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The Impact of Enterprise Resource Planning (ERP) Systems Implementation on Business Performance

[1]***Dr M Nishad Nawaz*** MBA., MHRM., M.Phil.,Ph.D.
Department of MBA & Research Centre,

[2]***Dr K Channakeshavalu*** ME.,,Ph.D.
Principal & Director
East West Institute of Technology Bangalore.

Abstract:

Over the last decade Enterprise Resource Planning (ERP) have been adopted by many companies as it contributes to the development and profitability of the organizations by business solutions. Once configured it allows information to enter at a single point in the process, and also updates a single, shared data base for all functions that directly or indirectly depend on this information. These are a set of applications combining key functions like finance, production. Sales, logistics, statutory compliance, human resources etc., in an integrated fashion. In a manner these combine Enterprise Resource Planning system with extended enterprise needs likes software solutions to the employees, customers and vendors. ERP not only helps to establish world class best business solutions and bring transparency in the business. This paper presents the definition, ERP Systems concept and need, the historical evolution of the ERP Systems, why is ERP Systems needed, why firms invest in ERP Systems, business performance development with ERP Systems, the scope of the ERP Systems, ERP model, ERP architecture, ERP implementation approaches have been discussed.

Keywords ***:*** *ERP, Business performance, Business applications, ERP Architecture, ERP Benefits.*

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Introduction

In today‟s dynamic business environment and in the era of knowledge workers, enterprise resource planning systems (ERP) has significantly contributed to the effectiveness of an organization. In the present day business world, they have become an important instrument without which the majority of enterprises could no longer function. Enterprise resource planning systems are the principal infrastructure of information systems helping an organization to prosper under the present day economic conditions. Successfully implementation of enterprise resource planning systems creates organizational synergy, which provides a stimulus for the development of particularly efficient processes necessary for the success of an organization. As practice shows, implementation of an enterprise resource planning system frequently does not justify the expectations of an enterprise, costs much more than expected, and its implementation lasts for a considerably longer period of time than planned. An organization has to analyze before implementing ERP Systems and to know the benefits of the implementation.

The aim of this article is to show the implementation ERP in organization establish the business success. Implementation of enterprise resource planning systems is a highly complex process which is influenced not only by technical, but also by other factors like performance of the business as well as organization. In the other hand to show what are the benefits carried out with the implementation of the ERP in organizations, in this connection literature the survey was conducted.

ERP Systems concept and need

There are different definitions of ERP. An ERP system is an attempt to integrate all functions across a company to a single computer system that can serve all those functions‟ specific needs. “Integration” is the key word for ERP implementation.

Enterprise resource planning (ERP) is an enterprise-wide information system designed to coordinate all the resources, information, and activities needed to complete business processes such as order fulfillment or billing.

An ERP system supports most of the business system that maintains in a single database the data needed for a variety of business functions such as manufacturing, supply chain

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management, financials, projects, human resources customer relationship management, knowledge management and talent management.

It may also integrate key customers and suppliers as part of the enterprise‟s operation. It provides integrated database and custom-designed report systems. It adopts a set of "best practices" for carrying out all business processes. A large number of firms forcing them to change their business processes, structures and even business strategies with implementation of ERP Systems. These ERP Systems providing many benefits like (i) Enterprise Integration, (ii) Business Process Re-engineering, (iii) Standardizing systems and procedures across the enterprise, (iv) Transparency, (v) Business networking, (vi) Best global management practices, (vii) Global information systems infrastructure for acquiring this benefits firms adopting ERP Systems and to meet the market and customer demand.

The historical evolution of the ERP Systems

The focus of manufacturing systems in the 1960‟s was on inventory control. Companies could afford to keep lots of „„just-in-case‟‟‟ inventory on hand to satisfy customer demand and still stay competitive. Consequently, techniques of the dayfocused on the most efficient way to manage large volumes of inventory. Most software packages (usually customized) were designed to handle inventory based on traditional inventory concepts ***[1,2]***.

In the 1970‟s, it became increasingly clear that companies could no longer afford the luxury of maintaining large quantities of inventory. This led to the introduction of material requirements planning (MRP) systems. MRP represented a huge step forward in the materials planning process. For the first time, using a master production schedule, supported by bill of material files that identified the specific materials needed to produce each finished item, a computer could be used to calculate gross material requirements. Using accurate inventory record files, the available quantity of on-hand or scheduled-to-arrive materials could then be used to determine net material requirements. This then prompted an activity such as placing an order, canceling an existing order, or modifying the timing of existing orders. For the first time in manufacturing, there was a formal mechanism for keeping priorities valid in a changing manufacturing environment.

