ERP AND INTEGRATED BUSINESS PROCESSES

Mrinmoy Biswas
Swati Sharma

ALEXIS PRESS
JERSEY CITY, USA

ERP AND INTEGRATED BUSINESS PROCESSES

ERP AND INTEGRATED BUSINESS PROCESSES

Mrinmoy Biswas

Swati Sharma

ALEXIS PRESS

Published by: Alexis Press, LLC, Jersey City, USA
www.alexispress.us

First Published 2022

A catalogue record for this publication is available from the British Library

Library of Congress Cataloguing in Publication Data

Includes bibliographical references and index.

ERP and Integrated Business Processes by *Mrinmoy Biswas, Swati Sharma*

ISBN 978-1-64532-599-4

CONTENTS

CHAPTER 1

AN OVERVIEW OF ENTERPRISE RESOURCE PLANNING (ERP)

Mr. Mrinmoy Biswas, Assistant Professor
Masters In Business Administration, Presidency University, Bangalore, India
Email Id: biswas@presidencyuniversity.in

ABSTRACT:

Systems for enterprise resource planning (ERP) combine and control a variety of essential business operations for an organisation. This summary gives a general overview of ERP, stressing its goals, advantages, and important elements. ERP solutions provide a centralised platform for data management and decision-making while streamlining and optimising processes across departments and functions. ERP enables effective information flow and cooperation across the organisation by integrating various areas such as finance, human resources, manufacturing, supply chain management, and customer relationship management. The advantages of ERP are many. By automating operations, decreasing human labour, and boosting output, it improves operational efficiency. It offers real-time insight into corporate data, facilitating strategic planning and informed decision-making. ERP gives improved control over finances, inventories, manufacturing, and customer contacts thanks to integrated data and reporting capabilities. Additionally, via reduced operations, ERP supports regulatory compliance, promotes standardisation, and improves customer service.

KEYWORDS:

ERP Systems, Planning MRP, Resource Planning, Supply Chain.

INTRODUCTION

A sophisticated software system known as enterprise resource planning (ERP) connects multiple business operations and activities inside an organisation. It acts as a central data repository, provides effective resource management, simplifies processes, and aids in decision-making. ERP systems are designed to increase output, foster better teamwork, and provide a comprehensive picture of an organization's operations. The architecture of ERP systems is modular, with several modules representing various corporate operations including finance, human resources, supply chain management, manufacturing, sales, and customer relationship management. Since these modules are linked and exchange data in real time, information may move across various departments and functions with ease.

Key ERP Features and Advantages:

Integration: By integrating different business processes and functions into a single system, ERP is able to do away with data silos and provide accurate and consistent information across the whole organisation. Better operational efficiency and departmental coordination result from this integration. ERP systems maintain all pertinent data in a centralised database, serving as the organization's single source of truth. Due to the reduction of data duplication and elimination of the need for various data stores, data consistency and integrity are guaranteed [1].

Process Automation: ERP automates repetitive and regular activities, minimising mistakes and requiring less human labour. This automation boosts output, expedites procedures, and frees up workers to concentrate on more worthwhile tasks.

Real-Time Reporting and Analytics: ERP enables businesses to get insightful information about their operations via real-time reporting and analytics capabilities. Decision-makers can quickly and accurately spot patterns, track important performance indicators, and make educated choices if they have access to accurate and current data.

Enhanced Customer care: CRM modules, which allow businesses to monitor customer contacts, manage sales funnels, and provide superior customer care, are often included in ERP systems. Organisations may personalise interactions and forge deeper connections with customers by having a full picture of client information.

Scalability and Flexibility: ERP systems are intended to be flexible enough to meet the demands of expanding businesses. As the business grows, they may scale up by adding additional capabilities or modules to match the demands of the changing business. Additionally, since ERP systems can be customised, businesses may fit the system to their own business processes and workflows.

Regulatory Compliance: By offering capabilities for data protection, privacy, and compliance, ERP systems assist businesses in adhering to legal obligations and industry norms. This guarantees that the business adheres to all legal and regulatory requirements.

ERP systems are now a crucial tool for contemporary businesses looking to boost productivity, teamwork, and decision-making. ERP systems help businesses to optimise their resources, boost efficiency, and spur development by integrating corporate processes and offering a uniform perspective of operations [2].

DISCUSSION

Enterprise Resource Planning (ERP) systems now provide a never-before-seen chance for businesses to obtain a decisive advantage over their rivals. Many firms in India are either in the process of purchasing ERP systems or have already installed them in order to compete and expand.

1. ERP is a high-end, complex software solution that lessens the managers' burden and strain while also giving them precise information at the right moment to make wise company choices.
2. The most sophisticated commercial use of information technology is enterprise resource planning.

We no longer operate in the same manner in terms of how we live and do business. Since the last ten years, IT has significantly altered our way of life. Today's users are more educated and IT proficient than they were in the past, when computers were mostly utilised as typewriters. The user is now aware that a PC is capable of much more than merely writing letters in word processing programmes or creating balance sheets in Excel. They have higher expectations for their computer. Every single one of us must have come across the term ERP at some point throughout this stage of the business. It may be mentioned in the title of any IT publication, as a topic of conversation at any IT seminar, or even in an advertising for a significant IT firm. Therefore, we have all experienced this term in some way. In reality, ERP software is made up of a number of software

modules that combine tasks from many functional divisions, such as order tracking, inventory management, and order-to-production planning. Application modules for basic company functions like finance, accounting, and human resources are often included in ERP software systems. Manufacturing Requirements Planning (MRP) II, which was primarily connected to the manufacturing industry and was created to regulate the manufacturing process and plan the necessary production with effective output, evolved into Enterprise Resource Planning (ERP) in the 1980s [3].

MRP is a development of the 1960s-era Inventory Management & Control system, which was primarily created to manage stocks in a certain sector. ERP now integrates enterprise-wide backed operations like production planning and delivery scheduling in addition to coordinating manufacturing processes. Technology-wise, ERP has advanced from a rigid tiered client-server design to a more adaptable legacy implementation.

What is ERP?

It functions as a cross-functional enterprise backbone, integrating and automating a large number of internal business processes and information systems that span all functional domains.Originally, ERP referred to systems created to schedule the usage of resources throughout the whole organisation. Although the initials ERP were first used in a manufacturing setting, the word "ERP systems" is now used in a much wider context. ERP systems often make an effort to cover all fundamental organisational tasks, regardless of the nature of the organization's mission or business. ERP systems are used by businesses, governments, non-profit organisations, and other large organisations. A software package must perform the duties of at least two systems in order to qualify as an ERP system.

Example: Technically speaking, a software package that offers both accounting and payroll services may be referred to as an ERP software package.

The phrase is usually only used in connection with bigger, more general applications. External interfaces between systems are no longer necessary with the implementation of an ERP system, which also offers additional advantages like standardisation and lower maintenance (one system instead of two or more, easier and/or more robust reporting capabilities as all data is typically stored in one database, and more [4].

Manufacturing resource planning (MRP II), which came after material needs planning (MRP), is where the phrase "enterprise resource planning" originates. When "routings" became a significant component of the software architecture and a company's capacity planning function also became a part of the typical software activity, MRP developed into ERP. ERP systems often take care of a company's production, logistics, distribution, stock, shipping, billing, and accounting. Business operations including sales, marketing, delivery, billing, production, inventory management, quality management, and human resource management may all be controlled with the use of enterprise resource planning (ERP) software.

As businesses dealt with the Y2K issue in their legacy systems in the 1990s, sales of ERP systems increased significantly. Many businesses used this chance to swap out their outdated information systems with ERP systems. Following this sharp increase in revenues, there was a decline in 1999, by which time the majority of businesses had already put their Y2K solution into place.

The Perfect ERP Solution

When a single database is used and houses all the data for different software modules, an ERP system is considered to be perfect. These software components may consist of:

1. **Manufacturing:** Engineering, capacity, workflow management, quality control, bills of material, manufacturing process, etc. are a few of the functions of
2. **Financials:** Cash management, fixed assets, accounts payable and receivable, general ledger, etc.
3. **Human Resources:** Payroll, Time and Attendance, Training, etc.
4. Supply Chain Management: Planning the supply chain, scheduling suppliers, processing claims, entering orders, buying, etc.
5. **Projects:** Billing, time and expenditure tracking, activity management, costing, etc.
6. Customer relationship management, including sales and marketing, customer service, commissions, in-person and telephone customer service, etc.
7. **Data Warehouse:** Typically, this is a module that customers, suppliers, and workers of an organisation may access.

Implementation of an ERP System

The process of implementing an ERP system requires extensive planning, consultation, and often takes three to twelve months. The scope of ERP systems is quite broad, and they may be very complicated for many bigger organisations. The employees and working procedures will eventually need to alter significantly as a result of ERP system implementation. Although it would seem sensible for an internal IT team to lead the project, it is generally recommended to engage ERP installation consultants since they are often more cost-effective and have specialised training in deploying these kinds of systems [5].

Ownership of the project is one of the most crucial qualities that an organisation should possess when installing an ERP system. It is crucial to ensure that everyone is on board and will contribute to the success of the project and the usage of the new ERP system since there are so many changes that must be made and because they have a significant impact on practically every employee in the organisation. Typically, organisations develop their own ERP system via ERP suppliers or consulting firms. When establishing an ERP system, three sorts of professional services are offered: consulting, customization, and support.

Consulting Services: Consulting services are often in charge of the earliest phases of ERP installation. They assist an organisation with product training, workflow, improving ERP's usage in the particular organisation, etc. as well as with going live with their new system.

Customization Services: By developing unique user interfaces and/or underlying application code, customization services expand the capabilities of the new ERP system or modify how it is used. There are still certain requirements that need to be established or customised for an organisation, even if ERP systems are designed for many fundamental tasks.

Support Services: Support services for ERP systems include both support and maintenance. For instance, support for ERP difficulties and troubleshooting.

Evolution of ERP

The dramatic advancements in computer hardware and software systems were quickly followed by the creation of ERP systems. The majority of businesses created, developed, and put into use centralised computer systems in the 1960s, primarily automating their inventory control systems using inventory control packages (IC). These were antiquated systems built on the foundation of COBOL, ALGOL, and FORTRAN. The development of material requirements planning (MRP) systems, which primarily entailed planning the product or component needs in accordance with the master production schedule, began in the 1970s. Following this path, new software programmes named Manufacturing Resources Planning (MRP II) were released in the 1980s with a focus on streamlining production needs and materials to optimise manufacturing operations. Shop floor and distribution management, project management, finance, human resources, and engineering were all incorporated in MRP II. In the late 1980s and early 1990s, interfunctional enterprise-wide coordination and integration initially became a feature of ERP systems. ERP systems, which are based on the MRP and MRP II technological foundations, integrate business processes such as production, distribution, accounting, finance, human resource management, project management, inventory management, service and maintenance, and transportation to provide accessibility, visibility, and consistency across the enterprise [6].

The "extended ERPs" were created in the 1990s when ERP providers "add-ons" (additional modules and functions) to the basic modules. These ERP extensions include supply chain management (SCM), customer relationship management (CRM), and advanced planning and scheduling (APS). Figure 1 lists the historical occurrences associated with ERP.

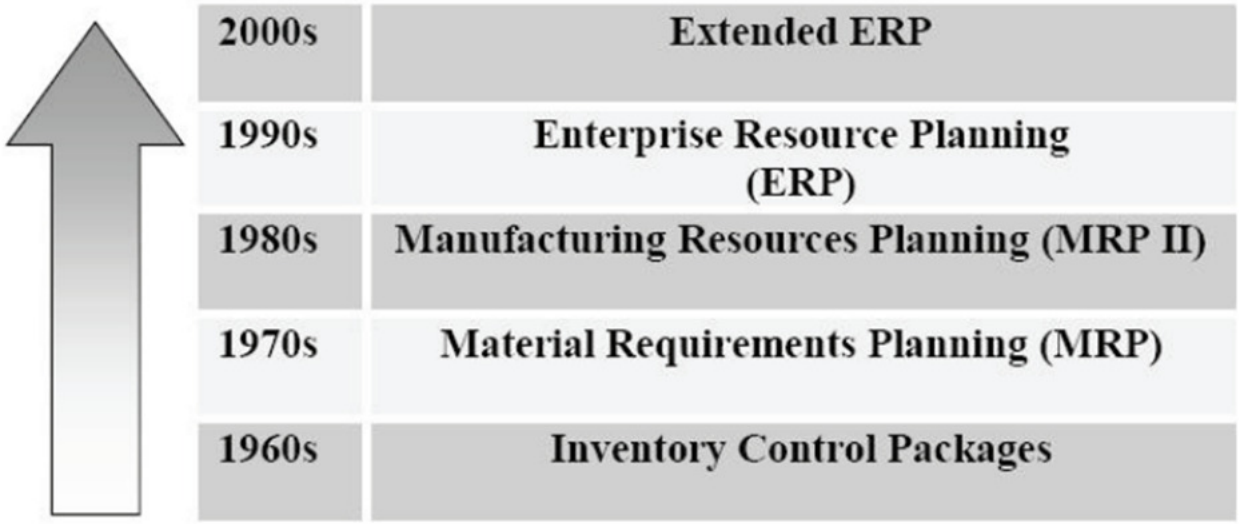

Figure 1: Illustrate the ERP Evolution.

Reasons for ERP's Growth

The ERP industry and ERP companies have grown rapidly for a number of reasons. Here are a few real advantages of ERP that have contributed to its quick development.

1. Lead time reduction;
2. A reduction in cycle time
3. Timely delivery

4. Inventories have increased
5. Increase in business
6. Removes restrictions in the legacy system (century dating, lack of adaptability, etc.).

Other than the aforementioned concrete advantages, there are several intangible advantages that contribute to the expansion of ERP systems. As follows:

1. Customer contentment
2. Expand your versatility
3. Improved decision-making ability via analysis and planning.
4. Utilise cutting-edge technologies to lower the expense of quality.
5. Effective resource use
6. Increased data accuracy.

The most recent technologies, including client-server architecture and open system technology, provide the full corporate system integration capabilities. By providing a smoother flow of information at all levels and areas of the organisation, it connects suppliers and consumers. As the whole organisation displays the same information and viewpoints, ERP aids in decision-making at the appropriate moment and by the appropriate person. This offers the decision-making process strong backing. This offers the decision-making process strong backing. The ultimate winner is the customer, who may benefit from improved products and services at reasonable pricing [7].

Advantages of ERP

The ERP software packages, which are among the fastest-growing in the globe, offer the seamless integration of all information moving through an organisation. The demand for the packages from ERP suppliers like SAP, Oracle, Baan, QAD, J.D. Edwards, and Peoplesoft is high. Delivering goods to businesses so they may manage their internal and external operations effectively is the primary responsibility of the ERP system. Adopting the ERP system also has additional benefits, some of which are as follows:

1. **Increased efficiency:** This is achieved by cycle time reduction, inventory reduction, order fulfilment, better supply chain support, management, etc.
2. **Business integration:** ERP programmes are connected, making it feasible for data to be exchanged across linked business components. The timeframe of system constructions and the directives change for each product and department function in major corporations.
3. **Better decision-making:** The highly organised, planned process makes it simpler to make decisions. The senior management of the organisation uses these processes to fulfil its fundamental aims and objectives and to keep an eye on the whole organisation. These processes regulate day-to-day activities and provide reports in a structured format.
4. **Quick customer response times:** The system is simple to use, therefore handling the operations doesn't need a lot of computer expertise. The system reduces needless duplication and redundancy in data collection and storage because of its comprehensive nature. As a result, the customer response time is shortened [8].
5. **Business integration:** ERP establishes an organization-wide shared database that is utilised by several departments. The automated information flow between departments is supported by the ERP. Support systems like DSS may utilise this shared database, which facilitates the grouping of business facts in real time and the timely execution of different

sorts of management decisions. Therefore, top-level management has access to information and data at their fingertips.

6. **Capabilities for analysis and planning:** Although several decision-support systems and simulation features are available, ERP facilitates data analysis. The middle and upper management are also supported by the DSS in their tactical and strategic planning [9].
7. **Support for technology:** ERP solutions swiftly adopt the newest developments in information technology. ERP has embraced a variety of flexible environments, including distributed systems, open systems, client-server technologies, the internet, intranet, e-commerce, and CALS (Computer assisted Acquisition and Logistic Support). Even throughout the customization, maintenance, and extension stages, the ERP packages are built such that they may embrace the most recent technologies [10].

CONCLUSION

In conclusion, Enterprise Resource Planning (ERP) systems provide businesses a complete means of integrating and controlling a wide range of corporate operations and activities. In order to handle data effectively, simplify processes, and make better decisions, ERP systems provide a centralised and unified platform. The integration of many departments and activities inside an organisation is one of the main advantages of ERP. ERP systems eliminate information silos and promote seamless departmental communication and cooperation by centralising data and procedures. Through increased visibility, efficiency, and coordination, this integration improves organisational performance as a whole. Data administration and analysis are made easier by ERP systems. Organisations may store, retrieve, and analyse data from several business sectors, including finance, inventories, sales, and human resources, using a centralised database. This makes it possible for businesses to produce thorough reports, see how their operations are running, and base choices on current data.

REFERENCES

[1] G. B. Remijn, E. Hasuo, H. Fujihira, and S. Morimoto, "An introduction to the measurement of auditory event-related potentials (ERPs)," *Acoust. Sci. Technol.*, 2014, doi: 10.1250/ast.35.229.

[2] S. J. Luck, "Overview of common ERP components," in *An lntroduction to the Event-Related Potential Technique*, 2014.

[3] A. Gupta, "Enterprise resource planning: The emerging organizational value systems," *Ind. Manag. Data Syst.*, 2000, doi: 10.1108/02635570010286131.

[4] S. Sur and V. Sinha, "Event-related potential: An overview," *Ind. Psychiatry J.*, 2009, doi: 10.4103/0972-6748.57865.

[5] C. Rémuzat, D. Urbinati, O. Mzoughi, E. El Hammi, W. Belgaied, and M. Toumi, "Overview of external reference pricing systems in Europe," *J. Mark. Access Heal. Policy*, 2015, doi: 10.3402/jmahp.v3.27675.

[6] S. C. Gardiner, J. B. Hanna, and M. S. LaTour, "ERP and the reengineering of industrial marketing processes. A prescriptive overview for the new-age marketing manager," *Ind. Mark. Manag.*, 2002, doi: 10.1016/S0019-8501(01)00167-5.

[7] S. Trivedi, S. Negi, N. Anand, R. Patankar, and G. Kumar, "ERP solution for effective supply chain of micro, small and medium-sized enterprises: A case study of customised ERP solution development and deployment for MSMEs in the Haryana state of India," *Int. J. Bus. Innov. Res.*, 2018, doi: 10.1504/IJBIR.2018.096371.

[8] P. Mandal and A. Gunasekaran, "Issues in implementing ERP: A case study," *Eur. J. Oper. Res.*, 2003, doi: 10.1016/S0377-2217(02)00549-0.

[9] C. Wang, L. Xu, X. Liu, and X. Qin, "ERP research, development and implementation in China: An overview," *International Journal of Production Research*. 2005. doi: 10.1080/13629390500124556.

[10] S. A. Shukor, A. Sheikhi, and A. H. M. Nashir, "Enterprise resource planning (ERP) adaptation in Malaysia agricultural SME: Issues and trends," *J. Theor. Appl. Inf. Technol.*, 2020.

CHAPTER 2

A BRIEF STUDY ON ERP AND RELATED TECHNOLOGY

Ms. Leena George, Assistant Professor
Masters In Business Administration (General Management), Presidency University, Bangalore, India
Email Id: leenageorge@presidencyuniversity.in

ABSTRACT:

An organization's numerous business processes and tasks are integrated and managed by an extensive software system called enterprise resource planning (ERP). This abstract examines the idea of ERP and the technologies that are associated to it. It lists the essential technologies that underpin ERP systems and illustrates the advantages and difficulties of ERP deployment. ERP solutions provide businesses a centralised platform to better decision-making, increase communication and cooperation, and simplify processes. ERP systems eliminate information silos by connecting processes and data from several departments, allowing for effective data management and analysis. They provide modules to help automate and optimise corporate operations in areas including finance, inventories, sales, and human resources. The implementation of an ERP system has its own set of difficulties, such as high costs, intricate customisation, data transfer, and user acceptance. To successfully adopt ERP and get its full advantages, effective project management and change management are essential.

KEYWORDS:

Business Process Management, Business Process Re-engineering, Re-engineering, Transaction-Processing System.

INTRODUCTION

An organization's numerous business operations may be integrated and managed via an enterprise resource planning (ERP) system. It gives businesses a centralised platform to organise their operations, boost productivity, and improve decision-making. Finance, human resources, manufacturing, supply chain, sales, and customer relationship management are just a few of the departments and functions that may share information more easily thanks to ERP systems. ERP systems break down data silos and allow real-time data exchange and collaboration by combining these domains [1].

ERP systems provide a broad variety of modules and features that are adapted to certain corporate requirements. These modules may cover business intelligence, human resources, customer relationship management, production planning, inventory management, sales and distribution, and finance management. ERP systems often integrate related technologies to improve performance and provide extra value in addition to their basic functionality. A few of these technologies are as follows:

Cloud computing: A lot of ERP systems are now available as cloud-based services, allowing businesses to access the software and data online. ERP that is cloud-based offers scalability, flexibility, and lower infrastructure expenses.

Mobile Applications: Users may access ERP capabilities and data on smartphones and tablets thanks to mobile ERP apps. Employees now have immediate access to vital information, enabling them to make choices while on the go.

Artificial Intelligence (AI) and Machine Learning (ML): To automate and improve business operations, AI and ML technologies are being incorporated into ERP systems. Demand forecasting, predictive analytics, anomaly detection, and intelligent automation of repetitive processes may all be aided by these technologies.

Internet of Things (IoT): IoT sensors and devices may be linked with ERP systems to collect real-time data from a variety of sources, such as equipment, goods, or supply chain elements. Utilising this data will increase operational effectiveness, monitor assets, and allow preventive maintenance.

Blockchain: Blockchain technology is being investigated in ERP systems to improve supply chain management and financial transactions' security, transparency, and traceability.

ERP systems and associated technologies are essential for streamlining operations, boosting productivity, and fostering corporate expansion as organisations increasingly embrace digital transformation. Companies may acquire a competitive edge, react rapidly to market developments, and satisfy changing consumer expectations by deploying an ERP system and using various connected technologies [2].

DISCUSSION

Business process re-engineering (BPR) is a fundamental rethinking and radical restructuring of an organization's business processes with the goal of dramatically improving crucial modern performance metrics including cost, quality, service, and speed. BPR, to put it simply, is the process of looking at present processes and rebuilding them to improve an organization's efficiency and effectiveness. In order to maximise efficiency and workflow inside an organisation, BPR refers more specifically to the quick and radical redesign of strategic, value-added business processes and the organisational systems, policies, and structure that support them. By using the power of information technology, BPR simultaneously seeks ground-breaking advancements in quality, speed, service, and cost while tackling the concerns of organisational strategies and change-related vision. Compared to incremental increases of 20–30%, breakthrough advances represent quantum gains of 5–10 times. These advancements are often defined by an increase in product and service quality at a lower cost and a shorter period between product creation and marketing [3].

Why Should We Reengineer Processes?

Re-engineering is done by businesses for a number of good commercial reasons. For firms to remain competitive in today's market, process improvement is essential. Because consumers are expecting better goods and services, businesses have had to upgrade their business procedures during the last several years. The expansion of global commerce and market liberalisation are two more trends that are readily obvious. With more businesses entering the market as a result of these developments, competition becomes tougher and tougher. Major adjustments are necessary in the market of today to even remain competitive. For the majority of organisations, existence is now at stake.

When management perceives a significant discrepancy between the actual and expected performance, which results in a business issue, the organisation re-engineers. Senior management sometimes interprets this business issue into issues with and opportunities for process performance. This enables the firm to concentrate on fundamentally changing the target process(es), hence enhancing business outcomes and resolving the issue. When deciding to re-engineer, top management support and dedication are crucial at this early stage of recognising the need for radical change. Historically, re-engineering initiatives have a failure rate of close to 70%. This high failure rate has often been attributed to a lack of top management support or a failure to maintain a commitment to the difficult managerial choices required to implement these changes to the workplace [4].

What is and is not reengineering?

Re-engineering is, by definition, "radical change, fast." An integrated set of business processes must be fundamentally rethought about and transformed as part of re-engineering. Re-engineering necessitates not just a redesign of business procedures but also a parallel analysis and redesign of the information technologies and the organisational structure that underpin these procedures. The secret to process transformation success is recognising that it ultimately involves performing work differently. The phrase "re-engineering is rethinking work" was coined by Hammer in 1990. Re-engineering is often misunderstood in terms of what it is and is not, and how it varies from process improvement or "quick hits."

What distinguishes re-engineering from process improvements?

Process improvements often fall into one of three categories: re-engineering, incremental improvement, and fast hits.

1. **Quick Hits:** These are usually low risk, doable tasks that provide right away prospects for return on investment (often within a few months).
2. **Incremental Improvement:** This method emphasises addressing tiny performance gaps and resulting in little but significant business outcomes.

The fundamental phases in process improvement are shown in Figure 1.

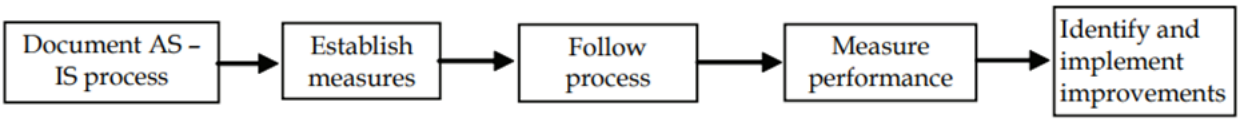

Figure 1: Continuous Process Improvement Model.

This procedure starts with recording what businesses now do, then sets up a means to measure the process based on what their clients desire, follows the process, measures the outcomes, and finally identifies chances for improvement based on the data gathered. Then, after implementing process modifications, organisations evaluate the effectiveness of the new procedure. Continuous process improvement is the process of continually improving a system. Other names for it include functional process improvement and business process improvement. This technique for streamlining corporate procedures works well to achieve slow, incremental progress. However, a number of events over the last several years have hastened the demand for business process improvement. Technology is the most apparent one. Businesses are increasingly gaining new capabilities thanks to technologies (like the Internet), which is boosting the competition level and

necessitating significant process improvement. As a consequence, businesses are looking for techniques for accelerating business process improvement [5].

Additionally, organisations seek immediate breakthrough performance increases rather than just gradual ones. Few firms can afford a delayed transformation process since everyone's pace of change has accelerated. Business process re-engineering (BPR) is one strategy for quick change and significant improvement. Third, re-engineering This exhibits innovative thinking and seeks to achieve significant business outcomes. Re-engineering is a kind of organisational change distinguished by radical process transformation, in contrast to fast fixes and gradual improvement.

Continuous process improvement is based on one school of thinking, while BPR is based on another. Re-engineering goes so far as to presume that the present method is obsolete, useless, broken, and should be forgotten. Restart the process. Business process designers may detach themselves from the current process and concentrate on a new process with the help of such a clean slate approach. It's like asking the organisation to imagine what its processes would be like in the future. What style do their clients want it to have? What would the other workers want it to look like? How do the best-in-class companies operate? What could they possibly do with ERP?

Figure 2 illustrates such a method. It starts with mobilising for action, defining the re-engineering project's scope and goals, planning for it, and then documenting the whole processes by taking a wider view and applying Michael Porter's value chain [6].

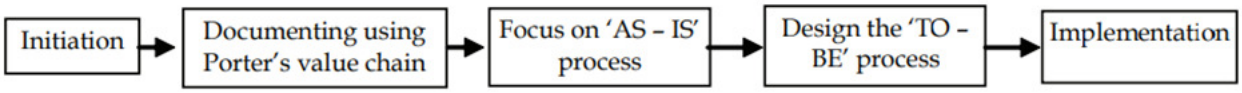

Figure 2: Illustrate the Re-engineering Model.

With the use of this documentation, the organization's "AS-IS" environment, present process performance, and business performance are all examined. The "TO - BE" state is then established, leading to the development of an action plan based on the discrepancy between the organization's present processes, technologies, and structures and its desired future state. The solutions must subsequently be put into action. The stark difference between business process re-engineering and continuous process improvement relies on where organisations start with the current process, or with a blank slate, as well as the size and speed of the changes that occur.

BPR Characteristics

BPR's key traits include a cross-functional emphasis, process innovation, customer focus, a fresh start, and a dramatic transformation of the business operations of the organisation utilising ERP technologies.

Process innovation and a Cross-Functional Orientation

BPR takes a more interdisciplinary approach. The goal is to put the broken parts of business processes back together. Clearly defined inputs and outputs, a beginning and an end, and a definite sequencing of labour activities through time and space are all characteristics of a process. To put it another way, a business process is the plan of action for creating a certain output for a specific client or market. A process often spans many organisational functional divisions. It could even pass through more than one organisation in certain circumstances. Since a business process may pass through several distinct organisational units, there is often no one individual in charge of

overseeing the performance of the whole process from start to finish. The absence of a "process owner" causes ownership and accountability to be dispersed, which often results in the modern business processes' typical inefficiencies [7].

The execution of internal processes is given higher priority in processes than addressing client and market demands. Core processes and support processes are two categories into which the business processes may be divided. The organisations' primary operations create commodities and products for their external clients. For internal usage, the support processes produce goods, services, or data. Core processes are often the focus of re-engineering initiatives since they directly serve customers and have a big influence on how well an organisation does. Re-engineering aims to create quick and precise core processes that enable more people to access information, dismantle old organisational barriers and hierarchies, and do more tasks concurrently rather than sequentially.

Business processes may be thought of as the fundamental building block of reengineered organisations. Instead of being organised around functions, these organisations are. The number of departments and functions involved in carrying out the essential business activities should be minimised. Information on business process products, suppliers, customers, component activities, and the relationships between activities are all included in a wide perspective of business processes.

Products used in business processes may be divided into three groups: commodities, services, and information. Information contributes to the product flow in manufacturing or service organisations by at least 70%. Therefore, rather of focusing on the flow of materials or activities, business process redesign techniques should include tools and recommendations that specifically target the streamlining of the information flow.

An overview of business process redesign

1. **How can business processes become redesigned?**

According to Davenport & Short (1990), business process redesign is "the analysis and design of workflows and processes within and between organisations." "The critical analysis and radical redesign of existing business processes to achieve breakthrough improvements in performance measures," according to Teng et al. (1994), is what BPR is.

