ARIS and ERP Systems

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How the EPC modeling language helps us customize ERP systems to the needs of the organization


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**The problem:**

- We have a component-based ERP (Enterprise Resource Planning) system that can be customized to the organization's needs.
- How can we investigate if this system can support our business?
- How can it make our business processes more efficient?
- Which modules are needed?
- How should the modules be customized?

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**Aha! BPR and Business Modeling**

- Objective: Reengineer your business according to the ERP system technology at hand
- Modeling activities include both system modeling, business modeling, and workflow modeling
- Requirements engineering = fit analysis:

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**ERP Systems**

- ERP = Enterprise Resource Planning
- ERP systems support and integrate business transactions across departments and physical locations
- Parameterized standard components usually available

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**Process Orientation**

- ERP systems shift the focus from functions to processes:

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**What is a business process?**

- Take the order
- Receive the payments
- Deliver the goods
- Invoice the customer
ERP Systems: SAP

- SAP (Systems - Applications - Products): Leading software vendor for ERP systems (located in Walldorf)
- SAP R/3: Separate modules for the following activities: Finance, Controlling, Sales & Distribution, Materials Management, Plant Maintenance, Production Planning, Project System, Quality Management, Human Resources, + industry-specific modules
- Each module:
  - contains a number of transactions (>5,000 all together)
  - can be used independently of others
  - must be configured (customized)
  - can be supplemented with add-ons
- Other ERP systems: Oracle, PeopleSoft, Baan

SAP Technology

- Common repository
- Transaction data
- Configuration
- Master data (vendors, materials,..)
- Business process
- Organizational structure
- Business flows
- Actors/roles involved
- Data structures
- Usage of resources/interfaces

Customizing SAP systems...

- Business Process Reengineering:
  - Model of optimal business processes with regard to organization and ERP system (e.g. ARIS model)
  - Model includes:
    - organizational structures
    - business flows
    - actors/roles involved
    - data structures
    - usage of resources/interfaces
- System customization:
  - Customization
  - Programming of add-ons
  - Interfaces to third-party products/other systems

Customization Activities

Fit Analysis

- ARIS Toolset
  - ARIS = Architecture of Integrated Information Systems
  - Toolkit for modeling, analysis and optimization of business processes
  - Specially tailored to the needs in SAP projects
  - System described:
    - with respect to different views (organization, data, control, function)
    - at different implementation levels (requirements definition, design specification, implementation description)
**ARIS Modeling: Outline**

- CASE description
- Organization view
- Function view
- Data view
- Control view/Combination of views
- Other information
- Conclusions

**CASE Description**

- Sølvberg & Conradi Consulting (SCC) needs an ERP system to support their business
- Current situation: 10 separate applications for financial management, costing, sales, materials management, project system, and service management
- Objectives:
  - Streamline business flow (modeling with ARIS Toolset)
  - Introduce ERP system that replaces old systems and also covers human resources

**Organization View**

- Establish ownership of data and responsibility for processes
- Analysis of resource usage and workflow (at different organizational levels)
- Model of organization structures (company, departments, etc.)
- Linked to processes and data structures

**Organization View: Modeling Concepts**

- Organizational unit
  - A unit or group with defined responsibilities and tasks
  - Linked to superordinate units and subordinate units
  - Can contain a number of positions
- Position (role)
  - A role usually played by one particular employee
  - Included in an organizational unit
- Employee
  - An employee has exactly one position

**Organization View: Example**

- The purchasing department of SCC has three employees

**Function View**

- Shows the main business processes, but not the order of execution or who carries them out
- Shows the relationship between high-level tasks/application areas and individual low-level tasks
- Hierarchical model of functions (function tree)
- Function can be application area, high-level processes, tasks or individual process steps
Function View:

**Modeling Concepts**

- **Function**
  - Purchase order processing
  - Denotes an organizational activity at some level of detail
  - Low-level functions correspond to transactions (interactive or batch) in ERP systems
  - Functions
    - Are triggered by events,
    - Have input data and output data,
    - Are performed by someone,
    - Are performed on behalf of some organizational unit

**Example**

- New materials are purchased with reference to a purchase requisition. Quotations list prices from potential vendors. Before creating a purchase order, the purchase requisition has to be assigned a source of supply (the vendor to buy from).

Data View:

**Modeling Concepts**

- **Information, material or resource object**
  - Real-world objects
- **Relationship**
  - Relationship between one or several objects (with multiplicities)
- **Attribute**
- **Generalization**
- **Event**
  - Events also classified as data view concepts

**Example**

- Structures of legal purchasing documents

Combination of Views:

- Main business model portraying the interconnections between functions, data, and organizational units and the logical time sequence involved
- Also called EPC (Event-driven Process Chain) or PCD (Process Chain Diagram) model
- EPC models are the ones usually used for business analysis
### EPC view: Additional Concepts

**Contract**
- Available
- Create purchase order
- XOR
- AND
- OR

**Event**: Something triggering or resulting from a process

**Process path**: Link to a separate diagram

**Logical operator**
- XOR
- AND
- OR

**Control flow**
- Information/material flow
- Resource/organization unit assignment

### EPC: Example

- The purchasing manager approves all purchasing. The purchaser is responsible for maintaining contracts and quotations, and the secretary turns assigned purchase requisitions into purchase orders.
- A purchase requisition triggers the purchasing process. If a contract for the requested material exist, the requisition can be assigned directly to the contract. Otherwise, they have to request a quotation to which the requisition is later assigned. Purchase orders can only be created from assigned requisitions.

### EPC: Example (part 1)

- Purchasing requisition arrives
- Quotation needed
- Contract available
- Purchasing conditions available
- Request quotation
- Approve requisition
- Quotation received
- XOR
- AND
- XOR
- Request sent
- Request is valid
- XOR
- Create purchase order

### EPC: Example (part 2)

- Purchasing conditions available
- Create purchase order
- Purchasing requisition
- Purchasing requisition
- Purchasing order
- Assign source of supply
- Create order
- Items
- Order sent
- Order released for monitoring

### Other Information

- Process responsibilities of units:
  - Tabular description of all functions performed by or on behalf of the various organizational units
- Resource view:
  - Describes technological components needed to perform functions
- Authorization model:
  - Grouping of low-level functions (transactions) into tasks, which are again grouped to form jobs with particular user profiles in the system
  - A position is a job that may have additional tasks and may restrict the transactions to work on certain organizational structures (e.g., can create purchase orders for Porsgrunn plant only)

### Conclusions

- ARIS Toolset not formal or precise enough for detailed system specifications
- Toolset intended for Business Process Engineering in ERP projects (business blueprints)
- Modeling views supported
  - Organization
  - Function
  - Data
  - Control (EPC)