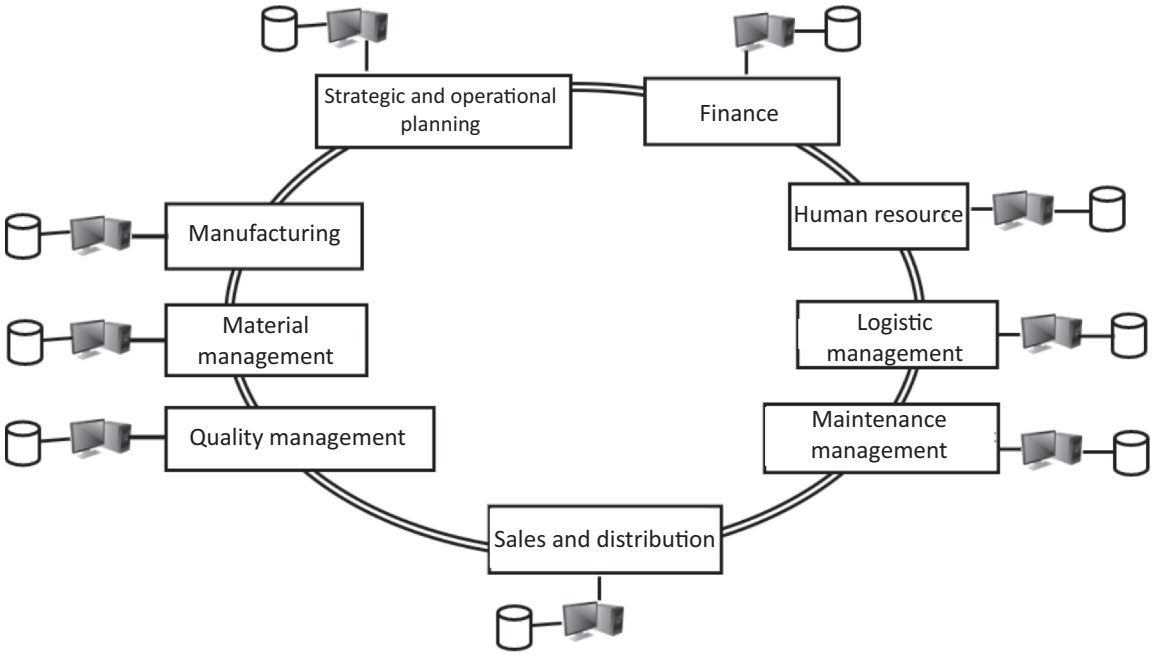


Figure – Before ERP

Before introduction of an ERP system, companies had different databases of different departments which they managed by their own. The employees of one department did not know anything about another department.

After ERP:

