IT2130
System Science

Department of Information Technology

Vincent School Mary of Science and Technology

Enterprise Resources Planning System And Systems Applications and Products in Data Processing

By

Surawat P. 5726804

Charoenkeith W. 5455213

Sethavoot R. 5511690

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Asst. Prof. Dr. Adtha Lawanna

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Syllabus

1.Introduction

ERP systems are now playing very important in large businesses This merge of the ERP system, are now becoming very complex, so we need to understand the history and background of the system. In addition, we need to understand the architecture of the current system. The advantages and disadvantages of the ERP systems will impact their penetration in this new market. The market position and general strategy of the major systems providers in preparation for this push are described. The chapter concludes that the growth and success of ERP adoption and development in the new millennium will depend on the legacy ERP system's capability of extending to Customer Relationship Management (CRM), Supply Chain Management (SCM) and other extended modules, and integration with the Internet-enabled applications.

Figure1.Customer relationship managing system
Source:
https://www.google.co.th/search?q=general+system+in+the+business&source=lnms&tbm=isch&sa=X&ved=0ahUKEwj1xZjq_4rTAhWLgLwKHbCeApQQ_AUIBigB&biw=796&bih=599#tbm=isch&q=scm+system&*

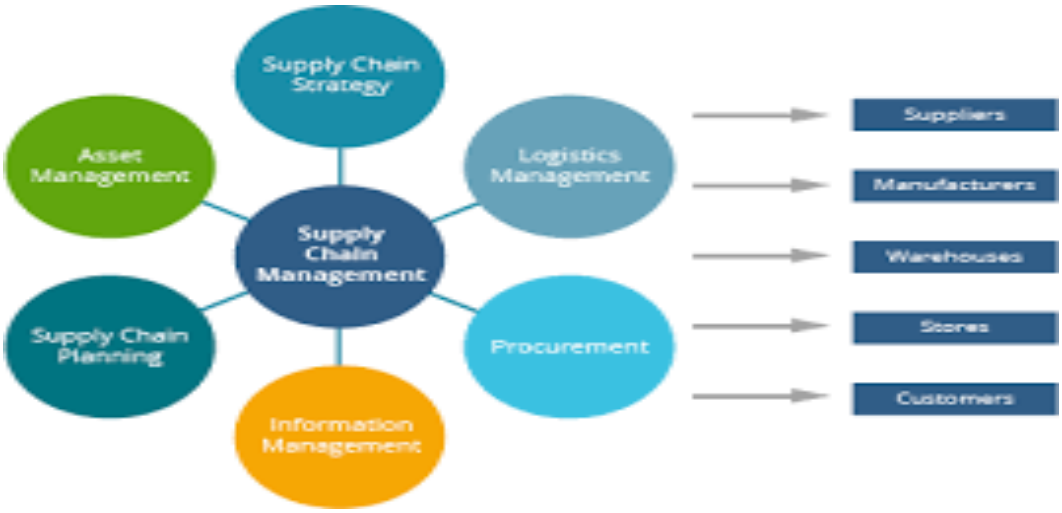


Figure2. Supply chain management system
Source :
https://www.google.co.th/search?q=general+system+in+the+business&source=ln

From late 1980s and the beginning of the 1990s , Enterprise resources planning (ERP) system is launched in to the market targeting mainly large and complex company or business and organization. These complex, expensive, powerful, proprietary systems are off the-shelf solutions requiring consultants to tailor and implement them based on the company's requirements. Many organization are forced to do re-engineering processes to suit the logic of the software modules for making the efficiency and effectiveness by employing faster or simpler working methods or streamlining data flow throughout the organization. These software solutions, unlike the old, traditional in-house-designed company specific systems, are integrated multi-module commercial packages suitable for tailoring and adding "add-ons" as and when required.

The phenomenal growth of computing power and the Internet is bringing more challenges for the ERP vendors and the customers to redesign ERP products, breaking the barrier of proprietorship and customization, and embracing the collaborative business over the intranet, extranet and the Internet in a seamless manner. The vendors already promise many "add-on" modules, some of which are already in the market as a sign of acceptance of these challenges by the ERP vendors. It is a never-ending process of reengineering and development bringing new products and solutions to the ERP market. ERP vendors and customers have recognized the need for packages that follow open architecture, provide interchangeable modules and allow easy customization and user interfacing.

2.Problem of the focal system before ERP system

As the document has mentioned on first topic that the ERP system is the system which integrated minor system of the organization to the centralized data control in order to reduce the complexity and redundancy of the system and the organization. The minor or subsystem on the organization include Human resources management system , Payroll System , Product management system , Financial system, Inventory Management system and etc.

2.1 Statement of Problem

2.1.1 Human resources Management system

2.1.1.1) Slow process of the Human resources

In the past , the HR system was recorded on the paper based system so their would be the redundancy and slow process across the system.