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The ability of the planning system to systematically and efficiently schedule all parts was a tremendous step forward for productivity and quality***[3,1,2]*****.** Yet, in manufacturing, production priorities and materials planning are only part of the problem. Capacity planning represents an equal challenge. In response, techniques for capacity planning were added to the basic MRP system capabilities.

Tools were developed to support the planning of aggregate sales and production levels (sales and operations planning), the development of the specific build schedule (master production scheduling), forecasting, sales planning and customer order promising (demand management), and high-level resource analysis (rough-cut capacity planning). Scheduling techniques for the factory floor and supplier scheduling were incorporated into the MRP systems. When this occurred, users began to consider their systems as company-wide systems. These developments resulted in the next evolutionary stage that became known as closed loop MRP**[3]**.

In the 1980‟s, companies began to take advantage of the increased power and affordability of available technology and were able to couple the movement of inventory with the coincident financial activity. Manufacturing resources planning

(MRP II) systems evolved to incorporate the financial accounting system and the financial management system along with the manufacturing and materials management systems. This allowed companies to have a more integrated business

system that derived the material and capacity requirements associated with a desired operations plan, allowed input of detailed activities, translated all this to a financial statement, and suggested a course of action to address those items that were not in balance with the desired plan[1].

By the early 1990‟s, continuing improvements in technology allowed MRP II to be expan ded to incorporate all resource planning for the entire enterprise. Areas such as product design, information warehousing, materials planning, capacity planning, communication systems, human resources, finance, and project management could now be included in the plan. Hence, the term, ERP was coined. And ERP can be used not only in manufacturing

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companies, but in any company that wants to enhance competitiveness by most effectively using all its assets, including information [1,2].

Why is ERP Systems needed

The business environment is dramatically changing. Organizations today face the challenge of increasing competition, expanding markets, and rising customer expectations. This increases the pressure on companies to lower total costs in the entire supply chain, shorten throughput times, drastically reduce inventories, expand product choice, provide more reliable delivery dates and better customer service, improve quality, and efficiently coordinate global demand, supply, and production [2]. As the business world moves ever closer to a completely collaborative model and competitors upgrade their capabilities, to remain competitive, organizations must improve their own business practices and procedures. Companies must also increasingly share with their suppliers, distributors & customers the critical in-house information they once aggressively protected [4]. And functions within the company must upgrade their capability to generate and communicate timely and accurate information. To accomplish these objectives, companies are increasingly turning to enterprise resource planning (ERP) systems. ERP provides two major benefits that do not exist in non-integrated departmental systems: (1) a unified enterprise view of the business that encompasses all functions and departments; and (2) an enterprise database where all business transactions are entered, recorded, processed, monitored, and reported. This unified view increases the requirement for, and the extent of, interdepartmental cooperation and coordination. But it enables companies to achieve their objectives of increased communication and responsiveness to all stakeholders [5].

Why Firms Invest in ERP Systems

Why do firms invest in ERP given the different alternatives for information integration in a business? The answer for this question lies between either technical gains e.g. replacing legacy systems, or for business reasons e.g. improving operational performance and efficiency (Nicolaou, 2004).

Many technical reasons exist including the replacement of disparate systems into a single integrated system (Hitt et al., 2002). The replacement of legacy systems was very important

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for the boom of ERP during the late 1990s when companies wanted to replace their legacy systems during the year 2000 (Y2K) with a more Y2K compliant solution so they have invested into ERP systems (Anderson et al., 2003). ERP also provides a tested system security basis which promises to keep the organization up to security standards and for providing data security (Fuß et al.,2007).

Business reasons also exist. This includes automation and reengineering of business processes (Hitt et al., 2002). Other business reasons provided by Federici (2009) are better management, better operations, better information availability and reengineering procedures, which are all reasons for acquiring ERP. Other business reasons include enhancing cooperation and teamwork between employees in the company. In addition, benefits expected from implementation of ERP systems include tangible benefits like reducing costs, reducing operations time, and a lean organization, while intangible benefits like information integration, better information quality, and increase in customer satisfaction also exist (Loh et al., 2006; Nicolaou, 2004).