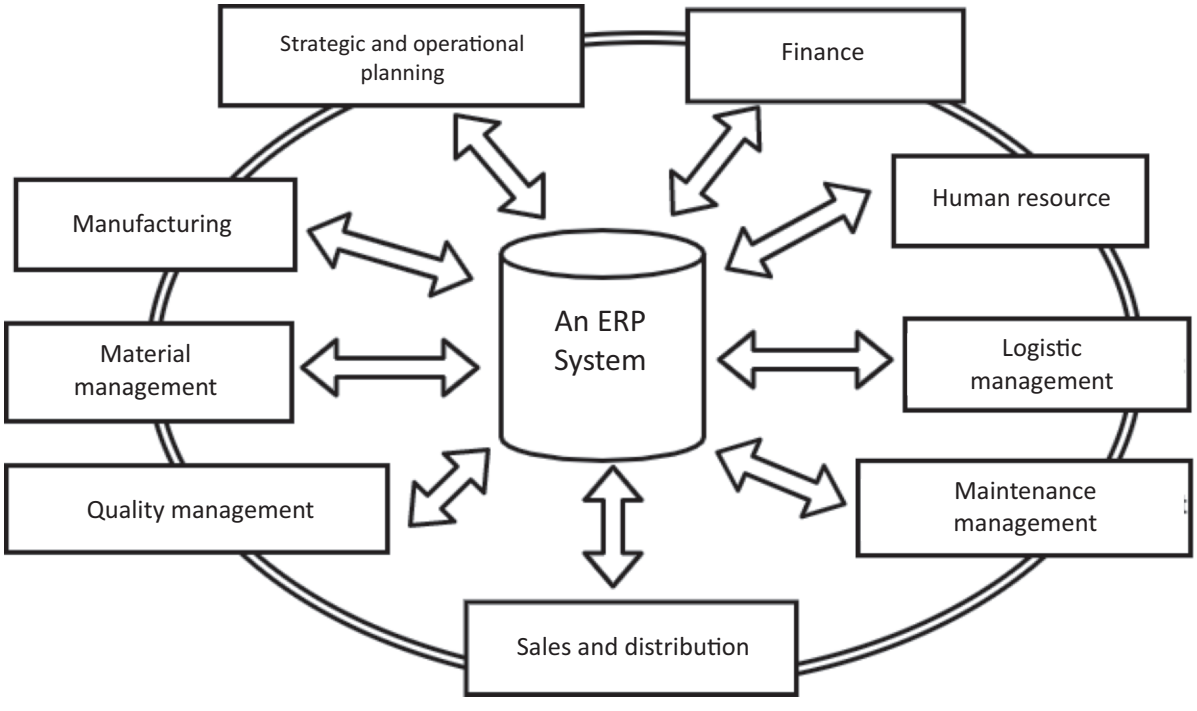


Figure – After ERP

After introduction of ERP system, databases of different departments are managed by one system called ERP system. It keeps tracks of all the database within system. In this scenario, employee of one department have information regarding the other departments.

BENEFITS OF ENTERPRISE RESOURCE PLANNING

There are many advantages to implementing an Enterprise Resource Planning (ERP) software solution. Among countless other advantages, implementing ERP software can improve productivity, increase efficiencies, decrease costs and streamline processes. Businesses employ enterprise resource planning (ERP) for various reasons, such as expanding, reducing costs, and improving operations. The benefits sought and realized between companies may differ; however, some are worth noting, which have been set out herein under:

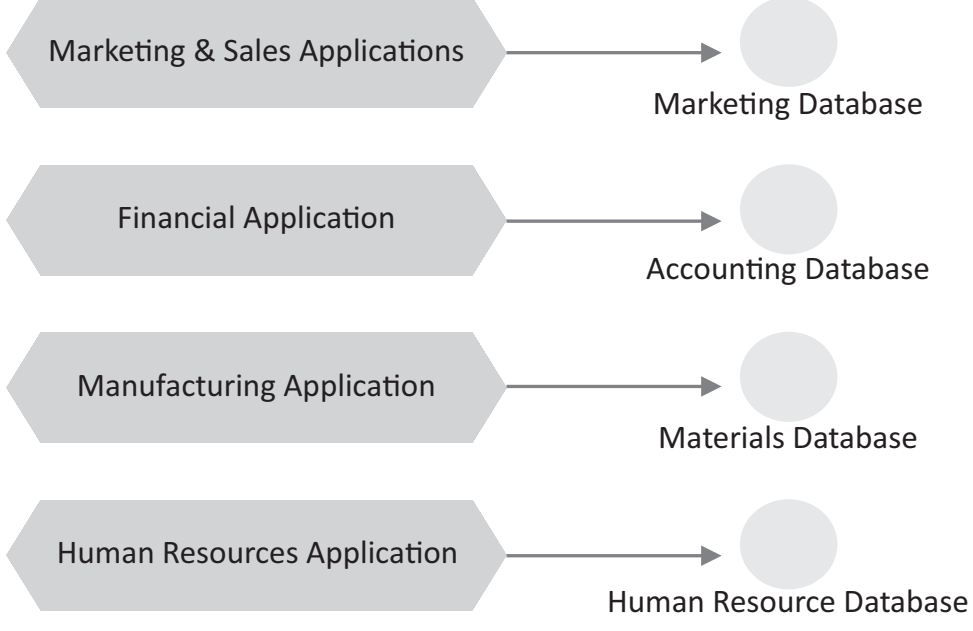
- **Integration and Cost Effectiveness**

  In a nutshell, Enterprise Resource Planning software tries to integrate all the different departments and functions of an organization into a single computer system to serve the needs of different departments.

  The task at hand, of implementing one software program that looks after the needs of the Finance Department together with the needs of the Human Resource Department and the Warehouse, seems impossible. These different departments usually have an individual software program that is optimized in the way each department works.

  However, if installed correctly this integrated approach can be very cost effective for an organization. With an integrated solution, different departments can easily share information and communicate with one another.