2.1.1.2) Security of employees′ record and the organization

The information cannot be protected 100 percent

2.1.1.3) Slow retrieval of data

The information could not be flow across the department fluently

2.1.1.4) Poor Data storage

All data is stored in filling in the cabinet and because of tht the data could be misplaced due to the human error

2.1.2 Financial Management System

2.1.2.1) Problem of delegation of authority

It is seen that usually there is no delegation of authority in a public sector undertaking with the result that prior concurrence of the competent authority is to be obtained for incurring some expenditure. This results in overloading a person with work and in the wake he can commit many mistakes as well.

2.1.2.2) Lack of proper planning

Public sector undertakings spend too heavily on construction as well as designing. It is primarily because there is a lack of proper planning. This lack of proper planning results in heavy drainage of funds and thus there is serious financial problem in the wake. In addition , the planning need to be plan properly so the cooperation across the department.

2.1.3 Inventory Management System

2.1.3.1) Centralized Design

An inventory system that stands on its own significantly increases the chances it will be inaccurate.

2.1.3.2) Lack of System Optimization

Lack of optimization is a common design problem that makes it more difficult to accurately plan and forecast future inventory needs.

2.1.3.3) Misplaced Inventory Items

common problem with an inventory system design is a failure to include methods for cross-referencing the locations of inventory items.

2.1.4 Payroll System

As the reader can noticed that all statement of problems from the focal system is mainly concerned about redundancy and complexity. So , the ERP is dealing about the complexity of the system which can leads to main problem of the system for example：

1. Time consuming：The redundancy can leads system to make harder for searching and selecting process
2. Error detection false： The complexity of the system is main problem when the system can cause the buffer overload and hard to develop or re-engineering.

3.Enterprise Resources Planning System(ERP)

Enterprise resource planning systems or enterprise systems are software systems for business management, encompassing modules supporting functional areas such as planning, manufacturing, sales, marketing, distribution, accounting, financial, human resource management, project management, inventory management, service and maintenance, transportation and e-business. The architecture of the software facilitates transparent integration of modules, providing flow of information between all functions within the enterprise in a consistently visible manner.

Corporate computing with ERPs allows companies to implement a single integrated system by replacing or re-engineering their mostly incompatible legacy information systems.

American Production and Inventory Control Society (2001) has defined ERP systems as "a method for the effective planning and controlling of all the resources needed to take, make, ship and account for customer orders in a manufacturing, distribution or service company."

"ERP systems are configurable information systems packages that integrate information and information-based processes within and across functional areas in an organization" (Kumar & Van Hillsgersberg, 2000)

Enterprise System software support multiple usages for industry that produces components supporting a variety of business functions. The ERP system integrates varied organizational systems and facilitates error-free transactions and production, thereby enhancing the organization's efficiency. However, developing an ERP system differs from traditional system development

Figure3. ERP system function is described

Source : https://www.google.co.th/search?q=ERP&source

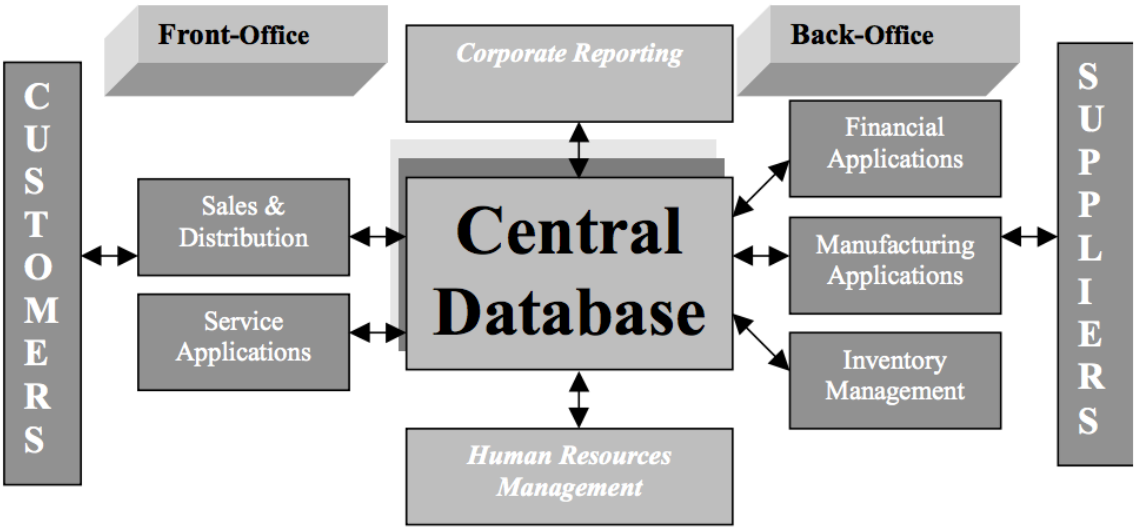


Figure 4 Enterprise System Concept
Source: https://faculty.biu.ac.il/~shnaidh/zooloo/nihul/evolution.pdf