2. **What distinguishes BPR from TQM?**

According to Teng et al. (1994), the TQM (Total Quality Movement) is primarily to blame for the growing focus on business processes in recent years. They draw the conclusion that TQM and BPR both have a cross-functional focus. Davenport noted that whereas proponents of re-engineering often seek radical redesign and abrupt improvement of processes, quality experts frequently concentrate on incremental change and steady improvement of processes.

According to Davenport (1993), quality management also known as total quality management (TQM) or continuous improvement refers to policies and plans that place an emphasis on small-scale adjustments to labour practices and product quality over an indefinite length of time. Reengineering, on the other hand, sometimes referred to as business process redesign or process innovation, refers to discrete efforts with the goal of fundamentally redesigning and improving work processes in a constrained amount of time [8].

What BPR myths have been propagated by popular literature?

More myths than useful approach re-engineering have been developed by popular management books. The idea of business process reengineering (BPR) has been around since about 1990, but it is misunderstood and often confused with downsizing, client/server computing, quality, ABC, and other management nostrums of recent years. Davenport & Stoddard (1994) identified seven re-engineering misconceptions based on talks and interviews with more than 200 firms and 35 re-engineering programmes.

The Myth of Re-engineering Novelty: Although re-engineering involves well-known notions, it is novel because these concepts are brought together to create a new synthesis. These essential elements have never been combined before.

The Myth of the Clean Slate: Contrary to Hammer's (1990) advice, "Don't automate, obliterate!" clean slate changes are uncommon in real-world settings. Alternatively, a "blank sheet of paper" used in design often needs a "blank check" for execution, according to Davenport and Stoddard (1994).

As a result, using Clean Slate Design, which comprises a clear vision for a process without consideration for the surrounding environment, is a more cost-effective strategy for the majority of businesses. The implementation, however, takes place through a number of staged initiatives. Additionally backed by early results by Stoddard & Jarvenpaa (1995), who found that, in contrast to Hammer (1990), "re-engineering does not always guarantee a revolutionary approach to change, even if it may provide radical designs. A revolutionary reform process may not even be possible given the danger and expense of using revolutionary methods [9]. Information Systems (IS) is typically seen as a partner within a cross-functional team that is typically headed by a non-IS project leader and a non-IS business sponsor who have better control over the processes that are being redesigned, in contrast to the much-touted leadership role.

The Myth of Re-engineering vs. Quality: Contrary to Hammer & Champy's (1993) demand for total "radical change," most businesses have a variety of organisational change strategies on hand, such as re-engineering, continuous improvement, gradual methods, and restructuring procedures. The myth of top-down design holds that individuals who do the work are responsible for the implementation and execution of the reformed procedures. Therefore, for BPR to be effective, participation and more crucially, acceptability and ownership at the grassroots level are crucial.

Re-engineering vs. Transformation Myth: Although BPR is a process that aids in organisational transformation (OT), it is not the same as transformation. According to Adams (1984), OT is characterised by "profound, fundamental changes in thought and action that create an irreversible discontinuity in the experience of a system." Reframing, which is a discontinuous shift in the organization's or group's shared meaning or culture, is a necessary component of OT since it often deals with the creation of a new belief system. In addition to the work processes, it also entails significant changes in the organisational structure, strategy, and business capabilities.

The Myth of Re-engineering's Permanence: According to Davenport & Stoddard (1994), re-engineering reached its peak in the US in 1994 and would likely be integrated with much broader organisational phenomena, such as another synthesis of ideas that incorporates re-engineering's tenets, its integration into current change management approaches, or its fusion with quality and other process-oriented improvement approaches into an integrated process management approach.

How Do Business Process Reengineering and Information Technology Relate?

Information technology (IT) is seen by Hammer (1990) as the primary facilitator of BPR, which he refers to as "radical change." He suggests using IT to question presumptions found in work practises that date back far before the development of contemporary computer and communications technologies. According to him, the concept of "discontinuous thinking," or recognising and letting go of the fundamental assumptions that underlie operations, is at the core of re-engineering. These rules of work design are based on presumptions about technology, people, and organisational goals that are no longer true. The following "principles of re-engineering" are his recommendations: The following principles should be followed: (a) organise around outcomes rather than tasks; (b) have those who will use the process output perform the process; (c) incorporate information processing work into the actual work that produces the information; (d) treat geographically dispersed resources as though they were centralised; (e) link parallel activities rather than integrating their results; (f) put the decision point where the work is performed; (g) incorporate control into the process; and (h) capture information once and store it securely.

According to Davenport & Short (1990), BPR necessitates adopting a more comprehensive perspective of both IT and business activities, as well as the connections between them. IT should be seen as a force that fundamentally alters how business is conducted rather than just automating or mechanising it. For maximum efficacy, business operations should be seen as more than a collection of discrete or even functional tasks. IT and BPR are related in a circular manner. Davenport & Short (1990) refer to this broader, recursive perspective of IT and BPR as the new industrial engineering, where IT capabilities should support business processes, and business processes should be in terms of the capabilities IT can deliver [10]. Business processes offer a new method of coordination for the whole company, and IT promises to be the most effective instrument for lowering coordination costs (Davenport & Short 1990). The following skills are listed by Davenport & Short (1990) and highlight the responsibilities that IT may play in BPR: Geographical, Automatic, Analytical, Informational, Sequential, Knowledge Management, Tracking, and Disintermediation transactions.

According to there are two ways to discriminate between related functions' participation in a process, or its functional coupling: the degree of mediation and the degree of cooperation. According to their definition, the degree of sequential input and output flow among included functions determines the process' degree of mediation. The level of information sharing and mutual adjustment across functions while taking part in the same process is how they describe the degree of collaboration of the process. Information technology plays a key role in their framework for reducing the degree of mediation and increasing the degree of collaboration. A lot of businesses would also undoubtedly create new, coordination-intensive structures as a result of novel IT applications, allowing them to coordinate their operations in ways that weren't before conceivable. The organization's skills and responsiveness may increase as a result of such coordination-intensive arrangements, providing potential strategic benefits.

What Function of Information Systems Plays in BPR?

BPR is largely a business initiative that has wide implications for meeting the demands of consumers and the other stakeholders in the company, although having its origins in IT management. The IS team may need to take on a back-room advocacy role, persuading top management of the potential that IT and process transformation provide. It would also need the ability to analyse, analyse, and modify processes. The CIGNA IS group was required to create a

new set of fundamental principles that represented a shift away from technology and towards business procedures and outcomes (Caron et al. 1994). The BPR efforts were spearheaded by the particular business divisions, while IS groups collaborated with them to make the drastic changes possible.

According to Bashein et al. (1994), who based their findings on interviews with BPR consultants, the following factors are necessary for BPR success: Senior Management Commitment and Sponsorship; Realistic Expectations; Empowered and Collaborative Workers; Strategic Context of Growth and Expansion; Shared Vision; Sound Management Practises; Appropriate People Participating Full-Time (cf. CIGNA: BPR as a way of life); and Sufficient Budget. A "Do It to Me" Attitude, Cost-Cutting Focus, Narrow Technical Focus, and the Wrong Sponsor are other detrimental preconditions connected to BPR that they list. Unsound financial state, too many projects in progress, fear and a lack of optimism, and animosity towards and by IS and human resource (HR) specialists are some of the detrimental preconditions affecting the organisation. To overcome unfavourable circumstances, businesses should: Start small (as CIGNA did with its pilot); transform themselves personally; and include IS and HR (CIGNA's CIO spearheaded the transition and gave HR issues the attention they deserved).

According to King (1994), the main cause of BPR failure was a compromise of the strategic dimensions due to a concentration on the tactical elements. He observes that tactical, as opposed to strategic, levels of thinking and application are to blame for the majority of re-engineering failures. Developing and prioritising objectives, defining the process structure and assumptions, identifying trade-offs between processes, identifying new product and market opportunities, coordinating the re-engineering effort, and developing a human resources strategy are just a few of the crucial strategic aspects of BPR that he discusses. He comes to the conclusion that the effectiveness of BPR ultimately rests on the people who conduct it and on their ability to be inspired to be innovative and to use their in-depth knowledge to rethink business processes.

Where Will BPR Go?

The re-engineering concept has changed over the past few years from a "radical change" to account for contextual realism and to reconcile with more incremental process change methods such as TQM. It has now evolved into a broader, yet more thorough process management concept.

Kettinger & Grover (1995) make several suggestions to direct future research into the phenomena of BPR based on a theoretical analysis and study of literature pertinent to re-engineering. They focus on the ideas of knowledge management, employee empowerment, implementing new IT, and having a common goal. In order to create an inductive taxonomy of BPR strategies, Earl et al. (1995) presented a "process alignment model" that consists of four lenses of inquiry: process, strategy, MIS, change management, and control. Based mostly on an integrated synthesis of contemporary research from organisation theory, organisation control, strategy, and MIS, Malhotra (1996) created the major focus on these concerns [11].

Management Information System (MIS)

An information system for management ("MIS") focuses mostly on internal sources of data. MIS often uses transaction processing system data to compile a number of management reports. Middle management and operational supervisors often utilise MIS reports. While Management Information Systems (MIS) are data-oriented, transaction systems are operations-oriented. It aids

managers in making decisions and resolving issues. The database, a non-redundant collection of connected data elements, is a crucial component of MIS. Every organisation must make choices on a variety of situations that arise often (weekly, monthly, quarterly, etc.) and that need for a certain set of data. The knowledge of the decision-making process allows for the identification of the data that will be required to make choices. The information system may then be designed such that frequent reports are generated to back up these recurrent choices.

The choices enabled by these systems are usually referred to as structured decisions by information systems professionals. The organised feature refers to the fact that managers are aware of the variables to take into account when making choices and which ones have the most impact on whether the decisions are good or poor. Systems analysts provide well-organized reports with the data required for choices or that describe the status of key variables. Middle and senior management, operational managers, and support personnel are the main consumers of MIS. Information submitted into the system no longer belongs to the person who initiated it and is instead made accessible to all authorised users.

Reports based on transaction level activities may be found in management reporting systems or management information systems. For instance, bank officers regularly use reports on deposits and withdrawals to track the performance of individual branches and to track the ratio of loans made to deposits received, the amount of cash reserves, the interest paid to depositors, and other common performance indicators. The information provided is often integrated with data from other sources, including as information on economic trends, loan demand, consumer spending rates, and borrowing costs. Bank employees may decide with knowledge whether to increase interest rates paid to clients to entice additional deposits or what rate of interest they will charge for different sorts of loans the next week. Each of these judgements is often required, and the data required to make the decisions is likewise routinely produced.

MIS has a number of issues. The majority of MIS reports are historical and often out of date. Additionally, a lot of deployments employ databases that don't meet user needs. Finally, a poor or partial database update puts the dependability of the system at risk for all users. Getting the approval and support of individuals who will interact with the system is a significant issue in MIS design.

DSSs (Decision Support Systems)

Decision support systems (abbreviated "DSS") were created expressly to assist managers in making choices when there is ambiguity about the potential repercussions of such actions. If there are no clear methods for making the choice and not all the aspects that will be taken into account can be easily defined beforehand, the decision is said to be unstructured. DSS include methods and tools for gathering pertinent data and analysing possibilities and alternatives. Executive information systems (EIS) and data warehouses are often used in DSS. Data and decision logic are the focus of decision-support systems.

The selection of the information that is required is a crucial step in the usage of decision support systems. It is feasible to anticipate information demands in situations that are well-structured, but it is challenging to do so in an unstructured setting. The management may become aware that more information is needed as it is gathered; possessing knowledge may thus cause the manager to become aware of further needs.

Think about the procedure that banks executives go through when deciding whether to start providing cash management accounts or to install automated teller machines—both brand-new banking services. These are a few of the numerous questions that need to be answered: How much will the watch service cost? What number of teller locations are required? How will the rivalry react to this? What restrictions on withdrawals should there be at any given time? Can this service be provided for a fee? Will this service lead to increased deposits, which would increase the bank's cash flow?

It is difficult to pre-design system report contents and forms in such circumstances. Therefore, a decision support system must be more adaptable than conventional information systems. The user must be allowed to make report requests by describing their content and even the method of information production. Similarly, rather than coming from a single master file as is often the case with transaction systems and several reporting systems, the data required to generate the information may emerge from many distinct files or databases. Where there is no structure to the issue, manager discretion is crucial in making decisions. The manager's discretion is supported but not replaced by the decision support system. Information systems specifically created to facilitate both individual and group decision-making by enabling the application of decision models to massive data sets. Instead of making a choice, these systems are designed to help the decision-making process.

CONCLUSION

Finally, Enterprise Resource Planning (ERP) and associated technologies have fundamentally changed how businesses manage their operations, resources, and data. These technologies provide all-inclusive options for harmonising and automating corporate procedures, increasing productivity, and strengthening decision-making skills. Organisations may manage and integrate different activities including finance, human resources, supply chain, inventory, and customer relationship management using a centralised platform provided by ERP systems. ERP systems allow businesses to acquire a comprehensive understanding of their operations and make choices based on up-to-the-minute, accurate information by combining data and simplifying procedures.

REFERENCES

[1] M. Mayeh, T. Ramayah, and A. Mishra, “The role of absorptive capacity, communication and trust in ERP adoption,” *J. Syst. Softw.*, 2016, doi: 10.1016/j.jss.2016.05.025.

[2] M. Y. Ma’arif, N. S. M. Satar, D. S. V. Singh, and S. M. Motahar, “A mediating effect on erp km model for the performance of oil and gas sector in klang valley: A preliminary study,” *Int. J. Adv. Trends Comput. Sci. Eng.*, 2019, doi: 10.30534/ijatcse/2019/7381.42019.

[3] R. Rodriguez, F. J. Molina-Castillo, and G. Svensson, “Enterprise resource planning and business model innovation: process, evolution and outcome,” *Eur. J. Innov. Manag.*, 2020, doi: 10.1108/EJIM-04-2019-0092.

[4] Y. M. Cheng, “A hybrid model for exploring the antecedents of cloud ERP continuance: Roles of quality determinants and task-technology fit,” *Int. J. Web Inf. Syst.*, 2019, doi: 10.1108/IJWIS-07-2018-0056.

[5] M. Albarghouthi, B. Qi, T. C. Wang, and M. Abbad, “ERP Adoption and Acceptance in Saudi Arabia Higher Education: A Conceptual Model Development

https://doi.org/10.3991/iiet.v15i15.12039," *Int. J. Emerg. Technol. Learn.*, 2020, doi: 10.3991/IJET.V15I08.12039.

[6] M. Ursacescu, D. Popescu, C. State, and I. Smeureanu, "Assessing the greenness of enterprise resource planning systems through green IT solutions: A Romanian perspective," *Sustain.*, 2019, doi: 10.3390/su11164472.

[7] K. Jenab, S. Staub, S. Moslehpour, and C. Wu, "Company performance improvement by quality based intelligent-ERP," *Decis. Sci. Lett.*, 2019, doi: 10.5267/j.dsl.2018.7.003.

[8] B. Scholtz, I. Mahmud, and T. Ramayah, "Does usability matter? An analysis of the impact of usability on technology acceptance in ERP settings," *Interdiscip. J. Information, Knowledge, Manag.*, 2016, doi: 10.28945/3591.

[9] H. Y. Lee and N. J. Wang, "Cloud-based enterprise resource planning with elastic model–view–controller architecture for Internet realization," *Comput. Stand. Interfaces*, 2019, doi: 10.1016/j.csi.2018.11.005.

[10] H. Li *et al.*, "EEG changes in time and time-frequency domain during movement preparation and execution in stroke patients," *Front. Neurosci.*, 2020, doi: 10.3389/fnins.2020.00827.

[11] M. Albarghouthi, B. Qi, T. C. Wang, and M. Abbad, "ERP adoption and acceptance in Saudi Arabia higher education: A conceptual model development," *Int. J. Emerg. Technol. Learn.*, 2020, doi: 10.3991/ijet.v15i15.12039.

CHAPTER 3

A BRIEF STUDY ON BUSINESS PROCESS RE-ENGINEERING

Dr. Kadambat Kumar, Professor
Masters In Business Administration (General Management), Presidency University, Bangalore, India
Email Id: krishnakumark@presidencyuniversity.in

ABSTRACT:

Businesses use the strategic strategy known as "business process re-engineering" (BPR) to rebuild and improve their essential business procedures. It entails a comprehensive reevaluation of current procedures with the intention of enhancing effectiveness, efficiency, and overall performance. Instead of emphasising incremental advances, BPR challenges traditional wisdom and welcomes novel ideas. The main ideas, advantages, and difficulties of business process re-engineering are highlighted in this abstract. It investigates the primary BPR phases, such as process identification, analysis, redesign, implementation, and monitoring. The abstract also explores how technology may help BPR activities and places a strong emphasis on the need of change management for BPR projects to be effective.

KEYWORDS:

BPR Lifecycle, Business Process Re-engineering, PITBM, Resource.

INTRODUCTION

Organisations are continuously looking for methods to increase their efficiency, effectiveness, and competitiveness in the today's ever changing business scene. Business Process Reengineering (BPR) is one potent strategy that has evolved. In order to achieve major gains in performance, efficiency, and customer happiness, BPR entails the radical restructuring and rethinking of business processes. Business process reengineering involves more than just making small adjustments to current procedures. The way work is done inside an organisation is being fundamentally reimagined and reinvented. BPR questions why things are done a specific way and seeks to create breakthrough outcomes by developing creative methods to achieve objectives. BPR challenges conventional assumptions and standards. Focusing on process results and goals rather than being constrained by conventional methods of doing things is the fundamental tenet of BPR. It entails examining processes from scratch and rebuilding them in an effort to cut out stages that aren't essential, simplify procedures, and make use of technology to automate and streamline processes [1].

Business process reengineering's ultimate objective is to build lean, agile, and customer-focused organisations that can react swiftly to changing market demands. Organisations may significantly enhance cost savings, cycle times, quality, and overall customer happiness by rethinking and optimising their processes. BPR also encourages a culture of innovation and continual development, which is important for businesses trying to remain competitive in today's market. It's crucial to remember that putting BPR into practice has its share of difficulties. Strong leadership, successful change management, and the participation of all stakeholders are required. BPR efforts must be well thought out, effectively conveyed, and given the required resources to be

implemented. Business process reengineering gives organisations a revolutionary strategy for achieving ground-breaking gains in efficiency, performance, and customer happiness. Organisations may build a foundation for long-term success and sustainable development in today's changing business climate by questioning conventional methods of working and embracing change [2].

DISCUSSION

One strategy for changing how work is done to better serve the organization's goal and save expenses is business process re-engineering. A high-level review of the organization's purpose, strategic objectives, and customer demands is the first step in re-engineering. Simple inquiries like "Does our purpose need to be redefined? Do our Simple inquiries like "Does our purpose need to be redefined? Are our purpose and our strategic aims compatible? Who are our clients? It's possible for a company to discover that some assumptions it has about its consumers' requirements and desires are unfounded. The organisation doesn't determine how to accomplish anything until it has reconsidered what it should be doing in the first place. A group of interconnected, organised actions or processes that create a particular service or product (serve a certain objective) for a specified client or customers is known as a business process or business procedure (Figure 1). A flowchart may often be used to represent it as a list of tasks [3].

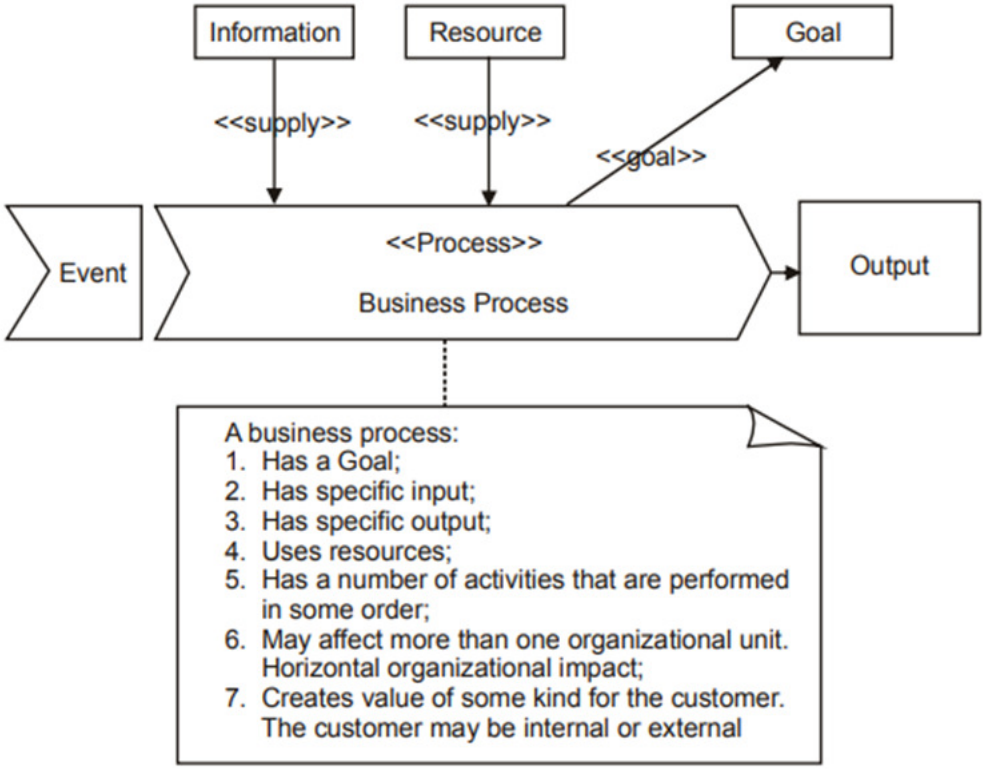

Figure 1: Illustrate the Business Process.

A business process:

1. Has a Purpose

2. Has certain inputs

3. Produces certain results

4. Makes use of resources

5. Consists of a number of interconnected activities

6. Has the potential to have an impact on several organisational units. influence on a horizontal scale

7. Provides the consumer with value of some type. Internal or external customers are both acceptable.

Reengineering business processes

Business process re-engineering (BPR) is a strategy for enhancing the efficacy and efficiency of business processes both inside and across organisations. Businesses must approach their business processes with a "clean slate" mentality if they are to implement BPR effectively. They must then decide how to best build these processes to enhance how they do business. BPR, business process redesign, business transformation, and business process change management are other names for business process re-engineering. It involves the comprehensive redesign of an organization's operations, particularly its business operations. Instead of dividing a company into functional specialisations (such as production, accounting, marketing, etc.) and taking into account the duties that each does, it is preferable to take into account the whole processes from the procurement of materials through production, marketing, and distribution. The company has to be reengineered into many procedures [4].

Re-engineering was primarily supported by Michael Hammer and James A. Champy. In a number of works, including Re-engineering the Corporation, Re-engineering Management, and The Agenda, they make the case that moving duties from one department to another wastes an excessive amount of time. They contend that appointing a team to handle every duty involved in the process is far more efficient. In The Agenda, the debate is expanded to include vendors, distributors, and other coworkers.

Many contemporary advancements in management have their roots in re-engineering. For instance, the cross-functional team has gained popularity as a result of the need to reengineer discrete functional activities into comprehensive cross-functional processes. Additionally, a large number of recent advancements in management information systems strive to combine a variety of corporate tasks. Re-engineering theory is responsible for the development of enterprise resource planning, supply chain management, knowledge management systems, groupware and collaborative systems, human resource management systems, and customer relationship management systems.

BPR is described as "fundamental revision and radical redesign of processes to achieve spectacular improvements in critical and contemporary measures of efficiency, such as costs, quality, service, and quickness" by Hammer and Champy (1994). In this BPR definition, key terms include:

1. **Foundational:** What is the company's primary method of operation?

2. **Radical:** New ways of functioning must be found in place of the current protocols and structures. Simple adjustments are useless. The basic foundation of changes must be altered.

3. **Spectacular:** Instead of finding incremental improvements, spectacular alterations must be found.

4. **Processes:** Instead of focusing on the activities, occupations, people, or structures, redesign must be focused on the processes.

As a result, a company must start again, putting past practices behind them, testing the work objectively, and forgetting current processes. To put it another way, redesigning is evolving. The processes are at the centre of re-engineering. According to Davenport and Short (1990), a process is a collection of actions taken in order to accomplish a certain business goal. A process is also a series of actions that, when combined, provide a beneficial outcome for the client. Other techniques, such total quality management or continuous improvement, are likewise centred on processes and realign the core functions of the business to meet consumer expectations. However, they could feel completely at ease with their current procedures, and they might not wish to implement any new ones. BPR system is shown in Figure 1.

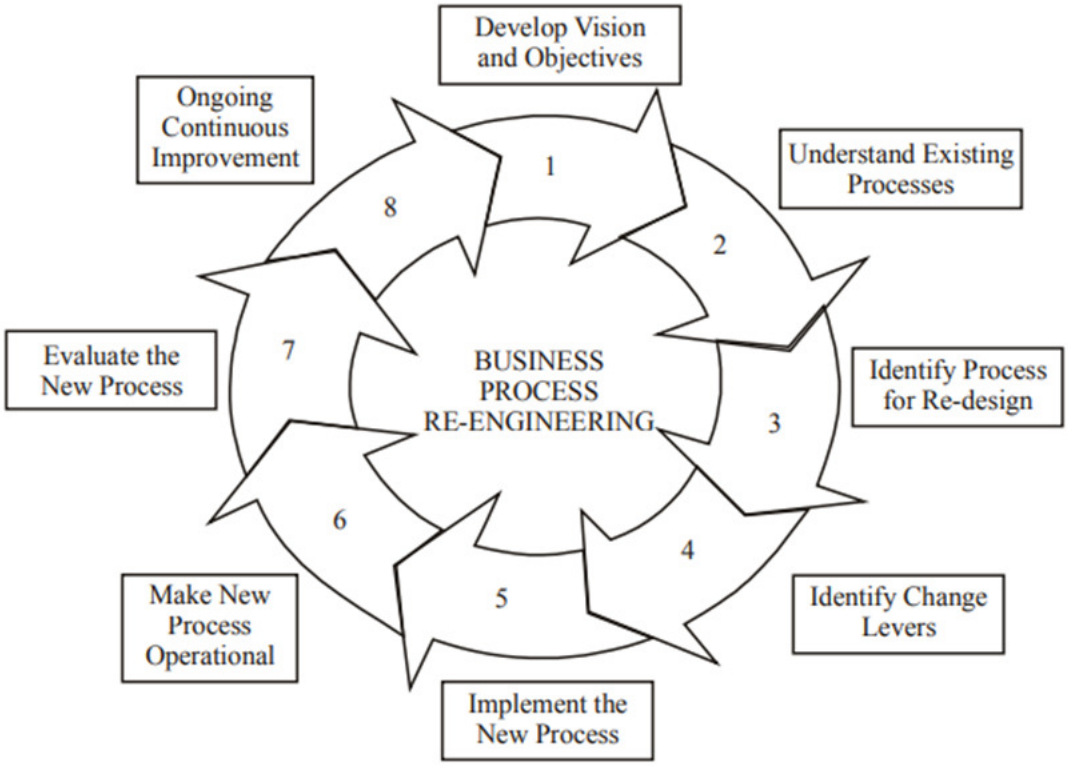

Figure 1: Illustrate the BPR System.

BPR, according to Parker, is the examination and redesign of business and manufacturing processes with the goal of getting rid of any steps that don't add value. With the help of these definitions, we can list the following BPR properties in general:

1. The focus should be on basic issues rather than on organisational components like departments.
2. Processes should get more attention than activities, functions, people, and structures. A process is a collection of actions that start with one or more inputs and end with an output that is useful to the client.

3. A bold strategy that calls for getting to the heart of the matter rather than just making surface adjustments to what is already in place and acting by deleting what is no longer necessary and creating new methods to conduct the activity.
4. Changes that have a remarkable quality that is yielding spectacular effects and not simply causing modest or incremental changes.
5. A close connection between BPR and informatics technologies, a crucial aspect that is difficult to discern from definitions. Without the use of informatics technology, the procedures implemented by BPR would not have been possible.

Concept of BPR

Business Method Re-engineering (BPR) started as a strategy in the private sector to assist businesses in fundamentally rethinking how they do business in order to significantly enhance customer service, reduce operating expenses, and establish themselves as global rivals. The ongoing creation and implementation of complex information systems and networks has served as a major impetus for re-engineering. Instead of enhancing established work practises, leading organisations are getting more daring in their use of modern technology to support novel business processes [5].

One strategy for changing how work is done to better serve the organization's goal and save expenses is business process re-engineering. A high-level review of the organization's purpose, strategic objectives, and customer demands is the first step in re-engineering. Simple inquiries like "Does our purpose need to be redefined? Are our purpose and our strategic aims compatible? Who are the people we serve? When it comes to the requirements and wishes of its consumers in particular, an organisation may discover that it is functioning under dubious assumptions. The organisation doesn't determine how to accomplish anything until it has reconsidered what it should be doing in the first place [6].

Re-engineering focuses on the organization's business processes—the actions and regulations that control how resources are employed to produce goods and services that cater to certain consumers or markets within the context of this fundamental review of the organization's purpose and objectives. A business process may be broken down into distinct activities and then monitored, modelled, and improved as an organised ordering of work tasks over time and space. It may also be entirely changed or deleted altogether. Re-engineering involves identifying, analysing, and redesigning a company's essential business processes with the goal of significantly enhancing key performance indicators including cost, quality, service, and speed. Re-engineering acknowledges that an organization's business operations are often divided into smaller processes and activities that are completed by a number of specialised functional areas. Frequently, no one is in charge of how well the whole process works as a whole.

According to re-engineering, although improving the performance of individual processes might have some advantages, the process as a whole won't change much if it is fundamentally flawed and out of date. Re-engineering focuses on rebuilding the process as a whole in order to generate the best advantages for the business and its clients. Re-engineering differs from process improvement initiatives that concentrate on functional or incremental improvement because of this desire to achieve huge changes by fundamentally reimagining how the organization's work should be done [7].

Instead of having functional hierarchies, successful organisations are seen to be networked across functional boundaries and business processes. However, the issue cannot be solved by just implementing the most recent technology on current processes or procedures. The answer lies in going a step further, reevaluating, and challenging the business activities that serve as the foundation for business processes. According to proponents of BPR, efficient redesign of business processes that eliminates pointless tasks and replaces outdated, functional tasks with cross-functional tasks, along with the use of information technology as a catalyst for this kind of change, will result in appreciable improvements in speed, productivity, service, quality, and innovation. A basic organisational study and redesign of the following are often part of business re-engineering:

1. Organisational structure
2. Job definitions
3. Reward structures
4. Business processes
5. Manage procedures and, sometimes
6. A review of the organisational culture and guiding principles.

