

# Defining and Understanding ERP Systems

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## INTRODUCTION

The last 15 years have seen the emergence on the software market of a category of software called Enterprise Resource Planning systems or ERP, which has become the focus of both researchers and practitioners in the information systems area. At this time, the ERP software market is one of the fastest growing markets in the software industry with long-term growth rates of 36-40%. Some estimates put the eventual size of the market by the year 2010 at US\$1 trillion (Bingi et al., 1999). Since these estimates have been put forward, the ERP market has slowed down, but the overall growth of the enterprise-wide application market is still quite strong, thanks to a number of additional segments, such as Customer Relationship Management (CRM) and Supply Chain Management (SCM). Also, more recently, a new trend is emerging in the market: the re-implementation and extension of ERP, referred to as ERP II (Humphries and Jimenez, 2003). Fundamentally, ERPs are all integrated “mega packages” (Gable et al., 1997) which provide support for several or all functional areas of the firm depending upon the configuration purchased by the client. Their complexity is reflected in the complexity of their implementation and deployment in organisations where they have been observed to have a substantial impact on everyday activities in both the short term and the long term. This has led to many reports of unsuccessful implementation, which are however matched by many reports of substantial benefits accruing to implementing firms. Thus, managers look upon ERP software as necessary evils and much research has been carried out in order to increase the success rate of ERP implementations and to ensure that benefits materialize.

## THE EMERGENCE OF ERP

The historical origin of ERP is in inventory management and control software packages that dictated system design during the 1960s (Kalakota and Robinson, 2001). The 1970s saw the emergence of Material Requirements Planning (MRP) and Distribution Resource Planning (DRP),

which focused on automating all aspects of production master scheduling and centralised inventory planning, respectively (Kalakota and Robinson, 2001). During the 1980s, the misnamed MRPII (Manufacturing Resource Planning) systems emerged to extend MRP’s traditional focus on production processes to other business functions, including order processing, manufacturing, and distribution (Kalakota and Robinson, 2001). In the early 1990s, MRPII was further extended to cover areas of Engineering, Finance, Human Resources, Project Management, etc. MRPII is a misnomer, as it provided automated solutions to a wide range of business processes, not just those found within a company’s manufacturing and distribution functions (Kalakota and Robinson, 2001). However, although MRPII systems overcame some of the drawbacks of MRP systems they became less relevant because:

- Manufacturing is moving away from a “make to stock” situation and towards a “make to order” ethos where customisation is replacing standardisation. This has led to a far more complex planning process.
- Quality and cost are only minimum requirements for organisations wishing to compete in the marketplace. Competition has moved to a basis of aggressive delivery, lead-times, flexibility and greater integration with suppliers and customers with greater levels of product differentiation.

As a result, MRPII was further extended and renamed ERP (Kalakota and Robinson, 2001). An ERP system differs from the MRPII system, not only in system requirements, but also in technical requirements, as it addresses technology aspects such as graphical user interface, relational database, use of fourth generation language, and computer-aided software engineering tools in development, client/server architecture, and open-systems portability (Russell and Taylor, 1998; Watson and Schneider, 1999). Also, while “MRP II has traditionally focused on the planning and scheduling on internal resources, ERP strives to plan and schedule supplier resources as well, based on the dynamic customer de-

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mands and schedules” (Chen, 2001). This brief evolutionary definition of ERP is depicted in Figure 1.

Kalakota and Robinson (2001) position ERP as the second phase in the “technology” and “enterprises internal and external constituencies” integration process, as illustrated in Figure 1. According to Kalakota and Robinson (2001), *Wave 1* of the evolution of ERP addresses the emergence of Manufacturing Integration (MRP), while *Wave 2* relates to Enterprise Integration (ERP). The combined impact of “key business drivers” (replacing legacy systems, gaining greater control, managing globalisation, handling regulatory change, and improving integration of functions across the enterprise) forced the “structural migration” from MRP to ERP (Kalakota and Robinson, 2001). Another significant factor in the second wave of ERP development was Y2K preparation, which was often cited as the major reason for ERP adoption (Brown et al., 2000; Kalakota and Robinson, 2001; Themistocleous et al., 2001). A new wave, *Wave 5*, now exists and positions ERP II as the new approach to enterprise integration.

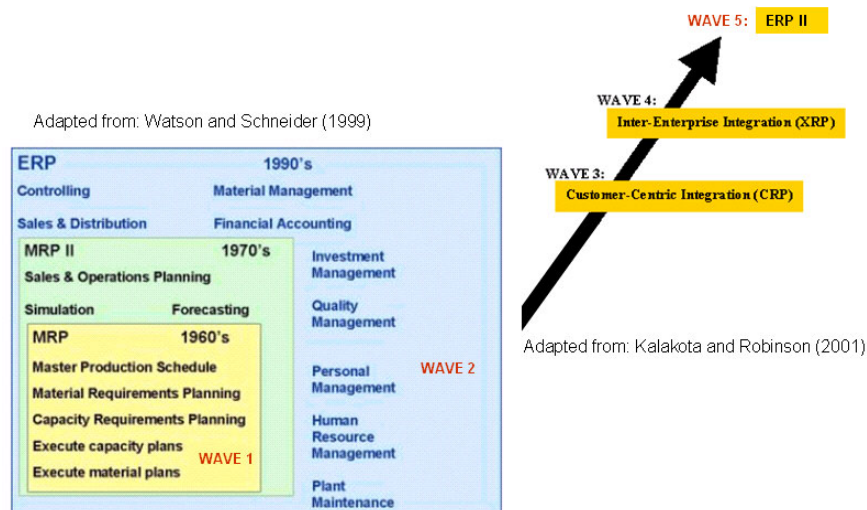
## ERP DEFINED

Although there is no agreed-upon definition for ERP systems, their characteristics position these systems as integrated, all-encompassing (Markus and Tanis, 2000; Pallatto, 2002), complex mega packages (Gable et al., 1997) designed to support the key functional areas of an organisation. The American Production and Inventory Control Society (APICS) defines ERP as, “an accounting-oriented information system for identifying and planning

the enterprise-wide resources needed to take, make, ship, and account for customer orders” (Watson and Schneider, 1999). As a result, by definition, ERP is an operational-level system. Therefore, an Enterprise Resource Planning (ERP) system is a generic term for an integrated enterprise-wide standard information system (Watson and Schneider, 1999) that impounds deep knowledge of business practices accumulated from vendor implementations throughout organisations (Shang and Seddon, 2000).

ERP can be further defined as a strategic business solution that integrates all business functions, including manufacturing, financial, and distribution (Watson and Schneider, 1999). ERP systems are also being referred to as “enterprise systems” (Davenport, 1998; Chen, 2001) and “enterprise-wide Information Systems” (Al-Mashari, 2000; Milford and Stewart, 2000). It is a customised, packaged, software-based system that handles the majority of an enterprise’s information systems’ requirements (Watson and Schneider, 1999). It is a software architecture that facilitates the flow of information among all functions within an enterprise (Watson and Schneider, 1999). As a result, ERP systems are traditionally thought of as transaction-oriented processing systems (Davenport, 1998; Chen, 2001) or transactional backbones (Kalakota and Robinson, 2001). However, they are continually redefined based on the growing needs of organisations. Therefore, various definitions point to ERP systems as being enterprise-wide information systems that accommodate many features of an organisation’s business processes. They are highly complex, integrated systems, which require careful consideration before selection, implementation, and use. Neglect of any of these areas can lead a company down the path to failure already

Figure 1. Evolution of ERP Systems



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