

Enterprise Resource Planning and Systems Integration

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INTRODUCTION

Systems integration has been an important topic ever since businesses started using mainframes to run their back-office operations. These systems specialized in common tasks found in functional areas such as accounts receivable and accounts payable, inventory, purchasing, and ordering. However, getting information from these fragmented systems to get a whole picture view of the business was extremely difficult if not impossible. By integrating back-office operations into a single system, enterprise resource planning (ERP) was supposed to solve that problem. In reality, however, very few companies fully implement all the modules of an ERP package and most continue to rely on legacy systems and other specialized software for their processing needs. Integration of ERP with various enterprise applications remains a challenge. Moreover, it is not uncommon to have ERP software from different vendors or multiple copies of ERP software from the same vendor running in the same company. Integrating multiple instances of ERP software will be the predominant ERP project in most large corporations in the next half decade. Finally, many companies pursue merger and acquisition as a major growth strategy. A critical task in merging two companies nowadays involves integrating their ERP systems. This paper addresses these integration issues involving ERP systems. Common tools for integration and success factors for integration projects are discussed.

NEED FOR SYSTEMS INTEGRATION

The trends in globalization, mergers and acquisitions, and the advent of e-commerce and e-business have all contributed to the intensification of the competitive landscape. Companies need to find better ways to interact with their customers and provide better services. More than ever before, customers require information on various relations they have with a business; information about their accounts, their balances, recent purchases, and bills (Slater, 2000a). Traditionally, all that information, even if available, was locked in disparate systems. Consequently, companies that succeeded in integrating their systems

enjoyed tremendous competitive advantage and reaped huge rewards in sales and market shares by offering unprecedented customer values. A good example is Dell, who was able to integrate not only its internal but also suppliers' systems. As a result, it has cut down its inventory to four day's worth of supplies, compared with from 30 to 50 days of its competitors. Its integrated supply chain system is a major contributor to its number one position in the worldwide PC market (Hildebrand, 2003).

Systems integration has been an important topic ever since businesses started using mainframes to support their back-office operations (Kumar & Hillegersberg, 2000; Hildebrand, 2003). Companies developed computer systems to automate common tasks in functional areas such as accounts receivable, accounts payable, inventory, purchasing and ordering. However, for the most part, these departmental systems were un-integrated and, therefore, not capable of providing a whole picture view of the business. Integration traditionally was done in a piece meal fashion and required custom coding that was both difficult and expensive. Attempts to develop enterprise-wide integrated systems for the most part have failed (Kumar & Hillegersberg, 2000). Commercial enterprise resource planning (ERP) systems, first appeared in the 1980s, were considered a major solution to the integration problem. However, it was soon found out that ERP could create its own integration problems, as discussed next.

Integration through ERP

ERP represents a major commercial solution that enables companies to integrate business operations across functions. Expanding from their roots in manufacturing and operations, vendors such as SAP and Baan continue to add business processes to their ERP offerings in areas including order management, marketing, purchasing, warehouse management, human resources and finance. In the mid-1990s sales of ERP software got a major boost as corporations rushed to replace their homegrown systems with Y2K compliant ERP systems. The implementation of ERP, however, was enormously difficult and expensive. Due to the extreme complexity of the software and the major changes required in the associated business processes, many ERP projects were abandoned or had their

scope dramatically reduced. As a result, a typical company only implements a very small portion of an ERP package. Many companies continue to rely on their legacy systems or special software to support their operations. Integration of ERP with various enterprise applications remains a challenge (*Themistocleous, Irani, & O'Keefe, 2001*).

ERP Consolidation

Many companies have also adopted the best-of-breed approach to the implementation of ERP: Picking and choosing the best modules on the market to create their ERP system. For example, a company may use PeopleSoft for human resources, SAP for finances and manufacturing, and JD Edward (now part of PeopleSoft) for purchasing. In fact, some have estimated that as many as 90 percent of companies have ERP software from different vendors (Worthen, 2003). A 2003 Hackett Group survey, for example, found that an average company had 2.7 copies of ERP systems (2003). Integrating various ERP systems with each other and with other enterprise applications makes systems integration an even more daunting job.

Even if there is only one ERP package from one vendor, integration can be complicated. In the rush to meet the project deadline, especially during the Y2K crisis, many companies made another mistake: Instead of having one instance or copy of, say SAP, serving the whole company, they installed multiple instances of the software for different business units, different geographical locations, etc. Due to a lack of time or will, instead of standardizing, companies allowed different units and locations to keep their idiosyncratic work processes, which required customization of the software in different ways in different units and locations. This has resulted in a proliferation of ERP systems that, even when purchased from the same vendor, are unable to talk to each other. One company reportedly has as many as 64 copies of SAP running in different business units (Sliwa, 2000)! Integration of these multiple instances of ERP is very expensive and will be the major systems implementation project for large corporations in the next decade (Berinato, 2003).

Mergers and Acquisitions

As more and more companies deploy ERP systems, their integration becomes a top priority in mergers and acquisitions (Stedman, 2000). Because these systems are very complex and difficult to implement, their integration with different cultures and management styles from two merging companies presents enormous hurdles (Radcliff & LaPlante, 1999; Stedman, 1999). In addition, since this kind of projects is so resource intensive, it may compro-

mise the implementation of other IT initiatives. Exxon/Mobil's merger in 1998 was especially noteworthy as it resulted in the largest SAP systems integration project at a time when the two companies had to contend with the Y2K issue (King & Nash, 1998).

Due to customizations and release variance, merging ERP systems from even the same vendor can be extremely difficult if not impossible (Kubilus, 2003; Stedman, 1999). Consequently, some firms chose not to integrate their ERP systems initially (Caldwell, 1998; Sliwa, 2000). The decision on which ERP system to keep has also been made irrespective of technical or even financial considerations. When Standard Register acquired Uarco, the former had PeopleSoft's ERP whereas the latter had Baan's. After the merger the new company stayed with Standard Register's legacy system because it was Y2K compliant. After 2000, the company moved to Baan's because the combined company had more experience with it than with PeopleSoft (Caldwell, 1998). Another example is the merger of Dow Chemical with Union Carbide. Dow was, and still is, an SAP R/2 user whereas Union Carbide had implemented SAP R/3. Some industry observer believed that the new company would move to R/3 since it was the newer version (Collett, 1999). In the end, however, the merged company decided to standardize on R/2, which has been an integrated system that supports Dow Chemical's global business operations in 135 countries since 1998.

To summarize, ERP is a solution to the systems integration problem. However, the installation of an ERP package does not create an integrated enterprise (Slater, 2000a). In fact, as discussed above, ERP amplifies the need for systems integration. It is, therefore, imperative that ERP implementers understand systems integration issues and be involved in integration projects. The next two sections discuss tools and success factors for systems integration.

TOOLS OF THE TRADE

Like all information systems project, systems integration takes people, resources and proper project management, some of which will be discussed in the next section. For the software component, most companies rely on middleware to integrate various applications. Middleware may be defined as software products that connect applications to enable data sharing (Slater, 2000b). The advantages of middleware and different types of middleware are discussed next.

Advantages of Middleware

Technically, middleware offers three advantages (Slater, 2000b):

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