Such perceived benefits are expected because ERP help make production inside manufacturing companies more efficient by integrating information from other departments like sales and procurement into the production system, which as a result helps eliminate costs and improve production schedules (Matolcsy et al., 2005).

Literature Review

Siriginidi, 2000; [7]Lee and Lee, 2000; [8]Ross and Vitale, 2000; [9]Teltumbde, 2000; [10]Scott and Vessey, 2000; [11]Stensrud, 2001; [12]Clemmons & Simon, 2001; [13]Light, 2001; [14]Weston, 2001; [15]Huang & Palvia, 2001; [16]Rajagopal, 2002; [17]Robey *et al.*, 2002; [18]Gulla & Brasethvik,2002; [19]Motwani *et al.*, 2002; [20]Siau & Messersmith, 2003; [21]Voordijk *et al.*, 2003; [22]Mabert *et al.*, 2003a; [23]Soffer *et al.*, 2003; [24]Thomas & Jajodia, 2004; [25]Siau, 2004; [26]Amoako-Gyampah, 2004; [27]Huin, 2004; [28]Light, 2005; [29]Kim *et al.*, 2005; [30]Worley *et al.*, 2005; [31]Gosain *et al.*, 2005; [31]Wei *et al.*, 2005b; [32]Sumner, 2000; [33]Nah *et al.*, 2001b; [34]Hong & Kim, 2002; [35]Umble *et al.*, 2003; [36]Loh & Koh, 2004; [37]Ehie & Madsen, 2005; [38]Ettlie *et al.*, 2005; [39]Kremers & van Dissel, 2000; [40]Koch, 2001b; [41]Boykin, 2001; [42]Nelson, 2003; [43]Nah *et al.*, 2004; [44]Calisir & Calisir, 2004; [45]Martin & Cheung, 2005; [46]Yu, 2005; [47]Koh & Simpson,

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2005; [48]El Sayed, 2006; [49]Koh & Saad, 2006 concluded that implementation of ERP create critical success factors, issues and develops the firms.

[50]Elisabeth J. Umble, Ronald R. Haft M. & Michael Umble their study identifies the success factors, software selection steps & implementation procedures critical to a successful implementation of ERP in an organization any type.

[51]Stephan A. Kronbichler et al made research with literature review to found the critical success factors (CSFs) within ERP projects and concluded that the more integration brings success factors of ERP Systems.

[52]Arnoldina Pabedinskaitė made study on the factors of the success of implementation and analyses differences in evaluations opinions experts and users of ERP systems. The study concluded that users of ERP consider as the most important factors determining the success of implementation are factors relating to management of project of implementation.

[53]Michael Krigsman conducted the study with 2000 respondents from 61 countries and taken data in between of Febrarury 2006 to May 2012 of ERP buyers. The study concluded that the SAP have the largest share of the market, Oracle implementation gives longest implementation duration, Microsoft Dynamics implementation have the smallest share of the market. For this above reasons ERP buyers have to aware about the benefits of implementation of ERP.

[54]Jiaqi Duan Parwiz Faker Alexander & Fesak Tim Stuart explained the benefits and drawback of cloud based versus traditional ERP systems in an organizations. Researchers discuss the revealed controversies of the previous research and reasons why or why not cloud-based ERP might be more of interest to SMEs than to large enterprises.

[55]Woltering et al conducted study on the tests the merits of a software tool employing the regression-based Gratton method that claims to remove the detrimental effects of the eye blink and leaves the activity of the brain. The study concluded that this tool distorts the data at acceptable levels, yet caution should be taken when interpreting later components, like the P3.

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Business performance development with ERP Systems

ERP automates the tasks involved in performing a business process-such as order fulfillment, which involves taking an order from a customer, shipping it and billing for it. With ERP, when a customer service representative takes an order from a customer, he or she has all the information necessary to complete the order. Everyone else in the company sees the same computer screen and has access to the single database that holds the customer's new order and all databases of the customers. When one department finishes with the order, it is automatically routed via the ERP system to the next department. To find out where the order is at any point, one need only log into the ERP system and track it down. The order process moves like a bolt of lightening through the organization, and customers get their orders faster and with fewer errors than before. ERP can apply that same magic to the other major business processes, such as employee benefits or financial reporting.

Objectives of the ERP Systems

The common objectives of ERP are to integrate all departments and functions across a company onto a single computer system that can serve all those different departments‟ needs. The ERP combines them all together into single, integrated software program than runs off a single database so that the various departments can more easily share information and communication with each other.

