

# ERP Systems' Life Cycle: An Extended Version

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## INTRODUCTION

The 1990's witnessed an impressive growth of Enterprise Resource Planning (ERP) systems in the market of corporate IT solutions, and now they are an important component of IT architecture in many companies. The ERP systems are introduced in companies following well-defined stages, namely the stages of decision, selection, implementation, stabilization and utilization. This last stage (utilization) is also characterized by the development of an organized effort to continuously ensure that the ERP system meets business needs regarding functionality, performance, availability, and to control operation costs, at the ERP management stage. 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 that aim 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. Examples of ERP systems found on the market are the SAP ERP of the German company SAP and Oracle Applications of the American Oracle. Some authors present and describe characteristics that allow differentiating ERP systems from systems developed within the companies and from other types of commercial packages (Markus & Tanis, 2000; Souza & Zwicker, 2001). 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 business processes integration, increased control of operations, technological updating, IT cost reduction and access to information in real time for decision making. However, there are also problems to be considered, with implementation failures being reported (Barker & Frolick, 2003). Table 1 synthesizes benefits and difficulties of ERP systems mentioned by many authors (Bancroft, Seip & Sprengel, 1998; Davenport, 1998), and relates them to ERP systems' characteristics.

Although the initial focus of ERP systems was the integration of the internal value chain of large industrial companies, they are now evolving to a wider scope, including interenterprise integration features (McGhaughey & Gunasekaran, 2007). In many cases, the ERP systems became the basis upon which companies began to develop other initiatives such as: customer relationship management (CRM), supply chain management (SCM) and business intelligence (BI). ERP systems are also now present in a growing number of companies in financial and service sectors and several vendors are now focusing small and medium companies as their target for market expansion.

## 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.

In the case of use of commercial software packages, these stages may differ. 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 regarding traditional systems development projects. But because of their large functional scope and the integration between its various

*Table 1. ERP systems benefits and difficulties*

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

modules, these differences are deepened. Some authors present models for the ERP systems' life cycle (Esteves & Pastor, 1999; Markus & Tanis, 2000; Souza & Zwicker, 2001). The main features of these many models are summarized in Figure 1, which includes the stages of decision and selection, implementation, stabilization, and utilization. The ERP management stage is included as an addition to the utilization stage and as an extension to the traditional ERP life cycle model, and is described next, along with the other stages.

## ERP Systems Decision and Selection

At the decision and selection stage the company decides to implement an ERP system as an IT solution and chooses the vendor. 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 between the organization and the characteristics of the ERP systems.

Hecht (1997) presents criteria that may help in this choice: adjustment of the package's functionality to the requisites of the company, technical architecture of the product, implementation costs, quality of post-sales support, and financial health of the vendor and its vision for the future of the package. The main product of this stage is a detailed implementation plan, where the modules to be implemented, the implementation approach, the project schedule, the implementation team and responsibilities are defined. Also, it is very common to hire a consulting company during the implementation project, for tasks that range from development of customizations to full responsibility for project management, depending on the case and the knowledge available in the company.

## ERP Systems Implementation

Implementation comprises the second stage of the ERP systems' life cycle. The implementation of an ERP system may be defined as the process by which the system's modules

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