  The following diagram illustrates the differences between non-integrated systems versus an integrated system for enterprise resource planning.



Source: https://www.tutorialspoint.com/management_concepts/enterprise_resource_planning.htm#

- **Improves Accuracy and Productivity:** Integrating and automating business processes eliminates redundancies and improves accuracy and productivity. In addition, departments with interconnected processes can synchronize work to achieve faster and better outcomes.
- **Improves Reporting:** Some businesses benefit from enhanced real-time data reporting from a single source system. Accurate and complete reporting help companies adequately plan, budget, forecast, and communicate the state of operations to the organization and interested parties, such as shareholders.
- **Increases Efficiency:** ERPs allow businesses to quickly access needed information for clients, vendors, and business partners. This contributes to improved customer and employee satisfaction, quicker response rates, and increased accuracy rates. In addition, associated costs often decrease as the company operates more efficiently.
- **Increases Collaboration:** Departments are better able to collaborate and share knowledge; a newly synergized workforce can improve productivity and employee satisfaction as employees are better able to see how each functional group contributes to the mission and vision of the company. Also, menial and manual tasks are eliminated, allowing employees to allocate their time to more meaningful work.
- **Competition:** It's true that ERP software requires a major investment, but this cost of investment is nothing as compared to the bigger cost in not making the investment. While some manufacturers choose to stick to the tried-and-tested methods of the past, others seek technology solutions. Manufacturers cannot afford to put off an ERP implementation while their competition invests in ERP and starts reaping the many benefits that ERP offers.
- **Forecasting:** Enterprise resource planning software gives users, and especially managers, the tools they need to create more accurate forecasts. Since the information within ERP is as accurate as possible, businesses can make realistic estimates and more effective forecasts.
- **Collaboration:** Nobody wants to run a siloed business with each department functioning separate from the other. Collaboration between departments is a crucial and often necessary part of the business.

With the data entered into ERP systems being centralized and consistent, there's no reason why departments cannot work together. The software also touches on almost every aspect of a business, thus naturally encouraging collaborative, interdepartmental efforts.

- **Regulatory Compliance:** A benefit of ERP software which sometimes goes unnoticed is how it ties well into regulatory compliance in the manufacturing industry. Powerful ERP solutions will keep track of regulations within the industry and monitor changes in compliance.
- **Flexibility:** Modern ERP software systems are robust, flexible, and configurable. They are not a one size-fits-all proposition but can be tailored to the unique needs of a business. ERP systems also can adapt to the ever-changing needs of a growing business, ensuring you won't have to buy a new solution once your needs change or your business grows.
- **Customer Service:** It's easier to provide high-quality customer service using an enterprise solution, especially when you're using one as well-equipped as Work Wise ERP. Sales and customer service people can interact with customers better and improve relationships with them through faster, more accurate access to customers' information and history. ERP also facilitates access to marketing automation and contact center software, ensuring consistent and simultaneous customers interaction.
- **Security:** ERP systems can help in protection of data. In an ERP system, data is spread across multiple systems with varying levels of security. This is coupled with built-in resources and firewalls, thereby increasing the level of protection and also safeguarding against a single point of failure. ERP system will improve the accuracy, consistency, and security of data, which becomes increasingly important if the company deals with a lot of sensitive data and information.

LIMITATIONS OF ENTERPRISE RESOURCE PLANNING

ERP system has following significant limitations:

- Managers generate custom reports or queries only with help from programmers which causes a delay in transfer and receipt of information quickly, which is essential for making a competitive advantage.
- There is no proper decision-making scenario i.e., these systems provide only the current status, such as open orders. Whenever there is need to look for past status to find trends and patterns that aid better decision making, it becomes difficult.
- No doubt that data is integrated within the system, but there is no integration of data with other enterprise or division systems and it does not include external intelligence.
- High implementation costs: Implementing an ERP system can be expensive and time-consuming. It requires significant investment in hardware, software, and personnel, as well as training and consulting costs.
- Complex customization: Customizing an ERP system to meet the specific needs of an organization can be complex and require specialized knowledge. This can lead to delays and additional costs.
- Resistance to change: ERP systems often require significant changes to an organization's processes and workflows, which can be met with resistance from employees who are comfortable with existing practices.
- Data security risks: Centralizing sensitive business data in an ERP system creates potential security risks, especially if the system is not properly secured or if there are vulnerabilities in the software.
- Limited flexibility: ERP systems are designed to provide standardization and control, which can limit the flexibility of an organization to respond to changing business needs and market conditions.