BPR requirement

Business process re-engineering (BPR) mandates a comprehensive revamp of an organization's strategic systems and procedures. More and more organisations are integrating information technology (IT) solutions into their core organisational operations in today's technology-driven business environment. Therefore, changing these IT systems' functions is necessary for BPR.

Company process re-engineering aims to rebuild and alter current company procedures or processes in order to significantly boost organisational performance. Although organisational growth is a never-ending process, the rate of change has greatly accelerated. Businesses use Business Process Re-engineering (BPR) to increase competitive advantage in the dynamic global market by dramatically rethinking a few chosen processes. The term "business process re-engineering" refers to modified business processes that together make up a part of a bigger system designed to equip organisations with modern business solutions and innovations. Modern business has made organisational effectiveness a watchword, and as a consequence, business process re-engineering is under constant pressure.

Important problems like "how should work be redesigned" and "who does it" are raised by the rife and quick spread of competition across markets and regional boundaries. as well as "where do they do it" and "how to get it done"? These concerns call for incorporating business process re-engineering into the entire strategy in order to maintain a competitive edge, control costs, distinguish goods, and manage prices effectively. It is important to clarify what "business process" and "business process re-engineering" are at this point.

Business processes, according to Stoddard and Jarvenpea (1995), are only a collection of actions that used people and tools to convert a set of inputs into a set of outputs (goods or services) for another person or process. A specified business output or outcome is the end result of a group of logically connected actions that make up a business process. It includes a broad range of tasks including product development, customer care, order fulfilment, and sales.

Re-engineering of business processes thus becomes a subset of business processes. According to Hammer and Champy (1993), there is broad agreement that organisational processes need to be fundamentally reexamined and completely redesigned in order to drastically enhance existing performance in terms of cost, service, and speed. The study and design of workflows and processes both inside and across organisations may thus be assumed to be a part of business process re-engineering.

A separate school of thinking underpins business process re-engineering. Re-engineering presupposes that the present process is irrelevant and that a new one has to be started. It supports continual process improvement. The business process designers may concentrate on brand-new processes thanks to this "blank slate" viewpoint. To project one's own ideas of how the process should go, is this the case? In what form do my consumers want it? How do the best-in-class businesses operate? What may be possible without technology?

Reengineering business processes has a mixed record of success. Business process re-engineering initiatives consequently sought to improve ineffective work processes. From this point forward, businesses like banks and other financial institutions must optimise the outcomes of this model in actual business circumstances. It is a well-established and well-documented strategy for firms to enhance how they function by raising the efficiency and effectiveness of their business operations. The need for constantly evolving process improvements has been fueled by the quick advancements in enabling technology and increasing client wants, expectations, and complexity [8].

PricewaterhouseCoopers continues to provide its customers with a superior business process improvement solution based on solid methodology and tools and supported by a demonstrated track record of success, locally and globally, in response to this requirement. Services for process re-engineering include:

1. 1.Process development and design
2. 2.Process analysis
3. Process modelling
4. 4.Process simulating
5. Assistance with process implementation

The BPR Life Cycle serves as an organization's closed-loop learning mechanism to support organisational learning and continuous development. BPR Life Cycle is shown in figure below (Figure 1). The following are some of the key elements of a business process reengineering life cycle:

1. Recognition of existing business procedures
2. Analyse, review, and adjust "As-Is" procedures.
3. Creating procedures for "To-Be"
4. Evaluation and application of "To-Be" procedures

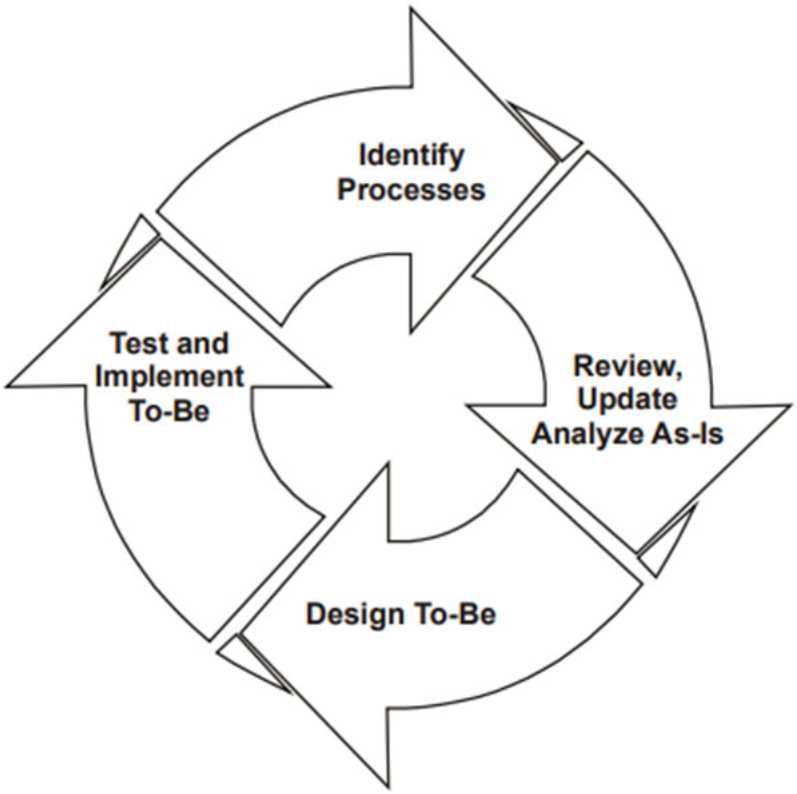

Figure 1: Illustrate the BPR Life Cycle.

Components of BPR

BPR is often thought of as having four components: strategies, processes, technology, and people. The strategies and processes are what provide the foundation for the utilisation of the technologies and the redesign of the system of human activity. Below will be a quick discussion of these four dimensions (Figure 2).

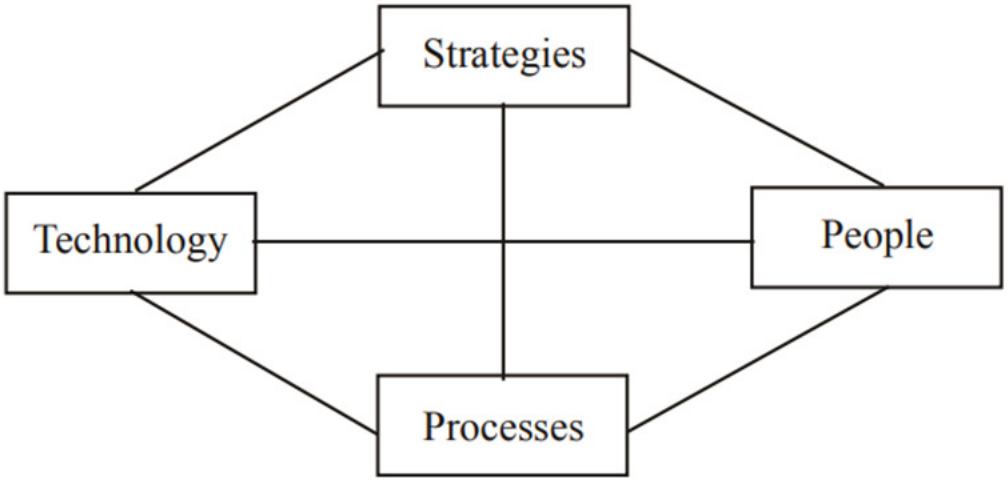

Figure 2: Illustrate the Elements of BP.

The strategy component must include the organisation, technological, and human resource strategies found within the other areas of interest. All plans must be decided with consideration for the changing markets that the organisation operates in, with less emphasis on internal factors and more on the outside factors that are necessary for effective market action. In addition, strategies must be current and relevant to the company's goal as well as to internal and external restrictions. This necessitates a possible assumption of additional change, which suggests that strategies may need to be reevaluated and redefined. In order to motivate workers and align the workforce with the strategy, they must be described in a manner that makes sense to them. Within an organisation, there are many levels at which processes may be described. Finding fundamental procedures that satisfy client expectations and provide value for them is the problem [9]. Although organisational restrictions must be taken into account, it is crucial to note that procedures are established by client needs rather than by internal organisational requirements. The transition from functional departments to inter-functional processes entails a complete overhaul of the human activity system and organisational structure, and it involves process- rather than task-optimization.

Implications of Business Process Re-engineering

Michael Hammer has undoubtedly received the majority of the BPR publicity due to the extreme tone with which he speaks. The notions of Davenport and Short's new business process redesign, however, are identical to those put out by Hammer and subsequently Hammer and Champy. They both agree that processes should be altered comprehensively rather than by gradually removing obstacles. Additionally, they agree that IT should play a crucial part in the transformation of business processes. The main benefit of their theories is that they provide a different formulation of the process business than the functional hierarchical organisation that companies had previously embraced. The creators of BPR have often shown in their publications how poorly functional organisations coordinate and how much better process organisations are at both coordination and performance improvement. The process enterprise, in its most extreme iteration, replaces functional organisation with a solely process-based one.

Having a matrix structure of process-hierarchy and functional-hierarchy is the most practical strategy for turning an organisation into a process business. As previously said, process enterprise promises to be more responsive to market demands and is best suited for businesses that compete on unique goods or services rather than just price. Organisational realignment does not, however, by itself provide improvements. Change in management techniques and perspectives must go hand in hand with organisational restructuring. Data in support of this opinion may be found in a 1996 Harvard Business Review paper by Ann Majchrzak and Qianwei Wang of the University of Southern California [10].

They examined the cycle times of 86 departments that assemble printed circuit boards for electronic industries. The same production procedures were carried out by these divisions at both big and small electronics manufacturers. 31 of the 86 departments were classified as process-complete, which means they carry out production processes, support duties, and customer interaction. The other departments are conventionally functional and do not engage in many tasks that are not directly related to production. The authors were surprised to see that cycle times for processcomplete departments were not any quicker than those for functional departments. Further investigation revealed that departments with completed processes had cycle durations that were shorter when management procedures were in place to encourage group accountability. Overlapping duties in employment, group-based incentives, open workspaces, and collaborative

work processes are some of these practices. After accounting for these management practises in the analysis of the data, it was discovered that process-complete departments that had adopted these practises saw cycle durations that were up to 7.4 times quicker than those of process-complete departments that had not.

Additionally, departments that operate with a process-complete perspective as opposed to a functional mindset have cycle durations that are up to 3.5 times longer than functional departments. Restructuring an organisation by itself does not always result in the anticipated gains. To achieve the intended goals, management practises and attitudes must also change in tandem with structural transformation. In fact, as we shall explain a little later, one of the main shortcomings of conventional BPR practises is the lack of emphasis on the human aspect of change.

What impact does BPR have on business performance? Many success stories have received a lot of media attention. Ford was able to reduce the number of employees in its accounting department by 75%, Mutual Benefit Life increased productivity in its insurance applications department by 60%, Hewlett-Packard increased the percentage of on-time deliveries in its purchasing department by 150%, and American Express was able to cut the average processing time for transactions by 25%. Hammer acknowledges that between 50% and 70% of business process re-engineering efforts fail. Along with Hammer's estimation of the failure rate, a survey revealed that only 16% of corporate leaders were completely happy with their BPR deployments [11].

BPR implementation's failure has often been attributed to its radicalism. BPR implementations used a clean-slate approach to business process modifications rather than expanding on what previously existed. In a perfect world, this strategy would provide creative business process designs a competitive edge. The truth often turns out to be quite different. On the project implementation teams, business users and decision-makers were often underrepresented. In many cases, the bulk of the project team was made up of IT and outside consultants. This led to the implementation of solutions that were largely influenced by best practises recommended by ERP systems. These "best practise" business procedures are often neither unique or distinctive since they are general. BPR has often been utilised as a cover for restructuring.

As a result, it often caused discontent among the workers. The original BPR prescriptions omitted advice on how to handle organisational transformation and human resource problems. On many BPR projects, the only functions that change management provided were those of communication and training. Front-line employees and middle managers showed a lot of resistance since BPR project methods combined a top-down implementation strategy with a weak change management role. Early BPR implementations also had a strong technical and process emphasis. These changes were often implemented without equivalent adjustments to the organisational structure. This led to re-engineering steps that were only partially successful, with new cross-functional procedures that were jointly owned by many functional divisions. Chaos often resulted from a lack of clear ownership of the process. In the business sector, BPR received unfavourable judgements as a result of a number of causes.

CONCLUSION

To sum up, business process re-engineering (BPR) is a strategic initiative that organisations may embark on to fundamentally rethink and rebuild their business processes in order to achieve significant gains in performance, efficiency, and customer satisfaction. In order to minimise duplication, simplify workflows, and take advantage of technological improvements, BPR entails

analysing current processes, spotting inefficiencies, and making radical changes. Organisations may significantly increase productivity, save costs, and enhance operational efficiency by questioning conventional methods of doing business and implementing new solutions. There are various advantages to BPR. It allows businesses to increase process efficiency, optimise resource allocation, and get rid of unnecessary tasks. BPR encourages fluid and seamless operations, which leads to quicker response times and higher customer satisfaction by reducing bottlenecks, streamlining processes, and connecting disparate systems.

REFERENCES

[1] G. N. Evans, D. R. Towill, and M. M. Naim, "Business process re-engineering the supply chain," *Prod. Plan. Control*, 1995, doi: 10.1080/09537289508930275.

[2] B. Beškovnik and M. Zanne, "Business Process Re-Engineering of a Maritime Car Terminal: Changing from Inbound to Outbound Intermodal Node in Finished Vehicle Logistics (FVL)," *Polish Marit. Res.*, 2018, doi: 10.2478/pomr-2018-0096.

[3] K. Wei Khong and S. Richardson, "Business process re-engineering in Malaysian banks and finance companies," *Manag. Serv. Qual. An Int. J.*, 2003, doi: 10.1108/09604520310456717.

[4] J. Peppard, "Broadening visions of business process re-engineering," *Omega*, 1996, doi: 10.1016/0305-0483(95)00063-1.

[5] Y. Borgianni, G. Cascini, and F. Rotini, "Process value analysis for business process re-engineering," *Proc. Inst. Mech. Eng. Part B J. Eng. Manuf.*, 2010, doi: 10.1243/09544054JEM1460.

[6] L. J. Chang and P. Powell, "Towards a framework for business process re-engineering in small and medium-sized enterprises," *Inf. Syst. J.*, 1998, doi: 10.1046/j.1365-2575.1998.00035.x.

[7] I. Martin and Y. Cheung, "Business process re-engineering pays after enterprise resource planning," *Bus. Process Manag. J.*, 2005, doi: 10.1108/14637150510591174.

[8] R. Dekkers, "Adapting organizations: The instance of business process re-engineering," *Syst. Res. Behav. Sci.*, 2008, doi: 10.1002/sres.857.

[9] Y. C. Lee, P. Y. Chu, and H. L. Tseng, "Corporate performance of ICT-enabled business process re-engineering," *Ind. Manag. Data Syst.*, 2011, doi: 10.1108/02635571111137287.

[10] M. Bertolini, M. Bevilacqua, F. E. Ciarapica, and G. Giacchetta, "Business process re-engineering in healthcare management: A case study," *Bus. Process Manag. J.*, 2011, doi: 10.1108/14637151111105571.

[11] S. E. Chang, Y. C. Chen, and T. C. Wu, "Exploring blockchain technology in international trade: Business process re-engineering for letter of credit," *Ind. Manag. Data Syst.*, 2019, doi: 10.1108/IMDS-12-2018-0568.

CHAPTER 4
MANUFACTURING PERSPECTIVE OF ERP

Mrs. Salma Syeda, Assistant Professor
Masters In Business Administration, Presidency University, Bangalore, India
Email Id: syeda.s@presidencyuniversity.in

ABSTRACT:

ERP (Enterprise Resource Planning) solutions are essential for simplifying and optimising production processes from a manufacturing standpoint. ERP systems provide a complete answer for integrating and controlling different manufacturing processes, such as production planning, inventory management, supply chain management, and quality control. ERP systems are advantageous to manufacturing companies in a number of ways. First, by coordinating demand forecasts, resource allocation, and scheduling, ERP allows effective production planning. This aids businesses in successfully meeting consumer requests, reducing lead times, and optimising manufacturing capacity. Second, by giving real-time insight into inventory levels, monitoring material consumption, and automating replenishment procedures, ERP systems help with inventory management. This prevents stockouts, excess inventory, and related expenditures by ensuring that the appropriate resources are available at the appropriate time.

KEYWORDS:

Database, Information, Integrated manufacturing, Management information system.

INTRODUCTION

Efficiency, agility, and good resource management are critical for success in today's competitive industrial environment. Production planning, inventory management, supply chain coordination, and quality control are just a few of the intricate procedures that manufacturing organisations must negotiate. ERP (Enterprise Resource Planning) systems have become effective tools for addressing the particular problems encountered by manufacturers, helping them to improve efficiency, simplify operations, and gain a competitive advantage. ERP systems provide a full range of integrated applications that are particularly designed to manage and optimise the many aspects of the manufacturing process. These technologies make it possible for real-time visibility and seamless collaboration to occur amongst many departments, including distribution, inventory management, and manufacturing [1].

ERP solutions are designed to meet the special needs of the industrial sector. These include capacity planning, quality management, material requirement planning (MRP), bill of materials (BOM) management, demand forecasting and planning, and shop floor control. ERP systems provide manufacturers a comprehensive perspective of their operations by combining various features on a single platform, empowering them to take wise choices, increase process effectiveness, and successfully satisfy consumer requests.

The capacity of ERP systems to automate and simplify activities is one of its primary advantages in the industrial sector. Through the manufacturing process, these systems enable the smooth flow of information and materials, lowering human involvement, decreasing error, and increasing

operational effectiveness. ERP systems provide firms the ability to manage production schedules, regulate quality, and optimise inventory levels, which improves product consistency, lowers costs, and shortens time to market.

Additionally, ERP systems provide useful data analytics capabilities to factories. Organisations may get important insights into operational performance, spot bottlenecks, and make data-driven choices by gathering and analysing data from all phases of the manufacturing process. These data help firms increase operational efficiency overall, pinpoint problem areas, and optimise manufacturing processes [2]. ERP systems are also essential for managing the supply chain for manufacturing. They make it possible for businesses to keep tabs on the flow of raw materials, control supplier performance, and guarantee the prompt delivery of final goods. Manufacturers may improve visibility, save lead times, and foster strong collaborative relationships with suppliers by integrating supply chain management into the ERP system. In nutshell ERP systems provide industrial organisations with a strong and complete solution to address the particular issues they encounter. From planning and demand forecasting through production management and supply chain management, these solutions provide an integrated approach to controlling and optimising the manufacturing process. Manufacturers may increase operational effectiveness, save costs, and increase agility in fulfilling consumer expectations by using the features of ERP systems [3].

DISCUSSION

Row resources are converted into useful goods in businesses via a procedure. Similar to this, when data are inputted into an information system, they are processed and converted into information, or output. The enterprise's data is transformed into useable information via technology through the use of the ERP.

Systems for Manufacturing Information

The production/operations function, which comprises all activities related to the planning and management of the processes that generate products or services, is supported by manufacturing information systems. The administration of the operational systems used by all business organisations is a responsibility of the production/operations department. All businesses that need to organise, monitor, and regulate inventories, purchases, and the flow of products and services are supported by information systems used for operations management and transaction processing.

The following industrial processes benefit from information systems:

1. 1.Material reallocation between orders.
2. Material demand evaluation.
3. Plant activity scheduling.
4. Adaptive inventory control
5. Classifying work orders according to "characteristics"
6. Resources required to complete the assignment

Integrated manufacturing using computers (CIM)

Computer-based manufacturing information systems assist computer-integrated manufacturing (CIM) through a number of key methods. CIM is a broad concept that emphasises the need of the following objectives for computer usage in industrial automation:

1. **Simplify:** As a crucial building block for automation and integration, simplify (re-engineer) production procedures, product designs, and factory layout.
2. Use computers, machines, and robots to automate both production processes and the business operations that support them.
3. **Integrate:** All computer-based, telecommunications-based, and other information technology-based production and support activities.

(CAD) Computer-aided design

The practice of using computers for design and design documentation is known as computer-aided design (CAD), sometimes known as computer-aided design and drafting (CADD). The process of drafting using a computer is referred to as computer-aided drafting. The user is given input tools via CADD software, or environments, in order to streamline design processes, as well as drawing, documentation, and manufacturing processes. The output from CADD is often in the form of digital files for printing or machining. Construction, manufacturing, and other industries often employ vector-based (linear) environments whereas graphic-based software uses raster-based settings; the development of CADD-based software is directly correlated with the processes it strives to streamline [4].

The automobile, shipbuilding, and aerospace sectors, as well as the fields of industrial and architectural design, prosthetics, and many more, employ computer-aided design (CAD) extensively. Computer animation for special effects in films, advertisements, and technical guides is another common use of CAD. Even perfume bottles and shampoo dispensers now are created utilising methods that would have been unthinkable to engineers in the 1960s due to the pervasiveness and power of computers in contemporary society. CAD has been a key driving factor for research in computational geometry, computer graphics (both hardware and software), and discrete differential geometry due to its huge economic relevance.

Uses for CAD

One of the various tools used by engineers and designers is computer-aided design, which may be used in a variety of ways depending on the user's profession and the programme being utilised. CAD is used in conjunction with other tools that are either integrated modules or stand-alone products since it is a component of the whole Digital Product Development (DPD) activity inside the Product Lifecycle Management (PLM) process. Examples of these additional tools include:

1. Finite element analysis (FEA) and computer-aided engineering (CAE)
2. Computer-aided manufacturing (CAM), which incorporates directives for CNC machines
3. rendering that is photorealistic
4. The use of Product Data Management (PDM) for document management and revision control.

CAM, or computer-aided manufacturing

The process of converting computer-aided design (CAD) models into production instructions for numerically controlled machine machines is known as computer-aided manufacturing (CAM).

Computer-aided manufacturing applications

Over the last four decades, the area of computer-aided design has progressively improved to the point where conceptual drawings for new items may now be created wholly inside the framework

of CAD software. No physical prototypes need to be built at any point in the process, from the creation of the basic design through the Bill of Materials required to create the product.

By bridging the gap between conceptual design and final product manufacture, computer-aided manufacturing goes one step further. Computer-Aided Manufacturing software enables the direct conversion of data from CAD software into a set of manufacturing instructions, whereas in the past it was necessary to manually convert a design created using CAD software into a drafted paper drawing outlining instructions for its manufacture [5].

CAM software transforms 3D CAD models into a set of fundamental G-Code operating instructions. G-code is a programming language that numerical controlled machine tools, which are basically industrial robots, can understand. Using G-code, a machine tool may be instructed to make a huge number of objects with absolute accuracy and loyalty to the CAD design.

A "cell" is a grouping of contemporary numerically controlled machine tools that each carry out a specific function in the production of a good. Similar to a production line, the product is moved through the cell when each machine tool (such as drills, lathes, welding and milling machines) completes a particular phase of the process. A single computer-based "controller" may operate all of the tools in a single cell for convenience's sake. This controller may be given G-code instructions, and it can be left to manage the cell with little involvement from human supervisors.

Origin of CAD/CAM

Three different places served as the foundation for CAD, highlighting the fundamental functions that CAD systems provide. Attempts to automate the drafting process led to the development of the first CAD systems. The General Motors Research Laboratories were the forerunners of these advancements in the early 1960s. The ability to swiftly adjust or edit a model by changing its parameters is one of the key time-saving benefits of computer modelling over conventional drawing techniques. The simulation-based design testing process was the second source of CAD. High-tech sectors like semiconductors and aircraft led the way in using computer modelling to assess goods. Numerical control (NC) technologies, which were widely used in many applications by the middle of the 1960s, were used to try to streamline the transition from the design phase to the production process, which led to the third source of CAD development. This source is what led to the connection between CAD and CAM. The ever-tighter integration between the design and manufacturing phases of CAD/CAM-based production processes is one of the most significant developments in CAD/CAM technology [6].

Because the design and fabrication of a component could be done using the same method of storing geometrical data, the development of CAD and CAM, and especially the connectivity between the two, overcome conventional NC disadvantages in cost, simplicity of use, and speed. This invention significantly reduced the time between design and production and increased the range of manufacturing processes for which automated technology could be employed profitably. Importantly, CAD/CAM enabled the integration of the design and manufacturing processes by giving the designer far more direct control over the production process.

After the early 1970s, the usage of CAD/CAM technology grew quickly thanks to the invention of the microprocessor and mass-produced silicon chips, which allowed for more easily accessible and inexpensive computers. The usage of CAD/CAM expanded from major companies utilising large-scale mass production processes to organisations of all sizes as the price of computers

continued to drop and their processing capacity increased. Additionally, the range of activities to which CAD/CAM was used expanded. In addition to classic machine tool procedures like stamping, drilling, milling, and grinding, companies that make consumer electronics, electronic components, moulded plastics, and a variety of other goods have started using CAD/CAM. Because the control data are not dependent on geometrical dimensions, computers are also used to control a variety of production processes (such chemical processing) that are not precisely characterised as CAM [7].

It is feasible to model in three dimensions how a component will travel through a manufacturing process using CAD. This method may mimic a machine's feed rates, angles, and speeds as well as the location of part-holding clamps, range, and other operational limitations. One of the primary ways that CAD and CAM systems are integrating more and more is via the ongoing advancement of simulation of different production processes. Communication between persons engaged in design, production, and other processes is also made easier by CAD/CAM systems. This is especially crucial when one company hires another to develop or manufacture a component.

Planning for Material Requirements (MRP)

The purpose of Material Requirements Planning (MRP) is to help manufacturers manage their inventories and production. By using MRP, you may prevent unnecessary expenditures from being incurred by having the materials on hand too early and guarantee that they will be accessible in the right amount and at the right time for production to happen. The use of MRP makes it easier to create and, if necessary, modify production plans to meet anticipated demand as well as replenishment plans to guarantee the timely availability of raw materials and all levels of product components.

A Bill of Materials (BOM) is created at the outset of MRP for each target end product or component. This is a list of the materials and their necessary amounts for producing the finished product or particular part. Theoretically, until only raw materials are included in the created BOMs, the compilation of BOMs continues recursively, listing the subcomponents required to make each component. In actuality, a manufacturer can want to extend the BOM enumeration just a certain number of levels and presume that raw materials and/or components below that level are readily accessible. To manufacture the components and finished goods, each manufacturing or assembly process needs to know the lead periods connected with it. Lead time, which is the amount of time that passes between the time when all necessary components are present and the completion of assembly or manufacturing, is the time needed to assemble or manufacture the required components into the finished product (or higher-level component). These lead times may be calculated based on specified batch sizes or may be calculated per unit of each component or product.

The Master Production plan, which outlines a plan of assembly and production that allows the manufacturer to fulfil the expected demand, is produced by MRP by combining the BOMs, lead times, and estimations of demand for final products. This schedule, which covers both the time and quantities of manufacturing, solely deals with the last stage of assembly or production (resulting in finished goods). All additional output data from MRP is based on the Master Production Schedule.

The task of combining the Master Production Schedule with the information on lead times and BOMs to create a schedule of component (and possibly raw material) requirements through as

many levels of assembly and production as the manufacturer chooses is conceptually straightforward but computationally challenging. This plan may take into consideration things like ongoing projects, available stock and unfulfilled orders for materials and components, as well as the direct demand for those components as service items. The manufacturer must choose a material replenishment plan that meets these standards using this schedule of requirements. Computer-based MRP models may include a broad range of ordering rules and heuristics.

The Master Production Schedule may provide other important data in addition to the material needs. These consist of the anticipated stock levels for any finished product, the anticipated timetable for any assembly or manufacturing process, and the anticipated capacity utilisation for a certain production activity. Any of these data ought to be helpful in assessing present or projected materials replenishment plans [8].

The technological and complex nature of production control systems might be intimidating. However, a straightforward comparison may be used to show why a system like MRP is necessary (Slack et al. 1995). Imagine that you will be holding a party for around 40 people in four weeks. You've made the decision to provide sandwiches, savoury snacks, beer, wine, and soft beverages. The night-of assembly would need some planning and production management. You would first need some rough estimations of your visitors' tastes in red or white wine, beer, fruit juice, etc. You would consider what you already have in stock at home before going shopping for these products. Shopping for the food at the party would once again include looking up the items listed in your food recipes for the different dishes and deducting them from your shopping list.

You must next consider the order in which the cooking and preparation will take place in addition to determining the number of materials and ingredients you need in relation to the anticipated demand. Since you can't complete everything in one sitting, you can decide, for instance, to prepare part of the food up to a week in advance and freeze it. This might include buying certain ingredients now and saving others for later. In order to effectively plan and manage your material acquisition and manufacturing process, you must throw a successful party. Based on predictions of the attendance at the party and your recipes for creating the completed dishes, you must decide the amount and time of the purchase and manufacturing of various components.

Although planning a party is far simpler than organising a manufacturing process, production control systems like MRP are designed to deal with issues that are comparable. The master production schedule (MPS), which may be compared to the party's food and beverages, is created by the front end. Over a specified planning horizon, the MPS schedules the manufacturing of the products made available to consumers. The back end organises supplies from suppliers and schedules production (equivalent to doing the shopping, planning, and cooking at home). The core component of the engine is material requirement planning (MRP). It uses a collection of MPS needs broken down by time to create a corresponding set of component and raw material requirements, similar to how our culinary recipes build shopping lists. The precise plan for the parts needed to complete the MPS is known as the MRP [8].

MRP contains two more inputs in addition to the MPS. A bill of materials (BOM) lists the part numbers of the corresponding components for each part number. Therefore, the BOM would indicate that a top assembly and four legs were needed for a dining room table. A sub frame, two leaf inserts, two end panels, and the BOM for the top assembly would all be necessary. The bill of materials (BOM) for the legs would demonstrate the need for strong lumber stock and the related hardware kits (screws and castors). The third input to MRP, inventory status data, would show how

many legs, leaf inserts, etc. were in stock, how many had been ordered, and how many had been committed to production. This would make it possible to determine the needs for further table production. Thus, for each component number, a time-phased need record may be created using MRP data. The intricate capacity planning modules may be operated using this data. Only the usage of contemporary computers allows for this enormous computing operation to be completed.