4.Evolutionary of the Enterprise Resources Planning System

In 1960s most organizations designed, developed and implemented centralized computing systems, mostly automating their inventory control systems using inventory control packages (IC). These were legacy systems based on programming languages such as COBOL, ALGOL and FORTRAN. Material requirements planning (MRP) systems were developed in the 1970s which involved mainly planning the product or parts requirements according to the master production schedule. Following this route new software systems called manufacturing resources planning (MRP II) were introduced in the 1980s with an emphasis on optimizing manufacturing processes by synchronizing the materials with production requirements. MRP II included areas such as shop floor and distribution management, project management, finance, human resource and engineering. ERP systems first appeared in the late 1980s and the beginning of the 1990s with the power of enterprise-wide inter-functional coordination and integration. Based on the technological foundations of MRP and MRP II, ERP systems integrate business processes including manufacturing, distribution, accounting, financial, human resource management, project management, inventory management, service and maintenance, and transportation, providing accessibility, visibility and consistency across the enterprise

Figure 5 . The figure shown the evolutionary of the ERP
Source : http://crackmba.com/wp-content/uploads/2012/01/ERP-Evolution.png

4.1 Characteristic of each system from evolutionary of ERP

4.1.1) Inventory Control Package 1960

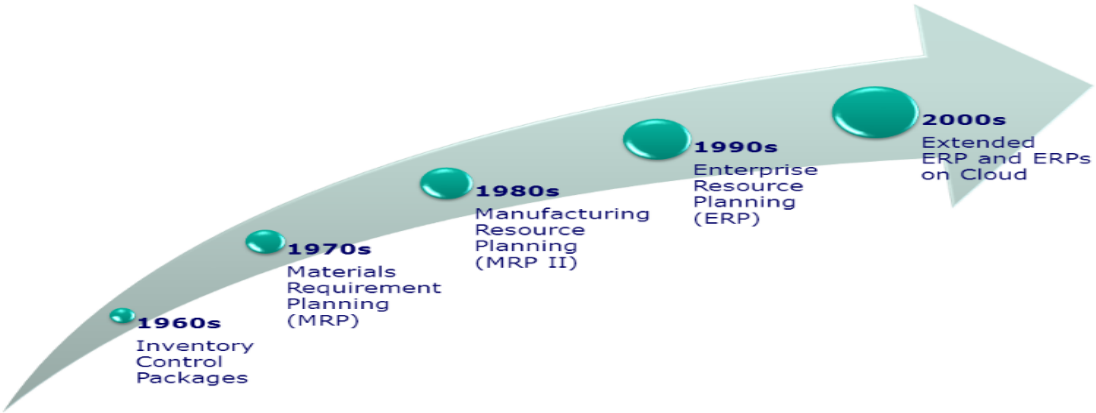
Inventory Management and control is the combination of information technology and business processes of maintaining the appropriate level of stock in a warehouse. The activities of inventory management include identifying inventory requirements, setting targets, providing replenishment techniques and options, monitoring item usages, reconciling the inventory balances, and reporting inventory status.

4.1.2) Material Requirement Planning (MRP) 1970

Materials Requirement Planning (MRP) utilizes software applications for scheduling production processes. MRP generates schedules for the operations and raw material purchases based on the production requirements of finished goods, the structure of the production system, the current inventories levels and the lot sizing procedure for each operation.

4.1.3) Manufacturing Requirements Planning (MRP II) 1980

Manufacturing Requirements Planning or MRP utilizes software applications for coordinating manufacturing processes, from product planning, parts purchasing, inventory control to product distribution



Statement of problem of MRP

1. Benefit did not extend to others sector

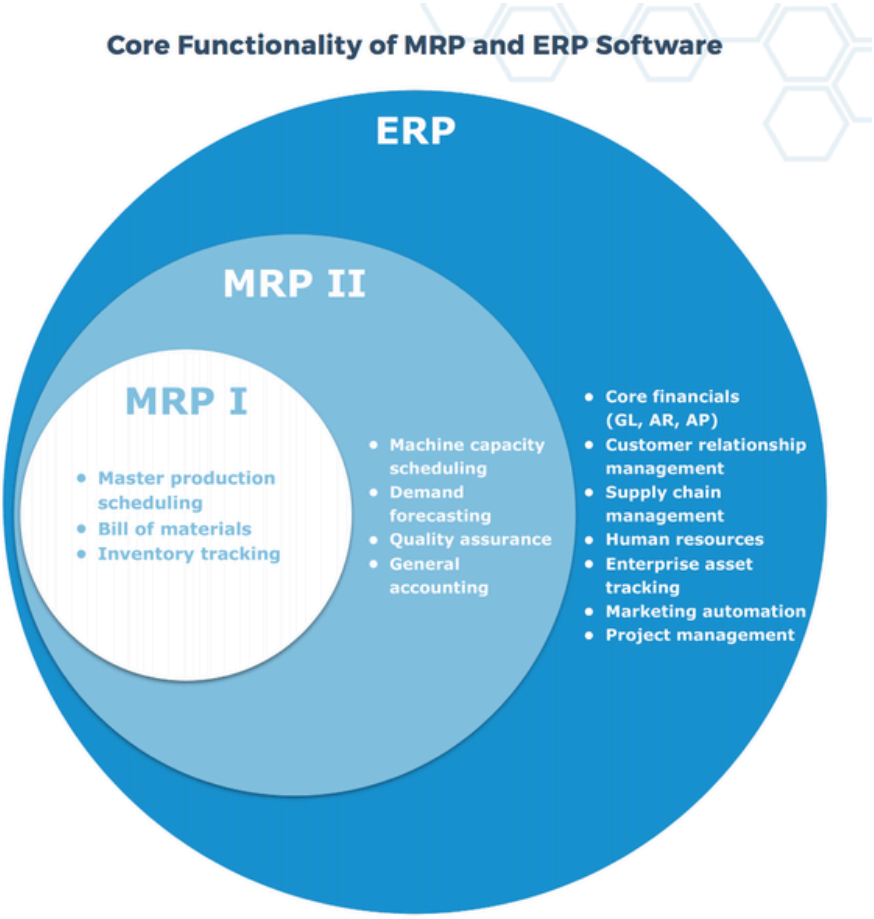
Their benefits did not extend to other Sectors. ERP was developed as multifaceted software that gradually stretched its limits into other areas like human resource, finance, marketing and so on.