- Dependence on vendor support: Organizations that use ERP systems are often heavily dependent on the vendor for support, maintenance, and upgrades. This can create a risk of vendor lock-in and limit an organization's ability to switch to other systems or providers.

ERP RELATED TECHNOLOGIES

Before giving you an ERP technologies list, it is very important to understand the typical structure of ERP systems. In a real life, enterprise resource planning solutions consist of dozens of connected applications, databases, modules, APIs etc. However, as any applications, they can be viewed as a structure built of the database, backend or server part and the frontend or the user interface:

- Database – It is where the data about the assets (like the number of products in the warehouse etc.) is stored.
- Backend – It refers to the engine that performs the operations in the system according to the users' request, for example, make a request for the database to make a list of the products and goods on the particular warehouse and render it to the user.
- Frontend – It refers to the graphical interface that allows the users to communicate with the backend and to form the requests and then display the received information.

Note: API or Application Programming Interface, is defined as an interface which enables two applications to interact, communicate and exchange data with each other without any user intervention.

TYPE OF ERP SYSTEM MODULES

Each ERP software module is designed to fit a specific business function by automating and supporting key processes and sharing business data that will help employees do their work. They can be designed to support best practices and standards for the function they are supporting: for example, a finance and accounting module can provide built-in financial controls and support for compliances under the relevant Income Tax laws. Here are the core modules offered by most ERP solutions:

- **Finance and Accounting:** The finance and accounting module is the core module of most ERPs. This module lets you understand the current financial state of the business, prepare and analyze financial statements and reports, and forecast financial performance to make better business decisions. The main functions of the finance and accounting module include accounts receivable, accounts payable, managing the general ledger, and creating and storing financial documents like P&L statements, tax statements, payment receipts, and balance sheets.

  The financial management module automates tasks associated with budgeting, billing, cash flow management, account reconciliation, and supplier payments to help the business remain compliant and close its books on time.

- **Procurement:** The procurement or purchasing module automates the processes associated with buying the materials, products, and services the business needs for its operations. This module can maintain lists of approved vendors, connect vendors with specific categories, goods, or services, track and apply discounts, and maintain supplier contracts. The module helps procurement teams automate requests for a quote, track and analyze quotes received, and prepare and send Purchase Orders (POs) to the selected supplier. Once the PO is issued, the procurement module tracks the PO as the supplier fulfills the purchase order and delivers the goods or services, then updates inventory levels when the order arrives.

- **Manufacturing & Production Management:** The manufacturing module enables production planning and ensures the business has what it needs (raw materials and machinery capacity) for production runs.

During the manufacturing process, the module updates the status of goods-in-progress and tracks actual production output against forecasts. It can also provide real-time status of the shop floor by capturing information on the production process and finished goods. The manufacturing module can assist in planning adequate production by calculating the average time to produce an item and then comparing supply with demand forecasts.

- **Inventory Management:** The inventory control module tracks item quantities and locations down to individual Stock Keeping Units to provide a complete picture of current and incoming inventory (when combined with the procurement module). This module helps manage inventory costs by ensuring sufficient stock without tying up cash in excess inventory. It can also analyze sales trends and compare them to available inventories to help the business make informed decisions to increase inventory turn, boost margins, and prevent stockouts and delays.
- **Warehouse Management:** The warehouse management module guides warehouse employees through processes, including put away when shipments arrive, picking, packing, and shipping. The module can help businesses plan labor based on forecasted order volume and support picking strategies to maximize employee productivity. The warehouse management module is often integrated with inventory management and order management modules to expedite shipping and increase customer satisfaction.
- **Order Management:** The order management module manages customer orders. After a customer place an order, this module transmits it to the warehouse, distribution center, or retail location and tracks the order status as the order is being prepared, fulfilled, and shipped. This boosts the rate of on-time deliveries and prevents orders from being lost, improving customer satisfaction and reducing expediting costs.
- **Supply Chain Management (SCM):** The supply chain module tracks the movement of supplies and goods across the global supply chain. It can provide visibility to every step of the supply chain, from sub-suppliers and suppliers through manufacturers to shippers, distributors, and end customers or retailers. These complex modules can be tightly integrated with other related modules such as procurement, inventory management, and manufacturing. They can also include functionality to manage logistics, trade regulations, and payments.
- **Customer Relationship Management (CRM):** The CRM module stores customer and lead information such as communications history (dates and times of contact), purchase history, and key personnel needed to manage sales leads. The CRM module improves customer service because employees can access customer information while working with a customer. Some CRM modules can also perform analytics and suggest which customers you should target for sales opportunities such as promotions, upselling, or cross-selling.