Material Bill of Materials

A list of the raw materials, sub-assemblies, intermediate assemblies, sub-components, components, parts, and the quantities of each are included in a bill of materials, also known as a BOM. A bill of materials (BOM) may describe a product while it is being created (engineering bill of materials), ordered (sales bill of materials), manufactured (manufacturing bill of materials), or maintained (service bill of materials). Depending on the business necessity and intended usage, multiple BOM kinds exist. The BOM is often referred to as the recipe, formula, or ingredients list in process industries. The list of components used on the printed wire board or printed circuit board is known as the BOM in electronics. After the circuit design is finished, the BOM list is sent to the PCB layout and component engineers, who will order the components needed for the design.

Bill of Materials characteristics

1. Understanding of present and future availability using Available to Promise and Component Availability
2. Visually drilling down into current material bills of lading
3. Use existing or optional components.
4. Include media objects for assembly videos or images.
5. Component replacement on a global scale
6. User-defined cost groups, number six
7. Definition of optional route
8. Engineering change history tracking
9. Each assembly has several user-defined fields.
10. The copy from feature makes creating fresh invoices easier
11. The name, revision, drawing, and effective dates for the engineer
12. Tracking of engineering change orders (ECOs)

Manufacturing Resource Planning (MRPII)

According to APICS, Manufacturing Resource Planning (MRP II) is a technique for efficiently planning all of a manufacturing company's resources. It should cover unit-based operational planning, dollar-based financial planning, and include simulation capabilities to address "what-if" scenarios and extend closed-loop MRP. MRP II stands for Manufacturing Resource Planning. - In the 1980s, MRP (Material Requirement Planning) changed into a new idea called Manufacturing Resource Planning (e.g. MRP 2) due to excessively frequent changes in sales predictions that required constant readjustments in production [9].

MRP II may exist in a variety of forms since it is not a proprietary software system. Although it is almost hard to imagine an MRP II system without a computer, an MRP II system may be built using either externally-purchased software or internally-developed software. The design of almost all MRP II systems is modular. An MRP II system's typical basic modules include:

1. One is the Master Production Schedule (MPS).
2. Technical Data (Item Master Data)
3. Technical Data or the Bill of Materials (BOM)
4. Manufacturing Technical Data (Production Resources Data)
5. Orders and Inventories (Inventory Control)
6. Purchasing Administration
7. Planning for Material Requirements (MRP)
8. SFC, or Shop Floor Control
9. Planning for capacity requirements, often known as CRP
10. Cost control using standard costing
11. Cost Management / Reporting (Cost Control)

Planning for Distribution Requirements

A supply channel consists of three different parts. The producer is located at one end of the channel. The distribution process is started by the manufacturer, who concentrates on product creation and manufacturing. The merchant that sells products and services to customers directly for their own, non-commercial usage is the channel's terminal point. Distribution, which is more difficult to define, sits between the two. A person who participates in distribution is known as a "distributor." A distributor is defined as "a business that does not manufacture its own products but purchases and resells these products" by the APICS Dictionary. Such a company often keeps an inventory of completed items. The emergence of alternative distribution channels including warehouse clubs, catalogue sales, marketing channel experts, and mail order have muddied functional lines and made it more difficult to define the distribution process and the word distributor.

In the end, one may argue that distributors are any businesses that sell goods to retailers and other merchants, as well as to industrial, institutional, and commercial customers, but do not make a major percentage of their sales directly to the final consumer. By this definition, the majority of businesses engaged in the distribution of completed goods and raw materials fall within the purview of the distribution industry. Adopting this definition broadens the scope of distribution to include almost all material management and physical distribution activities carried out by channel elements, with the exception of production and retailing [10].

Physical Distribution Management

When a business establishes a network or channel of middlemen who are in charge of managing the movement of products from the producer to the customer, there are several choices that need to be made. The firm must define what kind of connection it wants to have with each of its intermediate partners and carefully choose each channel member. After creating such a network, the company must next think about the best way to physically get these items from the point of production to the point of consumption. The goal of physical distribution management (PDM) is to make sure the product is at the appropriate location at the appropriate time. PDM is increasingly understood to be a crucial component of supply chain management in general. PDM may be optimised using business logistical approaches to save costs and increase customer satisfaction. There is no value in generating significant distribution cost reductions if, in the long term, revenues are lost due to disgruntled customers.

Similar to this, it is not economically sensible to give a degree of service that the client does not want yet reduces profitability. Physical distribution managers are faced with the fundamental conundrum of this cost/service balance. The more demanding nature of the corporate environment is the cause of PDM's rising relevance. Large stockpiles of raw materials and components were formerly a standard practise among businesses. Although stockholding practises vary greatly between sectors and across companies, today's stock levels are generally maintained to a minimum.

Holding stock is a waste of working capital since it does not generate revenue for the business. It is much too limited to evaluate the logistical process just in terms of transportation. Physical distribution management (PDM) is concerned with the movement of products from the time an order is received until the client receives them. PDM entails careful coordination with transportation as well as production planning, buying, order processing, material control, and warehousing. To provide the quality of service that the client expects at a price the business can afford, all these areas must be controlled so that they work well together.

Configure-to-order

When a user orders a product, they may specify its component make-up (or configuration), and the vendor can then generate that configuration on the fly after they get the order. This is known as configure-to-order (CTO). Customise-to-order (CTO) is a manufacturing process that enables you to choose a basic product and customise all of the variable parameters linked to it. Configure-to-Order (CTO) systems often produce the production routing and/or bill of materials based on features and choices such as colour, size, etc. for the customizable goods on each bid or order.

CTO, or configure-to-order, is a manufacturing method that enables consumers to customise a generic product's characteristics to meet their unique needs at the moment an order is made. Manufacturers and suppliers have a distinct edge to remain ahead of the competition when they provide customised items. After the customer confirms the purchase, the CTO product or service is built or rendered. The CTO process is very important since it calls for a high level of competence to meet individual needs and guarantee total client satisfaction. The increasingly complicated procedures and applications may have an impact on commercial operations including customer service, supply chain management, billing, and order fulfilment. In order to manage the transportation of materials in the supply chain, suppliers that provide CTO services must make sure that their solutions and services exhibit extensive and cutting-edge capabilities.

A knowledgeable CTO service provider is well-versed in the most recent procedures and software that are relevant to the CTO environment. The procedures may be readily integrated with other crucial corporate operations. Orders ranging from low-volume, high-mix to high-volume, low-mix may be handled by their services. The solutions assist clients in configuring desired items through websites as well. Based on the requirements of the design as requested by clients, the designing team and technicians operate. The client is then given access to software tools to carry out the design. The CTO providers must also make sure that clients get frequent status updates with up-to-date information.

By allowing self-service requests, web-based systems assist clients with order processing and quote operations. They also continue to play the functions of pricing and configuration. Customers may use these tools to carry out a simple and streamlined purchasing procedure as well as develop and test settings online. It is a well designed model with several operating features that can accommodate bulk modification while upholding deadlines. Professionals with excellent expertise

configuring, testing, and debugging a wide range of devices, including PCs, servers, switches, hubs, video, peripherals, audio, image products, components, and accessories, provide CTO services.

CONCLUSION

In conclusion, from the standpoint of manufacturing, implementing an Enterprise Resource Planning (ERP) system has a lot of advantages and benefits for businesses in the sector. First and foremost, ERP systems provide a centralised platform for controlling and monitoring all facets of manufacturing operations, such as production scheduling, inventory management, purchasing, and shop floor control. Better visibility and coordination across various production processes are made possible by this centralised approach, which boosts productivity and shortens lead times. Second, ERP systems make it easier to estimate demand and plan production. Organisations are able to optimise production schedules, coordinate resources, and reduce stockouts or overstocks by integrating sales, inventory, and production data. As a result, inventory management is enhanced, carrying costs are decreased, and customer expectations are better met.

REFERENCES

[1] S. Ranjan, V. K. Jha, and P. Pal, "Antecedents and imperatives of integrating SCM and ERP in manufacturing organizations: A coneptual perspective with big data analytics," *Int. J. Control Theory Appl.*, 2016.

[2] S. Muchina, "ERP Adoption and Organizational Efficiency- Balance Score Card Approach among Manufacturing SMEs in Kenya," *Bus. Manag. Horizons*, 2018, doi: 10.5296/bmh.v6i1.11826.

[3] P. Upadhyay, S. Jahanyan, and P. K. Dan, "Factors influencing ERP implementation in Indian manufacturing organisations: A study of micro, small and medium-scale enterprises," *J. Enterp. Inf. Manag.*, 2011, doi: 10.1108/17410391111106275.

[4] L. L. Hsu and M. Chen, "Impacts of ERP systems on the integrated-interaction performance of manufacturing and marketing," *Ind. Manag. Data Syst.*, 2003, doi: 10.1108/02635570410514089.

[5] I. Mahmud, T. Ramayah, and S. Kurnia, "To use or not to use: Modelling end user grumbling as user resistance in pre-implementation stage of enterprise resource planning system," *Inf. Syst.*, 2017, doi: 10.1016/j.is.2017.05.005.

[6] E. Manavalan and K. Jayakrishna, "A review of Internet of Things (IoT) embedded sustainable supply chain for industry 4.0 requirements," *Comput. Ind. Eng.*, 2019, doi: 10.1016/j.cie.2018.11.030.

[7] H. Y. Lee and N. J. Wang, "Cloud-based enterprise resource planning with elastic model–view–controller architecture for Internet realization," *Comput. Stand. Interfaces*, 2019, doi: 10.1016/j.csi.2018.11.005.

[8] V. Ilin, J. Ivetić, and D. Simić, "Understanding the determinants of e-business adoption in ERP-enabled firms and non-ERP-enabled firms: A case study of the Western Balkan Peninsula," *Technol. Forecast. Soc. Change*, 2017, doi: 10.1016/j.techfore.2017.07.025.

[9] U. M. Z. Usman, M. N. Ahmad, and N. H. Zakaria, "The determinants of adoption of cloud-based ERP of Nigerian's SMEs manufacturing sector using TOE framework and DOI theory," *Int. J. Enterp. Inf. Syst.*, 2019, doi: 10.4018/IJEIS.2019070102.

[10] S. N. R. Ali, P. Rajagopal, V. P. K. Sundram, S. B. Saihani, and S. Noranee, "ERP system implementation in a leading LED manufacturing in Malaysia: A supply chain perspective," *Int. J. Supply Chain Manag.*, 2020.

CHAPTER 5
ANALYSIS OF ERP MODULES

Dr. Nishant Labhane, Assistant Professor
Masters In Business Administration (General Management), Presidency University, Bangalore, India
Email Id: nishantbhimrao@presidencyuniversity.in

ABSTRACT:

ERP (Enterprise Resource Planning) solutions have become crucial for businesses across a range of sectors to improve decision-making, increase efficiency, and simplify operations. ERP modules are specialised parts of an ERP system that focus on certain functional areas and help businesses run their operations more efficiently. Overviews of the most important ERP modules and their individual functionality are given in this paper. Finance and accounting, human resources, supply chain management, customer relationship management, and manufacturing are among the courses addressed. The budgeting, financial reporting, accounts payable and receivable, general ledger administration, and financial transactions are all handled by the finance and accounting module. It offers precise financial analysis and forecasting and gives organisations real-time insights into their financial health.

KEYWORDS:

Accounting Systems, Computer-aided Manufacturing, Manufacturing Systems, Marketing Systems, Transaction Processing Cycle.

INTRODUCTION

Systems for enterprise resource planning (ERP) combine and automate a wide range of corporate operations and procedures inside an organisation. Individual parts or programmes that are part of an ERP system and are created with the intent of handling certain company functions are known as ERP modules. Each ERP module is specifically designed to address a certain functional area, such as finance, personnel resources, inventory management, sales, procurement, production planning, customer relationship management (CRM), and more. The integration of these modules results in a comprehensive and unified perspective of an organization's activities. The goal of ERP modules is to facilitate data exchange and integration across modules while also streamlining and optimising procedures within their specific fields. The real-time data updates and complete perspective of the organization's performance made possible by this connection enable for better decision-making and increased operational effectiveness [1].

An ERP system's finance module, for instance, manages accounts payable, accounts receivable, general ledger, financial reporting, and financial transactions. It enables businesses to produce accurate financial accounts, automate repetitive accounting procedures, and manage financial processes more effectively. Similar to how payroll, benefits administration, training and development, performance management, and recruiting are all supported by the human resources module of an ERP system. This module helps to enhance personnel management, guarantee compliance with labour laws and regulations, and simplify HR operations.

Other common ERP modules include inventory management, which keeps track of and regulates the movement and availability of goods and materials, sales and marketing, which controls the sales process, customer information, and marketing campaigns, procurement, which manages supplier management, purchase orders, and procurement workflows, and production planning, which aids in controlling manufacturing procedures, capacity planning, and production scheduling [2].

Each ERP module may be tailored and set up to match the unique requirements of an organisation, providing flexibility and scalability as operational demands evolve and expand. Businesses may choose the modules that are pertinent to their operations and effortlessly integrate them into their ERP system, delivering a customised solution that supports their corporate goals. ERP modules are distinct parts of an ERP system that focus on various operational functional areas of an organisation. By using these modules, organisations may improve cooperation, simplify procedures, and receive insightful data about how well their businesses are doing. This will eventually result in increased productivity, efficiency, and overall success.

DISCUSSION

The ERP system is being used by an increasing number of businesses today to streamline operations. An organisation may contain a variety of dispersed data types, which ERP combines and stores in a single central database. Numerous modules are included in high performance ERP programmes. Every ERP programme offers unique features and advantages. All ERP programmes have common modules like the financial module, plant maintenance, quality management, material management, etc.

Modules of ERP

An ERP system is made up of several interconnected functions. An ERP system has a number of modules, including financial modules like financial accounting, controlling, asset accounting, materials management, production planning for discrete and process manufacturing, quality management, plant maintenance, sales and distribution, human resource management, and project management. The following fundamental business operations and the related example modules are covered by conventional ERP capabilities, despite the fact that ERP features vary depending on the application [3].

Functional ERP Software Modules

Numerous software components make up ERP software. Every module of ERP software represents a key functional area of an organisation. Modules for product planning, buying of components and materials, inventory management, product distribution, order monitoring, finance, accounting, marketing, and human resources are examples of common ERP modules. Frequently, businesses only use the ERP modules that are both financially and technically possible [4].

Finance Module

There are four key sections in the accounting and finance subject.

1. General Ledger
2. Debtor's Account
3. Payments Receivable
4. Asset Management

Ledger General

Giving a complete view of external accounting and accounts is the main goal of G/L accounting. The accounting data is always comprehensive and correct since all business transactions—both main posts and internal accounting settlements are recorded in a software system that is completely connected with all other operational areas of a firm.

The following characteristics of the ERP FI General Ledger:

1. You may choose between corporate group or business levels.
2. Instantaneous and automatic posting of all sub-ledger items to the relevant general ledger accounts (reconciliation accounts)
3. General ledger and cost accounting sections' simultaneous updating
4. Current accounting data is evaluated in real-time and reported on, with account displays, several balance sheet versions, and other analysis.

The general ledger essentially acts as a comprehensive record of all financial transactions. It serves as a single, current resource for the presentation of accounts. The source documents, line items, and monthly debits and credits at different levels may all be shown, allowing for real-time processing to review specific transactions at any moment, including:

1. Statement
2. Journals
3. A summary of the balances (debits and credits) for the month
4. Analysis of the balance sheet and profit and loss

Accounts Payable keeps track of and manages all vendor accounting information. Additionally, because deliveries and invoices are tracked depending on each vendor, it is a crucial component of buying. In reaction to these transactions, the system instantly posts transactions to the FI component. Similar to this, the system provides invoice data to the Cash Management application component to enhance liquidity planning [5].

The payment programme, which accepts checks, transfers, and other common payment methods in written form as well as electronic form (data medium exchange on diskette and electronic data interchange), settles outstanding payables. This programme also covers payment mechanisms unique to many nations. Dunning notifications may be sent if required for unpaid accounts receivable (for instance, to collect payment for credit memos). The Dunning programme supports this feature. Accounts Payable postings are concurrently recorded in the General Ledger, where various G/L accounts are updated depending on the transaction (payables, down payments, etc.). There are due date projections and other common reports that you may run to assist you keep track of open items. In business interaction with suppliers, you may create balance confirmations, account statements, and other types of reports based on your needs. Accounts Payable transactions may be documented using balance lists, diaries, balance audit trails, and other internal reviews [6].

Accounts Receivable

Client accounting data is recorded and managed. It is a crucial component of sales management as well. Additionally, the General Ledger receives a direct record of every posting in Accounts Receivable. Depending on the transaction (such as receivables, down payments, bills of exchange, and so on), different G/L accounts are reported. You may use a variety of tools in the system,

including as account analyses, alert reports, due date lists, and a configurable dunning programme, to keep track of open items. You may customise the printed materials associated with these products to meet your specific needs. The same is true for account statements, interest computations, payment notifications, and balance confirmations. through user-friendly screen functionality or electronically through EDI and data transfer, incoming funds may be assigned to outstanding receivables. Direct debiting and down payments may be made automatically using the payment system.

Accounts receivable transactions may be documented using a variety of tools, including as balance lists, diaries, balance audit trails, and other common reports. Financial statements are created by revaluing foreign currency products, listing customers who are also suppliers, and sorting account balances by remaining life. Not only is accounts receivable one of the accounting branches that serves as the foundation for adequate and orderly accounting, but it also offers the data necessary for effective credit management thanks to its close integration with the Sales and Distribution component and information crucial for the improvement of liquidity planning through its connection to Cash Management.

Asset Management

The Asset Accounting (FI-AA) component of the ERP system is utilised to manage and oversee fixed assets. It acts as a subsidiary ledger to the FI General Ledger in ERP Financial Accounting, giving thorough information on transactions involving fixed assets. FI-AA sends data directly to and from other systems as a consequence of the integration with the ERP System. For instance, it is possible to publish directly to FI-AA from the Materials Management (MM) component. When an asset is acquired or produced internally, the invoice receipt, goods receipt, or warehouse withdrawal may all be immediately posted to the asset in FI-AA. Depreciation and interest may be transferred simultaneously to Cost Accounting (CO) and Financial Accounting (FI). You may settle maintenance tasks that need capitalization of assets from the Plant Maintenance (PM) component [7].

The following components make up the FI-AA component:

1. Conventional accounting for assets
2. Rented property
3. Consolidation preparation
4. Information technology

The lifespan of an asset is covered by traditional asset accounting, which starts with the purchase order or first acquisition (which may be handled as an asset under development) and ends with retirement. The values for depreciation, interest, insurance, and other reasons between these two points in time are mostly automatically calculated by the system, which then makes this information available to you in a variety of ways utilising the information system. A report is available that forecasts depreciation and simulates the growth of asset values.

Controlling

This module consists of:

1. Overhead cost controlling
2. Product cost controlling

Overhead Cost Controlling

Overhead expenses are indirect expenses that can't be ascribed to cost items directly. You can plan, assign, manage, and monitor overhead expenses with the help of the overhead cost controlling component. Planning in the overhead area enables you to define guidelines that help you manage expenses and assess internal operations. Every overhead expense is attributed to the cost centres where it occurred or the tasks that caused it. You have access to a variety of ways for additional overhead allocation via the ERP system. These techniques allow you to apportion overhead expenses according to their original sources. Some of the overheads may easily be transferred into direct expenses by being assigned to cost objects. The operational rate is used to compare the plan (target) expenses with the corresponding actual costs at the conclusion of a posting period after all allocations have been made. The resultant target/actual variations may be broken down by source, and the findings can be used to further management accounting actions in controlling [8].

Product Cost Controlling

You may plan the non-order related costs of materials and other cost accounting items as well as establish pricing for them in the product cost planning part of product cost controlling. Following are the components of product cost planning:

1. A cost estimate that includes a quantity structure
2. A cost estimate without quantity constraints
3. Costing using references and simulations,
4. Price Revision

Enterprise Controlling

In order to take into consideration these varied elements and organisational possibilities, the EC (Enterprise Controlling) application of the ERP System has been created with four subcomponents.

Accounting for Profit Centres

A firm organisation that is unique from all other organisational conceptions is produced by profit centre accounting. From a managerial viewpoint, profit centres are the master data. The necessary allocations may be made in the operational systems (for instance, material, project, and cost centre) to prevent extra entries. The essential metrics for responsibility accounting (ROI, cash flow, etc.) as well as profits and losses are calculated for these profit centres using transfer pricing. For the latter, each profit centre needs have access to a few balance sheet elements.

Consolidation

General consolidation operations make up this component's subcomponent. These features apply to both internal and external reporting. Integrated application areas include business area consolidation, profit centre consolidation, or consolidation based on group-wide profitability analysis by product line, in addition to the consolidated financial statements on the group level as required by law. A rule-based reconciliation between external and internal consolidation values is where the benefits are.

Executive Information System

ERP-EIS enables the creation of organization-specific data structures that are focused on multidimensional evaluation perspectives. For numerous R/2 components as well as the majority

of ERP components, data gathering programmes are available. The transfer of data from non-ERP programmes is also possible. To transform this data into a coherent, homogeneous whole, a variety of functions are available. Presentations may be made using a graphical interface, especially for management. Simple consolidation processes are made feasible by hierarchical processing and removal functions [9].

Plant Maintenance

World-class performance requires the prompt and efficient delivery of high-quality goods. When an organization's equipment is unreliable, it simply cannot excel. The removal of inefficient production techniques, "just-in-time" inventory reduction of work-in-progress, and fast response manufacturing have all transformed how people see maintenance management. It used to be standard practise for equipment to break down and need downtime for maintenance. The world has evolved. Today, a malfunctioning equipment may shut down a whole manufacturing line as well as the customer's entire factory. The plant maintenance module offers a comprehensive approach to addressing the operational requirements of a system that spans the whole organisation. The module is a set of goods that covers every facet of plant and equipment maintenance and is crucial to the success of process improvement.

With its object, type, and function-related views, plant maintenance allows a variety of choices for building technical systems and facilitates flexible navigation. Data on the scheduling, carrying out, and history of maintenance activities are recorded in the system and meet the criteria for business verification. The plant maintenance system's catalogue function may be used to specify causes, actions, and maintenance chores. All upkeep operations, including inspection, servicing, and repair work, are recorded in a historical database. Many systems additionally provide a variety of analytical tools for assessing this data in addition to typical indications.

Depending on the parameters selected, plant maintenance offers you technical, commercial, and diverse presentation alternatives. For instance, the system manufacturer, the location, the job execution time, or the organisational unit. By using this information, you can save the time and expense of plant downtime caused by damage and identify any potential weak areas in your technological system early on. In the context of "Total Productive Maintenance" (TMP) or risk-optimized maintenance, it also serves as the foundation for developing the best maintenance approach.

A plant maintenance module's key sub-systems are:

1. Control for preventive maintenance
2. Monitoring of equipment
3. Component monitoring
4. Plant upkeep calibration monitoring
5. Tracking plant maintenance warranty claims

Quality Control

The field of quality management makes it easier to create and implement company quality. The principles of quality management and quality assurance are now necessities for doing business in the modern global marketplace rather than optional extras up to the discretion of a company. The driving requirements initially outlined by the ISO 9000 series of quality measures and company certification serve as the foundation for quality management in ERP.

Automation of ISO compliance has been implemented into the Quality Management module of ERP. According to ISO Standards, quality management must be used in every aspect of a firm, including internal corporate management and operational procedures in addition to manufacturing. Therefore, the various modules have components of quality management. In order to build, monitor, and maintain quality measures and analyses throughout the ERP business architecture, the QM module serves as a central control point [10].

CONCLUSION

In summary, ERP modules provide businesses a thorough and integrated way to manage all facets of their corporate operations. Numerous advantages are offered by these modules, which encompass operations like finance, human resources, supply chain, inventory, customer relationship management, and manufacturing. An ERP system's finance module enables businesses to automate financial operations including accounting, budgeting, and financial reporting. This module offers real-time access to financial data, enhances the precision and effectiveness of financial operations, and makes it easier to make wiser financial decisions. An ERP system's human resources module assists businesses in managing employee data, payroll, benefits, and performance reviews. This module promotes talent acquisition and development while streamlining HR procedures and enabling efficient staff management.

REFERENCES

[1] S. Hartono, R. Dwipanilih, and A. Wicaksono, "Evaluation of enterprise resource planning system based on sap financial accounting module in PT. Kimia Farma Tbk.," *Int. J. Recent Technol. Eng.*, 2019, doi: 10.35940/ijrte.C3906.098319.

[2] W. Torbacki, "Dematel method in ERP systems for TSL branch," *Transp. Probl.*, 2017, doi: 10.20858/tp.2017.12.4.3.

[3] A. Andreas and R. Natariasari, "Satisfaction ERP Systems: Impact on End-User," *Indones. J. Econ. Soc. Humanit.*, 2019, doi: 10.31258/ijesh.1.1.6.

[4] H. Ritchi and A. L. Debora, "On change management for enterprise accounting system: iterative content analysis for success factors," *J. Akunt. Audit. Indones.*, 2020, doi: 10.20885/jaai.vol24.iss2.art5.

[5] B. Y. Chung and M. J. Skibniewski, "Cost-benefit analysis of ERP modules in construction firms," in *AACE International Transactions*, 2007.

[6] C. Iris and U. Cebeci, "Analyzing relationship between ERP utilization and lean manufacturing maturity of Turkish SMEs," *J. Enterp. Inf. Manag.*, 2014, doi: 10.1108/JEIM-12-2013-0093.

[7] P. Arip Pianto and L. Yuniar Banowosari, "Analysis and Design ERP System in Order to Cash Module using NetSuite One Methodology," *Int. Res. J. Adv. Eng. Sci.*, 2020.

[8] G. Dantes and Z. Hasibuan, "The Impact of Enterprise Resource Planning (ERP) System Implementation on Organization: Case Study ERP Implementation in Indonesia," *IBIMA Bus. Rev. J.*, 2010, doi: 10.5171/2011.210664.

[9] S. Parthasarathy and S. Sharma, "Impact of customization over software quality in ERP projects: an empirical study," *Softw. Qual. J.*, 2017, doi: 10.1007/s11219-016-9314-x.

[10] A. Nofriandi and H. Kamil, "Penerapan Enterprise Resource Planning (ERP) pada Sistem Pembelian, Penjualan dan Inventory Barang di Mini Market 7 Putra," *J. Nas. Teknol. dan Sist. Inf.*, 2015, doi: 10.25077/teknosi.v1i1.2015.29.

CHAPTER 6

EVALUATION OF ENTERPRISE RESOURCE PLANNING (ERP) BENEFITS

Ms. Swati Sharma, Assistant Professor
Masters In Business Administration, Presidency University, Bangalore, India
Email Id: swatisharma@presidencyuniversity.in

ABSTRACT:

ERP (Enterprise Resource Planning) systems provide a broad variety of advantages and are now essential tools for businesses in all sectors. The main advantages of ERP systems are highlighted in this abstract, including superior decision-making skills, faster business operations, and higher customer satisfaction. ERP systems combine several corporate processes into one centralised platform, including finance, human resources, supply chain, and customer relationship management. Organisations may break down data silos, foster collaboration, and increase overall operational effectiveness thanks to this connection. Decision-makers can make well-informed choices, react rapidly to market developments, and promote organisational growth with real-time data access and thorough insights. By automating repetitive operations, lowering manual mistakes, and enhancing workflow effectiveness, ERP systems help simplify processes. Organisations may save costs, shorten lead times, and boost productivity by carefully allocating resources, managing inventories, and planning production. Additionally, ERP systems have strong reporting and analytics capabilities that give useful insights into market trends, consumer behaviour, and performance measures.

KEYWORDS:

CAD, Decision Process, Enterprise Resource Planning, Product Flexibility.

INTRODUCTION

In order for organisations across sectors to efficiently manage their operations, resources, and information, enterprise resource planning (ERP) systems have emerged as crucial tools. Numerous advantages of ERP systems include increased productivity, simplified operations, and better decision-making ability. We'll go through some of the major advantages that businesses may get from installing an ERP system in this introduction [1].

Improved Operational Efficiency: The integration of diverse business operations onto a single platform is one of the main benefits of ERP systems. Through this connection, data silos are eliminated, manual data input is decreased, and processes are streamlined. Organisations may increase productivity, reduce mistakes, and maximise resource use by automating regular processes.

Greater Data Visibility and Accuracy: ERP systems provide a centralised, real-time repository for data from many departments and functions. In order to make decisions, organisations may now get precise and current information. Organisations can make educated choices, react swiftly to changes, and match their strategy with market needs with greater data visibility.

Streamlined processes and standardisation: ERP systems make it easier to implement best practices and standardise processes. Organisations may implement standard operating procedures, create uniform workflows, and get rid of activities that are unnecessary or wasteful. This process simplification boosts output quality, cuts down on cycle times, and increases productivity.

Effective Supply Chain Management: ERP systems combine supply chain operations, including as procurement, inventory management, and logistics, for effective supply chain management. Organisations may optimise their supply chain operations, better demand forecasting, and improve supplier management thanks to this connection. Organisations may save lead times, lower stockouts, and boost customer satisfaction by having insight over the whole supply chain.

Improved Customer Relationship Management: CRM (Customer Relationship Management) modules are often included in ERP systems, allowing businesses to more efficiently handle customer interactions, sales processes, and marketing campaigns. Organisations may personalise customer experiences, improve customer happiness, and boost customer retention with the use of a centralised customer database and analytics tools [2].

Scalability and Adaptability: ERP systems are designed to be able to grow with an organisation and adapt to changing business needs. ERP systems can scale and adapt to support more users, data volume, and functions as businesses grow or diversify their activities. Organisations can successfully support their expansion plans thanks to this scalability.

Accounting process automation, precise financial reporting, and regulatory compliance are all made possible by the extensive financial management modules that ERP systems provide. These modules simplify budgeting, auditing, and financial consolidation, lowering mistake risk and enhancing financial transparency. As a whole, ERP systems provide a host of advantages for businesses, such as increased operational effectiveness, improved data accuracy and visibility, streamlined business processes, efficient supply chain management, enhanced customer relationship management, precise financial reporting, and scalability. Employing an ERP system enables businesses to streamline operations, make data-driven choices, and gain a competitive advantage [3].

DISCUSSION

Manufacturing and marketing divisions often interact to decide the profitability and a company's capacity to compete. Systems for enterprise resource planning (ERP) address. Integration problems with business operations; advantages of using ERP discovered. Those attained via the combination of production and technology are comparable to those in the literature marketing has a purpose. The benefits of installing an ERP system are many, both directly and indirectly. The immediate benefits include increased effectiveness in integrating information for better decision-making and quicker reaction customer service response time, etc. The indirect advantages include enhanced brand recognition and increased client loyalty, customer happiness, and so on [4].