2. Did not meet the expected result

MRP solutions did not render the expected results due to exorbitant costs and practical work problems.Inaddition it also called for a huge pool of technical expertise in terms of manpower and machines.

4.1.4) Enterprise Resource Planning (ERP)

Enterprise Resource Planning or ERP uses multi-module application software for improving the performance of the internal business processes. ERP systems often integrates business activities across functional departments, from product planning, parts



purchasing, inventory control, product distribution, fulfillment, to order tracking. ERP software systems may include application modules for supporting marketing, finance, accounting and human resources.

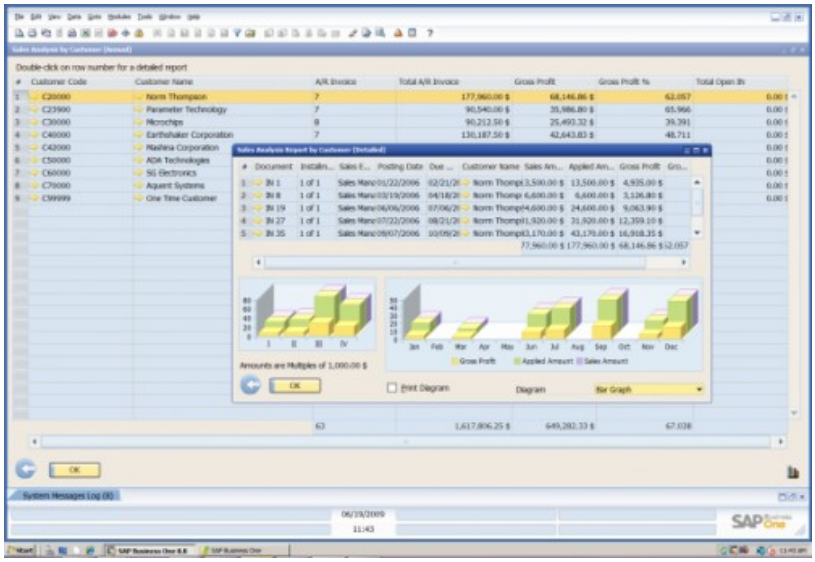


Figure 6 The detail of evolutionary of ERP

Source :

https://qph.ec.quoracdn.net/main-qimg-7eaa8fe6aca95072af67d64e1d33e86d

4.1.5) Extended ERP

Extends the foundation ERP system's functionalities such as finances, distribution, manufacturing, human resources, and payroll to customer relationship management, supply chain management, sales-force automation, and Internet-enabled integrated e-commerce and e-business

5. Systems Applications and Products in Data Processing(SAP)

SAP's ERP system enables companies to run their business processes, be they accounting, sales, production, human resources or payment, in an integrated environment. The integration ensures that information flows from one SAP component to another without the need for redundant data entry, and it helps enforce financial, process and legal controls. SAP's ERP system also facilitates effective utilization of resources (the R in ERP), be it machines, production capacities, manpower or other assets of an enterprise (the E in ERP) through detailed planning (the P in ERP) of resources.

Figure 7. The example interface of the SAP System
Source :
https://www.google.co.th/search?q=sap&source=lnms&tbm=isch&sa=X&ved=0ahUKEwikkeC2h6nTAhUDtY8KHRVgDHkQ_AUIBigB&biw=796&bih=571

5.1 History of the System Applications and Product in Data Processing

SAP was started in the German (IBM Company). The original name for SAP, Systeme, Anwendungen, Produkte, is German for "Systems, Applications and Products." The original idea for SAP was to provide customers with the ability to interact with a common corporate database for a comprehensive range of applications in real time.

In 1973, SAP released R/1, a financial accounting system. R/1 ran on IBM servers and DOS, and it had a single-tier architecture in which presentation, applications and data were on one platform.