  Note: Upselling is a sales technique that encourages customers to spend more money by purchasing an upgraded or premium version of the product they originally intended to buy.

  Cross-selling is a sales technique that is used to increase income by persuading the buyer to buy complementary/ancillary products, in addition to their original order.

- **Human Resource Management (HRM):** The human resource management, or human capital management module, helps manage the company's workforce. It stores and maintains employee records and documents such as contracts, job descriptions, offer letters, and performance reviews. It also tracks employee hours and vacation time, paid time off or sick days, and employee benefits information.

  The HRM module may also include a Workforce Management Module that is designed to manage hourly employees. It monitors employee attendance and time and can track and measure productivity and absenteeism.

- **Other Functional Modules:** Some ERP systems may offer additional modules to manage specific business processes. These modules often include:
    - *Professional Services Automation:* Automates and optimizes planning and project management, tracking project status and managing human and capital resources.
    - *Ecommerce:* This module allows companies to launch online B2B or B2C e-commerce websites to enable a business to sell goods and services online. Integration of this module within the ERP system ensures that all payment, order and inventory information is transferred from the ecommerce module into the shared database, which further that ensures all transactions are added to the ledger, out-of-stock items are removed from the site and orders ship on time.
    - *Marketing Automation:* Automatically manages marketing campaigns across digital channels and provides reports and analytics to increase leads and conversions.
    - *Technical Modules of ERP Systems:* Technical modules provide added functionality to the ERP system to facilitate integration across modules and application suites. Common technical modules include
    - *Security Module:* Controls access to the ERP system, manages firewalls and encryption to protect data.
    - *Networking and Interface:* Ensures data flow between the different modules and parts of the ERP system.
    - *Management Information System:* Provides managers with the information and analytical tools they need to make informed decisions.
    - *Application Programming:* Allows businesses to create custom code to extend the functionality of the ERP system.
    - *APIs for External Use:* Allows the integration of third-party applications with the ERP software and facilitates data synchronization.

PLANNING EVALUATION AND SELECTION OF ERP SYSTEMS[1]

As per Wei and Wang (2004), a successful ERP project requires selecting an ERP solution, implementing the solution, managing changes and examining the practicality of the system. Choice of a wrong ERP solution would either lead to failure of implementation or weakening of the system, leading to an adverse impact on the enterprise, according to Hicks, (1995) and Wilson (1994).

Most enterprises often jump into looking at ERP functions and features, without examining their strategy and business processes. It is important for management to know the current strategy, processes and supporting systems of their enterprise to understand what changes can be brought through a new ERP system.

For most enterprises, the decision to implement ERP functionalities will require buying a software package from one of the more popular vendors on ERP market like SAP and Oracle. But the selection process is not a straightforward task, hence thorough understanding of what ERP packages are to offer, differences in each of them and what might be at stake in selecting one package over the other should be well examined.

Evaluating and selecting an ERP system can be a very complex process on the other hand, but it should be a 'fact-based' process that will bring the enterprise to the point where comfortable & well-informed decisions can be made.

1. Reproduced from Digital Notes on Enterprise Resource Planning, Department of Mechanical Engineering, Malla Reddy College of Engineering and Technology.

Therefore, research carried out by Management Agility Inc, (2005), revealed that it is imperative to adopt a thorough evaluation process before adopting any ERP solution in SMEs, i.e. Small and Medium Sized Enterprise.

1. Planning
2. Request For Proposal (RFP)
3. Solution Evaluation
4. Negotiation
5. Selection and Agreement
6. Define Requirements
7. Shop Round for Product
8. Clarify Requirements
9. Evaluation Vendor Inquiry
10. Interact with Vendors
11. Negotiate Agreement
12. Action Agreement.

