Enterprise Resource Planning

- **Definition**
  - Integrated suite of modules supporting (core) business processes

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**ERP modules**

- **Cross industry modules**
- **Industry modules**
  - Specific to automotive, chemical, ..
- **Extended modules**
  - On the boundary company – companies or company customer (CRM, SCM, ..)
  - (very wide view of ERP becomes ES)
ERP – levels

1. Suite
   Set of software applications sharing one or more DB
   Supports set of business processes

2. Module
   Software application
   Supports business process
   Made of functions

3. Function
   Supports simple operation/activity

Diffusion (Motta 2003)

<table>
<thead>
<tr>
<th>Vendor (dati 2000 da AMR 2001)</th>
<th>Vendite (M di $)</th>
<th>Quota mercato</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP</td>
<td>5.839</td>
<td>30%</td>
</tr>
<tr>
<td>Oracle</td>
<td>2.870</td>
<td>15%</td>
</tr>
<tr>
<td>Peoplesoft</td>
<td>1.736</td>
<td>9%</td>
</tr>
<tr>
<td>J.D. Edwards</td>
<td>980</td>
<td>5%</td>
</tr>
<tr>
<td>Others</td>
<td>7.127</td>
<td>41%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of installations (I) or clients (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vendor</td>
</tr>
<tr>
<td>Or (C)</td>
</tr>
<tr>
<td>Peopl (C)</td>
</tr>
<tr>
<td>SAP (I)</td>
</tr>
<tr>
<td>WW (ND) 4.000 (ND) 20.415</td>
</tr>
<tr>
<td>Europe (ND) 900 (ND) 13.500*</td>
</tr>
<tr>
<td>Italy (ND) (ND) 517</td>
</tr>
<tr>
<td>2000 WW 10.000 4.700 28.968</td>
</tr>
<tr>
<td>Europe 3.600 1.000* 19.300*</td>
</tr>
<tr>
<td>Italy 180 40 807</td>
</tr>
<tr>
<td>2001 WW (ND) 5.700* 38.251</td>
</tr>
<tr>
<td>Europe (ND) 1.300* 25.500*</td>
</tr>
<tr>
<td>Italy (ND) 50 1.256</td>
</tr>
</tbody>
</table>

Diffusion

- Major players, world
  - SAP, Oracle, Peoplesoft
  - Oligopoly in large companies, multinationals
- SMEs, Italy
  - Local producers, products

The ERP model

- Data sharing
  - No data replication
- Modularity
  - Independent modules
- Prescriptivity
  - The approach is the same for all companies (pro and con)
Data replication: *legacy islands*

- Same data in several (legacy) systems
- Dedicated interfaces to synchronize (point to point)
  - Cost
  - Delays
  - Unfeasibility (of overnight synchronization)
  - Company must become system integrator

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**Data replication**

- Same data in several (legacy) systems
- Dedicated interfaces to synchronize (point to point)
  - Cost
  - Delays
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**ERP: data sharing**

- One DB or replicas with automatic synchronization
- One data model
- Horizontal integrity of data
  - All applications/modules share same data, with same data model
- Vertical integrity
  - From operation level to management level (aggregates of data)
From functions to processes

Modularity

- Ex.: SAP R/3 for Manufacturing
  - SD Sales And Distribution
  - MM Materials Management
  - PP Production Planning
  - QM Quality Management
  - PM Plant Management
  - HR Human Resource
  - FI Finance
  - CO Controlling
  - AM Asset Management
  - PS Project
  - WF Work Flow
  - IS Information System (summary data)

Modularity

- Smoother transition, extensibility
- Large module offer
- One stop shopping
  - All modules from same vendor, ease of integration
- Best of breed
  - Modules from different vendors

Prescriptivity

- ERP modules contain a business logic
  - Ex.: Supply part can be accepted only if related order has been issued
  - Ex.: Supply can be ordered only if authorized role needs it
- Current business process in company may or may not comply
**Approaches**

- Traditional: Understand business process, develop software supporting it
- ERP: Adapt business process to ERP
  - Actually ERP software can be parameterized and changed

**Gap analysis**

<table>
<thead>
<tr>
<th>Attività</th>
<th>Modulo funzionale corrente</th>
<th>Funzionalità ERP</th>
<th>Azioni col processo</th>
<th>Azioni col software</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ricevimento materiali</td>
<td>Solo registrazione; non un controllo su ordine fornitori</td>
<td>Controllo sull’ordine al momento di entrare nel processo e di essere stato ordinato</td>
<td>Adegamento del processo alla prescrizione ERP</td>
<td>-------</td>
</tr>
<tr>
<td>Controllo qualità</td>
<td>Guidato da regole predefinite</td>
<td>Solo registrazione dell’esito del controllo (le regole non sono incorporate nel sistema)</td>
<td>-------</td>
<td>Adegamento software ERP</td>
</tr>
<tr>
<td>Carico a magazzino</td>
<td>Il SI guida la scelta della ubicazione di magazzino in cui stivare</td>
<td>Solo registrazione dell’evento di avvenuto caricamento al magazzino</td>
<td>-------</td>
<td>Adegamento software ERP</td>
</tr>
<tr>
<td>Prelievo da magazzino</td>
<td>Il SI guida la scelta della ubicazione di magazzino da cui prelevare</td>
<td>Solo registrazione dell’evento di avvenuto prelievo da magazzino</td>
<td>-------</td>
<td>Adegamento software ERP</td>
</tr>
<tr>
<td>Rettifica inventariale</td>
<td>Modifica dei valori nella base dati (suspensione)</td>
<td>I valori delle scorte sono corretti mediante apposito transizione di rettificazione</td>
<td>Adegamento del processo alla prescrizione ERP</td>
<td>-------</td>
</tr>
</tbody>
</table>

**Transition to ERP in company**

- Cost of licenses + personalization
  - Especially for SMEs
- Delay
- Changes to business processes
  - Acceptance, human factors
- Heavy solution?
  - Especially for SMEs

**Options**

- Large company (turn over > 50MEuro)
  - ERP (Sap, Oracle, ..) + BPR activity
    - Core modules + industry modules
    - Transition risks
    - Delay (>12 months)
    - Cost (0.5 – 10 M)
  - Same as for SME
Options

- SMEs
  - Package for accounting
  - Package specific to domain
  - ERP light
  - ERP in ASP mode

Packages for accounting

- ‘gestionale’: Esatto, Zucchetti, Buffetti
  - Sometimes rigid (data: like bill of materials, processes)
  - Reduced cost: ~50K
  - Hard to scale up

Vertical packages

- Often used by SMEs
- On open (Unix, MS) or close platform (AS/400)
- Specific to domain
- Sometimes with different vendors
- Cost: ~100K

ERP light

- Reduced, precustomized versions of SAP, Oracle, etc
  - Inherit complexity of parent product
  - Cost: ~150K
- New products of traditional local vendors (ESA, Formula)
  - Good coverage of processes
  - Less impact for customization
  - Cost: ~100K
ASP modes

- Pay service and not product
  - Pay per client, per transaction
- Access through Internet/Browser
  - Ex.: BtoBiscom – RDS, SEMA, EDS, AONet
    - Formula,