The scope of the ERP Systems

- ERP facilitates a company-wide integrated Information Systems covering functional areas such as manufacturing, sales and distribution, accounts, payables, receivables, inventory, human resources, customer relationship management, knowledge management and talent management etc
- ERP integrates and automates most business processes and shares information enterprise-side in real-time, thereby improving customer service and the corporate brand.
- ERP provides complete integration of the system not only across departments but also across companies under the same management.

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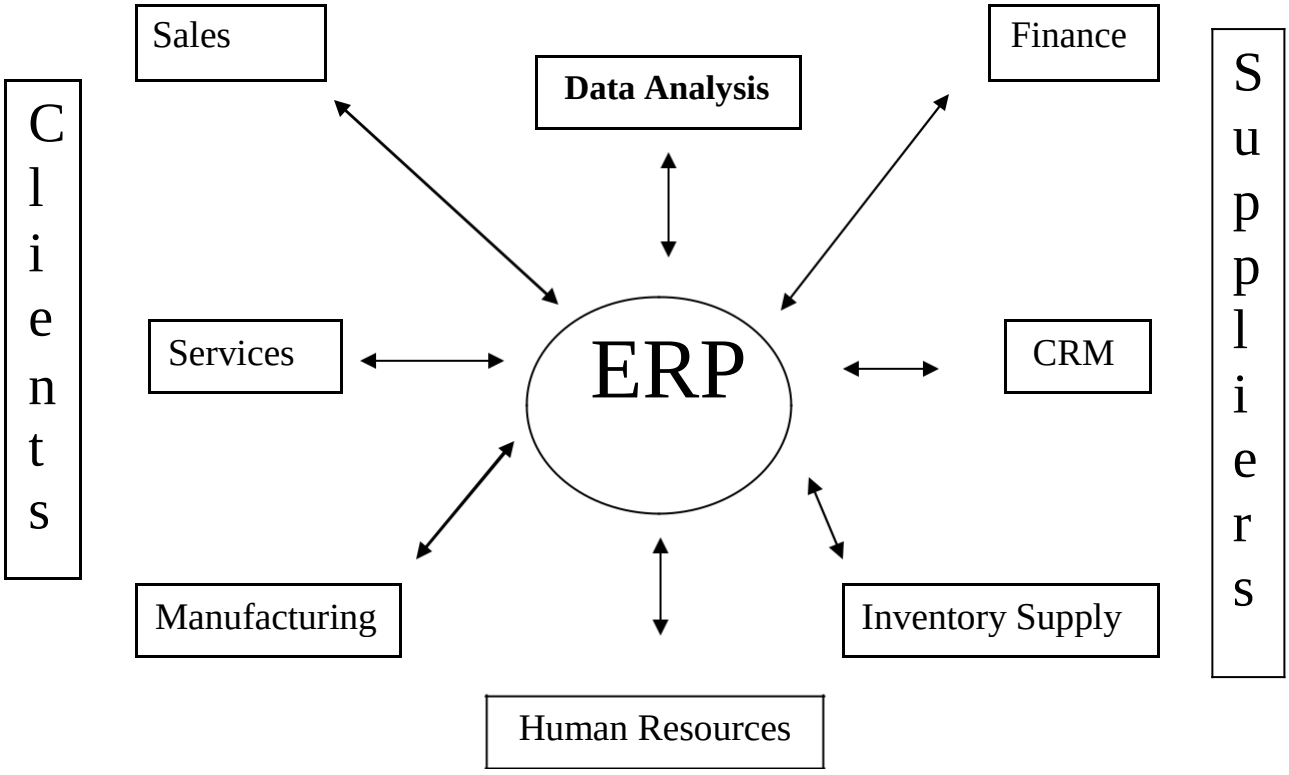
- ERP bridges information gaps across a company and focuses on key issues such as productivity enhancement, customer service, cash management, inventory, quality control, prompt delivery, etc.
- ERP is the solution for better project management.
- ERP provides business intelligence tools like decision support systems, executive information system, reporting, data-mining, early-warning systems, enabling people to make better decisions and improve business processes.
- ERP not only addresses the current requirements of the company but also provides an opportunity for improvement and refinement in the business processes on a continuous basis.

ERP Model



Source: Simon Holloway, Practice Leader-Process Management & RFID, Bloor Research, October 2010.

