



# ERP implementation and development

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ERP

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## ERP SYSTEMS LIFE-CYCLE

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- ◆ Adoption decision phase
- ◆ Acquisition phase
- ◆ Implementation phase
- ◆ Use and maintenance phase
- ◆ Evolution phase
- ◆ Retirement phase

## Adoption decision phase

- ◆ During this phase managers examine the need for a new ERP system while selecting the general information system approach that will best address the critical business challenges and improve the organizational strategy.
- ◆ This decision phase includes the definition of system requirements, its goals and benefits, and an analysis of the impact of adoption at a business and organizational level.

## Acquisition phase

- ◆ This phase consists on the selection of a ERP product that best fits the requirements of the organization, thus minimizing the need for customization.
- ◆ A consulting company is also selected to help in the next phases of the ERP life-cycle especially in the implementation phase.
- ◆ Factors such as price, training and maintenance services are analyzed and, the contractual agreement is defined.
- ◆ In this phase, it is also important to make an analysis of the return on investment of the selected product.

## Implementation phase

- ◆ This phase include the customization or parameterization and adaptation of the ERP package to the needs of the organization.
- ◆ Usually this task is made with the help of consultants who provide implementation methodologies, know-how and training.

## Use and maintenance phase

- ◆ This phase covers the period of time where the ERP product is selected in a way that returns benefits and minimizes disruption.
- ◆ During this phase, one must be aware of the aspects related to functionality, usability and adequacy to the organizational and business processes.
- ◆ Once a system is implemented, it must be maintained, because malfunctions have to be corrected, special optimization requests have to be met, and general systems improvements have to be made.

## Evolution phase

- ◆ This phase corresponds to the integration of more capabilities into the ERP system, providing new benefits, such as advanced planning and scheduling, supply-chain management, customer relationship management, workflow, and expanding the frontiers to external collaboration with other partners.

## Retirement phase

- ◆ This phase corresponds to the stage when, with the appearance of new technologies or the inadequacy of the ERP system or approach to the business needs, managers decide if they will substitute the ERP software with other information system approach more adequate to the organizational needs of the moment.

## ERP IMPLEMENTATION PROCESS & METHODOLOGY

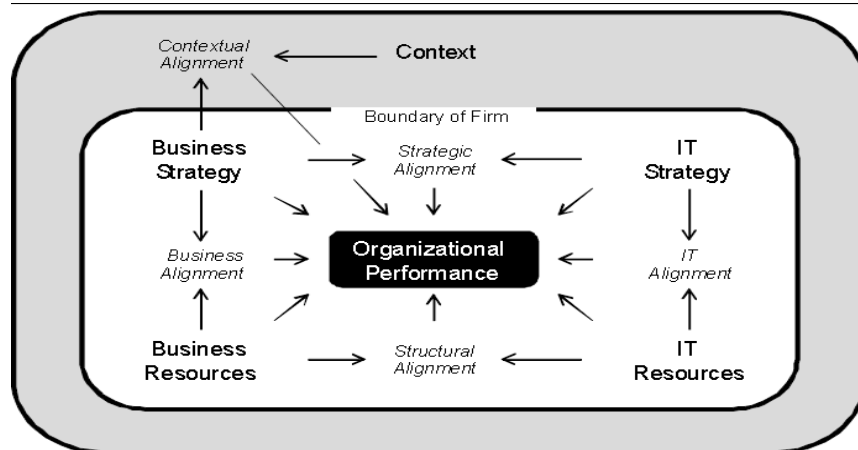
- ◆ Information systems (IS) implementations in general are notoriously difficult, however, ERP implementations pose more difficult technological and organizational challenges than traditional implementations
  - a typical ERP contains 8000 to 10,000 configuration tables and 800 to 1000 business processes
- ◆ ERP systems require much tailoring or customization in order to configure the system to fit the organizations' requirements

## Implementation Methodology

- ◆ Methodology Selection
- ◆ How can a company planning to introduce a new ERP system find an appropriate methodology?
  1. The company has an implementation methodology, which they perhaps developed themselves, improved over the years, and applied when implementing other software systems.
  2. The company works with the vendor of the ERP system who has an implementation methodology and applies this methodology when contracted by the customer.
  3. The company works with an external consulting firm, which employs its own methodology based on previous experience in ERP implementation, or the ERP vendor's recommended methodology.