The following are some concrete and abstract advantages of EPR systems:

1. Integration of information
2. Shortened lead time
3. On-time delivery
4. Decrease in cycle time
5. Improved client satisfaction

6. Enhanced performance of suppliers
7. Greater adaptability
8. Decrease in quality expenses
9. Improved use of resources
10. Improved capacity for analysis and planning
11. Enhanced decision-making and information accuracy
12. Utilising modern technologies

ERP systems are integrated, bundled, enterprise-wide software programmes that include extensive knowledge about business procedures acquired via vendor deployments in several businesses. New technologies like E-commerce, data warehousing, and customer relationship management are being incorporated into ERP systems as they develop. ERP software is a semi-finished product that user organisations and their implementation partners customise to their own business requirements. Therefore, business and IT managers collaborate to create new operational and managerial procedures as part of the implementation of ERP systems.

ERP software aims to combine several departmental business operations into a unified enterprise-wide information system. ERP's main advantages include better communication across functional units and enhanced productivity. Daily administration is made easier by the adoption of ERP systems. Initial and ambitious designs of ERP software systems serve the resource planning component of strategic planning. The complexity of strategic planning and the inadequate integration of ERP with Decision Support Systems (DSS) have made resource planning the weakest link in ERP practice [5].

Shortening of the Cycle Time

Cycle time is the interval between placing an order and having the goods delivered. The make-to-order operation, when the cycle time and cost of production are high, is at one extreme of the manufacturing range. This is so because in a circumstance where a product is made to order, the manufacturer does not begin creating or designing it until after receiving an order. After receiving the order, he will only begin to acquire the supplies and parts needed for manufacturing. The make-to-stock strategy is the opposite of manufacturing operations; it involves making the items and keeping them in the completed goods inventory prior to receiving an order. The ERP systems may decrease cycle time in both scenarios, but make-to-order systems will see a greater reduction. In the case of make-to-stock, the products are already produced and maintained with distributors or in warehouses for sales. Here, order fulfilment reduces the cycle time rather than the shop floor. Even for things that were produced to order in the past.

The cycle time was formerly long. This is because the procedure was manual and was not integrated if it had been computerised. Let's say a consumer makes a purchase. If a product is ordered, the order entry clerk must determine if it is stock at the warehouse closest to the client. If it is not offered there, he must next inquire about its availability with wholesalers or at other warehouses. He will then need to process the order, notify the relevant distributor or warehouse to send the goods, then notify the finance department to raise the invoice, and so on. All of them used to take days, even weeks, to complete. But with an ERP system, the system verifies the products' availability as soon as the order is submitted. If the warehouse nearest to the client does not have it in stock, the closest warehouse with the item is determined. The distribution module notifies the warehouse of the order and transmits the shipping information. The distribution module then completes the required actions, such as packing, picking, and so on, to ensure that the items are

delivered on schedule. To increase the invoice, the finance module is also changed with regard to the order. The order entry clerk clicks a button to start each of these processes. Nearly all of these actions are completed without the need for human involvement since all the data, which is updated to the minute, is accessible in the centralised database and because all the processes are automated. The effectiveness of ERP systems contributes to cycle time reduction [6].

The EPR systems' integration with CAD/CAM systems helps them save time when producing things on demand. The automated conversion of CAD-engineered designs into software for computerised manufacturing equipment may result in significant time and cost savings. Systems for CAD/CAM. For computer-controlled manufacturing equipment like robots or machine tools, this automated conversion saves the pricey and time-consuming procedures of having a human turn design drawing into a computer programme. Cycle times are decreased by 30–50% with these technologies. In addition to this, the efficiency gained via the plant maintenance and production systems of the ERP packages, as well as the automation attained in material procurement and production planning, go a long way towards lowering cycle times.

Shortening of Lead Time

The lead-time, which is the amount of time between placing an order and getting it, is important for buying and inventory management. The majority of buying departments advise materials management to plan ahead for material requests far before they are really needed. To prevent a scenario when the material is out of stock, all inventory management systems include safety features like safety or buffer stock, re-order level, and so on integrated into them. The absence of a component that is necessary for manufacturing may lead to a number of issues, including missed delivery dates, diminished customer loyalty as a consequence of delivery delays, or even the loss of a client to rival businesses. By ordering the goods much before the time they are really required, having a large buffer stock, or keeping a very high reorder level, one might prevent this issue. But all of this necessitates maintaining greater inventory, which results in money being blocked. Additionally, the useful result of allowing more time. Perhaps this is a result of the "squeaky wheel principle," which states that providers pay more attention to customers who want the shortest lead times and protest the loudest when deliveries are delayed [7].

Therefore, rather than automatically raising permitted lead times, the corporation should determine the minimal lead time and make an effort to address supplier delivery delays. Therefore, the company needs an effective inventory management system that integrates with the departments of buying, production planning, and manufacturing in order to shorten lead times. Knowing the correct lead times for each and every item is crucial for maintaining production in this age of just-in-time manufacturing. Keeping track of the lead times for each and every individual item manually is almost hard for a corporation working with thousands of raw materials and components. ERP solutions assist in automating this process, improving the effectiveness and efficiency of inventory management.

Additionally, since the ERP system is connected and the materials management module is coupled with other modules like sales, marketing, buying, manufacturing, and production planning, it is possible to determine the demand for a certain item even before an order is placed. Consider, for instance, that a request is made to equip, let's say, 100 automobiles with air conditioners. Numerous procedures are started as soon as the order data are put into the system. If the products are present in the completed goods inventory, the system will verify that they are. After that, it will create a BOM for the order and determine if all of the goods are in stock [8].

It takes no time to order the necessary components. The materials management module will then construct purchase orders for each and every item, taking into consideration lead times and when the goods are needed for production, once the things to be made have been identified and the production planning system has created a production plan. The system also handles any additional steps required by the purchase process, such as vendor selection and invitations for quotes. A purchase order or requisition is updated in the supplier's system as soon as it is issued since the majority of suppliers are also linked to the organization's system. As a result, the supplier is aware of the products and timing of their supply. The amount of time saved is incredible since tasks like contract preparation, purchase order issuance, and payment processing all take place online. Due to their integrated nature and use of cutting-edge technologies like electronic data interchange (EDI) and electronic funds transfer (EFT), ERP systems enable organisations to have the products they need when they need them (just-in-time inventory systems).

Reduction in Cost

There are several ways to describe quality, including excellence, compliance to requirements, usability, value for the money, and so forth. Operations managers often carry out the analysis of quality-related expenses, which is a crucial responsibility, in contrast to manufacturing and design engineers who are generally in charge of some of the technical challenges in product quality assurance. Starting aggressive quality management efforts is typically motivated by strategic opportunities or dangers. The financial basis for putting them into practice may be found by analysing the cost of quality. Usually, quality expenses account for 20% or less of the cost of items supplied. Planning efforts for quality improvement carefully leads to higher quality and reduced expenses associated with it. increased corporate flexibility by swiftly and affordably responding to internal and external changes and by offering a variety of solutions in response to the altered needs.

Improved use of resources

Manufacturers lay increasing attention on planning and regulating capacity as production processes grow more complex and the philosophies of waste reduction and constraint management gain wider appeal. The availability of both material and capacity is necessary for the development of an accurate, realisable production schedule. If the capacity is inadequate or poorly designed, it is pointless and unwise to have financial resources committed to material. Waste not only drives up prices, but it also has an impact on consumer satisfaction.

Most ERP systems provide both rough-cut and thorough capacity planning via their capacity planning tools. The system fills each resource with the necessary production needs from shop floor control, master production scheduling, and material requirements planning. Each resource's capacity criteria are used to analyse and load all planned, firm scheduled, and released production. All capacity needs are then tied back to the orders that make up the load. Definitions of capacity are given based on work centre and machine records. Work centres may exist on a facility- or company-wide basis. Rough-cut capacity planning allows for the designation of any work centre as a key work centre for review. With the use of this capacity, bottleneck processes that impose restrictions on the system may be easily and effectively identified. The user may redesignate the work centres as critical or non-critical as the limitations change over time. With both from and to material movement site designations, situations with high volume and repetitive work are better facilitated. These sites, which might be marked by specific machines inside the work centre, are utilised for pull system back-flushing and replenishing [9].

By defining certain machines or pieces of equipment, these systems further define the amount of capacity that is accessible. Additionally, each work centre contains user-defined input/output tolerance factors to regulate the degree of action message sensitivity, a factor for average efficiency, distinct speed factors for labour and machine, designation of shift/hours schedule, and maximum desired load %. Processes with vessel size limits and fixed cycle constraints may also be given capacity minimums. Additionally, the ERP system has simulation features that will aid capacity and resource planners in simulating numerous scenarios for capacity and resource utilisation and selecting the optimal one. Manufacturing, materials management, plant maintenance, sales, and distribution, among other modules in the ERP system, all work together to guarantee that inventory is maintained to a minimum and that completed items are supplied to customers in the most effective manner. As a result, the ERP systems significantly increase the organization's capability and resource utilisation.

A better performance from suppliers

Any organization's performance depends heavily on the quality of the raw materials or components and the vendor's ability to supply them on time. In order to prevent difficulties from impairing the company's operations, an organisation must carefully choose its supply or vendors and regularly monitor their actions. Corporations depend significantly on supplier management and control systems to assist plan, manage, and control the intricate procedures involved with global supplier alliances in order to realise these advantages. ERP systems provide capabilities for managing vendors and supporting procurement that are designed to coordinate every part of the procurement process. They aid the company in its efforts to successfully negotiate, oversee, and manage the prices and timelines of procurement while ensuring outstanding product quality. Features that assist the organisation in managing supplier relations, keeping an eye on vendor activity, and regulating supplier quality are included in the supplier management and control procedures. Partnership arrangements between organisations and their suppliers are becoming more common. Mutually advantageous outcomes in terms of quality, delivery, and cost have been attained via these commercial agreements [10].

Companies largely depend on procurement support systems to manage and monitor activities related to supplier partnership agreements in order to realise these advantages. When formalising such collaborations, process phases including request for quotes, contract negotiation and control, purchase order release, and delivery are taken into account. The sorts of goods or services being purchased, the quantity and price discounts, the conditions of the agreement, and the techniques used for monitoring and supervising the transaction all provide complications. The procurement support system will provide the company a definite competitive edge if it offers quick feedback, flexibility, and thoroughness in managing supplier agreements. ERP systems include capabilities that allow businesses to reap the rewards of established collaboration arrangements. Contracts and bids from suppliers may be made to facilitate the purchase of any goods or services the company needs. Examples of this include items that need to be sent directly to clients, office supplies and services, inventory and non-inventory products, and more. Multiple quantity and price breaks, as well as clauses defining when the quote or contract takes effect and expires, are supported since each agreement must be able to stand on its own two feet.

These technologies provide various options to the techniques businesses use to monitor and manage these agreements. Purchase orders and requisitions are first monitored as they are distributed in accordance with a relevant contract once contracts have been made. The best-fitting

supplier contract is automatically selected by the ERP system and assigned to the associated purchase order or requisition. The system immediately informs the organisation of any changes to the status of a supplier quote or contract. The use of in-depth procurement analysis techniques is made possible by the provision of detailed history. Comparing total bid or contract obligations to actual buying actions is simple for a supplier management expert. Organisations may effectively manage their supply-side partners with the flexibility and comprehensiveness of the system's supplier quote and contract management capabilities, which will have a positive impact on their business's cost and delivery procurement.

Additionally, because the majority of suppliers are linked to the company's system, information about an order is sent to the supplier's systems very instantly. Because of the time savings, the supplier has more time to complete the orders. For the sake of quality control and auditing, businesses often divide their suppliers into certified, authorised, and probationary categories. Programmes for certifying suppliers must also be able to identify between suppliers and original manufacturers. Programmes for supplier auditing and categorization aim to reduce lead times and costs while ensuring that bought goods and services adhere to specifications. All the resources required to execute overall quality management programmes within the procurement function of an organisation are provided by the quality management system in the ERP systems. The technology enables businesses to create and administer highly efficient supplier certification programmes that guarantee the highest level of procured material conformity to specifications while preserving lead times and budgets. The original manufacturer may be used to administer the quality control programme, allowing purchasers to shop around for the best price and delivery conditions from a choice of certified distributors or brokers [11].

Greater Adaptability

Companies must have the ability to react more quickly to client demands and market changes as a result of increased competition. They will need to be fast and effective product designers who can create new items or redesign existing ones. Only then will businesses be able to take advantage of opportunities as they arise. Frequently, the window of opportunity is quite tiny. The production procedure must be adaptable enough to quickly and minimally interrupt the introduction of new product designs. When developing strategic plans for businesses, flexibility is a crucial factor. When adapting to new product designs, flexibility might entail making fast changes to what is being done or altering everything entirely. Other times, flexibility means having the capacity to manufacture in modest amounts in order to create a product mix that more closely matches real customer wants and lowers work-in-progress inventories. Regardless matter how flexibility is defined, classic fixed automated production facilities are often rigid while being effective. Similar to this, very flexible procedures are often ineffective. The relative virtues of both flexibility and efficiency may be defended.

Product flexibility refers to an organization's capacity to manufacture highly customised and distinctive goods in an effective manner. By employing the assemble-to-order method, manufacturers attempted to provide a little flexibility. This offered some flexibility without raising the cost of manufacturing, but it wasn't applicable in every circumstance. There is a rising convergence between settings that rigorously assemble-to-order and entirely engineer-to-order along the wide range of make-to-order production. Configure-to-order is a common term for this dynamic environment. The majority of ERP systems currently include this strategy in their systems. Configure-to-order (CTO) manufacturers may streamline the order entry process and

preserve engineer-to-order (ETO) flexibility without having to keep bills of materials for all potential combinations of product choices by using a rules-based product configuration system. ERP solutions increase the adaptability of the organisation as a whole as well as the industrial activities.

A flexible organisation is one that can quickly adjust to environmental changes. The market's regulations are evolving quickly as a result of the technology revolution. Every day, more and more tournaments are created. Every day, there are new, challenging issues that must be resolved. Not for the sake of success, but rather to remain in business, new market niches must be entered. It is necessary to quickly develop and deploy new marketing tactics. To maintain consumer satisfaction, businesses must continually develop new strategies. To do all of this, the business must be adaptable. The previous operating procedures will no longer be effective. By removing departmental obstacles to access corporate information and automating the majority of processes and procedures, ERP systems aid businesses in maintaining flexibility. This makes it possible for the business to respond swiftly to the changing market circumstances.

CONCLUSION

Determining the value an ERP (Enterprise Resource Planning) system adds to an organisation requires careful consideration of its advantages. Organisations can make wise choices and get the most return on their investment by evaluating the effects and results of deploying an ERP system. Lastly, mention the things you've learnt from using the ERP and the deployment process. Establish methods for ongoing ERP system improvement by identifying areas for improvement, assessing the success of post-implementation assistance, and establishing improvement areas. Organisations may obtain a thorough grasp of the advantages associated with an ERP system and take well-informed choices to maximise its value and promote continuous success by carefully assessing these variables.

REFERENCES

[1] O. Tatari, D. Castro-Lacouture, and M. J. Skibniewski, “Performance Evaluation of Construction Enterprise Resource Planning Systems,” *J. Manag. Eng.*, 2008, doi: 10.1061/(asce)0742-597x(2008)24:4(198).

[2] J. S. Chou and J. H. Hong, “Assessing the impact of quality determinants and user characteristics on successful enterprise resource planning project implementation,” *J. Manuf. Syst.*, 2013, doi: 10.1016/j.jmsy.2013.04.014.

[3] B. Johansson, L. Karlsson, E. Laine, and V. Wiksell, “After a Successful Business Case of ERP - What Happens then?,” in *Procedia Computer Science*, 2016. doi: 10.1016/j.procs.2016.09.173.

[4] A. Teltumbde, “A framework for evaluating ERP projects,” *Int. J. Prod. Res.*, 2000, doi: 10.1080/00207540050205262.

[5] A. Greasley and Y. Wang, “Integrating ERP and enterprise social software,” *Bus. Process Manag. J.*, 2017, doi: 10.1108/BPMJ-04-2015-0053.

[6] A. E. Wirawan and T. A. Napitupulu, “Factor affecting the implementation benefit of enterprise resource planning system using modified delone and Mclean information system success model,” *J. Theor. Appl. Inf. Technol.*, 2018.

[7] H. A. Fatimah and R. Trisminingsih, "Analyzing Success Factors of Enterprise Resource Planning Adoption using Analytical Hierarchy Process," *Int. J. Innov. Enterp. Syst.*, 2018, doi: 10.25124/ijies.v2i01.16.

[8] K. E. Murphy and S. J. Simon, "Intangible benefits valuation in ERP projects," *Information Systems Journal*. 2002. doi: 10.1046/j.1365-2575.2002.00131.x.

[9] V. S. Lai, F. Lai, and P. B. Lowry, "Technology Evaluation and Imitation: Do They Have Differential or Dichotomous Effects on ERP Adoption and Assimilation in China?," *J. Manag. Inf. Syst.*, 2016, doi: 10.1080/07421222.2016.1267534.

[10] C. J. Stefanou, "A framework for the ex-ante evaluation of ERP software," *Eur. J. Inf. Syst.*, 2001, doi: 10.1057/palgrave.ejis.3000407.

[11] B. Wu and L. Kao, "New fuzzy dynamic evaluation for ERP benefits," *J. Appl. Bus. Res.*, 2006, doi: 10.19030/jabr.v22i4.1418.

CHAPTER 7

AN OVERVIEW OF ENTERPRISE RESOURCE PLANNING (ERP) MARKET

Ms. Neha Saxena, Assistant Professor
Masters In Business Administration, Presidency University, Bangalore, India
Email Id: nehasinha@presidencyuniversity.in

ABSTRACT:

In recent years, the Enterprise Resource Planning (ERP) industry has seen substantial expansion and change. For businesses looking to improve productivity, simplify operations, and use data-driven insights for improved decision-making, ERP systems have become crucial. An overview of the ERP market is given in this abstract, together with information on its size, major players, trends, and outlook. The ERP industry is characterised by a broad range of suppliers providing a variety of solutions suited to different business sectors and organisational sizes. Multinational enterprises and smaller, more niche vendors are both major participants in the ERP industry. Vendors constantly innovate in this highly competitive sector to accommodate changing client requests and industry standards. Using cloud-based ERP systems has become a significant industry trend. Scalability, flexibility, and cost-effectiveness are all features of cloud ERP that enable businesses to access and control their ERP systems from a distance. Small and medium-sized businesses now have more options to implement ERP systems that were previously seen as being too sophisticated or expensive thanks to this trend towards cloud-based solutions.

KEYWORDS:

ERP industry, Investment Management, Quality, SAP R/3 System.

INTRODUCTION

Over the years, the enterprise resource planning (ERP) industry has seen substantial expansion and evolution, becoming into a vital technological solution for businesses in several sectors. ERP systems provide a full suite of modules to handle important activities including finance, human resources, supply chain, manufacturing, and customer relationship management. ERP systems integrate and simplify corporate processes [1]. Due to considerations including the demand for operational efficiency, better data management, and increased decision-making skills, the worldwide ERP industry has seen significant rise. Businesses are realising more and more the benefits of deploying ERP systems to streamline operations, acquire a competitive advantage, and adjust to the changing business environment. The ERP industry is characterised by a large number of suppliers providing a variety of solutions to meet the specific needs of various sectors and organisational sizes. For businesses looking to deploy or update their ERP systems, the market provides a number of alternatives, from huge enterprise-focused ERP suppliers to cloud-based solutions and industry-specific services.

The rising need for scalability, integration, and real-time data access are three major factors influencing the development of the ERP industry. ERP systems provide as a basis for managing complex business operations and facilitating strategic decision-making as firms attempt to increase

operational efficiency, acquire insights from data analytics, and adapt to digital transformation. The ERP market is also changing as a result of the introduction of cutting-edge technologies like artificial intelligence (AI), machine learning (ML), and the Internet of Things (IoT). Vendors are integrating these technologies into their products to provide cutting-edge functionality like predictive analytics, intelligent automation, and linked devices, allowing businesses to get more in-depth insights, automate procedures, and improve operational agility [2].

The ERP market offers businesses a wealth of options, but it also has its share of difficulties. Organisations may encounter challenges while adopting ERP, including implementation complexity, integration with current systems, data transfer, and organisational change management. However, organisations may overcome these difficulties and capitalise on the advantages that ERP systems have to offer with careful planning, efficient project management, and cooperation with knowledgeable implementation partners. The ERP industry is still growing as businesses realise the benefits of simplifying and integrating their operations. ERP systems have evolved into a critical piece of business technology for organisations of all kinds and sectors due to the growing need for operational effectiveness, data-driven decision-making, and agility. Due to technology improvements and the rising need for comprehensive and flexible business management systems, the market now provides a wide variety of solutions [3].

DISCUSSION

Commercial software packages known as "enterprise systems" or "ERP systems" guarantee the seamless integration of all the information passing through an organisation, including financial and accounting information, customer information, supply chain information, human resources information, manufacturing information, plant maintenance information, and so forth. ERPs provided a superb business answer for managers who had experienced extreme irritation dealing with incompatible information systems and inconsistent operational procedures. ERPs are user-friendly and effective at all organisational levels, from operational to decision-making.

The ERP industry is one that is both highly competitive and expanding quickly. The enterprise resource planning (ERP) market grew by double digits in 2007, and AMR Research predicts that growth will average 10% over the next five years. Despite the increasing consolidation of the vendor environment, the ERP industry grew well in 2004. Future market growth is anticipated to be boosted by SAP as its share reaches 50% and offsets flat to decreasing sales from many established, mid-size manufacturers. Due to product overlaps and client reluctance to commit to add-on purchases before project fusion is more precisely defined and upgrade pathways are considered, Oracle's acquisition of PeopleSoft and JD Edwards may hinder near term licence revenue growth. The mid-market is still a place of strong growth and fierce competition, with sector specialisation offering the greatest chance for distinction.

The general acceptance of the notion that organisations need integrated information systems in order to remain competitive continues to be advantageous for the ERP industry. In certain organisations, the discussion over integrated best-of-breed continues, but it is obvious that the suite proponents are triumphant. According to AMR Research, they will increase by around 14% in 2006, rising from $25.4 billion to $29 billion in 2007 [4].

Market share of ERP

Although the ERP market has seen an increase in revenue, consolidation has continued to alter the sector. 59% of the revenue generated by the ERP market's top five vendors in 1999 came from this segment. The top five vendors (SAP, Oracle, Sage Group, Microsoft, and SSA Global), according to APR Research, will generate 72% of all ERP vendor revenue in 2005. The top positions held by SAP, Oracle, Sage Group, Microsoft, Infor Global Solutions, etc. continued the pattern from 2006 into 2007. A significant percentage of the 14% increase in global ERP vendor revenue in 2004 may be attributable to favourable Euro to US dollar exchange rates. Despite the problems with the currency rate, the organic market grew significantly in 2004 by between 8 and 9%. Without making any acquisitions, SAP AG raised global sales by 17% and licence revenues by 20% in 2004 while several ERP suppliers struggled.

Comparing market segment analysis for any other product or service to market share analysis for ERP reveals significant differences. In such scenario, there will be multiple segmentations based on a variety of parameters, including physical, geographical, functional, distribution level, and many more. The three basic categories of ERP segmentation are industry type, industry size, and geographic regions in terms of the countries where the product is wanted. This helps in determining the market for ERP and the market share of ERP software.

When analysing industry size, the amount of business done and the firm's capability in terms of big, midsize, or low rung are all taken into consideration. The term "type" refers to the sort of company, such as hospitality, insurance, manufacturing, or health, etc. The vendor's services are the only factor that influences the market for them. When it comes to ERP markets, the issue of regional segmentation necessitates a thorough investigation. ERP need ongoing updates and improvements. Both suppliers and businesses are putting a lot of pressure on ERP developers. Analysis of ERP's patterns and modalities is crucial in this situation [5].

As a result, you must seriously consider an ERP solution for the benefit of your business after meditating on what has been discussed above about an ERP and what incorporating this into your business plan can do for your business success. The first step in placing your firm on the path to complete business development and success is realising that assistance is needed for it to ultimately reach its objectives and aspirations. Numerous businesses have adopted the widely used business system known as ERP, and these businesses are now reaping its rewards. Enterprise resource planning is one of the finest ways to make sure that you give your business the chance to become the success that it has the potential to become in the long run.

Using SAP's Technology

One of the leading (in more than 107 countries) ERP providers, SAP (System Applications and Products in Data Processing) is situated in Walldorf, Germany, and offers the client-server business application solution. Industries including chemicals, consumer goods, oil, high technology, and electronics use SAP as a standard. The SAP company employs more than 19300 people and has operations in more than 50 different countries. The most prosperous provider of common business applications is SAP.

In 1998, SAP AG reported revenues of DM 847 billion, a 41% increase over revenues in 1997. SAP R/3 sales also increased by 31% during this period. The SAP AG publicised its shares in 1988. The business was included in the DAX, an index of German blue-chip businesses, in 1995.

In 1998, SAP commenced trading of its American depository rights on the NYSE. Both the mainframe version (SAP R/2) and the client-server version (SAP R/3) of SAP's ERP software are available. R/3, an enterprise application suite from SAP, is available for open client/server systems. Customers may install the basic system and one or more additional pieces of software with SAP as a single unit [6].

Technology and Products

Over 800 preconfigured business processes have been compiled into a sizable library by SAP. To meet the precise needs of the user, these processes may be chosen from the SAP library and integrated into the installed SAP application solution. A company's business processes and applications may be linked using SAP software, which also supports real-time integration and quick reactions to changes at various organisational levels. Additionally, new technologies are always being developed to keep up with emerging business trends. The programme was created with consideration for worldwide standards, including simultaneous support for several currencies and automated handling of country-specific import/export, tax, legal, and linguistic needs. The functionality and technology of the R/3 system are unmatched. R/3's modules may be utilised alone or expanded incrementally to suit different needs.

With 27 significant industrial sectors, SAP is always being improved.Here are a few examples:

1. Aircraft and defence
2. Automotive
3. Chemicals
4. Goods for consumers
5. Operations, engineering, and construction
6. Technology
7. Medical care
8. Industrial equipment and parts
9. Milling initiatives
10. Mining
11. Natural gas and oil
12. Prescription drugs
13. Professional services;
14. Retail
15. Services
16. Distribution in bulk

System R/3

SAP customers, industry experts, and technology partners all highly regarded R/3 workers' three-tier client/server architecture for resolving some of today's most difficult information management problems.

Each of the three functional levels supports the requirements of its respective functions.

1. The control servers house the data layer, which is the first layer.
2. The second layer, or application layer, prepares and formats the data for distinct offices and departments and contains the system's processing logic.

3. The presentation layers handle all responsibilities for data display, including those involving user interface on personal computers.

SAP also integrated the business solution for intranet and Internet technologies. SAP creates novel information technology strategies via the network and its Industry Business Units (IBUs). With this strategy, clients join the SAP development team and contribute their expertise. The most common client/server business solution in the world is the SAP R/3 system. With this strategy, customers might get prompt responses, increasing the flexibility of the company process. The R/3 system can optimise corporate operations and is perfect for all sorts of companies. For each industrial department, such as accounting and controlling, sales and distribution, production and material management, quality management, project management, and human resource management, the system offers a potent programme. All of these programmes assist in top-level decision-making since the warehouse easily changes both internal and external data [7].

SAP Benefits

R/3 provides an integrated client/server information system solution, network management tools, and backup software to build effective communication networks. A comprehensive business solution is made possible thanks to SAP's partnerships with hardware manufacturers, database providers, and technology and service suppliers. While the client level distributes this database throughout the many levels to the end users, the server collaborates with real programmes and manages communication with the database. This client/server system may be utilised with anywhere between 30 and several thousand end users and is endlessly extensible. This guarantees that R/3 can always expand to meet the company's expanding needs.

The following is a list of SAP's advantages and disadvantages:

1. Long-term business relationships with clients
2. Comprehensive business understanding
3. Strong market position
4. Recognising a brand
5. Stable financial position
6. Consistent R&D spending
7. Significant R&D expenditures
8. Powerful, comprehensive, and robust core ERP solution

Weakness

The expansion of the big company market is a challenge for SAP. Primary SAP customers often see a slowdown The majority of big businesses that need an ERP system already use one. Although SAP anticipates selling many more R/3 modules to its current customers, the conversion of smaller organisations will drive growth. According to several observers, SAP R/3 is too large and complicated for smaller companies. SAP must provide more affordable, more compact solutions for this population.

Company BAAN

Jan and Paul BAAN, brothers, established the BAAN Company in the Netherlands in 1978. The business has offices in both Reston, Virginia, and Barneveld, the Netherlands. The business has increased its sales and services throughout North America, Latin America, Europe, and Asia since

1995. The BAAN Company offers corporate business software that streamlines information administration, enhances fundamental company operations, and lowers complexity and expense. The company's products provide a variety of business tools and a versatile line of year 2000 compliant software solutions. The instruments are built using a multi-tier design [8].

Oracle Corporation

In 1977, Oracle Corporation was established. It is the second-largest software corporation in the world. The firm provides relevant consulting, education, and support services along with its database, tools, and applications solutions. For creating and distributing corporate software, Oracle Corporation offers its own Internet computing paradigm. It offers databases, relational server software, tools for creating applications and making decisions, as well as corporate business applications.

Technology

Network computers, PDAs, minicomputers, mainframes, parallel computers, set-top boxes, and PCs are all supported by Oracle software. Oracle 8i, the most recent version of the company's software, is the industry's top database and enables Internet-connected devices. Oracle Corporation's database, networking, and gateway technologies provide access to any data from any client device on any server over any network. Customers that utilise Oracle's Warehouse Technology Initiative (WTI) get a full data warehousing solution. Oracle database and more than 60 free third-party software and service offerings are used to support WTI. Greater variety, Oracle-optimized products, specialised tools, and more efficient support are all provided by the WTI for Oracle-based database warehousing solutions.