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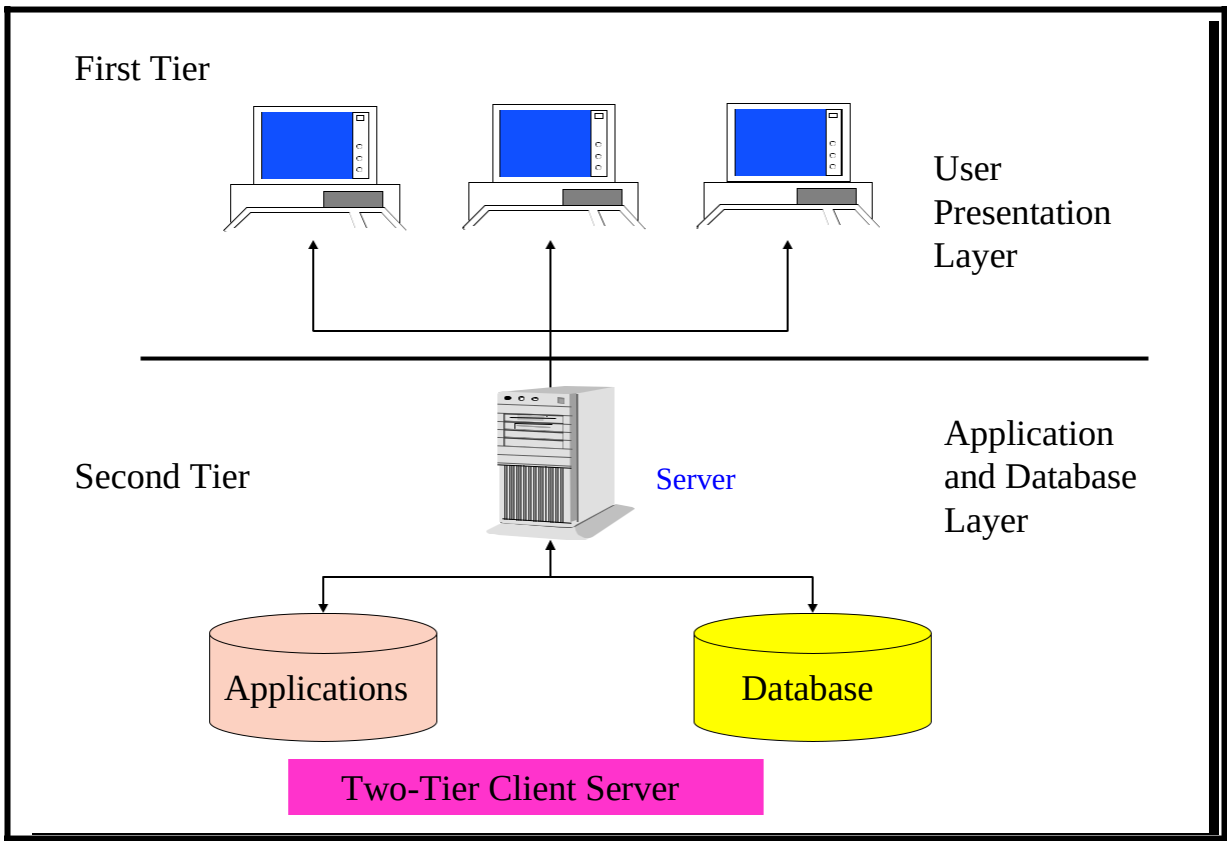
ERP Architecture

The most commonly employed architecture are

- Two Tier Architecture
- Three Tier Architecture

ERP System Configurations: Client-Server Network Topology

Two-tier



Source: Zubair H. Shaikh, ERP : The Future of Business Automation 01 Edition,Atlantic,2009

- Common server handles both application and database duties
- Used especially in LANs

Three-tier

Client links to the application server which then initiates a second connection to the database server used especially in WANs