In 1979, SAP released R/2, a mainframe system that provided real-time data processing across accounting, manufacturing, supply chain and human resources. R/2 used a two-tier architecture, where presentation was on one platform and applications and data were on another. R/2 helped power SAP's growth, and the vendor expanded its customer base to about 200 companies.

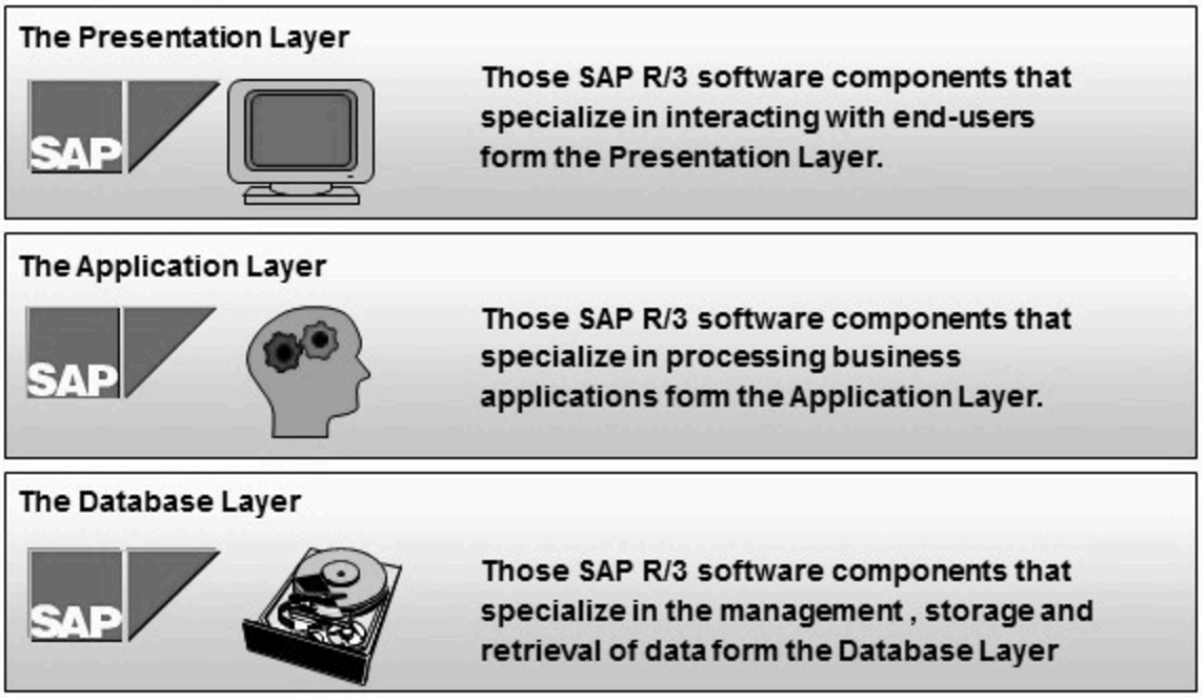
In 1992, SAP released R/3, which represented a switch from mainframe computing to the client-server model, and from a two-tier to a three-tier architecture, in which presentation, applications and data were housed separately. R/3 was a critical product for SAP that launched the company onto the world stage.

In 1999, SAP launched mySAP, which marked a new strategy for the company of focusing on combining e-commerce software with the applications in R/3. One year after R/3's release, SAP partnered with Microsoft to port the new version to Windows NT. By 1997, SAP employed 13,000 people.

6.SAP Architecture on R/3

The SAP architecture on R/3 is using the Three tier architecture, The architecture will be divided in to layers such as Presentation, application and database layer.

Figure 8. The explain of three layers of R/3
Sources : https://www.tutorialspoint.com/sap/sap_architecture.htm



6.1 Presentation Layers

The Presentation layers will have functions as the user interaction phases. It is also known as the client layers. In this layers , GUI (graphic user interface) is used. For example: Desktop , Mobile device and laptops.

Figure 9 The interaction between the user machine and presentation layers is shown

Source : https://www.tutorialspoint.com/sap/sap_architecture.htm

6.2 Application Layers

The application layers include the specific the system to be included in to the SAP's with the multiple CPU and vast amount of the RAM. It is also known as the Kernel and Basic layers. SAP application program is executed in the application layers applications. This layers is the link between the presentation and database layers.

Figure 10. The interaction between the application layer and High-end server
Source : https://www.tutorialspoint.com/sap/sap_architecture.htm

6.3Database layers

The database layers is the layers that used to store the data and information including the business data and SAP table and programs. For example , Oracle, Microsoft SQL Server, IBM DB/2, Siebel, Sybase, etc.