- Define business case/need and spell-out required values. Be specific. Ensure the business sponsor is willing to push through business case for change.
- Look round the market for what product is available. Identify vendors that operate and their general approaches to technologies. Discuss with others in the same industry as you are etc.
- Clarify your requirements and be sure of whether what you are looking for is in line with your business case. Refine requirements if possible and be specific too.
- Find out what product is looking promising in line with the business need and from which vendor. Identify which vendor and their products suits the requirements and invite interesting ones for demo etc. Request for proposal (RFP).
- Invite each shortlisted vendor over for a chat and find out more about the product. List out expectations based heavily on business requirements.
- At this point evaluate the following approach. Can you afford to change your current process? Can you afford the change the new product will bring ?
- Initiate Negotiation for the selected product with the selected vendor. Agree on who does what, when are they to be done. Negotiate deliverables, timelines, cost & payments schedules and terms, support inclusive.
- Review all legal terms, finalise the contract and select product for onward implementation.
- Alignment of business requirement to what the software/hardware can provide. This is the core of the whole exercise else stop the evaluation.
- Evaluate the product capabilities in line with the business requirement. Evaluate the impact of the product on the business requirement.

Stage 1 - Plan Requirement

Business need is defined, along with areas in business that require technical approach. Develop a specific business case with business value for a solution. Ensure that the project sponsor is willing to articulate the business case for change. Identify vendors that operate in the line of products that you are looking for. Get familiar with the software and hardware infrastructure framework for problem solving. Get general view of investment needed, considering software, hardware, other related infrastructure and ongoing support. Based on the survey, evaluate the organization readiness for the investment and decide whether to continue or not. Now define priorities under "must-have" and "nice-to-have" accordingly.

Stage 2 - Request For Proposals (RFP)

Shortlist interesting vendor based on the outcome of market survey for products. Invite interesting vendors for interaction/demonstration of their products. Collect facts/functionalities in line with the business need from various products demonstrations for the developments of unbiased RFP for vendors. Set-up a neutral body to develop RFP using all facts gathered during products demonstration aligned to the business requirements. Distribute out RFP that addresses the vendor as a company and the products they offer. Generate basic expectations from an ideal proposal in line with the business need for onward selection of the ideal software vendor.

Stage 3 - Solution Evaluation

Identify and prioritize remaining gaps between demonstrated software capabilities and business requirements. Identify how the gaps will be bridged in terms of configuration, configuration, process change or combination of all these. If the gaps can be bridged, consider reengineering of those affected business processes and continue with further evaluation.

Stage 4 - Contract Negotiation

Negotiate with each vendor. Establish software, hardware and other infrastructure agreement requirements, which include version, components, maintenance and support. Also negotiate participation in user groups, license costs, maintenance fees and many others. Establish service provider agreement which also include deliverables, timelines, resources, costs and payment schedules. Establish other legal requirements.

Stage 5 - Selection and Agreement

Upon successful negotiation with the right vendor; Review all legal terms on privacy protection, operation guidance and data manipulation etc. Approve agreements with the selected vendors. Agree on implementation plan.

RECENT TRENDS IN ERP: 2023[2]

1. ***Cloud ERP:*** Historically, many organizations used on-premises ERP applications and were reluctant to entrust core business applications to the cloud, but that's changing rapidly. Businesses are adopting cloud ERP to take advantage of a simpler deployment, lower costs, elasticity (i.e., the ability to only use the necessary resources at any given time), new functionality, less need for internal IT resources, and the ability to easily add users and functions to accommodate business growth.

   The pandemic has further established the value of cloud ERP and accelerated the shift from on-premises software, partly because cloud-based applications allow employees to get their work done

2. Luthar David (2023) 8 ERP Trends for 2023, Oracle Netsuite. Available at https://www.netsuite.com/portal/resource/articles/erp/erp-trends.shtml

from anywhere with an internet connection—they don't need to be in an office. Some CFOs looking to cut costs amid the economic uncertainty are actually increasing investment in cloud ERP to drive savings and better support their remote workforce. A 2020 survey of finance executives indicated that 20% expect to spend more on cloud ERP technologies.

2. ***Two-Tier ERP:*** Historically, many companies tried to deploy a single ERP system for both the headquarters and all regional offices and subsidiaries. But in practice, that approach was often costly and extremely challenging to implement; subsidiaries often had specialized requirements which didn't need the full functionality of the corporate system and struggled with the one-size-fits-all approach.