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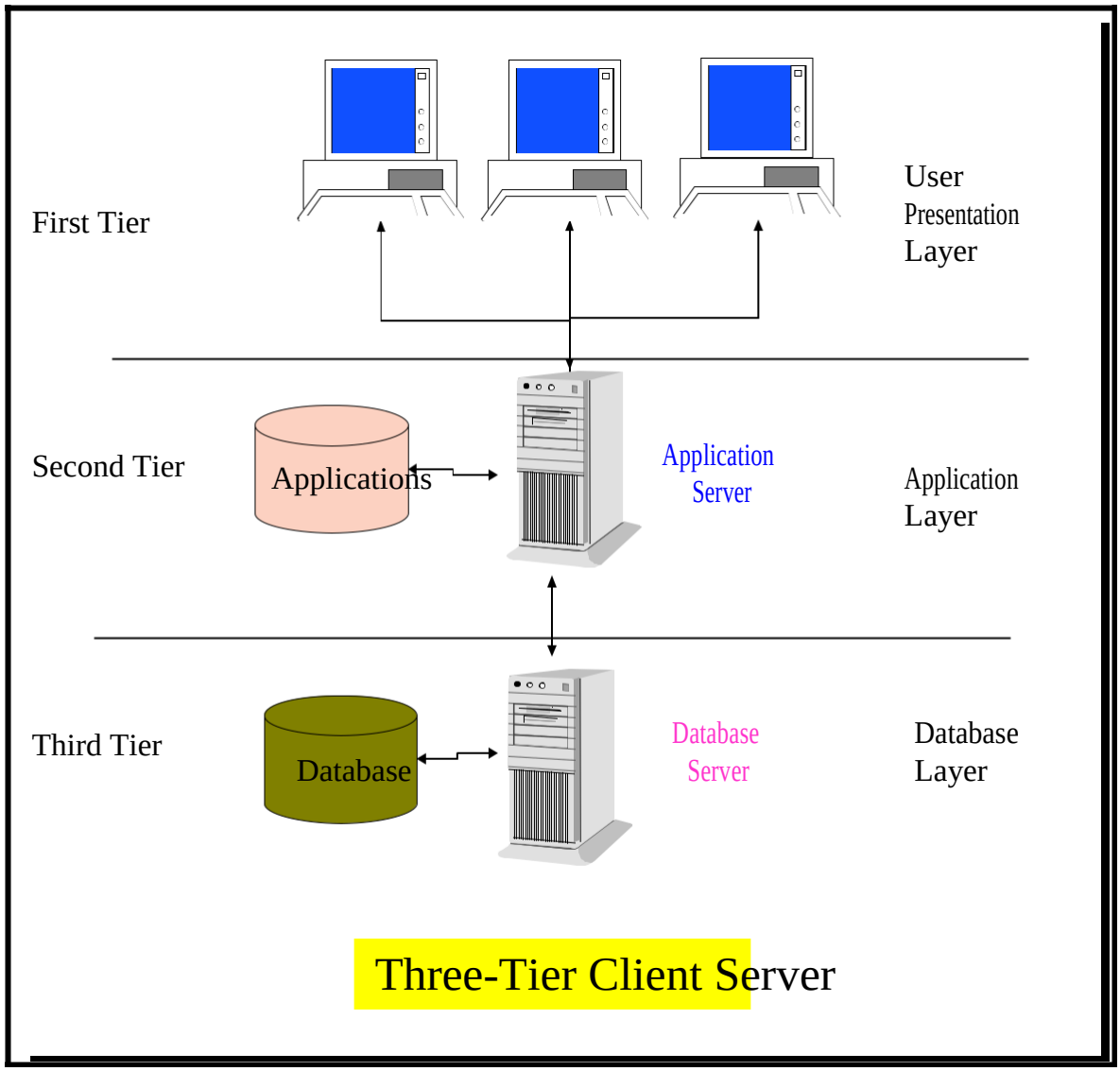

