

Life Cycle of ERP Systems

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INTRODUCTION

The 90's witnessed an impressive growth of Enterprise Resource Planning (ERP) systems in the market of corporate IT solutions. For instance, O'Leary (2000) reports that a single ERP system (SAP's R/3) is used by more than 60% of the multinational firms. Among the explanations for this phenomenon are the competitive pressures suffered by the companies that have forced them to seek alternatives for cost reduction, differentiation of products and services and integration of their business processes. The ERP systems evolved exploiting the need for quick deployment of integrated systems to meet these new business requirements, while companies were (and still are) under pressure to outsource all the activities that are not embraced by their core business.

The ERP systems are introduced in companies following some well-defined stages. In this context, their life cycle encompasses the stages of decision, selection, implementation, stabilization and utilization. This chapter presents aspects involved in each stage of this life cycle, based on the referenced bibliography.

BACKGROUND

Enterprise Resource Planning (ERP) systems are integrated information systems acquired as commercial software packages with the aim of supporting most of the operations of a company. Markus and Tanis (2000) define them as commercial packages that enable the integration of data coming from transactions-oriented information systems and from the various business processes throughout the entire organization. Although companies may internally develop systems with similar characteristics, the term ERP is associated to commercial packages. Examples of ERP systems found on the market are the R/3 of the German company SAP and the PeopleSoft EnterpriseOne of the American Peoplesoft. Some authors present and describe characteristics that, if taken as a whole, permit to differentiate the ERP systems from systems developed within the companies and from other

types of commercial packages (Souza & Zwicker, 2001; Markus & Tanis, 2000). These characteristics may be summarized as:

- ERP systems are commercial software packages;
- They include standard models of business processes;
- They are integrated information systems and use a corporate data base;
- They have a large functional scope;
- They require adjustment procedures to be used in a given company.

When deciding to use ERP systems, companies hope to achieve manifold benefits, like the integration of business processes, the increase of possibilities to control the company's operations, the technological updating, IT cost reduction and access to quality information in real time for decision taking (spread over the complete production chain). However, there are also problems to be considered. Table 1 synthesizes the benefits and difficulties of the ERP systems mentioned by many authors (Lozinsky, 1998; Hecht, 1997; Bancroft, Seip & Sprengel, 1998; Davenport, 1998; Stedman, 1998; & Cole-Gomolski, 1998), and relates them to the characteristics of ERP systems.

ERP SYSTEMS LIFE CYCLE MODEL

The life cycle of information systems represents the various stages through which a project of development and utilization of information systems passes through. In its traditional form, the systems development life cycle encompasses project definition, system study, design, programming, installation and post-implementation stages (Laudon & Laudon, 2001). Two different approaches for system development are the *waterfall* model, where stages are executed sequentially and only once for each system, and *prototyping*, where the stages are repeated, refining an initial solution (prototype) until it can be used as the definition for the system to be built or as the system itself.

Table 1. Benefits and difficulties of ERP systems

<i>Characteristics</i>	<i>Benefits Sought</i>	<i>Possible Difficulties</i>
Commercial Package	<ul style="list-style-type: none"> - IT costs reduction - Focus on the company's core activities - Technological updating - Backlog reduction 	<ul style="list-style-type: none"> - Supplier dependence - Lack of knowledge on the package - Time for learning of interfaces not specifically developed for the company - Loss of former systems functionalities - Costs regarding the continued adjustment - Excess of screens and fields to be typed in - Lack of adequate managerial reports
Best Practice Business Models	<ul style="list-style-type: none"> - Knowledge on best practices - Access to other companies' experience - Reengineering of processes 	<ul style="list-style-type: none"> - Need to adjust the company to the package - Need to change the business procedures - Need of consulting for implementation - Resistance to change
Integrated System	<ul style="list-style-type: none"> - Greater control on the company's operation - Real time access to data and information - Elimination of interfaces between isolated systems - Improvement of information quality - Synchronization between activities of the value chain enhancing global planning of the company 	<ul style="list-style-type: none"> - Higher implementation complexity and costs - Difficulty to update the system as it requires agreement among various departments - One module not available may interrupt the functioning of the others - Resistance due to increase of work in the areas responsible for data input - Resistance due to increase of demands to the areas responsible for data input
Corporate Data Base	<ul style="list-style-type: none"> - Standardization of information and data definitions - Elimination of discrepancies between information of different departments - Information quality improvement - Access to information for the whole company - Cultural change to a view of dissemination of information from the departments to the entire company 	<ul style="list-style-type: none"> - Cultural change of the view of "owner of the information" to that of "responsible for the information" - Responsibilities attribution on files shared between areas - Overload of the data base causing performance problems
Great Functional Scope	<ul style="list-style-type: none"> - Maintenance elimination of multiple systems - Standardization of practices - Reduction of training costs - Interaction with a single supplier 	<ul style="list-style-type: none"> - Dependence upon a single supplier - If the system fails the entire company may stop - Support difficulties in the stabilization phase

In the case of use of commercial software packages, it is, prewritten and precoded application software programs commercially available for sale or lease, the stages must be considered in a different manner. For instance, in the system study stage the focus is not on obtaining a detailed system specification from the users for programming the system, but instead, verifying the functionality of the many choices available from vendors, against a set of requisites from the users that will guide system adaptation or customization.

Like any commercial software package, ERP systems exhibit differences in their life cycle in relation to traditional systems development projects. But because of their large functional scope and their integration between its various modules, these differences are deepened. Some

authors present models for the life cycle of ERP systems (Esteves & Pastor, 1999; Markus & Tanis, 2000; Souza & Zwicker, 2001). Souza and Zwicker's model is shown in figure 1 and includes the stages of decision and selection, implementation, stabilization and utilization and is used next as a framework to present aspects involved in each stage of the life cycle.

(a) Decision and Selection

At the decision and selection stage the company decides to implement an ERP system as an IT solution and chooses the supplier. A series of issues must be taken into account at this stage. For instance, Davenport (1998) analyzes the decision from the point of view of the compatibility

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