Oracle's solution offers the company strong decision-making capabilities whenever and wherever they are needed. The Oracle Corporation offers an extensive selection of business intelligence tools. Oracle's enterprise reporting tools, Oracle Reports, its market-leading enterprise OLAP engine, its financial analyzer, sales analyzer, and ad hoc query and analyzer's tool are all included in the product line. A division of Oracle Corporation is Oracle Application. It is a top supplier of front office and ERP integration solutions. This provides the business solution with cutting-edge technology, industry knowledge, and partnerships necessary to help clients execute goals, reduce risks, and maximise rewards. For finance, human resource, manufacturing, supply chain, and front office automation, Oracle Application offers over 45 modules [9]. The Oracle Application is made up of around 45 software modules that are broken down into many categories. It's them,

1. Oracle Financials, Inc.
2. Oracle Human Resources
3. Oracle Projects,
4. Oracle Front office,
5. Oracle Supply Chain,
6. Oracle Manufacturing

All of these programmes take use of the Internet's natural accessibility and cheap cost. These programmes provide a whole business process that is automated and integrated. The Oracle programme can manage business-critical operations across borders and can work in many currencies and languages. It also supports local business practices and regulatory requirements.

More than 6000 clients in 76 countries utilise Oracle programme as a result of the advantages listed above [10].

CONCLUSION

Additionally, elements like globalisation, regulatory compliance, and the need for data protection have an impact on the ERP industry. ERP systems must support several languages and currencies for businesses that operate internationally. Additionally, ERP systems must adhere to standards and laws relevant to their respective industries, such as the GDPR in Europe or the FDA in the healthcare business. Data security and privacy are important factors as well, and ERP suppliers spend heavily on security measures to safeguard sensitive corporate data. In the end, the ERP market provides businesses with a variety of options and solutions to improve decision-making, simplify operations, and spur corporate expansion. The ERP industry is anticipated to continue growing and innovating in the next years due to the ongoing improvements in technology and the rising need for integrated business management solutions. To maximise the advantages of ERP in their unique business settings, organisations should carefully assess their needs, choose the best ERP technology, and work with knowledgeable providers.

REFERENCES

[1] E. Bjelland and M. Haddara, "Evolution of ERP systems in the cloud: A study on system updates," *Systems*, 2018, doi: 10.3390/systems6020022.

[2] A. Tenhiälä and P. Helkiö, "Performance effects of using an ERP system for manufacturing planning and control under dynamic market requirements," *J. Oper. Manag.*, 2015, doi: 10.1016/j.jom.2014.05.001.

[3] D. C. Hayes, J. E. Hunton, and J. L. Reck, "Market Reaction to ERP Implementation Announcements," *J. Inf. Syst.*, 2001, doi: 10.2308/jis.2001.15.1.3.

[4] A. Pang, "Top 10 ERP Software Vendors and Market Forecast 2015-2020," *Appsruntheworls*, 2016.

[5] C. Pang, Y. Dharmasthira, C. Eschinger, K. F. Brant, and K. Motoyoshi, "Market Share Analysis: ERP Software, Worldwide, 2013," *Gart. Res.*, 2014.

[6] L. Columbus, "Gartner's {ERP} {Market} {Share} {Update} {Shows} {The} {Future} {Of} {Cloud} {ERP} {Is} {Now}," *Forbes*. 2014.

[7] A. Winkelmann and C. Leyh, "Teaching ERP systems: A multi-perspective view on the ERP system market," *J. Inf. Syst. Educ.*, 2010.

[8] A. Pang, "Top 10 ERP Software Vendors, Market Size and Market Forecast 2018-2020," *Apps Run The World*. 2019.

[9] L. C. Forbes, "Gartner's ERP Market Share Update Shows The Future Of Cloud ERP Is Now - Forbes," *Forbes*, 2015.

[10] S. Jacobson and J. Shepherd, "The ERP market sizing report, 2006–2011," *Amr …*, 2007.

CHAPTER 8

A STUDY ON ENTERPRISE RESOURCE PLANNING (ERP) IMPLEMENTATION LIFECYCLE

Dr. Vijayarengam Gajapathy, Professor
Masters In Business Administration (General Management), Presidency University, Bangalore, India
Email Id: vgajapathy@presidencyuniversity.in

ABSTRACT:

Enterprise resource planning (ERP) system deployment is a challenging and crucial process that needs careful planning, carrying out, and administration. From early planning to post-implementation assistance, the ERP implementation lifecycle offers organisations a defined framework to adhere to as it leads them through the different implementation phases. This abstract gives a high-level overview of the ERP deployment lifecycle, emphasising its important phases and tasks. Planning, analysis, design, implementation, and support are the five primary steps of the ERP implementation lifecycle. Organisations determine project goals, form a project team, and create a thorough execution strategy during the planning phase. In the analysis phase, processes are thoroughly evaluated in order to find gaps and provide needs for the new system. Organisations create the ERP system according to their own requirements, personalise procedures, and specify data transfer plans throughout the design phase.

KEYWORDS:

Benchmark, Customized Maintenance, Feasibility Analysis, Local Area Network, Preventive Maintenance, Software Maintenance.

INTRODUCTION

Enterprise Resource Planning (ERP) system setup is a challenging and crucial task for organisations. It includes a number of phases and tasks that together make up the ERP deployment lifecycle. A systematic framework is provided by the ERP implementation lifecycle enabling organisations to properly design, install, and integrate the ERP system into their operations. The planning, requirements collecting, system design, development, testing, training, deployment, and continuing support stages are often included in the ERP installation lifecycle. Each phase includes certain goals, assignments, and outputs that all work together to make the ERP system's deployment and use effective. The ERP deployment lifecycle begins with the planning phase. Organisations determine the project scope, set goals, allot resources, and create a project team at this phase. In the planning stage, a feasibility study is carried out, project objectives and deadlines are established, and possible risks and difficulties are noted [1].

Understanding and capturing the functional and technical needs of the organisation are the main objectives of the requirements collecting phase. To determine the precise requirements and expectations that each major stakeholder has from the ERP system, it is necessary to conduct interviews, seminars, and conversations with them. The goal of the requirements gathering phase is to match the organization's distinct business processes and workflows with the ERP system. During the system design phase, the requirements acquired are converted into a detailed design

that specifies the setup and configuration of the ERP system. This include specifying the user interface, database design, and system architecture. In order to fulfil the unique demands of the organisation, any customisation or integration requirements must be determined during the system design process.

The system development phase starts when the system design is complete. In this stage, the ERP system is configured and customised in accordance with the design requirements. Additionally, it could entail data migration, which is the transfer of current data to the new ERP system. The development phase's goal is to create a customised and functioning ERP system that meets the needs of the organisation. A critical stage of the ERP deployment lifecycle is testing. To make sure the ERP system runs properly and satisfies the organization's requirements, it requires carrying out numerous tests, including unit testing, integration testing, and user acceptability testing. Before the system is launched, testing enables the discovery and correction of any problems or flaws [2].

The lifespan of ERP adoption must include training. It entails giving users and stakeholders in-depth training on how to use the ERP system efficiently. Users are given training so they are acquainted with the ERP system's features, procedures, and workflows and can take full use of it. The ERP system is introduced into the production environment during the deployment phase. To make sure the system is completely functional and prepared for usage, it entails installing the system, setting up user access permissions, and performing final testing. The cutover procedure, in which the organisation switches from the old system to the new ERP system, is also a part of deployment.

After implementation, continual support and maintenance are required to guarantee the ERP system's efficient functioning. This involves offering technical assistance, responding to customer inquiries and concerns, and carrying out routine system upgrades and improvements. The ERP implementation lifecycle offers organisations an organised and methodical method for implementing and integrating an ERP system. Each element, from planning to continuing assistance, is included, and they all work together to make the ERP deployment a success in the end. Organisations may minimise risks, guarantee stakeholder alignment, and maximise the returns on their ERP investment by adhering to the ERP implementation lifecycle [3].

DISCUSSION

A variety of key performance metrics, including profitability, efficiency, and the quality of information system data and reports, are key performance indicators that are hoped to be improved by the use of ERP systems inside an organisation. ERP suppliers often guarantee increases of 10% to 15% in revenue, customer satisfaction, and other value-related metrics. These systems need a tremendous amount of work to create. According to research by Meta Group, the typical ERP deployment takes 23 months and has a $15 million total cost of ownership. It is usual for businesses implementing ERP to have an early phase when little gains are seen. Some businesses may temporarily see a drop in performance. The failure to completely re-engineer business processes, management errors in system configuration, failure to map changes to the system resulting from changing business needs, errors in estimating processing power and data storage requirements, and inadequate end-user training are the main causes of such declines. All of these elements would have been taken into account during preparation and taken care of prior to going live in an ideal world. It is difficult to account for every element in practice [4].

Lifecycle of ERP Implementation

Any organisation that chooses to deploy enterprise resource planning (ERP) has a clear aim in mind: successful implementation. ERP deployment is a unique occasion since it takes place over time and includes the whole organisation. It brings together many functionalities, people, processes, and philosophies and results in significant changes throughout the whole organisation. The risks involved are significant because of the level of complexity and the time constraints that practically all initiatives of this kind have. But what does it take to navigate an implementation's seeming turbulence with ease? How can one maintain the consumers' enthusiasm? How can we use ERP to our advantage as soon as possible? Even if a firm has the greatest package, experienced users, and enough resources, these factors alone will not ensure that ERP will be successful.

This chapter covers the functions of consultants, vendors, and users as well as customization techniques, safety measures, significant concerns, implementation strategies, and ERP installation best practices. Any organisation that opts for enterprise resource planning (ERP) has a clear aim in mind: successful deployment. Any ERP deployment is a unique occasion since it takes place over time and includes the whole organisation. It combines many functionalities, personnel practices, and beliefs and results in significant organisational changes. The risks involved are significant because of the level of complexity and the time constraints that practically all initiatives of this kind have [5].

But what does it take to navigate an implementation's seeming turbulence with ease? How can one maintain the consumers' enthusiasm? How can we use ERP to our advantage as soon as possible? Even if a company has the greatest package, experienced users, and enough resources, none of these factors alone can ensure the success of ERP.

1. An evaluation of ERP solution needs
2. A feasibility study
3. Project life cycle for ERP

The three steps below may be used to categorise the life cycle of an ERP project.

Stage 1: Pre-implementation Stage

Companies must decide if they really need a new ERP system at this phase by developing a business case study and using it to determine that requirement. This phase includes choosing the product that best fits the needs of the company, minimising the need for customization. Various methodologies are used to assess the critical processes and practices of that company, and attempts are made to forecast the impact it can have both financially and commercially. The contract is established after an analysis of factors including cost, training, and maintenance services. Making a study of the suggested solution's return on investment at this step is also crucial [6].

Enterprise Case Analysis

Due to the following reasons, the majority of businesses choose to proceed with the high-risk installation of ERP.

1. It may not be at all appropriate for them, yet it is the in thing. In other instances, it even caused businesses to fail. However, it seems that individuals are deciding to install ERP irrationally.

2. It is intended to save expenses and time while streamlining their organization's operations.
3. Adapting a mindset that prioritises spending a lot of money, effort, and time. In general, it is seen that passion and curiosity are only present at the beginning stages. Due to a lack of dedication, interest gradually begins to decline.

Business case analysis is essentially a pre-implementation step that studies the present and potential future effects of the following:

1. Method
2. The procedures used
3. Individual mindset (involvement, collaboration)
4. The accessibility of resources (cash, time, and energy).
5. System's capacity for adaptation
6. Suitability

Business case analysis basically focuses on all the related issues involved and the different methodologies that are used to successfully complete this phase, so that one can make a decision regarding the implementation of ERP with strong evidence that can be measured and quantified at each stage of the ERP life cycle.

In business case analysis, the following topics are looked at:

1. Adopting international best business practices
2. Adoption of international best practices
3. The need for a worldwide IT infrastructure
4. Analysis of the competitive environment
5. Analysis of strategic needs
6. A feasibility study

Stage 2: Implementation Stage

Due to the deployment of ERP, it primarily addresses change management, project management, IT infrastructure management, and the implementation strategy. Numerous changes are made to the organisational structure and operational procedures of the company. To deal with these changes, training sessions, site visits, and workshops are organised to inform employees about the process of change as well as the ERP package and its effective use. Project management schedules are also created, which take project orientation, time, cost, and quality into account. The choice on the implementation strategy, including whether it should be a phased or big bang approach, is made after the company's preparedness has been evaluated [7].

Stage 3: Post-implementation Stage

When a project goes online, the ERP life cycle does not stop. Afterward, the project's post-impact study is often completed. 1-2 years after installation. Analysis is done to determine how best to use the project's resources. The profitability of the firm is determined by calculating the influence that ERP adoption has on all aspects of the operation, including financial, operational, organisational, etc. It is investigated if there are any opportunities for the project to be upgraded and benefitted in the future.

Ways to Achieve Success

To effectively install an ERP system, Willcocks and Sykes recommended the following measures in addition to acquiring the necessary IT skills.

1. **Focus on Users vs. Technology**

The ERP design may get more attention than current, improved support techniques. An ERP is designed to help people accomplish their jobs more effectively. Changes in perspectives on business needs are a natural result of business process reengineering. As a result, requirement lists are often unstable, and ERP system deployment calls for flexibility. Additionally, this modification could render vendor software obsolete. Willcocks and Sykes advise putting the requirements of the user ahead of technology. Only when a high level of technical maturity is necessary and precise specifications can be created can a technology emphasis be used [8].

2. **Personnel and Governance**

Effective company innovations need high-level support and a project champion, according to Willcocks and Sykes' research. Typically, the business side rather than the IT side provides this top support. ERP installation project managers must have a track record of success, be able to maintain the project's critical path, and be credible to senior stakeholders. A versatile team that includes end users, internal IT experts, individuals who can persuade different groups to cooperate, and experts in business and IT requirements is crucial.

3. **Time-box Thought**

From a systems viewpoint, a quick implementation period for ERP may appear obviously better; ideally, this period should be between six and nine months. This is often considered to be unrealistic. If so, it could be reasonable to divide implementation into smaller initiatives, each of which would have observable advantages for the company. This kind of time management lowers the chance of projects failing to meet business requirements. Willcocks and Sykes described this strategy as turning "whales" into "dolphins." The time needed for staff to adapt to the new system is one reason why quick ERP installation initiatives are undesirable. If personnel have used various systems for protracted periods of time, a lengthier transition period will be needed to reorient their thinking.

4. **ERP Supplier/Consultant Role**

Consultants have a wealth of expertise and ERP experience to offer. It is important to closely regulate outside consultants when developing highly creative ERP systems that serve business functions that are the organization's core capabilities. The alternative is to outsource company innovation management. Because the consultant receives access to the company's knowledge to sell to others, this is unproductive.

The selection and installation of an ERP system have drawn the most attention. However, there are still a lot of significant problems with how ERP systems operate. User staff training is crucial. The trauma of the new system is often quite tough for everyone to handle for roughly a year. Adopting a rigorous training programme helps you get through this trying time. One has a strong propensity to undervalue the scope of such a training programme. According to Wheatley, a vice president of research at a significant consulting business, ERP software is seldom the cause of implementation issues. Additionally, there was no discernible variation in issues across suppliers or by geography.

The majority of the issues were attributed to inadequate user training. Implementing ERP may be simpler for businesses with a larger percentage of new hires [9].

Companies with a large number of workers and years of experience need more transformation. It is often simpler to persuade managerial and professional personnel of the beneficial effects of ERP on organisational efficiency. Additionally, the time of ERP installation may be impacted by the amount of change that must occur inside the organisation. The system may not provide enough time for the organisational atmosphere to adapt if it is introduced too soon. Only 10% to 15% of ERP deployments go without a hitch. Among the pitfalls listed by Wheatley were:

1. Not paying attention to business processes while placing people in software-specific training.
2. Concentrating instruction on command sequences without providing justification.
3. Cutting training time too short.
4. Using outdated methods to solve issues rather than learning the new ones.

For a number of reasons, such as diversity, the complexity of the new system, and the range of training techniques available, training in new ERP systems may be challenging. ERP systems will fundamentally alter how employees go about doing their work. Integrating computer assistance into every element of the company will inevitably result in a diverse user base. These workers are likewise quite busy, particularly when they adjust to the demands of the new system. More than 10% of the overall cost of an ERP system might be spent on user training for new systems [10].

CONCLUSION

In conclusion, the ERP implementation lifecycle is a systematic strategy that firms take to effectively install an Enterprise Resource Planning (ERP) system. It includes numerous phases, including planning, analysis, design, development, testing, deployment, and continuous maintenance. Successful ERP implementation requires strong project management, effective communication, engagement from stakeholders, and adequate resources. It is vital to have a committed team monitoring the implementation process and managing change inside the firm. Ultimately, the ERP deployment lifecycle is a holistic methodology that helps firms to capture the full potential of an ERP system, streamline business processes, increase productivity, and generate long-term development and success.

REFERENCES

[1] M. E.R, B. T. Hanggara, and H. M. Astuti, "Model for BPM implementation assessment: evidence from companies in Indonesia," *Bus. Process Manag. J.*, 2019, doi: 10.1108/BPMJ-08-2016-0160.

[2] M. Ali and L. Miller, "ERP system implementation in large enterprises – a systematic literature review," *Journal of Enterprise Information Management*. 2017. doi: 10.1108/JEIM-07-2014-0071.

[3] S. I. Chang and G. G. Gable, "A delphi examination of public sector erp lifecycle implementation, management and support issues," *J. Decis. Syst.*, 2001, doi: 10.3166/jds.10.29-48.

[4] R. Kachur and W. Kleinsmith, "The Evolution to the Cloud – Are Process Theory Approaches for ERP Implementation Lifecycles Still Valid?," *Bus. Syst. Rev.*, 2013.

[5] A. Ramburn, L. F. Seymour, and A. Gopaul, "Understanding the role of knowledge management during the ERP implementation lifecycle: Preliminary research findings relevant to emerging economies," in *Lecture Notes in Business Information Processing*, 2013. doi: 10.1007/978-3-642-36611-6_21.

[6] O. Khadrouf, M. Chouki, M. Talea, and A. Bakali, "Influence of SME characteristics on the implementation of ERP," *Telkomnika (Telecommunication Comput. Electron. Control.*, 2020, doi: 10.12928/TELKOMNIKA.V18I4.13537.

[7] Z. Shao, Y. Feng, Q. Hu, and Y. Liu, "A conceptual model for studying the influence of charismatic leadership on ERP implementation lifecycle," in *Proceedings of the 42nd Annual Hawaii International Conference on System Sciences, HICSS*, 2009. doi: 10.1109/HICSS.2009.7.

[8] D. Saxena and J. McDonagh, "Evaluating ERP Implementations: The Case for a Lifecycle□based Interpretive Approach," *Electron. J. Inf. Syst. Eval.*, 2019.

[9] S. Sudevan, M. Bhasi, and K. V. Pramod, "Distinct stakeholder roles across the ERP implementation lifecycle: A case study," *Int. J. Enterp. Inf. Syst.*, 2014, doi: 10.4018/ijeis.2014100104.

[10] O. El-Telbany and A. Elragal, "Gamification of Enterprise Systems: A Lifecycle Approach," in *Procedia Computer Science*, 2017. doi: 10.1016/j.procs.2017.11.015.

CHAPTER 9

A BRIEF STUDY ON ENTERPRISE RESOURCE PLANNING (ERP) VENDORS, CONSULTANTS AND USERS

Mr. Venkatesh Ashokababu, Assistant Professor
Masters In Business Administration, Presidency University, Bangalore, India
Email Id: ashokababu@presidencyuniversity.in

ABSTRACT:

Modern firms have adopted ERP systems as a necessary component since they provide a complete solution for managing numerous operational elements. The knowledge and cooperation of three main stakeholders ERP providers, consultants, and users are crucial to the effective deployment and use of ERP systems. The ERP software solutions are created and delivered by ERP suppliers. To satisfy the various demands of organisations, they build and create solid systems that include a broad variety of features. Vendors are essential in continuing to support, upgrade, and maintain the system to guarantee its dependability and efficiency. On the other side, throughout the ERP installation phase, ERP consultants provide organisations with specialised knowledge and direction. They can help organisations define requirements, map processes, configure the system, and manage change since they have in-depth understanding of ERP systems and industry best practices. The unique requirements of the organisation and the capabilities of the ERP system are bridged by consultants.

KEYWORDS:

CASE, DSS, End-user Development, Outsourcing.

INTRODUCTION

Enterprise resource planning (ERP) involves three major groups of stakeholders that work together to successfully adopt, customise, and utilise ERP systems: ERP providers, consultants, and users. Each is essential to maximising the potential of ERP technology to improve decision-making, streamline business operations, and promote organisational development. Companies that create and provide ERP software solutions are known as ERP suppliers. These companies develop, create, and manage the essential ERP software, making sure it satisfies the changing requirements of companies in various sectors. They provide a variety of ERP packages to accommodate various company sizes and needs. Vendors of ERP systems are essential to providing dependable, expandable, and feature-rich ERP systems that support organisations' digital transformation [1].

ERP consultants are subject matter experts in ERP systems that collaborate closely with businesses to support the effective adoption and use of ERP software. They are very knowledgeable about the best practises, industry-specific needs, and ERP functionality. ERP consultants assist businesses at every stage of the ERP lifecycle, including planning, customization, training, and support. They provide insightful recommendations, offer suggestions for process enhancements, and guarantee that the ERP system is in line with the organization's aims and objectives. The people and groups inside organisations that regularly engage with and use the ERP system are known as ERP users. These users come from a variety of offices, including those in finance, operations, sales, and

human resources. To complete tasks, access information, and cooperate across departments, ERP users depend on the system. They gain from ERP systems' reduced procedures, improved visibility, and capacity for data-driven decision-making.

Collaboration is essential for the success of ERP amongst users, consultants, and suppliers. Vendors and consultants collaborate closely to comprehend industry needs and create cutting-edge ERP systems. In turn, consultants use their experience to help organisations choose the finest ERP system, adapt it to fit unique needs, and put best practises into practise. Users actively interact with the ERP system, giving input and promoting organisational adoption [2]. An ecosystem of symbiotic relationships between ERP providers, consultants, and users promotes the efficient use of ERP technology. Organisations may maximise the benefits of ERP systems, simplify processes, and experience sustainable development by using the skills and competencies of these stakeholders. To obtain a competitive advantage in today's digital business environment, ERP providers continually innovate, consultants offer knowledgeable advice, and users adopt and optimise the ERP system.

DISCUSSION

The process of creating an ERP package is time-consuming and very difficult. Numerous qualified workers and other resources are required. Many businesses have in-house divisions and specialists with knowledge in creating complex systems. But these businesses' primary goal is not specialised computer work. In order to better serve their clients and maintain growth, they should focus their efforts on enhancing their own goods and services. Therefore, even while internal deployment is an option, it is best to contact an ERP vendor or software company. These software companies may provide a more advanced technology and functionality combined with breadth and quality, which can boost reserves, profitability, and shareholder returns since building and deploying integrated software is their primary business. ERP providers need a team of individuals to carry out the planning and execution of the whole project effectively. (For instance, a consulting team, an internal team, users, etc.). These individuals assist organisations in implementing ERP using a standardised technique or approach [3].

Vendors

The individuals that created the ERP software are known as vendors. To build the software solutions, these individuals put in a significant amount of time and work. The makers of ERP invest billions of rupees in research to develop improvements that boost the software's effectiveness, adaptability, and simplicity of use.

What a Vendor Does

The vendors are in charge of both development and research as well as technological upgrades. Vendors often update their goods to reflect the greatest and most recent technological developments. The vendor is required to take on a number of tasks throughout the project, from planning to implementing. Vendor obligations are changing in a number of circumstances. Below is a list of the numerous duties that the ERP suppliers are responsible for.

1. Immediately after the contract is signed, the vendor must provide the goods and all related paperwork. The firm doesn't create its training and testing environment for the implementation until after the programme has been deployed. A vendor should have a

licence officer who communicates with the implementation team in order to address any implementation-related issues.

2. A vendor's other position or duty is that of a trainer, providing initial training for a company's important users. This explains to users how the package operates, what its main components are, how data and information move throughout the system, what is flexible and what is not, what can be configured and what cannot, what its limitations are, what its advantages and disadvantages are, and so on.
3. The suppliers must do quality control when the product is put into use and they must also support the project functions. The suppliers will bear the brunt of the responsibility if the implementation fails.
4. On the other side, giving this help results in a happier customer, more goodwill, and positive referrals.
5. Vendors should continue to be involved at all stages of project execution, mostly in an advising role and answering specific technical queries regarding the technology and goods they are offering.

In addition to these duties, merchants should give the assurance of customisation and become involved in filling in the gaps between the product's packaging and its real use. It will be able to gain from the growing enhancements made by the providers to their software solutions in the future.

Advice on Choosing an ERP Vendor

The majority of ERP software providers on the market are occupied with marketing their offerings. Some of them are also capable of offering effective software solutions. Nevertheless, choosing the right software for an effective and reliable ERP software system might be difficult. Furthermore, the work is Spartan because to the abundance of merchants in the market. The business needs a provider that can meet all the requirements, from service to price [4]. A number of factors should be taken into account when choosing an ERP provider. The first thing the business has to do is research the ERP provider. In-depth research should be done in the studies to ensure that the conclusions are appropriate. The business must base its judgements on the research since, if the studies indicate that the market leader in ERP providers does not match the need, it is improper to choose them. The popularity of ERP software providers does not imply that their services should be in line with the requirements and operations of the firm.

There are several ERP companies vying for customers' business. They should seek for the seller that provides more features than the competition. This boosts vendor rivalry and narrows the choices in the proper direction. In order to attract businesses, vendors also work to raise the quality of their goods and services. The corporation benefits from the outcomes in either case. The business should use actual demonstrations of the ERP software to validate it. Without actually using the services, it is impossible to get a sense of what they are like. Even better, the decision-making authority should go to the vendor's location to check that the requirements, norms, and other aspects are met. The authorities may choose a few providers from the list of ERP vendors for better implementation.

Information on the ERP vendor's position in the market must be gathered. This would make it easier to weigh the benefits and drawbacks of selecting a provider. In order to determine if a given vendor is qualified to provide services, it is helpful to look at their history, prior experiences, and business. Regarding the service area where the business wants to install ERP, the vendor's

reputation should be evaluated. If such an evaluation is carried out, it will add value and significance when picking the ERP provider [5].

The business need to choose a flexible ERP provider. In a larger sense, it implies that the vendor should follow and put into practise the vendors' suggestions. On the other hand, the business should take the vendor's advice about technical details and experience. It should be possible for both parties to cooperate and come up with answers. This would facilitate achieving reciprocal advantages. In India, having ERP is seen as an investment by the majority of commercial organisations. Enterprise resource planning, or ERP, is a comprehensive, integrated, multi-module system that incorporates all of an organization's procedures and data. It is crucial to find an effective balance between hardware and software in order to achieve this aim.

Large industrial organisations were the first adopters of enterprise resource planning, using the technology to streamline their workflow and business operations. However, as time went on, ERP developed into a more complete system and is now widely accessible to businesses of all shapes and sizes. It supports and services a broad spectrum of company operations, including production, order entry, accounts receivable and payable, general ledger, buying, warehousing, transportation, and human resources [6].

For an extensive ERP project, consultancy is available at three levels:

1. the architecture of a system The systems architect creates the enterprise's entire dataflow, including a future dataflow strategy.
2. Technical advice, mainly with tool setup and programming: This often requires substantial programming.
3. Business process consulting (mainly re-engineering): The business consultant becomes familiar with the organization's present business procedures. Additionally, it assesses the related processes inside the ERP system, aiding in its configuration to the needs of the organisation.

In most cases, ERP vendors let firms alter their software to suit client requirements. Cost is, nevertheless, the most crucial factor in ERP installation.

Role of Vendor Comparison

SAP offers the most comprehensive ERP solution with the most functionality. The product is said to be overly stiff, rigid, and complicated, demanding more business process modifications than any other ERP system, high learning curves, and difficult screen navigation [7].

Consultants

Business consultants are highly trained individuals that focus on creating approaches and techniques for addressing implementation issues as well as other issues that may arise throughout the execution of the package. They are effective administrators that oversee the whole installation and follow-up process. The only issue with them is how very costly they are. The consultancy companies examined the different products, gained a thorough grasp of each product's advantages and disadvantages, and collaborated with the ERP suppliers. It verifies that the vendor's package is effective, learns the methodologies, discovers the hazards and errors that may be avoided, and so develops a pool of specialists who successfully manage the ERP deployment [8].

A consultant's role

In the implementation, the consultants perform a variety of functions. The following are the duties of the consultant towards the organisation using ERP:

1. The consultant must ensure the project's success and be able to demonstrate the outcomes to the firm management's satisfaction.
2. The consultant should be in charge of overseeing, monitoring, and inspecting the implementation-related activities. This is crucial to completing tasks on time and maintaining the package's quality.
3. Since consultants have worked on several projects and have either made or seen errors, they should contribute value to the project. They may increase quality while avoiding certain blunders, which helps to save time, money, and effort.
4. The consultant offers their prior knowledge with a package's deployment, which makes it simpler and more beneficial. As a result, consulting helps by implementing ideas correctly the first time around rather than via trial and error.
5. Consultants must be able to maintain objectivity while challenging present procedures in an attempt to support improved business practises and achieve outcomes.
6. Consultants are in charge of analysing and resolving customization-related difficulties; requirements, demands, and alternatives should be separated into "must have" and "nice to have" categories.

Consultants must strike a balance between their allegiance to the customer and the project. It is the consultant's responsibility to comprehend the whole context and extent of the job and to be aware of when to advise changing the corporate management's course of action or decision.

End-users

Once the ERP system is in place, these individuals will use it. These are the individuals who formerly performed the tasks that ERP is automating or computerising. Implementation will affect the nature of the work. Human nature makes us resent change, and implementation fundamentally transforms every aspect of business. Employees will worry that the system will eliminate their employment. Additionally, they fear the training and education required to utilise the new system. Due to their operational level jobs, these are the persons who will be most immediately impacted by the implementation adjustments. Their work description changes, and their duties significantly shift [9].

They are compelled to acquire new skill sets as well. The organisation will run into difficulty if the issues that end users encountered during installation or post-implementation stages are not addressed and resolved as soon as possible. The main barrier to using an ERP package will be removed if the organisation can get its staff to recognise this reality and help with the transition.

Implementing internally: Benefits and Drawbacks

Since most businesses don't deal in creating and implementing software, the systems their internal teams generate are inferior in terms of quality, scope, functionality, and technology to those developed by software corporations. Therefore, it is advisable for a company to focus on its core competencies and leave the work of ERP deployment to software companies that specialise in that field. But to get the most out of a packaged solution, the business should be actively involved with a package installation. In order to have enough specialists on staff after the implementation is

complete, the organisation should organise employee engagement so that each individual may have a suitable role in the project [10].