   That's why two-tier ERP is one of the top ERP trends in 2023. Two-tier ERP is a strategy that enables organizations to leverage their investment in existing ERP systems at the corporate level (tier 1), while subsidiaries and divisions operate using a different ERP solution (tier 2), which is often cloud-based. Larger companies may continue to use their core ERP system for financials and other core processes, while smaller business units turn to solutions that address their specialized needs. The effectiveness of this approach depends in part on the ability to exchange data between the tiers—some tier 2 cloud solutions include built-in capabilities for integration with corporate ERP systems.

   There are a number of benefits to this approach. It's often less costly than retrofitting the corporate ERP system to work for the entire business. A tier 2 solution may be simpler to implement and provide subsidiaries with more flexibility to respond to changing business conditions. In addition, the two-tiered approach may be better suited for organizations in high-growth mode. As Gartner puts it, large organizations should "assess whether a two-tier ERP strategy would offer more business benefit than a single-tier one, especially by modernizing small, potentially fast-growing business units."

3. ***Digital Transformation:*** Digital transformation refers to integrating digital technology into all business functions to improve daily operations. This approach can often boost revenue and competitiveness while increasing employee productivity and improving customer service and communication.

   Since an ERP suite typically touches most areas of a company, it's a logical place to start to facilitate this transformation. Indeed, Accenture's 2020 ERP Trends Report found that three-quarters of U.K. businesses are using cloud ERP as a gateway to modernization. Several of the trends highlighted below—including the integration of ERP with IoT devices and the adoption of AI and advanced analytics—can be considered part of this digital transformation.

4. ***Other Technology Integrated With ERP:*** While modern ERP is the main element in a company's digital transformation, it is only part of a bigger investment in technology. Companies are integrating their business applications with other new technologies, including IoT, to improve core processes. For example, retailers use warehouse management systems that collect data from mobile scanners and smart conveyers to track the movement of goods within the warehouse. Some companies integrate ERP with ecommerce to improve online order workflows, automatically triggering order fulfillment, updating inventory levels and recording payment.

   The year ahead will also see a greater connection between social media and ERP. By seeing the social media activity of customers and prospects in one place, companies can develop a more complete understanding of their audience that allows them to enhance their digital marketing strategies and the customer experience. By integrating data from social media interactions with sales order history and communication with customers, companies can gain more insights about the entire sales process and experiment with new ways to target and sell.

5. ***Personalization:*** Historically, ERP platforms with complex scripting languages were difficult to customize to the specialized needs of each business. But organizations can now take advantage of cloud ERP

platforms designed for easier configuration, or what analysts call "low-code" platforms. There's also a growing range of ERP solutions tailored to suit the needs of specific industries.

As companies focus on delivering more personalized, relevant experiences to customers, they need ERP systems that can accommodate those needs with features like highly customizable dashboards. One emerging trend is the growing popularity of AI-based assistive and conversational user interfaces such as chatbots, which can interpret user voice or text input and respond to questions using customer and order information stored within the ERP.

6. ***AI-Powered Insights and Improvements:*** Artificial intelligence and machine learning capabilities embedded into ERP systems work behind the scenes to help meet increased demand for personalization and improve a broad range of business processes. While companies could add AI functionality to some ERP systems in the past, more vendors now offer ERP software having built-in AI capabilities.

   AI can deliver significant benefits for businesses, including:

   - More insights. As organizations gather more operational and customer data than ever before, they look to AI to deliver valuable business insights based on that information. AI technologies scan vast amounts of unstructured information, quickly identify patterns and predict various trends that wouldn't be possible to spot with manual number crunching alone.
   - Improved processes. AI helps to automate and improve a whole range of processes. For example, consider a manufacturer that adopts a just-in-time inventory strategy, which aims to deliver components at the last possible moment to minimize inventory carrying costs. AI, in the form of machine learning, can optimize the supply delivery and labor schedules to increase productivity and lower costs. IFS's 2019 study found that 40% of manufacturers planned to implement AI for inventory planning and logistics, and 36% intended to use it for production scheduling and customer relationship management.

7. ***Predictive Analytics:*** The hunger for AI-infused ERP highlights organizations' increasing desire to mine their operational and customer data for new and relevant insights that will increase the top and bottom lines.

   While it's always been possible to analyze ERP data to reveal what happened in a business's past, the focus lately has been on using predictive analytics to uncover and address what is likely to happen in the future. For example, software with machine learning capabilities can comb through a maintenance company's data about machine repairs to predict when breakdowns are likely to occur. The organization can optimize maintenance schedules so it services or replaces parts right before they cause problems.