## INFORMATION SYSTEMS FIT AND RATIONAL CHOICE

- ◆ Strategic Alignment
- ◆ Social Process & Cultural Factors
  - How users' attitudes are shaped and formed toward that technology and
  - how top management mobilizes support for this system.



Baker, J., and Jones, D.R. "A Theoretical Framework for Sustained Strategic Alignment and an Agenda for Research," JAIS Theory Development Workshop, Sprouts: Working Papers on Information Systems, 2008, pp. 299-322

## ERP Myth

- ◆ The Myth of Integration
- ◆ Performance Crisis

## ERP CUSTOMIZING



## Customizing

- ◆ Customizing usually refers to tailoring an information system to the specific requirements of the company during the system implementation phase.
- ◆ Modifications and extensions of the ERP system after the implementation project is completed are usually not comprised by the term customizing.

## Forms of Customizing

- ◆ The term “customizing” the process of tailoring a standard software system to individual requirements.
- ◆ In ERP implementation, this means that the company does not use the system “as is” (i.e., the data structures, forms, and processes as given by the ERP vendor).
- ◆ Instead, they configure their own data structures, forms, and processes according to their own detailed requirements.
- ◆ ERP software incorporates best practices and experience gathered by the ERP vendor from many implementation projects
- ◆ By deviating from the standard, the company cannot benefit from this added know-how.

## Customizing Grades

- ◆ **Parameterization** (Customizing in the Narrow Sense): the preferred approach to tailoring an application system
  - the system is adjusted with the help of settings that the individual company specifies when the system is implemented
  - user assigns values to predetermined system parameters.
  - A particular customer may choose from the available options by setting the system parameters in such a way that they reflect the company's specific requirements
- ◆ **Disadvantages**
  - For vendor: systems that can be parameterized are often very large and unwieldy
  - For the user, parameterizing a system is an extremely arduous task (150-200 just for 1 module and 1 million for medium-sized company)

## Customizing Grades

- ◆ **User Exits (Program Exits)**
  - predefined places in the program code where external programs can be invoked
  - With the help of such programs, customers can apply their own problem-solving procedures.
  - User exits are often employed when the ERP vendor foresees the need of individual solutions but is unable (or unwilling) to implement them.
  - The reason for this can be that solutions are so customer specific that other customers would not be able to use them, or the implementation is too costly.

## Customizing Grades

### ◆ Application Programming Interfaces

- By using APIs, programs developed by the user company can employ prefabricated modules provided by the system vendor.
- Comprehensive APIs are common in modern software systems.
- Through APIs and module libraries, reusable software components can be embedded in newly developed information systems.

## Customizing Grades

### ◆ Changing the Program Code

- Making changes directly to the ERP system's program code is another way to "bend" the standard solution implemented in the system into an individual solution.
- In order to do so, the user must have access to the program code (i.e., the source text in the programming language the system is written in), be able to understand the code, and have the right to make changes

## Customizing Grades

### ◆ Individual Development

- Software development outside the ERP system
- a way to create individual solutions to problems not covered by the system.
- It is advisable to embed individual software in the ERP system through features such as user exits, APIs, or an enterprise portal.
- Otherwise, the end user must work with different application systems and cope with the shortcomings associated with this, such as different user interfaces and perhaps redundant data.

## Customizing Grades

### ◆ Model-Based Generation

- the customization of models from which program code is generated
- to reduce the high cost of software development in general and adaptation programming in particular, computer science began early on to work on the generation of software from specifications.
- For application development, this means that the major share of development work is shifting to a higher level, the level of models
- When adjustments have to be made, they are done on the level of the information model or its submodels.