People who are developing ERP systems should possess the following abilities in addition to having solid product knowledge:

1. The ability to plan and manage a project of this size, including strong organisational abilities, project management expertise, team leadership abilities, and familiarity with the scientific project management methodology for software.
2. Sufficient expertise in resolving difficulties and problems that pop up during implementation, such as issues with cost overruns and time overruns, etc.
3. Effective interpersonal skills: The deployment of ERP will encounter opposition from the workforce, including lack of product knowledge, fear of job loss, resistance to training, fear of technology, etc. Because of this, it is crucial that members of the implementation team have a strong background in diplomacy and crisis management.
4. Effective leadership abilities: Since an ERP deployment includes several parties, suppliers must have effective leadership and communication abilities. For implementation with current staff, this is necessary.
5. outstanding training abilities: Since the team and end user training stages of the implementation process are crucial, the vendor should provide outstanding training.

The success of an ERP deployment rests in the hands of the end users, who manage the whole system. Before leaving the organisation, an ERP provider must provide the training flawlessly. In addition, the post-implementation (maintenance mode) situation affects how well the ERP is implemented. What would happen if a corporation decided to create or use an ERP system? In-house resources are appropriately assigned the duties of ERP installation given that the current corporate trend is to cut staff and concentrate on competition. If a business wishes to plan internal implementation, it may engage specialists and add them to its staff. This is a pricey undertaking since there is no need to retain professionals once implementation is complete [11].

CONCLUSION

In conclusion, users, consultants, and ERP providers all contribute significantly to the effective deployment and usage of an ERP system. Users are important participants in the ERP journey, including management, workers, and stakeholders. Successful ERP adoption and utilisation depend on user participation and buy-in. For users to fully comprehend how the ERP system fits with their roles and responsibilities, they must actively engage in requirements gathering, user acceptability testing, and training sessions. Their input and participation are essential for system optimisation, ongoing development, and efficient use of the ERP system to meet organisational objectives. For an ERP installation to provide the intended results, cooperation and communication between ERP suppliers, consultants, and users are essential. Vendors and consultants must interact with users, ascertain their requirements, provide thorough training and support, and resolve any issues that may crop up. On the other side, users should contribute actively, provide suggestions, and accept the change that occurs with using an ERP system.

REFERENCES

[1] Saide and E. R. Mahendrawathi, "Knowledge Management Support for Enterprise Resource Planning Implementation," in *Procedia Computer Science*, 2015. doi: 10.1016/j.procs.2015.12.170.

[2] Z. J. H. Tarigan, H. Siagian, and P. Sebayang, "The impact of implementing enterprise resources planning (ERP) project on firm performance and organizational citizenship behavior as a moderating," *J. Proj. Manag.*, 2020, doi: 10.5267/j.jpm.2020.8.001.

[3] E. T. G. Wang, S. P. Shih, J. J. Jiang, and G. Klein, "The consistency among facilitating factors and ERP implementation success: A holistic view of fit," *J. Syst. Softw.*, 2008, doi: 10.1016/j.jss.2007.11.722.

[4] C. S. Yu, "Causes influencing the effectiveness of the post-implementation ERP system," *Ind. Manag. Data Syst.*, 2005, doi: 10.1108/02635570510575225.

[5] F. F. H. Nah, S. Faja, and T. Cata, "Characteristics of ERP software maintenance: A multiple case study," *J. Softw. Maint. Evol.*, 2001, doi: 10.1002/smr.239.

[6] J. L. Salmeron and C. Lopez, "A multicriteria approach for risks assessment in ERP maintenance," *J. Syst. Softw.*, 2010, doi: 10.1016/j.jss.2010.05.073.

[7] S. Dezdar and S. Ainin, "Examining ERP implementation success from a project environment perspective," *Bus. Process Manag. J.*, 2011, doi: 10.1108/14637151111182693.

[8] M. AL-Zoubi and A. Al-Haija, "Organization Factors for ERP Projects in a Developing Country: A Case Study Jordan," *Int. Bus. Res.*, 2018, doi: 10.5539/ibr.v11n8p1.

[9] S. C. L. Koh, A. Gunasekaran, and J. R. Cooper, "The demand for training and consultancy investment in SME-specific ERP systems implementation and operation," *Int. J. Prod. Econ.*, 2009, doi: 10.1016/j.ijpe.2009.05.017.

[10] G. C. Alex Peng and C. Gala, "Cloud ERP: A newdilemma to modern organisations?," *J. Comput. Inf. Syst.*, 2014, doi: 10.1080/08874417.2014.11645719.

[11] S. Dezdar, "Strategic and tactical factors for successful ERP projects: Insights from an Asian country," *Manag. Res. Rev.*, 2012, doi: 10.1108/01409171211276945.

CHAPTER 10

A BRIEF DISCUSSION ON ENTERPRISE RESOURCE PLANNING (ERP) FUTURE DIRECTIONS

Dr. Bipasha Maity, Professor
Masters In Business Administration (General Management), Presidency University, Bangalore, India
Email Id: bipasha@presidencyuniversity.in

ABSTRACT:

As businesses look for new ways to run their operations more efficiently, Enterprise Resource Planning (ERP) is positioned for substantial breakthroughs and changes in the future. The future landscape of ERP systems is now being shaped by a number of significant trends and directions. ERP systems will be significantly impacted by the incorporation of developing technologies. The Internet of Things (IoT), machine learning (ML), artificial intelligence (AI), and predictive analytics will all play significant roles in enhancing ERP systems' automation, decision-making, and predictive capabilities. These technologies will provide businesses the tools they need to analyse massive volumes of data, streamline operations, and spur creativity. Additionally, improved interaction and compatibility with other corporate systems and external platforms will characterise ERP in the future. This would allow organisations to use external data sources for better decision-making and ease smooth data interchange and integration with specialised applications.

KEYWORDS:

Cloud Computing, Enterprise Network, Online Analytical Processing, UNIX.

INTRODUCTION

Enterprise Resource Planning (ERP) is primed for innovative breakthroughs that will transform how businesses manage their business operations. ERP systems are anticipated to adopt new trends and innovations as technology continues to advance at an unprecedented rate, helping organisations remain ahead in a competitive and dynamic corporate environment. In this introduction, we will look at a few possible possibilities for ERP's future while underlining its revolutionary potential. The future of ERP promises to provide organisations more efficiency, agility, and insights for better decision-making via the use of intelligent technologies, cloud computing integration, and a growing emphasis on user-centric experiences.

Intelligent Technologies

Automation, machine learning, and artificial intelligence (AI) are expected to have a big impact on ERP in the future. These intelligent technologies will be used by businesses to automate repetitive jobs, simplify processes, and mine massive volumes of data for insightful information. While ML algorithms will allow predictive analytics and proactive decision-making, AI-powered chatbots and virtual assistants will improve user interactions and provide real-time help.

Cloud Computing

ERP systems that are cloud-based will keep gaining popularity because they provide businesses scalability, flexibility, and cost-effectiveness. ERP will undergo a considerable transition to cloud-based installations in the future, enabling companies to use their ERP systems from any location at any time without the need for a sizable IT infrastructure. Additionally, seamless collaboration, data integration, and improved security will be made possible by cloud-based ERP systems.

User-Centric Experiences

ERP will prioritise providing intuitive and user-friendly experiences in the future. User interfaces will be a major focus in the design of ERP systems, ensuring that users can easily browse and interact with the system. Individuals will be able to customise their ERP experiences according to their unique roles and interests, increasing productivity and user happiness.

Data Integration and Connectivity

ERP systems will progressively interact with other systems and platforms as businesses become more data-driven in order to facilitate easy data exchange and analysis. Integration with supply chain networks, customer relationship management (CRM) systems, and Internet of Things (IoT) devices will provide thorough understanding and end-to-end visibility across the organisation. This connection will provide a comprehensive perspective of corporate operations and real-time data-driven decision-making.

Enhanced Mobility and Accessibility

Mobility and accessibility will be given top priority in ERP in the future, allowing users to access vital information and complete activities while on the move. Users will have the freedom to work from any device thanks to responsive interfaces and mobile ERP software, which will improve productivity and cooperation. Businesses will use mobile technology to provide field workers, sales teams, and executives with up-to-the-minute information and insights.

DISCUSSION

ERP offers the ideal option for back-office procedures. ERP systems in areas like financial management, human resources, and basic manufacturing have already shown their effectiveness. ERP systems also provided the industry with the answer to the Y2K issue. This led to an increase in demand for investments in front office software like e-commerce, supply chain management, and HR - customer self-services. The top five ERP vendors advance to the latest technology as demand increases. Significant company development is fueled by suppliers like SAP, BAAN, PeopleSoft, and J.D. Edwards refocusing their efforts on Front-office tasks like customer management and SCM like checkout. ERP software has historically offered multi-module packages for payroll, accounting, human resources, and company administration. ERP providers first used platforms from IBM mainframe, ASI400, DEC, or HP minicomputers before transitioning to client/server and UNIX systems [1].

As all vendors were compelled to advertise their goods to small businesses, they reduced the pricing of individual modules while increasing the overall costs by basing the price on user licences, for example. Oracle sells software at a discount from vendors like Platinum Software and Great Plains Software. The OneWorld suit is available in less priced variants from JD Edward.

ERP's Future Directions

Change is the only constant. Nowhere is this truer than in the fast-paced, always changing world of technological progress. Thus, the issue is: How will the ERP market be impacted by these unavoidable changes? In this lesson, we will look at the landscape of the business and see what is coming up, bearing in mind that a lot of times, what seems to be looming enormous in the distance is really a mirage. At least one thing is universally acknowledged by observers of the ERP sector: one-size-fits-all, universal integration is no longer regarded as the rule. Even though the ERP concept was and still is somewhat revolutionary, given the number of businesses that have yet to adopt it, it is doubtful that it will be able to maintain its status as the "hottest" technology overall in the face of competition from EDI (Electronic Data Interchange), Internet commerce, and other cutting-edge technologies, as well as from aggressive new supply chain and customer self-service business practices [2].

Quicker implementation strategies

The idea that ERP suppliers' software is expensive and difficult to deploy has hurt all of them. Because of this view, the "Big 6" accounting firms now the "Big 5" with the merger of Price Waterhouse and Coppers SB Laybrand have made enormous profits from their "practices" of implementing ERP software. Implementing ERP software is challenging, despite the fact that just 10-15% of projects took years to complete and cost millions of dollars in consultancy fees. An ERP system may include dozens of modules that are deployed globally to serve hundreds of users from several corporate divisions. A number of key business processes may be reengineered concurrently with a full change in infrastructure, such as moving from a mainframe to a UNIX platform. As a result, ERP suppliers have started to concentrate their efforts on facilitating the deployment process by:

1. Providing more efficient tools
2. More effective methods to accelerate the process,
3. Assembling expert consulting teams to ramp up assistance as necessary, and
4. Adopting model-based strategies and simplifying integration by opening up their systems

With the aid of this solution, installation teams may tailor the SAP modules to match the processing requirements of more than 100 different business operating situations. In many circumstances, methodologies like ASAP assist cut the length of time it takes to adopt SAP to less than six months. To hasten the installation of its Oracle Applications suites and stabilise upfront costs, Oracle has unveiled a programme akin to Fast Forward. Reengineering is required in order to execute the whole business. This might completely alter the prior operating business model, making it impossible to adopt. Only 10% to 15% of implementations always take years to finish, and by that point, the cost of the implementation may have gone up [3].

The ERP suppliers are looking towards speedier implementation approaches, such as, to make the installation of packages easier. SAP has launched a programme called Accelerated SAP (ASAP). A product called the Business engineer is created by this programme using the experience gathered from R/ 3 implementations. This aids in setting up SAP modules to adhere to the same 100 business operational scenario processing patterns. In many instances, this technique cuts the SAP deployment period to under six months. Oracle also unveiled the Fast - Forward implementation approach. This programme expedites the adoption of Oracle application packages and establishes upfront fees. Due to a lack of qualified experts, implementing ERP systems is sometimes a

challenging undertaking. The ERP vendors also offer consulting services with highly skilled consulting teams and are tasked with delivering fully trained experienced consultants on a global basis, such as Oracle's OracleOne or SAP's Platinum Consulting Services with highly skilled consulting teams providing their services along with new channel partners and implementation methodologies [4].

Platforms for Applications

The ERP manufacturers provide extensive suites of application modules in addition to core platform administration capabilities. These modules facilitate international deployment, year 2000 compliance, and the Euro (European currency), for example. R / 3 solution leverages well-known platform administration technologies for centralised support. These tools are provided by companies like Computer Associates (Unicenter TNG) and Tivoli (TME) using its R/3 product being one of the few that can be administered centrally using well-known platform management tools from manufacturers like Computer Associates (UniCenter TNG) and Tivoh (TME), SAP is already in the lead in this race.

Segments of new businesses

ERP companies are attempting to give specialised versions of their software to business categories including government, health care, retail settings, and financial services after establishing themselves in business/enterprise contexts. Some vendors are providing their services in more specialised fields including supply chain management, sales automation, and demand forecasting. For instance, BAAN purchased Aurum Software for its Aurum Customer Enterprise suite of CRM solutions and also partnered with Hyperion Solution to bolster its finance module. People Soft purchased Red Pepper Software to enhance its supply chain application. The distribution and production components of BAAN are connected by Hyperion Software to Hyperion's financial accounting, budgeting, and reporting systems [5].

Enabling the Web & Snapshot

ERP companies are being pressured to switch from client/server to browser/server architecture in order to web-enable their software in order to give the self-services and e-commerce features. Vendor provides Java-based web-enabling software applications. For instance, BAAN is working to provide all of its products with a java-based web interface and is also concentrating on the automation of supply chain relationships via the internet, on e-commerce via Microsoft merchant server (Site Server), and on using Spider-Man technology from Hyperion Software Corp. for report and alert distribution across the web. Java-based self-service applets are provided by PeopleSoft with its version 7. Java is being used by J.D. Edward to make One World accessible through a web browser or a Windows client.

In addition to 25 web apps and access to online catalogues for web-based procurement, SAP published version 3.1 of the R/3 in 1997. ERP providers all use Java rather than Microsoft's Activex for their initial generation of web-enabled applications. The web interface for ERP companies' universal applications is built on Java. As a result, they switch from using proprietary technology to more open-source solutions.

For instance, SAP solutions and PeopleSoft provide tools for customising their ABAPG and PeopleTools products. These tools are proprietary and increase the cost of implementation, whereas many lower-tier software vendors use commercial tools like Power Builder VB or

Microsoft Access to build their application front ends. As a result, customers must pay more for ABAG and PeopleTools [6].

Oracle is a tool provider as well, and it creates its Oracle Applications using Oracle Forms, Developer 2000, and Designer 2000. The integration of corporate packaged applications with cutting-edge technologies, such as sales force automation (SFA) and customer relationship management (CRAM), is one of the newest trends in business software. The availability of internet-based services like e-commerce causes new applications to be redirected away from things with back-office and front-office functions. In order to give self-service and electronic commerce features, ERP companies must transition from a client/server to a browser/server architecture, just like every other software vendor.

All of BAAN's products will eventually have a Java-based Web interface. The firm is also concentrating on e-commerce utilising the Microsoft Merchant Server (formerly known as Site Server), automating supply-chain interactions over the Internet, and using Spider-Man technology from Hyperion Software Corp. for report and alert delivery throughout the Web.

With PeopleSoft 7, PeopleSoft will provide its Universal Applications, which are Java-based self-service applets. Additionally, JD Edwards uses Java to make its OneWorld capability accessible through a Windows client or a web browser. While Oracle's Oracle Web Suppliers, Oracle Web Customers, and Oracle Web Employees modules are all delivered using Java. For R/3 version 3.1, SAP launched 25 Web apps in 1997. More recently, linkages to online catalogues for Web-based procurement were added. For their initial generation of Web-enabled apps, the ERP providers all use Java rather than Microsoft's ActiveX, in contrast to the Microsoft-centric middle market products. The first step towards moving away from proprietary technology and towards more open tools is the use of Java by ERP providers as a mechanism to offer and deploy their Web capabilities [7].

Implementing solutions from SAP and PeopleSoft may be costly due of the proprietary nature of the ABAP4 and People-Tools used to customise their products. The ERP manufacturers have not followed this path, in contrast to many lower-tier software providers that have created their application front ends using well-known commercial technologies like PowerBuilder, Visual Basic, or Microsoft Access. As a consequence, the client will have to pay more for ABAP4 and PeopleTools programmers rather than making use of whatever existing PowerScript or Visual Basic knowledge they may have. The business employs Oracle Forms, Developer 2000, and Designer 2000 to create its Oracle Applications since Oracle is already a tool provider [8], [9].

Business Application Programming Interfaces (BAPIs) and business models

By publishing the specifications for almost 170 business application programming interfaces (BAPIs), which enable direct communication between R/3 and other applications, SAP has refuted the claim that the R/3 system is not open. Simply said, BAPIs are collections of methods that let outside programmes communicate with certain R/3 business objects, such customers, accounts, or employees. Due to the fact that the R/3 data may be accessed via these callable methods (BAPIs), third party application suppliers have a great deal of freedom when developing companion apps for the R/3 system. Similar to this, BAAN offers a product called OrgWare that is built on the usage of a closely integrated business-modeling tool together with industry-specific templates that assist in automatically configuring the software to meet certain operational demands. To speed up

the deployment of applications on the Windows NT platform, BAAN is actively improving this product with additional setup wizards [10].

CONCLUSION

In summary, Enterprise Resource Planning (ERP) is set for exciting future developments and improvements that will influence how businesses conduct their daily operations. As ERP continues to develop, a number of important patterns and tendencies may be seen. The growing integration of cutting-edge technology like artificial intelligence (AI), machine learning (ML), the Internet of Things (IoT), and analytics is one major future trend for ERP. By delivering predictive insights, automation, and data-driven intelligence, these technologies have the potential to revolutionise ERP systems. Massive volumes of data may be analysed using AI and ML algorithms to find trends, streamline procedures, and allow predictive decision-making. IoT integration enables proactive monitoring and management of operations by providing real-time data gathering and analysis from linked devices. Analytics capabilities provide businesses meaningful information to spur innovation and ongoing development.

REFERENCES

[1] J. Motwani, R. Subramanian, and P. Gopalakrishna, "Critical factors for successful ERP implementation: Exploratory findings from four case studies," *Comput. Ind.*, 2005, doi: 10.1016/j.compind.2005.02.005.

[2] T. Oseni, S. Foster, M. Rahim, and S. P. Smith, "A framework for ERP post-implementation amendments: A literature analysis," *Australas. J. Inf. Syst.*, 2017, doi: 10.3127/ajis.v21i0.1268.

[3] D. Tanner, "On the left anterior negativity (LAN) in electrophysiological studies of morphosyntactic agreement: A Commentary on 'Grammatical agreement processing in reading: ERP findings and future directions' by Molinaro etal., 2014," *Cortex*. 2015. doi: 10.1016/j.cortex.2014.04.007.

[4] S. K. Talluri and A. Vasu Deva Reddy, "Evaluating critical success factors of ERP implementation in SMEs," *Int. J. Recent Technol. Eng.*, 2019, doi: 10.35940/ijrte.B1716.078219.

[5] R. Eden, D. Sedera, and F. Tan, "Sustaining the momentum: Archival analysis of Enterprise Resource Planning systems (2006-2012)," *Commun. Assoc. Inf. Syst.*, 2014, doi: 10.17705/1cais.03503.

[6] J. Olhager and E. Selldin, "Enterprise resource planning survey of Swedish manufacturing firms," *Eur. J. Oper. Res.*, 2003, doi: 10.1016/S0377-2217(02)00555-6.

[7] B. L. Alderman, R. L. Olson, and C. J. Brush, "Using event-related potentials to study the effects of chronic exercise on cognitive function," *Int. J. Sport Exerc. Psychol.*, 2019, doi: 10.1080/1612197X.2016.1223419.

[8] J. E. M. Scanlon, K. A. Townsend, D. L. Cormier, J. W. P. Kuziek, and K. E. Mathewson, "Taking off the training wheels: Measuring auditory P3 during outdoor cycling using an active wet EEG system," *Brain Res.*, 2019, doi: 10.1016/j.brainres.2017.12.010.

[9] J. R. Kuhn and S. G. Sutton, "Continuous auditing in ERP system environments: The current state and future directions," *J. Inf. Syst.*, 2010, doi: 10.2308/jis.2010.24.1.91.

[10] N. Molinaro, H. A. Barber, and M. Carreiras, "Grammatical agreement processing in reading: ERP findings and future directions," *Cortex*. 2011. doi: 10.1016/j.cortex.2011.02.019.

CHAPTER 11
A BRIEF INTRODUCTION ON ERP-II

Dr. Vankadari Gupta, Associate Professor
Masters In Business Administration (General Management), Presidency University, Bangalore, India
Email Id: chithambargupta@presidencyuniversity.in

ABSTRACT:

The next generation of ERP systems, commonly referred to as Enterprise Resource Planning II, go beyond the conventional features of its predecessors. In order to be competitive in a quickly growing digital market, contemporary enterprises need greater flexibility, integration, and sophisticated capabilities, which are addressed by ERP-II systems. This paper gives a summary of ERP-II, emphasising its main characteristics, advantages, and possible drawbacks. It looks at how ERP-II expands on the fundamentals of conventional ERP systems and applies fresh ideas in order to help businesses operate more effectively, quickly, and creatively. The paper also addresses the essential elements of ERP-II, such as collaborative commerce, expanded supply chain management, customer relationship management (CRM), and sophisticated analytics. In order to facilitate real-time data exchange and provide organisations the ability to make defensible choices based on correct, current information, it emphasises the significance of seamless connectivity between these components.

KEYWORDS:

ERP-II, Information System, Information Technology (IT), Manufacturing Resource Planning (MRP II), SCM.

INTRODUCTION

Enterprise Resource Planning (ERP) has seen substantial development throughout time, and ERP-II is one of the most important developments in this area. The next generation of ERP systems, known as ERP-II, go beyond the conventional functionality of its predecessors. It contains more recent technology, more features, and a more thorough method of managing business resources and operations. The basis of classic ERP systems, which mainly focused on integrating and controlling essential corporate operations like finance, human resources, and supply chain, is built upon by ERP-II. Instead of being predominantly internal-focused like standard ERP systems, ERP-II expands the scope to include external stakeholders including customers, suppliers, and partners. ERP-II places a strong focus on networking and cooperation, which is one of its primary advantages. The company ecosystem's many organisations may collaborate and share information easily thanks to ERP-II solutions. This includes seamless supply chain coordination with partners, real-time interaction with suppliers for effective procurement, and integration with customers for simplified order administration [1].

ERP-II's support for sophisticated analytics and business intelligence is another noteworthy feature. ERP-II systems use big data analytics, machine learning, and artificial intelligence (AI) to get a better understanding of corporate operations, consumer behaviour, and market trends. Organisations may use this to find growth possibilities, make data-driven choices, and react

proactively to changing market dynamics. Mobility and accessibility are also included in ERP-II, enabling users to use the system from a variety of devices and places. Employees may work remotely, interact while on the road, and have immediate access to vital information because to this flexibility, which boosts output and responsiveness [2]. Additionally, ERP-II systems take into account the dynamic regulatory and compliance environment. They include components that guarantee compliance with rules particular to the industry, data protection standards, and corporate governance requirements. This aids businesses in risk mitigation, compliance upkeep, and sensitive data protection.

DISCUSSION

Innovating study note from GartnerGroup titled "ERP is dead-long live ERP II". The enterprise resource planning (ERP) suppliers' responses to market difficulties and the evolution of ERP and ERP strategies by 2005 are projected in this research note by GartnerGroup. ERP II, according to GartnerGroup, is an evolution of ERP into next-generation business solutions. Today's top vendors have included this idea into their ERP programmes. However, research does not react swiftly to novel commercial methods. This delay is a problem since the information systems (IS) field's research inertia prevented the development of ERP until the late 1990s. The failed ERP implementation initiatives stoked the interest in ERP research, which has only lately been unified into a strategic and managerial view of enterprise systems (ES) management [3]. Supply chain management (SCM) has long been the driving force pushing the sector to integrate and work with other companies, and ES has played a key role in this development. SCM practises have been significantly impacted by new information technology (IT), and interest in loose-coupled and network-oriented viewpoints is now rising.

Studying ERP-II

ERP II is a crucial idea for business, but up to this point, research on it hasn't been reliable or decisive in terms of the nature and scope of the phenomena. This unit will approach the ERP II idea by assessing the evolution of the ERP packages and the emerging business needs. An overview of a conceptual framework for ERP II will result from this. This research advances existing ERP theory, system evaluations of the vendors, and current business procedures. This indicates that the framework will be valuable in the actual study and design of large corporate systems. The conceptual foundation and decomposition of the ERP II idea are presented. The study concludes by summarising other enterprise systems research and discussing the research and commercial implications of next-generation enterprise systems [4].

Reviewing Enterprise Systems

The development of ERP has often been used to describe the idea of ES. Over the course of over 50 years, the idea of ES has changed because to shifting business demands, emerging technology, and the capacity for development of software suppliers. The advent of computers into business in the 1950s and 1960s gave rise to the basic framework of ERP. The first software programmes automated manual processes like purchasing, billing, and accounting. Early bill of materials (BOM) processors and inventory control systems (ICS) evolved into standardised material needs planning (MRP) throughout time. Even today, it is possible to identify remnants of the early COPICS standards from IBM in the design of the systems [5].

The MRP II and CIM concepts furthered development in the 1970s and 1980s. Even if many of the CIM principles were unsuccessful, research on business models and IS development (ISD) provided the framework for progressively including additional domains within the scope of information systems. The arrival of ERP systems, often reflected in SAP R/3 together with the other main vendors: JD Edwards, Baan Oracle, Peoplesoft, and SAP, the so-called JBOPS, marked the height of this development in the early 1990s. Although accounting is another legacy of ERP systems, the planning and control mindset has its roots in manufacturing. ERP is a standardised software package designed to connect an enterprise's internal value chain. An ERP system is composed of many modules targeted at different company functions and is based on an integrated database.

Davenport's follow-up book on enterprise systems is a sign of how businesses are reevaluating ERP and the hoopla around it. ERP hype in the late 1990s was mostly driven by businesses scrambling to be ready for Y2K.summarises this first experience with ERP system implementation in a widely referenced article titled "Putting the Enterprise System into the Enterprise" and highlights the new potential business effect of ERP systems. The conversation moved from the initial excitement around integration, through the increasing number of horror tales about failed or out-of-control initiatives, to the resurging buzz surrounding e-business and SCM [6].

Describe the early key drivers for adopting ERP systems as follows:

1. Legacy systems and Y2K system concerns;
2. Business globalisation;
3. Increasing national and international regulatory environment, such as the European Monetary Union;
4. Business process standardisation and the current focus on ISO 9000;
5. Scalable and flexible emerging client/server infrastructures; and
6. Trend towards vendor collaboration.

The analysis of ERP research from the previous millennium, for example, may be found in the works of. Through an ERP lifecycle model that reflects the adoption process, they examine the ERP literature studies a number of lifecycle models and comes to the conclusion that the separation between the pre-implementation and post-implementation phases and the absence of a clear use stage are the common characteristics. He notes that implementation-related difficulties are covered in up to 30% of study. To further summarise the distinguishing characteristic for ERP project complexity:

1. The sheer volume and diversity of stakeholders in any implementation project;
2. The high cost of implementation and consulting;
3. The fusion of business functions;
4. The subsequent setting up of software resembling core processes;
5. The management of change and political issues related to BPR projects;
6. The improved education and acquainting necessity.

Due to this intricacy, there are now two sizable subfields of study on ERP deployment and success/failure. The introduction of the "ERP journey" and the notion that ERP adoption should be seen as a business transformation made possible by ERP made the ideas of implementation, success, and failure even more complicated. Process-oriented research is another area of ERP study that addresses company change. This strand places a strong emphasis on the ERP technology as a

business process reengineering (BPR) facilitator. It also deals with organisational change challenges and process orientation both internally and as a subsequent stage in the supply chain.Expand on these threads and bring them together to create a multi-dimensional model of the change that primarily addresses concerns with people, business, technology, and process. The following part examines the necessary business transformation after discussing the combination of implementation and use [7].

Requirements for New Businesses

One of the most significant new business ideas is SCM. Supply chain fragmentation brought on by global competitiveness and outsourcing has made supply chain excellence a must for competitive advantage. Theoretically, SCM places a strong emphasis on managing the whole supply chain as a single entity. In practice, this is accomplished by extending internal business operations outward into the supply chain, resulting in the creation of an integrated supply chain. The origins of SCM may be traced to system dynamics research in the late 1950s, which examined the systemic characteristics of chains of cooperating businesses. Business dynamics addressed current issues including the "Bullwhip effect," which is still a big concern, as well as delays and information flow. Due to the inexperience of the available computers and the success of the developing MRP systems, interest in this technique was postponed for decades. This study had no commercial implications. In operations and logistics research, the ideas first reappeared around the beginning of the 1980s, and by the 1990s, many companies were making significant structural changes to their supply chains. SCM was described as: SCM was a systems approach to planning and regulating the material and information flow from the raw material to the ultimate client.

1. Managing connections with suppliers and customers upstream and downstream to provide higher customer value while incurring less costs for the supply chain as a whole.
2. Though the early research agenda was dominated by talks of strategic management, the software industry reacted to the new business necessity by creating a new kind of Advanced Planning and Scheduling (APS) systems, which are add-on or "bolt-on" software to ERP.APS was made possible by improving mathematical programming models, particularly the evolutionary algorithms used to address network issues over a complete supply chain. The MRP/II planning ideas are fundamentally extended to include the full supply chain by the APS systems, making them effectively SCM systems. This allows for the central administration of the supply chain activities and procedures in real time [8].
3. Even though the SCM concept covers the whole supply chain, the upstream and downstream SCM perspectives are different.
4. SCM deals mostly with collaborative relationships with customers, such as collaborative planning, forecast and replenishment (CPFR), order fulfilment, replenishment, and demand management downstream. As a fresh viewpoint, some scholars have suggested demand chain management (DCM).Customer relationship management (CRM) solutions were developed by software providers to address these new needs as the administration of market information gained importance.
5. Upstream, SCM focuses mostly on controlling supplier network concerns. The growth of the supply chain is hampered by issues including supplier relations, collaborations, competence development, and technology transfer. In the supply chain, just-in-time (JIT) practises were put into place, and new ideas like vendor managed inventory (VMI) arose. The old-fashioned duty of buying was transformed into strategic sourcing, and the new tools needed were grouped under the supplier relationship management (SRM) hat.