8. ***Mobile ERP:*** ERP providers have offered mobile support for some time, and mobile apps are increasingly becoming the norm. ERP solutions are evolving to provide on-the-go access to critical business data, allowing employees to conduct both back-end and front-end tasks no matter where they are, from the warehouse floor to a retail checkout terminal to an airport. Mobile ERP can also encourage collaboration for dispersed workforces in different time zones.

   Mobile ERP apps designed with a user-friendly interface can help users get work done when they're not in front of a computer. Employees can complete tasks like expense reporting, call logging and time tracking, and they can view the status of critical workflows or approvals from their phones. Mobile ERP offers real-time data and insights and provides overall benefits including always-on remote access, improved productivity, faster and more accurate data capture and increased agility.

LESSON ROUND-UP

- Enterprise Resource Planning ("ERP") is a platform companies use to manage and integrate the essential parts of their businesses.
- Enterprise resource planning (ERP) is business process management software that allows an organization to use a system of integrated applications to manage the business and automate many back-office functions related to technology, services and human resources.
- ERP software can integrate all of the processes needed to run a company.
- ERP solutions have evolved over the years, and many are now typically web-based applications that users can access remotely.
- Some benefits of ERP include the free flow of communication between business areas, a single source of information, and accurate, real-time data reporting.
- There are hundreds of ERP applications a company can choose from, and most can be customized.
- An ERP system can be ineffective if a company does not implement it carefully.
- ERP applications also allow the different departments to communicate and share information more easily with the rest of the company.
- ERP applications can help a corporation become more self-aware by linking information about production, finance, distribution, and human resources together.
- ERP has evolved over the years from traditional software models that made use of physical client servers and manual entry systems to cloud-based software with remote, web-based access.
- The platform is generally maintained by the company that created it, with client companies renting services provided by the platform.
- There are many advantages to implementing an Enterprise Resource Planning (ERP) software solution.
- Among countless other advantages, implementing ERP software can improve productivity, increase efficiencies, decrease costs and streamline processes. Businesses employ enterprise resource planning (ERP) for various reasons, such as expanding, reducing costs, and improving operations.
- In a real life, enterprise resource planning solutions consist of dozens of connected applications, databases, modules, APIs etc.
- Each ERP software module is designed to fit a specific business function by automating and supporting key processes and sharing business data that will help employees do their work.
- ERP software module can be designed to support best practices and standards for the function they are supporting. For example, a finance and accounting module can provide built-in financial controls and support for income tax laws compliance.
- A successful ERP project requires selecting an ERP solution, implement the solution, manage changes and examine the practicality of the system.
- Most enterprises often jump into looking at ERP functions and features rather than examining the strategy and business processes.
- Evaluating and selecting an ERP system can be a very complex process on the other hand, but it should be a 'fact-based' process that will bring the enterprise to the point where comfortable & well-informed decisions can be made.

TEST YOURSELF

(These are meant for recapitulation only. Answer to these questions are not to be submitted for evaluation.)

1. Write detailed note on ERP.
2. What are the advantages and disadvantages of ERP system? Discuss briefly.
3. What are future trends in ERP systems? Discuss any 4 in detail.
4. Write Case Study on Before ERP and After ERP Scenario of an organization.
5. Write a short note on ERP System Modules.

LIST OF FURTHER READINGS

- Alexis Leon, "ERP Demystified", Tata McGraw Hill, New Delhi, 2000
- Digital Notes on Enterprise Resource Planning, Department of Mechanical Engineering, Malla Reddy College of Engineering and Technology. Available at https://mrcet.com/downloads/digital_notes/ME/III%20year/ERP%20Complete%20Digital%20notes.pdf
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LIST OF OTHER REFERENCES

- Alexis Leon, Enterprise Resource Planning, second edition, Tata McGraw-Hill, 2008
- ERP Modules and Integrations: Our Complete Field Guide, Stampli. Available at https://www.stampli.com/blog/accounting/erp-modules-integrations/
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- Joseph A Brady, Ellen F Monk, Bret Wagner, "Concepts in Enterprise Resource Planning", Thompson Course Technology, USA, 2001
- Kawal, Introduction to ERP, Geeksforgeeks. Available at https://www.geeksforgeeks.org/introduction-to-erp/
- Vinod Kumar Grag and N.K. Venkitakrishnan, ERP- Concepts and Practice, Prentice Hall of India, 2nd edition, 2006.