

Evolution of ERP Systems

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INTRODUCTION

The functional units of today's complex business environment require more and more interfunctional data flow for decision making, timely and efficient procurement of product parts, management of inventory, accounting, human resources, and distribution of goods and services. Management of such organizations need efficient information systems to improve competitiveness by cost reduction and better logistics. Enterprise resource-planning systems (ERP), or enterprise systems (Brady, Monk, & Wagner, 2001; Grant, 2003; Hamilton, 2002; Hossain, Patrick, & Rashid, 2002; O'Leary, 2000), are such software systems for business management encompassing modules supporting functional areas such as planning, manufacturing, sales, marketing, distribution, accounting, finances, 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 reengineering their mostly incompatible legacy information systems.

The concept of the ERP system as "one database, one application and a unified interface across the entire

enterprise" (Tadger, 1998) can be illustrated, following Davenport (1998), with the diagram in Figure 1. The American Production and Inventory Control Society (APICS, 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." An ERP system "comprises of a commercial software package that promises the seamless integration of all the information flowing through the company—financial, accounting, human resources, supply chain and customer information" (Davenport, 1998). They are "configurable information systems packages that integrate information and information-based processes within and across functional areas in an organisation" (Kumar & Van Hillsgrsberg, 2000).

ERP systems surfaced in the market in the late 1980s and the beginning of the 1990s, targeting mainly large complex business organizations. During the 1960s, most organisations designed, developed, and implemented centralised computing systems, mostly automating their inventory control systems using inventory control (IC) packages. Material requirements planning (MRP) systems were developed in the 1970s and involved mainly planning the product or parts requirements according to the master production schedule. Following this route, new software systems called manufacturing resources

Figure 1. ERP systems concept

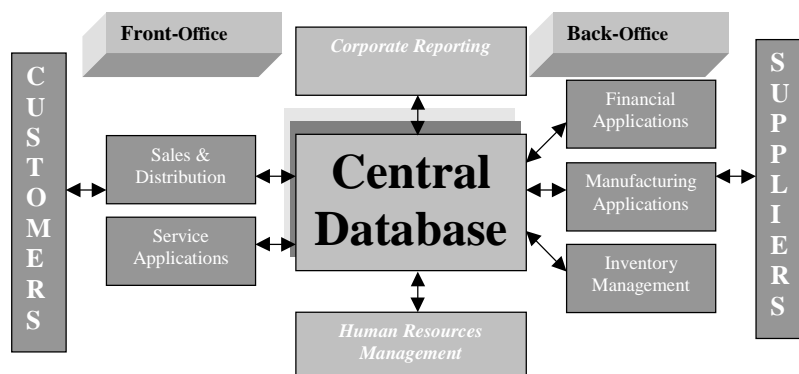


Figure 2. ERP evolution



planning (MRP II) were introduced in the 1980s with an emphasis on optimizing manufacturing processes by synchronising the materials with production requirements. MRP II included areas such as shop floor and distribution management, project management, finance, human resource, and engineering. Based on the technological foundations of MRP and MRP II, ERP systems integrate business processes including manufacturing, distribution, accounting, finances, human resource management, project management, inventory management, service and maintenance, transportation providing accessibility, visibility, and consistency across the enterprise.

During the 1990s, ERP vendors added more modules and functions as “add-ons” to the core modules, giving

birth to the “extended ERPs.” These ERP extensions include advanced planning and scheduling (APS), e-business solutions such as customer relationship management (CRM), and supply chain management (SCM). Figure 2 summarises the historical events related with ERP.

Organisations choose and deploy ERP systems for many tangible and intangible benefits and strategic reasons. In many cases, the calculation of return on investment (ROI) is weighted against the many intangible and strategic benefits. The benefits that an ERP system may bring to organizations are shown in Table 1 while Table 2 shows the problems and disadvantages organisations need to overcome to reap the benefits.

Table 1. Advantages of ERP systems

What Benefit	How
Reliable information access	Common DBMS (database management system), consistent and accurate data, improved reports
Avoid data and operations redundancy	Modules access same data from the central database, avoid multiple data input, and update operations
Delivery- and cycle-time reduction	Minimizes retrieving and reporting delays
Cost reduction	Time savings, improved control by enterprise-wide analysis of organisational decisions
Easy adaptability	Changes in business processes, easy to adapt and restructure
Improved scalability	Structured and modular design with add-ons
Improved maintenance	Vendor-supported, long-term contract as part of the system procurement
Global outreach	Extended modules such as CRM and SCM
E-commerce, e-business	Internet commerce, collaborative culture

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