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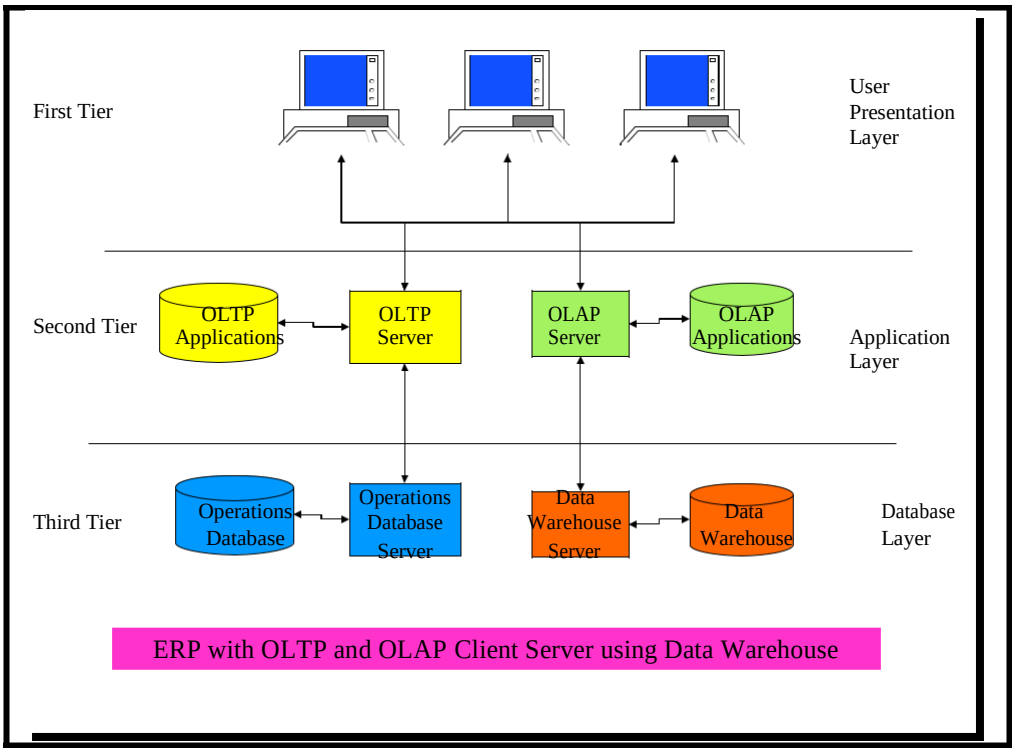

Source: Stephen Harwood, ERP: The Implementation Cycle, Butterworth-Heinemann,2003.

Potential benefits and uses of Enterprise Resource Planning (ERP)

Organizations getting following benefits are getting for implementation of ERP. *Internal Benefits*

- Integration of a single source of data
- Common data definition
- A real-time system
- Increased productivity
- Reduced operating costs
- Improved internal communication
- Foundation for future improvement
- Improved customer service and order fulfillment
- Improved communication with suppliers and customers
- Enhanced competitive position
- Increased sales and profits

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ERP Implementation Approaches

- The big bang-install a single ERP system across the entire organization
- Franchising-Independent ERP systems are installed in different units linked by common processes, e.g., bookkeeping.
- Slam dunk-install one or several ERP modules for phased implementation of key business processes.

Major Phases of ERP Implementation (Kent Sandoe, Enterprise Integration)

- Initiation-develop business case, project scope, and implementation strategy
- Planning-establish implementation team, determine goals and objectives, establish metrics
- Analysis and process design-analyze and improve existing processes, map new processes to be adopted by the system
- Realization-install a base system, customization, and test the system
- Transition-replace the formal system with the new system, data conversion
- Operation-monitor and improve system performance, provide continued training and technical support

Major Challenges to ERP Implementation

- Limitations of ERP technical capabilities
- Inconsistency with existing business processes
- Costs - implementation (hardware, software, training, consulting) and maintenance
- Impact on organizational structure (front office vs. back office, product lines, etc.)
- Changes in employee responsibilities
- Flexibility of software system upgrades
- Implementation timelines
- Availability of internal technical knowledge and resources
- Education and training
- Implementation strategy and execution
- Resistance to change

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Scope of Further Research

Based on the literature review, the researchers have to select and opt for web-based ERP Systems. The future of ERP Systems lies in wireless and digital devices. However as more and more companies adopting change management in Information Technology. So researchers have to concentration on change management with emerging of ERP business applications. Even researchers can do more research on linkage to other software systems, e.g., supply chain management system, e-commerce, customer relationship management system, E-Business, M-Business and G-Business, Enterprise Assets Management, Product Lifecycle Management and Business Intelligence.

Conclusion

This article exhibits the impact of ERP systems on business performance. The relationship between ERP systems adoption and business benefits was also reviewed. It was found that with ERP architecture make better smooth functioning of operational level activities can be achieved. Different factors like why is ERP needed in organization, why firms investing ERP systems, ERP model were discussed.

Therefore, the importance and impact of ERP systems and its implementation in the organizations, ERP buyers, management thinkers, corporate giants and host of other who are implementing ERP systems for gaining a competitive and better performance in various functions of the organization.

A good ERP systems also makes an organization seamless by removing all the communication barriers. Thus the overall purpose of ERP systems is to provide profitability and related information to help managers and staffs understand business performance and plan its future direction and also allow the companies to correct negative situations quickly and minimize financial losses. ERP Systems act as a solution to run the business globally and profitably.

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