Figure 11. The interaction between the database layer and High-end database server
Source : https://www.tutorialspoint.com/sap/sap_architecture.htm

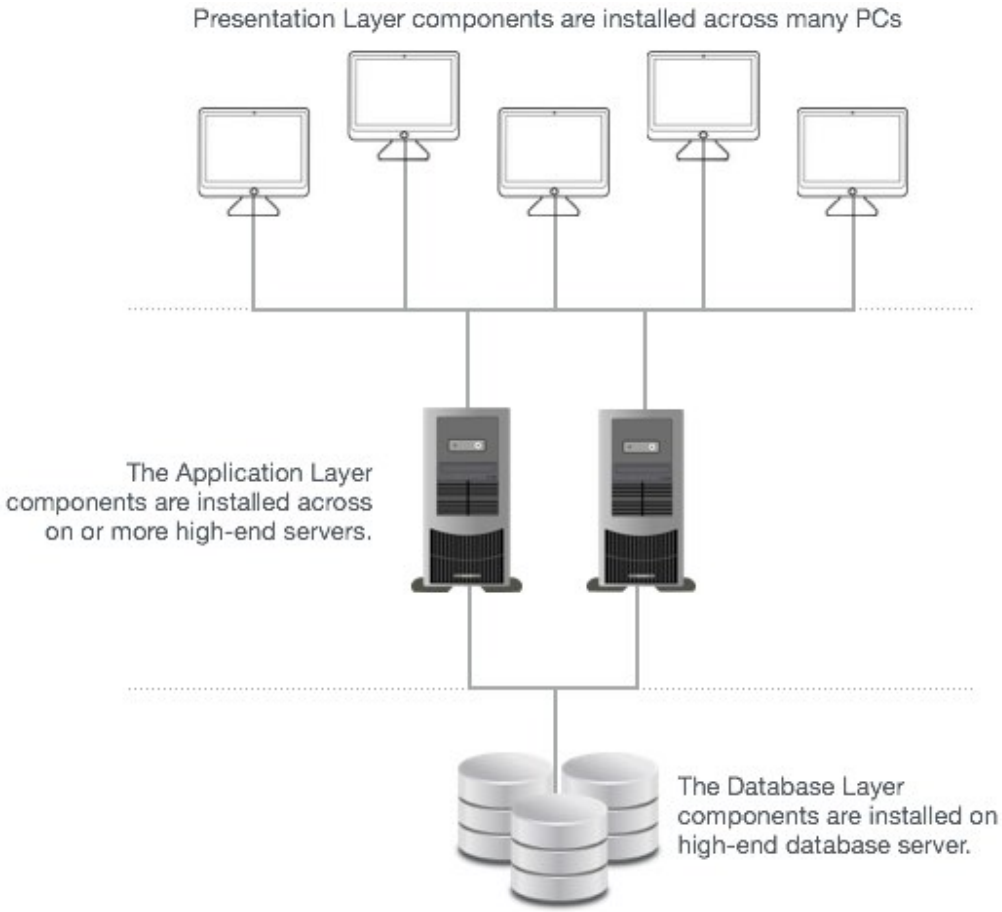


Figure 12 The overall architecture of r/3
Source：https://www.tutorialspoint.com/sap/sap_architecture.htm

7.Advantages of SAP on business

7.1 Global integration

The SAP system allows various sub system to integrate together to increase the performance of the system.

7.2 Automatic Alerts

Eliminate the need to query the system for information by delivering reports to the appropriate recipients at predetermined times. Because it integrate many system together , The SAP does not need to query information from the other source of the database.

7.3 Availability to Promise

providing effective supply chain management by offering the ability to quote available quantities and delivery dates to customers with accuracy.

7.4 Increased revenues due to less stock outages (reduction in lost sales)

Its reduced loss of revenue due to items being out-of-stock and Fewer stock outages occur because there are more reliable materials buying processes/procedures in place.

7.5More customer satisfaction

Increases customer satisfaction due to the higher availability of products.

8.Disadvantages of SAP

8.1The cost of implementation

SAP need the high cost of implementation because its required the many expert to set up and install the program

8.2 it is not user friendly

The SAP required the training cost t train the organization employees to understand the SAP program

8.3Over complex UI

Some UI designer of SAP interface has designed the complex interface so the user may not interest of using the program

9.Case study

This is the case study of implementing ERP with SAP program in the Thai company on 2006 Thai Stanley Electric Public Co., Ltd.

"Thai Stanley is a manufacturer of world-class automotive lighting based in Thailand. In late 2006, two core employees of Thai Stanley, Mr. Boriboon Samrejphol and Mr. Watchara Sathapornpiboon, realized that Thai Stanley's legacy system needed to be improved, and that in order to succeed in an increasingly competitive world the company needed to introduce an ERP system. These two conveyed their concerns to the head office, and the company, along with its principle shareholder Stanley Electric, decided that it was time for Thai Stanley as well to introduce SAP. This is the story of a company taking the initiative to safeguard its future and provide better services to its customers. ABeam Consulting is proud to have been selected to support Thai Stanley in helping its employees make their dream for a coordinated approach to integrated business processes a reality"

From the above paragraph , The THAI Stanley company wanted to implement ERP system on the company because they realized that they need a bigger and new release system to implement

9.1 Problem occurring before using SAP and ERP

9.1.1Thai Stanley needed an integrated and multifaceted global standard that could be used in local factories