6. The rise of the internet and the variety of linked e-business technologies introduced new possibilities and dangers for supply chain managers, making information management in an interorganizational setting crucial.

What New Features Does ERP II Have?

From inside its own community, ERP faces a formidable rival. Its sequel, ERP II, has received a lot of attention. There are, however, counterarguments that it essentially represents an expansion of ERP. ERP and ERP II vary greatly from one another. Contrary to common belief, ERP II is not an expansion of ERP. They will be clearly explained by the comparison between ERP and ERP II characteristics [9].

The following are some of the new features of ERP II:

1. **Coverage of Individual Elements with Detail**

The different components were not given significant consideration in enterprise resource planning. On the other hand, it placed greater emphasis on macro factors like departments, processes, and procedures. There was no adequate solution for the flaws since the tiny elements went unnoticed, and even if there had been, they would not have been very successful. The complete aspects of ERP II don't focus on individual components, but rather combine them to provide the operation of the relevant overall component greater significance.

2. **All Industries are Affected**

The industrial industry found extensive use for the ERP idea. Additionally, the retail and distribution sectors profited. They were also relevant to all sectors and industries, but the investments were not justified by the gains. They were really unnecessary. This is not to argue that other industries couldn't benefit from ERP. In reality, ERP lacked the features that these industries need. It was only natural that they were hesitant to accept ERP. Due to the fact that ERP II has fixed this issue, all industries may now use it, regardless of their industry or amount of transactions.

3. **Includes additional features**

ERP was created to make the routine tasks of an organisation easier. Even if there were certain new fundamental functions, ERP did not apply to them. Although ERP continued to aid in streamlining the business process, the results fell short of expectations. This restriction seemed to be a significant disadvantage for ERP, particularly in light of the quick changes in organisational structure and roles. By incorporating the most functions possible within its scope, ERP II has assisted in removing this barrier. It has made it easier to bring about non-conventional, core, and supporting functions as well as the best practises used in the sector, other industries, and practises that were specifically targeted to the concerned sector.

4. **Other Benefits**

The way that ERPII is used in an organisation and the resources that it offers are some additional benefits. ERP often uses online resources. However, they are not fully used. On the other hand, ERP only uses them sparingly. With ERP-II, however, this is not the case. The internet has been used to its full potential by ERP II. Along with the unique qualities of ERP, its contemporary Wireless ERP and WEB enabled ERP have contributed to make this feasible. ERP is utilised more strategically inside the organisation. It has a significant effect on extraneous variables. ERP II, on

the other hand, takes into account both internal and external elements. Even in the connecting section, it stays internal. When it comes to ERP II, every other area is given the appropriate amount of attention in the meantime [10].

What ERP's Future May Hold?

In order to maintain track of the advancements that occured gradually, it is vital to know the history of ERP before talking about its future. Manufacturing resource planning which had its roots in material resource planning evolved into ERP.With the introduction of web-enabled and open source technologies, the operation of ERP has significantly increased in importance and value. The most recent improvement in ERP software, ERP II, demands particular attention. In this situation, it is crucial to consider if ERP will continue to grow or whether it will eventually stagnate, etc.

The following are some of the points that need attention:

1. Current Level: At the present time, ERP is unquestionably a crucial business tool for all sectors. Almost every organisation now does it, regardless of whether they are in the manufacturing or service industries. Companies have no choice but to implement ERP if they want to turn a profit and get rid of their current drawbacks and they believe that coordination and business communication are their main issues. It goes without saying that ERP has benefited businesses in both financial and non-financial ways if they are eager to use it to the fullest and take the required efforts to overcome the challenges. However, ERP still needs a lot of work (this comment includes the most recent versions). An successful application is ERP. If an ERP system can be developed without the shortcomings of the current ones, that would be excellent. The most recent incursions, especially open source and web enabled technologies, have improved the application's efficacy. Technically speaking, nevertheless, they fall short. ERP software should be created to take full use of the internet so that users may click a mouse to access data from anywhere in the globe. The future of ERP has become more complex as a result. ERP's potential remains yet untapped.

2. Market forecasting: Historically, only Fortune 500 firms could afford to invest in ERP, since only they could afford to do so. The small and medium-sized industries suffered greatly as a result. They were unable to utilise the application to their advantage in order to get the required rewards. The future of ERP seemed to be bleak for them. The idea of outsourcing has made it easier for small and medium-sized businesses to overcome obstacles. Therefore, the S.M.E. market still has a lot of room for ERP. This market may be efficiently targeted by ERP suppliers. However, it is important for both the vendor and the businesses in this market segment to keep in mind that there is fierce rivalry in this industry, and one is unlikely to win unless he offers the greatest product.

3. The Global Scenario, Employment, and Education: The advent of ERP has given many businesses the chance to do business with counterparts abroad for the purposes of outsourcing, implementing, and deploying their current systems. It has made significant economic contributions. Academics also claim their fair share of relationships with ERP. Numerous job and educational prospects have been boosted by it. India is one of the main winners in this regard.

Overview of Open Source ERP Technologies

ERP work has become simpler because to open source technologies. In addition to cost, it has benefited the customer in many other ways. They are becoming more and more popular among businesses. These are a few of the features:

1. The Cost Factor's Influence: It's fascinating to learn how much Open Source ERP solutions cost. There is practically no charge for it. The user only has to download and install the programme. The idea that even the source code is available for free is astounding. Numerous businesses have chosen ERP as a result of this alone since they are not burdened with investments. Companies don't always choose ERP these days since their attitude towards spending on ERP has changed dramatically in the sense that they don't mind paying as long as they believe ERP is worthwhile. Famous solutions include open source ERP for accounting and open source ERP for payments.

2. Impact on Operational Expenses: Open Source ERP technology have a significant impact on operational costs. The corporation is liberated from having to spend the additional amount for the facilities required to transition to a new system. Similar to that, the business does not have to spend more money on licence purchases and renewals when new components are introduced to the framework. This progressively lowers the cost that would otherwise be associated with each update. The financial procedures have been made simpler using open source accounting ERP. Easy cash distribution has been made possible by open source ERP payment [11].

3. Lack of vendor assistance: Unlike traditional ERP solutions, the organisation manages everything on its own, therefore vendor assistance is not available. There are several facets to this. First, the business has a single obligation. Second, a little mistake that goes uncorrected (or that internal staff is unaware of) might end up costing the business money. Above all, the business benefits by learning from errors on its own.

4. Lawsuits: Open source ERP has given rise to several lawsuits and other claims. The characteristics of copying are yet unclear. As can be seen from the prior instances, the issue of infringement and indemnity remains unresolved.

5. Not Suitable for All Applications: The types of applications that can employ open source software are limited. They do not find universal application, particularly in the case of customary practices. Without altering how the systems operate, it is not suitable to bring open source there. In fact, doing it can be a dangerous choice. This flaw makes it difficult for many functions to be open source friendly [12].

CONCLUSION

In conclusion, ERP-II is the next generation of Enterprise Resource Planning (ERP) systems, including cutting-edge functions and integration capabilities while constructing on the basis of conventional ERP systems. By combining additional features including e-commerce, supply chain management, business analytics, and customer relationship management, ERP-II broadens the scope of ERP. As a result of its added functionality, integration skills, and real-time insights, ERP-II marks a development in ERP systems. Organisations that use ERP-II may boost customer interaction, optimise supply chain processes, and improve cooperation. ERP-II systems provide a solid basis for attaining operational excellence, sustainable development, and competitive advantage as organisations continue to change and adapt to the fast-paced business environment.

REFERENCES

[1] S. T. Ponis and A. C. Spanos, "ERP II systems to support dynamic, reconfigurable and agile Virtual Enterprises," *Int. J. Appl. Syst. Stud.*, 2009, doi: 10.1504/IJASS.2009.027664.

[2] R. C. Beatty and C. D. Williams, "ERP II: Best practices for successfully implementing an erp upgrade," *Communications of the ACM*. 2006. doi: 10.1145/1118178.1118184.

[3] R. Santi, "Perencanaan Strategis Implementasi Enterprise Resource Planning (ERP) Di Institusi Pendidikan," *TEMATIK*, 2018, doi: 10.38204/tematik.v5i2.267.

[4] S. L. Lambert, R. Calvasina, S. Bee, and D. Woodworth, "Assembly FG: An Educational Case on MRP II Integrated within ERP," *Account. Perspect.*, 2017, doi: 10.1111/1911-3838.12136.

[5] B. Bond, Y. Genovese, D. Miklovic, N. Wood, B. Zrimsek, and N. Rayner, "ERP is dead–Long live ERP II," *Gartner Group*. 2000.

[6] M. Mohamed and A. Fadlalla, "ERP II: harnessing ERP systems with knowledge management capabilities," *J. Knowl. Manag. Pract.*, 2005.

[7] D. L. Olson, B. Johansson, and R. A. De Carvalho, "Open source ERP business model framework," *Robot. Comput. Integr. Manuf.*, 2018, doi: 10.1016/j.rcim.2015.09.007.

[8] M. S. Dewi, S. Alva, and W. A. Wan Jamil, "DEVELOPMENT AND CHARACTERIZATION OF SOLID CU / CUSO4 REFERENCE ELECTRODES," *Int. J. Innov. Mech. Eng. Adv. Mater.*, 2020, doi: 10.22441/ijimeam.v3i1.11607.

[9] A. L. Norton, Y. M. Coulson-Thomas, C. J. Coulson-Thomas, and C. Ashurst, "Ensuring benefits realisation from ERP II: The CSF phasing model," *J. Enterp. Inf. Manag.*, 2013, doi: 10.1108/17410391311325207.

[10] C. Møller, "ERP II: A conceptual framework for next-generation enterprise systems?," *J. Enterp. Inf. Manag.*, 2005, doi: 10.1108/17410390510609626.

[11] H. M. Beheshti, "What managers should know about ERP/ERP II," *Manag. Res. News*, 2006, doi: 10.1108/01409170610665040.

[12] M. Haddara and A. Constantini, "ERP II is Dead- Long Live CRM," in *Procedia Computer Science*, 2017. doi: 10.1016/j.procs.2017.11.123.

CHAPTER 12

A BRIEF STUDY ON BUILDING AND DEPLOYING AN INFORMATION SYSTEM

Dr. Jayakrishna Herur, Associate Professor
Masters In Business Administration (General Management), Presidency University, Bangalore, India
Email Id: jayakrishna.udupa@presidencyuniversity.in

ABSTRACT:

Organisations specify their needs and define the scope and goals of the information system throughout the requirements collecting and analysis phase of the process. Understanding user needs, business processes, and current systems is necessary at this stage to make sure the new system is in line with organisational objectives. System design and development come next when the requirements are identified. This include creating the user interface, functionality, database structure, and system architecture. It entails picking the right programming languages, technology, and development tools. The system is then created, examined, and improved to satisfy the specified needs. To guarantee the information system's continuous efficiency and efficacy after deployment, organisations must monitor, maintain, and optimise it. This includes regular system upgrades, security precautions, and performance tracking to find and fix any problems or inefficiencies. Collaboration and coordination among several stakeholders, including business users, IT experts, project managers, and suppliers, are necessary for the development and deployment of an information system. Successful implementation depends on good project management, adherence to best practices, and attention to user needs and requirements.

KEYWORDS:

Benefit Analysis, Cost Analysis, Data Flow Diagram, Lan, System Maintenance.

INTRODUCTION

Businesses depend significantly on information technology to simplify operations, facilitate effective decision-making, and create competitive advantage in the modern digital world. To guarantee an information system's efficacy and alignment with business objectives, building and deploying it is a complicated process that requires careful planning, development, and execution. In order to gather, store, process, and disseminate information inside an organisation, a mix of people, procedures, and technology is known as an information system. It includes a number of elements, including user interfaces, databases, networks, hardware, and software, all of which are intended to manage and transmit information efficiently [1].

Understanding the needs and goals of the organisation thoroughly is the first step in developing and implementing an information system. Analysing business processes, identifying pain spots, and choosing the precise functionality and features the system should have to meet those demands are all necessary steps in this process. The development phase starts when the requirements are established. The software components that make up the information system's core are created at this phase, together with the system architectural design and tool selection. The creation of user

interfaces, database architecture, and, if appropriate, interaction with current systems are also included.

The system goes through extensive testing and quality assurance procedures after the development phase to guarantee its dependability, security, and usefulness. To ensure that the system satisfies the stated requirements and operates as anticipated, testing involves functional testing, performance testing, and user acceptability testing. After a test is successful, the deployment step starts. Installing the system on the proper hardware infrastructure, configuring the software components, and, if required, moving data from older systems are all part of this step. To achieve a seamless transition and user acceptance of the new system during this phase, user training and change management activities are essential. To guarantee the information system performs at its best and handle any problems or improvements, regular maintenance, support, and monitoring are required. System monitoring, security patches, and regular upgrades all work to maintain the system current and in line with evolving business requirements [2].

Collaboration between business stakeholders, IT experts, and users is necessary for the continual process of developing and implementing an information system. The creation, deployment, and successful use of the information system depend on effective project management, clear communication, and a well-defined implementation plan. For organisations looking to use technology to improve their operations and decision-making processes, developing and implementing an information system is an essential task. Organisations may build information systems that meet their needs, increase efficiency, and promote commercial success by adopting a methodical approach.

DISCUSSION

Any business expert nowadays has a duty to create information system solutions to company difficulties. He will be required to take the initiative and contribute as a business end user to the creation of successful information systems for his organisation. It is the duty of the business end user to utilise the system and continually suggest changes. He will oversee the information system experts' development efforts in his capacity as an IT manager. An information system's development process is system-oriented in the systems approach to issue resolution. All business end users, in addition to the IS specialists, must participate in the interrelated activities [3].

The system approach entails:

1. Identifying and identifying the opportunity or issue
2. Considering different system fixes
3. Deciding on the "Best fit" option
4. Creating the chosen remedy
5. Putting the planned system into action and assessing its effectiveness.

It is known as information systems development or application development when a systems approach to problem solving is used to create information system solutions to business challenges. However, we must first comprehend the information system architecture before turning our attention to application development.

Building Information Systems

According to Synnott (1987), the information system architecture is a conceptual foundation for the organisational IT infrastructure. It is a strategy for organising and integrating the organization's information resources. A paradigm for information system design that Synnott suggests has two main components. The centralised part, which contains the business architecture (the organization's information requirements), data architecture, and communications architecture, supports the whole organisation. The decentralised (upper) component is focused on a system, service, or organisational function like systems, computers, end-user computing, or human resources. Each organisation has applications for operations, management, and strategy [4]. Information system architecture types: The function that hardware plays in information system design is one method to categorise it. Two extreme situations may be distinguished: a mainframe environment and a PC environment. The distributed or networked environment, a third form of architecture, is produced when these two are combined.

A mainframe computer processes data in a mainframe environment. Passive (or "dumb") terminals are used by the users to input or modify data and access mainframe information. Up until the middle of the 1980s, this style was the norm. These days, very few businesses utilise just this kind of architecture. Its extension is a system design that makes use of PCs as smart terminals. The mainframe, with its strong storage and processing capabilities, remains the system's brain. The function of the centralised computing environment is being redefined by the network computers (NCs), which were first deployed in 1997. The hardware information architecture in a PC setup is only made up of PCs. The PCs may operate independently of one another, but they often link to one another through electronic networks. Many small and medium-sized businesses use this architecture [5].

A distributed (networked) environment spreads the processing work amongst two or more computers. The participating computers may be distributed across one or more locations and may be entirely mainframe, entirely midrange, entirely micro, or a mix of these. Cooperative processing is a kind of distributed processing in which two or more computers located in different locations work together to complete a single job. The client/server setup, in which several computers share resources and may connect with a large number of other computers over LANs, is another significant distributed processing configuration. An enterprise wide system is a distributed system that spans the whole organisation, and it typically has an intranet connecting its many components.

Most medium- and large-sized businesses often employ a distributed infrastructure that includes both mainframe and PCs since it is quite versatile. This fundamental categorization is comparable to a mode of transportation, like a train or an aeroplane. In this scenario, a number of passengers share the car, use it at certain times, and are subject to a number of regulations. Similar to utilising a mainframe, this. It's similar to utilising a PC to be able to operate your own automobile. The third option is to combine the two. For instance, you may drive to the railway station and take the train to work or to the airport and fly to your holiday location. This last configuration, which resembles a dispersed system, is adaptable and offers the advantages of the first two.

Networked computing is becoming into the predominant architecture of most organisations, particularly the Internet and intranets, thanks to communication networks. This architecture enables collaboration in computing across organisations, access to enormous volumes of data, information, and expertise, and highly effective use of computer resources. The modern architecture of today is motivated by the idea of networked computing [6].

Client/server architecture and enterprise wide computing, the newest architectural principles, form the foundation of the Internet, intranets, and extranets. In this part, the underlying ideas of these ideas are briefly described. LANs and maybe VANs link all of the clients and servers in a client/server architecture, which separates networked computing devices into two main categories: clients and servers. A client is a machine that connects to a network, such as a PC or workstation, and is used to access shared network resources. A machine that offers these services to customers is a server.

Lifecycle of Software Development

A phased procedure known as the systems development life cycle (SDLC) is used in the systems approach to building information system solutions. The planning, creation, deployment, and maintenance of an information system are all included in the information systems life cycle. It includes the phases of research, analysis, design, implementation, and upkeep. The first step in the process is to conduct a feasibility analysis for the proposed solution [7].

1. **Feasibility Study**

A feasibility study is typically needed during the systems research stage since creating a large-scale information system may be expensive. A feasibility study is a preliminary investigation into the information needs of potential users in order to assess the project's viability and estimate the necessary resources, costs, and benefits. The purpose of feasibility studies is to assess potential systems and recommend the most viable and appealing solutions for growth. A proposed system's viability may be assessed in terms of four main characteristics. How effectively a proposed information system serves the goals of the organisation and its information systems strategic plan is the main concern of organisational feasibility. If anticipated cost savings, higher income, greater profits, decreased necessary investment, and other advantages outweigh the costs of creating and maintaining a proposed system, it is considered to be economically feasible.

Technical viability may be shown if a company can quickly buy or build dependable hardware and software that can fulfil the requirements of a proposed system. The capacity and willingness of management, staff, clients, suppliers, and others to utilise, run, and support a proposed system is known as operational feasibility.

2. **Cost-benefit calculations**

Cost/benefit analysis is usually used in feasibility studies. Costs and benefits are said to be tangible if they can be calculated, and intangible if not. The price of software and hardware, personnel pay, and other measurable expenses required to create and deploy an IS solution are a few examples of tangible costs. The loss of customer loyalty or staff morale brought on by mistakes and interruptions associated with the installation of a new system are examples of intangible expenses that are hard to measure.

Positive outcomes are known as tangible benefits, such as a drop in payroll expenses from a staff reduction or a decrease in inventory carrying costs from a reduction in inventory. Intangible benefits are more difficult to quantify. This category includes advantages like improved customer service or quicker, more precise information for management [8].

3. Examination of the Current System

Studying the system that will be enhanced or replaced (if there is one) is crucial before developing a new one. You must examine how this system transforms data sources, such transaction data, into information products, like reports and displays, by using hardware, software, network, and human resource resources. The implementation of input, processing, output, storage, and control for an information system should then be documented.

4. Analysis of Systems

One of the trickiest steps in a systems analysis is this one. To identify your unique business information requirements, you may need to collaborate with systems analysts and other end users. Functional requirements are those that relate to end users' information needs rather to the hardware, software, network, data, or human resources that end users now use or could use in the new system. Finding out what has to be done, not how to accomplish it, is your major objective.

5. Design of Systems

System analysis outlines what a system ought to perform to satisfy users' informational demands. The system's design outlines how it will achieve this goal. The system specifications produced by the systems design process fulfil the functional criteria established in the previous stage.

6. Implementation

A new information system must be put into use once it has been created. Purchasing hardware and software, developing software, testing methods and programmes, creating documentation, and a number of installation tasks are all part of the systems implementation stage. It also entails educating and training professionals and end users who will utilise a new system.

The last step in implementation is the move from using an existing system to using a new or upgraded application. The effects of implementing new technology inside an organisation may be mitigated via transitional approaches. As a result, transition may include running both new and outdated systems concurrently for a test time or running a pilot system on a trial basis in one place. Another common transition technique is phasing in the new system by implementing it in one application or area at a time. However, a quick switchover to a new information system is also a common transition technique [9].

7. Maintenance

The life cycle of an information system ends with systems maintenance. It entails tracking, assessing, and changing a system to bring about desired or required changes. This phase is ongoing and consists of a post-implementation review procedure to make sure the newly built system satisfies the functional business requirements that were defined for it when it was created. The maintenance action fixes mistakes that occurred during the creation of a system. Modifying a system as a result of internal business changes or external changes to the business environment is also a part of system maintenance. Changes in tax rules or the creation of new goods or services, for instance, may necessitate modifying a company's marketing and accounting procedures.

Models for Software Development

Given the significance of software in business, efficient methods for its development have received a lot of attention. At least as far back as the 1960s, there have been early efforts to standardise a

formal paradigm for designing software. The so-called "Waterfall" approach of software development was established in response to issues in managing big bespoke software development projects. This model defined the distinct phases that any software project must go through and provided guidelines for the requirements that must be satisfied before a project can go on to the next phase. The purpose of this concept was to provide discipline and control to a previously unorganised and chaotic process.

In the waterfall model, there were many steps that had to be completed, including requirements formulation, specification, planning, design, implementation, and integration. The focus was on creating a thorough design specification early on in the development process and then efficiently implementing this specification. Although the waterfall model of development was an effective solution to the early issues that had dogged software development, in the years that followed, growing unhappiness was voiced with its outcomes. The criticism was particularly pronounced in situations when there was a great deal of ambiguity about either the product's client needs or its required technological answers. The major assumption in the model that caused a difficulty was that as long as the initial task was done properly, there was minimal need for intermediate performance feedback or a process that could adapt to changing needs.

As a result, these turned became the main goals for more "flexible" models of development, models with the capacity to react to the many forms of uncertainty that software engineers confronted more often. This idea that software development is a process that can be actively controlled over time prompted the creation of additional process models, each of which offered solutions to problems with the waterfall model. Although the majority of these models had the same goal a more flexible model of development the specifics of how they were carried out seemed to vary greatly. Many more adaptable models of development started to appear in the early 1980s, each attempting to solve the waterfall model's alleged shortcomings.

The initial models to replace the waterfall model relied on showing clients one or more prototypes at an early stage so they could provide feedback based on an actual depiction of the product rather than a word specification. In the prototyping paradigm, a prototype is used early in the development process, usually as a tool to inform judgements regarding the design of the user interface. The prototypes are not a crucial component of the final product and are discarded after usage. The approach required to refine the design is then identical to the waterfall model that was previously discussed.

The subsequent group of models, which resulted from attempts to increase development flexibility, are distinguished by the progressive creation of functional subsets of a product. The term "rapid development models" refers to them. By giving clients early access to portions of the expected functionality, the incremental delivery model's main goal is to reduce risk in major projects. A whole subsystem is given to consumers after development is divided into a number of subcycles, each of which generally follows a mini-waterfall method. The most recent model is iterative and gradual. The spiral growth model, so named because it includes a feedback mechanism that enables it to

1. In response to user input, rework features in these interim versions.
2. Rearrange upcoming events in light of the fresh data produced when each sub-cycle is finished.

The waterfall development model and the prototype technique, which involves a number of incomplete implementations of the product, are combined in the spiral development model. The spiral development paradigm has benefits such as early emphasis on the reuse of pre-existing software components, implementation of software quality standards, and fusion of hardware and software development cycles [10].

Analysis of Requirements

One of the trickiest steps in a systems analysis is this one. To establish your unique business information requirements, you must collaborate with systems analysts and other end users. Systems analysis is a thorough investigation of end user information requirements that generates functional requirements that serve as the foundation for designing a new information system or putting packaged software into use. An essential initial step in systems analysis is an organisational analysis. A development team's members must have a basic understanding of the organisation, its management structure, its workforce, its operations, the environmental systems it must contend with, and its existing information systems.

Software requirements specifications need to be identified based on the system analysis. The hardware, software, network, data, and human resource resources that end users now use or potentially use in the future system are not connected to these end user information needs. Finding out what has to be done, not how to accomplish it, is the essential objective. This will assist in creating the strategy for the user acceptability test. Activities involved in software requirement analysis include:

1. Determine the "customer" and negotiate "product-level" specifications with them.
2. Create an analysis by concentrating on the facts, defining function, and representing behaviour.
3. Areas of uncertainty for the prototype
4. Create a specification that will serve as a design manual.
5. Hold official technical assessments to confirm the specifications
6. Create a plan for user acceptance testing.

Considerations for Design

System analysis outlines what a system ought to perform to satisfy users' informational demands. Systems design lays out exactly how the system will achieve this goal and creates system specifications that meet the functional needs noted in the previous stage. The analytical model should be able to be linked back to the design. The design should be flexible enough to enable change and "minimise the intellectual distance" between the programme and the issue. It is important to examine the design to reduce conceptual mistakes. The architecture of the programme to be produced is the software's general structure. It is a representation that enables a software engineer to:

1. Evaluate whether the design successfully satisfies the stated requirements;
2. Consider architectural alternatives while it is still feasible to make design changes; and
3. Decrease the risks connected with the software development process.

The design phase establishes the following and transforms the SRS into a practical solution:

1. Database design outlines the data dictionary and database architecture.
2. The menu's design outlines the alternative choices and selecting methods.
3. Input Design establishes the user interfaces for data collection. Input Form Design and Input Screen Design are the two topics covered.

The fundamental input that is received from the outside entity is in the input form. Depending on the application, it may be feasible in the current environment to provide the external entity a screen to submit this information. However, there are circumstances in which this is not possible, thus an input form must be created. The user may enter the necessary data into the system using the input screen. A few of the rules on which the screen design should be based are stated below:

1. Keep the screen simple and uncluttered.
2. Continually provide information on the screen in the same location.
3. Simple screen switching - Skip the main menu and use scrolling or calling another screen instead, as needed.
4. Give the user status using user-friendly messaging
5. Offer a way to reverse a decision.

Information is delivered to the user as soft copy, printed copy, screen display, audio output, or a combination of these. The outputs should be designed to fulfil their intended function and provide the information when needed. Programme Design is a collection of rules and a technique for creating readily maintainable programmes. Through the division of the programmes into smaller parts, structured design minimises complexity.

Computer testing

The most time-consuming, unreliable, and costly stage of software development is software testing. It is vital to include reviews to testing in order to make this easier. Design reviews and code walks actually come before software testing. These are pre-implementation "tests" that may find a substantial portion of errors in the early going. This also requires far less time and money than computer-based examinations for the same objective.

Planning and carrying out testing and reviews at different points in the system life cycle is necessary to identify flaws in the requirements, design, documentation, and code as soon as feasible. In the past, testing has centred on running the programme in order to determine its readiness for use and show that it is functioning successfully. In addition to the aforementioned factors, testing nowadays acknowledges that significant mistakes result from misunderstandings, omissions, and discrepancies in requirements and design. At various phases of the system development process, testing is done in the form of reviews, walkthroughs, code inspection, and functional testing [11].

CONCLUSION

In conclusion, building and deploying an information system is a complex and critical process that requires careful planning, effective execution, and ongoing support. Successful implementation of an information system can bring numerous benefits to an organization, such as improved efficiency, enhanced decision-making, and increased competitive advantage. By monitoring system performance, addressing user feedback, and adapting to changing business needs,

organizations can maximize the benefits and longevity of the information system. It is important to note that building and deploying an information system is not a one-time event, but rather a continuous process. As technology advances and business requirements evolve, organizations should proactively assess the system's effectiveness, identify areas for improvement, and embrace emerging technologies to stay ahead of the competition. In conclusion, building and deploying an information system is a strategic endeavor that requires careful planning, stakeholder involvement, and ongoing support. When executed effectively, an information system can significantly enhance an organization's operations, decision-making capabilities, and overall competitiveness. By prioritizing user needs, ensuring smooth deployment, and providing continuous support, organizations can leverage their information system as a valuable asset for success and growth.

REFERENCES

[1] T. Trinh-Phuong, A. Molla, and K. Peszynski, "Enterprise systems and organizational agility: A review of the literature and conceptual framework," *Commun. Assoc. Inf. Syst.*, 2012, doi: 10.17705/1cais.03108.

[2] A. M. Green *et al.*, "Codesign of the Population Health Information Management System to measure reach and practice change of childhood obesity programs," *Public Heal. Res. Pract.*, 2018, doi: 10.17061/phrp2831822.

[3] J. Waese *et al.*, "ePlant: Visualizing and exploring multiple levels of data for hypothesis generation in plant biology," *Plant Cell*, 2017, doi: 10.1105/tpc.17.00073.

[4] D. Conte de Leon, C. E. Goes, M. A. Haney, and A. W. Krings, "ADLES: Specifying, deploying, and sharing hands-on cyber-exercises," *Comput. Secur.*, 2018, doi: 10.1016/j.cose.2017.12.007.

[5] A. M. Elshurafa and A. Muhsen, "The upper limit of distributed solar PV capacity in Riyadh: A GIS-assisted study," *Sustain.*, 2019, doi: 10.3390/su11164301.

[6] S. A. Rashid *et al.*, "Retrofitting low-cost heating ventilation and air-conditioning systems for energy management in buildings," *Appl. Energy*, 2019, doi: 10.1016/j.apenergy.2018.12.020.

[7] K. Sokol and P. Flach, "One Explanation Does Not Fit All: The Promise of Interactive Explanations for Machine Learning Transparency," *KI - Kunstl. Intelligenz*, 2020, doi: 10.1007/s13218-020-00637-y.

[8] F. Longo, L. Nicoletti, A. Padovano, G. d'Atri, and M. Forte, "Blockchain-enabled supply chain: An experimental study," *Comput. Ind. Eng.*, 2019, doi: 10.1016/j.cie.2019.07.026.

[9] C. a. Ellis and G. J. Nutt, "Workflow: The Process Spectrum," *Proc. NSF Work. Work. Process Autom. Inf. Syst.*, 1996.

[10] R. Zhang, R. Xue, and L. Liu, "Security and privacy on blockchain," *ACM Comput. Surv.*, 2019, doi: 10.1145/3316481.

[11] P. Pauwels *et al.*, "A semantic rule checking environment for building performance checking," *Autom. Constr.*, 2011, doi: 10.1016/j.autcon.2010.11.017.