## Customizing Grades

### ◆ Componentware

- Creating an information system using software components is based upon the same idea as model-based generation: reduction of development and maintenance costs and shortening the development time.
- Software components are put together according to a component model in order to create a software system
- Customizing using componentware means that only individual components need to be modified or exchanged. For example, one web service will be replaced by another

## Disadvantages of Individual Solutions

### ◆ Programming {except parametrization}

- time-consuming
- Needs: specification, design work, testing, solving interface issues, documentation, etc

## ERP COST

## Implementation Cost: Total Cost of Ownership

- ◆ Total cost of ownership (TCO)
  - Direct costs: directly associated with implementing an ERP system (e.g., licensing cost, hardware cost).
    - One-time costs are usually included in the budget of the implementation project,
    - recurrent costs, when foreseeable, are considered in the project proposal and justification
- ◆ Indirect costs are harder to quantify than the direct costs have to be estimated, although it can be quite difficult to obtain reasonable estimates.
  - Indirect costs are usually regarded as quite high.

| One-time Project Costs       | Recurrent Costs                       |
|------------------------------|---------------------------------------|
| Software licenses            | Software licenses                     |
| Server hardware              | Software maintenance                  |
| Infrastructure               | Software upgrades                     |
| Consulting (external)        | End-user support (internal)           |
| Project team (internal)      | End-user support (external)           |
| IT support (internal)        | Hardware and infrastructure operation |
| End-user training            | Additional end-user training          |
| Administrator training       | Additional administrator training     |
| Project team training        | Server and infrastructure maintenance |
| Data adoption and conversion | Server and infrastructure upgrades    |

**Fig. 6.4** Direct costs of ERP implementation (Murray 2009, pp. 342–343)

| Indirect Costs                               |
|--|
| Impact of system downtime                    |
| Impact of system errors and poor performance |
| Retraining of end-users                      |
| Additional vendor support                    |
| Lower end-user productivity                  |
| Inadequate business processes                |

**Fig. 6.5** Indirect cost drivers in ERP implementation (Murray 2009, p. 344)

*Table 1: Costs items along the ERP life-cycle*

| Phase                 | Tangible Costs  | Intangible Costs  |
|-----------------------|---|---|
| Adoption              |   | Decision making costs   |
| Acquisition           | Consultancy<br>Hardware<br>Software licenses                          | Decision making costs<br>Opportunity costs  |
| Implementation        | Consultancy<br>Training<br>Human resources<br>System specification    | Customization, conversion and d<br>Time dedicated by staff<br>Business process re.engineering |
| Usage and Maintenance | System Reconfiguration<br>System adaptation<br>Cost of system failure | Indirect costs of system failure<br>Lost of competitiveness                                   |
| Evolution             | Cost of new applications  |   |
| Retirement            |   | Opportunity costs<br>Decision making costs  |

## ADOPTION Costs

### Intangible Costs

- ◆ *Decision-Making Costs*
- ◆ the least associated costs
  - the time spent by managers in the decision- making task

### Tangible Costs



## ACQUISITION Costs

### Intangible Costs

- ◆ *Decision-Making Costs*
  - the selection of the ERP system that best addresses the organization needs
- ◆ *Opportunity Costs*
  - analysis of the several ERP systems
  - a return on investment (ROI) study
    - “how much”
    - “when.”

### Tangible Costs

- ◆ *Consultancy Costs*
  - the highest for an ERP system
- ◆ *Hardware Costs*
- ◆ *Software Licenses*

## IMPLEMENTATION

### Intangible Costs

- ◆ *Customization, conversion and data analysis*
- ◆ *Time of dedicated staff*
- ◆ *Business-process re-engineering cost*
  - more than 50% of the implementation budget is spent in business process re-engineering

### Tangible Costs

- ◆ *Consultancy Costs*
- ◆ *Training Costs*
- ◆ *Human-Resources Costs*
- ◆ *System-Specification Costs*

## USAGE AND MAINTENANCE

### Intangible Costs

- ◆ *Indirect costs of system failure*
- ◆ *Loss of competitiveness*

### Tangible Costs

- ◆ *System reconfiguration*
- ◆ *System Adaptations*
- ◆ *System-failure costs*

## EVOLUTION

- ◆ Cost of new applications.
  - purchase and implementation of new applications, such as advanced planning and scheduling, customer relationship and management, workflow, e-commerce, etc

## RETIREMENT

- ◆ the opportunity and decision-making costs repeat and all the tangible costs related with software.

# Questions?