9.1.2Data collection needed to be done in real-time, with greater accuracy and visibility, to help Stanley Electric get a better grasp on data for management purposes and realize its global strategy

9.1.3There was an overdependence on individual efforts, and disunity among various code types, leading to waste

9.1.4 It was important that there be thorough, multilingual communication between all parties at each level of the information chain in Japan and Thailand throughout the SAP implementation process

9.2 Scope and solutions

9.2.1 Promote complete standardization through the first international installation of SAP in the Stanley Electric Group

9.2.2Improve business processes and workflow to establish clear roles and responsibilities

9.2.3Work to facilitate knowledge transfers throughout Thai Stanley factories

9.2.4Establish Key Performance Indicators (KPI) to gauge waste and performance

9.2.5 Construct a system for cost accounting

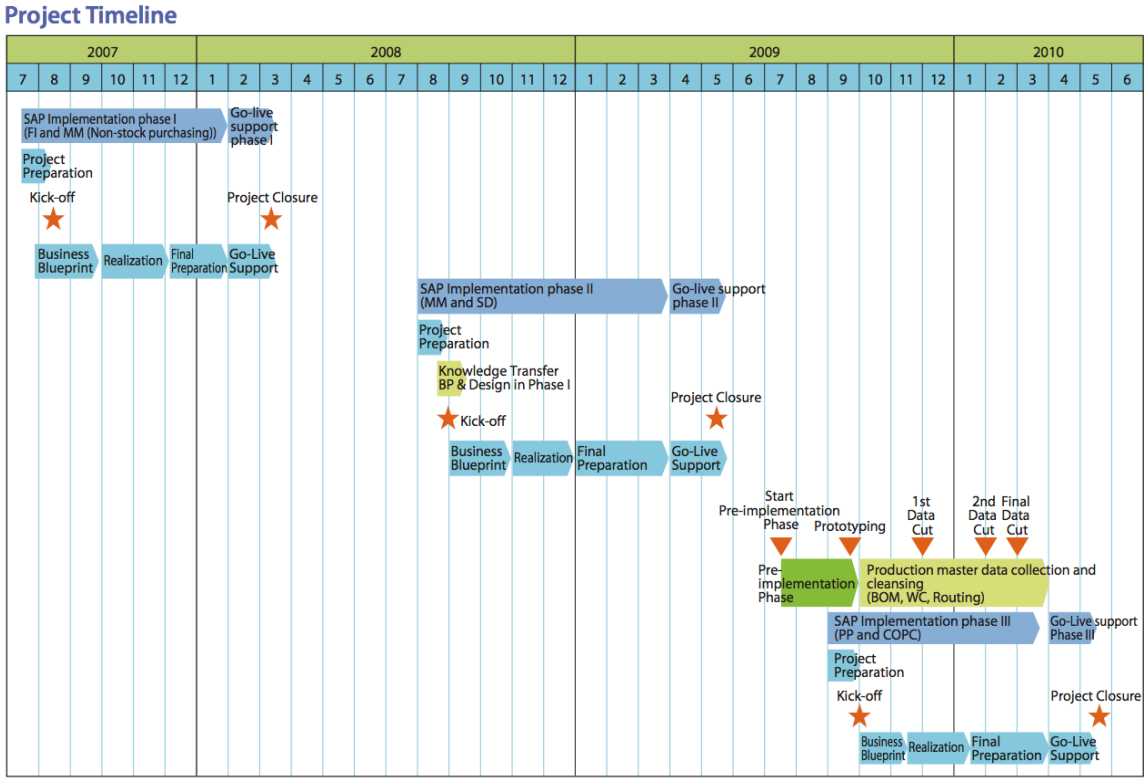


Figure 14 The project of implementing ERP
Source: https: CS040E.pdf

Implementing process

"We completed Phase One with a local provider," said Mr. Nakano, looking back. "When it came time to implement Phase Two, we decided to consider what other companies were available. For Phase Two and Phase three, since we were dealing with business processes that react our customers, we knew it was absolutely important that implementation proceed smoothly. We needed a partner who could provide us with total support for any issues we faced, and who would stay with us in the long run. Finally, since we are in a company, we knew we needed a partner that could facilitate **effective communication** between all the involved parties in land and Japan."

For Phase Two and Phase three of the project, In Stanley decided to call for bids from many consulting agencies. Al- though the company received numerous proposals, for ai Stanley, the clear choice was **ABeam Consulting**.

For both Phase Two and Phase Three, the team from ABeam Consulting drew up detailed project timelines and plans to help ai Stanley proceed smoothly from the Kick- off Date to the Go Live. The team made sure that at each project milestone the Steering Committee in Thai Stanley was well informed of the project's status and had total control over its evolution. ABeam Shanghai Principal Takeshi Kawa- mura, total coordinator for the Thai Stanley project, flew back and forth between Japan and Thailand to make sure that Stanley Electric was included as well. In Thailand

Conclusion , there are three phases in developing in the SAP for this company. Mostly, this concern about the re-engineering method of the whole process. Since starting from getting the requirement to the developing the

10.Customer relationship management (CRM)

Customer relationship management (CRM) is a term that refers to practices, strategies and technologies that companies use to manage and analyze customer interactions and data throughout the customer lifecycle, with the goal of improving business relationships with customers, assisting in customer retention and driving sales growth. CRM systems are designed to compile information on customers across different channels -- or points of contact between the customer and the company -- which could include the company's website, telephone, live chat, direct mail, marketing materials and social media.

CRM systems can also give customer-facing staff detailed information on customers' personal information, purchase history, buying preferences and concerns.

10.1 Evolutionary of CRM

The idea of customer relationship management began evolving in the early 1970s, when customer satisfaction was evaluated using annual surveys or by front-line asking. At that time, businesses had to rely on standalone mainframe systems to automate sales, but the extent of technology allowed them to categorize customers in spreadsheets and lists. The key year was 1982, when Kate and Robert Kestnbaum introduced the concept of Database marketing, namely applying statistical methods to analyze and gather customer data.

The trend was followed by numerous developers trying to maximize leads' potential, including Tom Siebel, who signed the first CRM product Siebel Systems in 1993. Nevertheless, customer relationship management as a term became popular only in 1997, thanks to the work of Siebel, Gartner, and IBM. In the period between 1997 and 2000, leading CRM products were enriched with enterprise resource planning functions, and shipping and marketing capabilities.

It is only in 2009 that we get to speak of social CRM. During this year, developers considered the options to profit from social media's momentum, and designed tools that help companies become accessible on all users' favorite networks. Many startups at the time benefited from this trend to provide exclusively social CRM solutions,
including Base and Nutshell. The same year, Gartner organized and held the first Customer Relationship Management Summit, and summarized the features systems should offer to be classified as CRM solutions.

In 2013 and 2014, most of the popular CRM products were linked to business intelligence systems and communication software to improve corporate communication and end-users' experience. In the last two years, the leading trend is to replace standardized CRM solutions with industry-specific ones, or to make them customizable enough to meet the needs of every business.

10.2 Common features of CRM

Marketing automation: CRM tools with marketing automation capabilities can automate repetitive tasks to enhance marketing efforts to customers at different points in the lifecycle. For example, as sales prospects come into the system, the system might automatically send them marketing materials, typically via email or social media, with the goal of turning a sales lead into a full-fledged customer.

Sales force automation: Also known as sales force management, sales force automation is meant to prevent duplicate efforts between a salesperson and a customer. A CRM system can help achieve this by automatically tracking all contact and follow-ups between both sides.

Contact center automation: Designed to reduce tedious aspects of a contact center agent's job, contact center automation might include pre-recorded audio that assists in customer problem-solving and information dissemination. Various software tools that integrate with the agent's desktop tools can handle customer requests in order to cut down the time of calls and simplify customer service processes.

Geolocation technology, or location-based services: Some CRM systems include technology that can create geographic marketing campaigns based on customers' physical locations, sometimes integrating with popular location-based GPS apps. Geolocation technology can also be used as a networking or contact management tool in order to find sales prospects based on location.

10.3 Benefit on using the CRM on the costumer

There are some mainly benefit of using the CRM on the customer side such as :

1. Enhanced ability to target profitable customers.
2.Integrated assistance across channels
3.Enhanced sales force efficiency and effectiveness
4.Improved pricing
5.Customized products and services
6.Improved customer service efficiency and effectiveness
7.Individualized marketing messages also called campaigns
8.Connect customers and all channels on a single platform.

11.Summary

In the past dealing with complexity of the system is problematic such as the difficulty in controlling every aspect of business process within the organization like the connection and communication between department the workflow slow down and lack of proper planning for instant.

This result in the introduction of the enterprise resource planning is a unique way of reducing the complexity and solve most of the problem within the organization in terms of complexity and redundancy of the workflow within the firm. By introducing the ERP system help in evolving the way organization function's like from the earlier stage of Inventory Control Package dealing with the inventory management that controls and measure the level of stock to the degree of an ERP system which use multiple software application to improve the performance of the business processes including many different processes in the firm with different department. Which then evolve to the Extended ERP that is used in the present moment which excel in controlling and dealing with multiple faction of the firm that is more than the standard ERP system can manage including supply chain management, sales-force automation, Internet-enabled integrated, e-commerce-businesses, etc.

The most well-known system used today is Systems Applications and Products in Data Processing (SAP) that connect seamlessly within the company without redundancy and flows obstruct from other modules. Which promise the availability, more customer satisfaction, Automatic Alerts, etc. However due to the massively processes and data used in the organization, the implementation of the system is quite high which required many expert to set and implement the system. Other aspect is concern as well as the system is complex need proper training before using it.

All in all, by using the ERP system solve mostly all the problem facing in the history of business like problem in dealing with the workflow of the business processes, inventory, customer management, etc. which all of this is by far the most effective result that has been kept using up until now. Nonetheless, there may be a lot of problem occurred in the future to considered and some problem might not be solve but the ERP system will continue to evolve further but the cost may be quite high that the firm have to keep in mind before implement any additional system.