Lecture 3: Overview of Enterprise Resource Planning

Oran Kittithreerapronchai\textsuperscript{1}

\textsuperscript{1}Department of Industrial Engineering, Chulalongkorn University
Bangkok 10330 THAILAND

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OUTLINE

1. **Introduction of ERP**

2. **Fundamental Facts of ERP**

3. **Creating Requirement for Information System Project**

4. **Framework for IS/IT Project**

5. **Fundamental of models related to ERP**
**What is ERP?**

- **Stand for:** Enterprise Resource Planning
- **Key function:** information system for integration and back office operations
- **Key rationales:** standard business practice, strategic competitive, technology enabler

**Detailed Definition**

A business strategy and set of industry-domain-specific applications that build customer and shareholder communities value network system by enabling and optimising enterprise and inter-enterprise collaborative operational and financial processes

**source:** Gartner’s Research Note SPA-12-0420
Evaluation of ERP

ERP Facts

Customer Relationship Management (CRM)
Supply Chain Management (SCM)

Executive Information Systems (EIS)
Electronic Data Processing (EDP)

Decision Support System (DSS)
Computer Integrated Manufacturing (CIM)

1970
1980
1990
2000

source: www.arhum.com
Overview of ERP System: Module

Human Resources

Financials & Accounting

Central Database

Bolt-On

Bolt-On

Customers

Suppliers

Sales & Distribution

Inventory & Manufacturing

Architecture

Industry Solutions

**Key ERP Modules and Operation**

![Diagram of Key ERP Modules and Operation](source: Jacob et al. 2011.)
Key ERP Modules

SAP Modules
- **FI** Financial Accounting
- **CO** Controlling
- **SD** Sales and Distribution
- **MM** Materials Management
- **PP** Production Planning
- **HR** Human Resources

Source: [www.ceeitandtelecom.com](http://www.ceeitandtelecom.com)

Source: [http://www.hareshpradhan.com](http://www.hareshpradhan.com)
## Big 5 of ERP Vendors

<table>
<thead>
<tr>
<th>Origin</th>
<th>Key features</th>
<th>Market share</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAP</td>
<td>Germany Pioneer and largest firm</td>
<td>32% 28%</td>
</tr>
<tr>
<td>Oracle</td>
<td>USA Flexibility, Newcomer, but quickly gaining share</td>
<td>13% 15%</td>
</tr>
<tr>
<td>PeopleSoft</td>
<td>USA Originally focused on HR</td>
<td>9% -</td>
</tr>
<tr>
<td>BAAN</td>
<td>Holland Early ERP Vendor</td>
<td>7% -</td>
</tr>
<tr>
<td>J.D. Edwards</td>
<td>USA Internet emphasis</td>
<td>7% -</td>
</tr>
<tr>
<td>MS Dynamic</td>
<td>USA SME leader, .NET, good service</td>
<td>- 12%</td>
</tr>
<tr>
<td>Infor</td>
<td>USA Specializing in SCM</td>
<td>- 7%</td>
</tr>
<tr>
<td>Epicor</td>
<td>USA Excellent in service industry</td>
<td>- 5%</td>
</tr>
</tbody>
</table>

**Source:** Olson, D. 2004

*# AMR Research
† ERP Market Share and Vendor Evaluation 2011*
## ERP Cost Breakdown

<table>
<thead>
<tr>
<th>Category</th>
<th>Average Cost</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consulting</td>
<td>30%</td>
<td>20-60%</td>
</tr>
<tr>
<td>Hardware</td>
<td>25%</td>
<td>0-50%</td>
</tr>
<tr>
<td>Implementation team</td>
<td>15%</td>
<td>5-20%</td>
</tr>
<tr>
<td>Training</td>
<td>15%</td>
<td>10-20%</td>
</tr>
<tr>
<td>Software</td>
<td>15%</td>
<td>10-20%</td>
</tr>
</tbody>
</table>

Source: Olson, D, 2004
Why does a company implement ERP?

- **Streamline financial**: speed process (CU-ERP), development of supply chain, eOrdering,
- **Integrate customer order information**: order tracking (USAA–empowerment)
- **Reduce inventory**: consolidated order, visualizing inventory, reducing dead stock,
- **Standardize HR process**: reducing man-hour
- **Standardize manufacturing process**: enforce practice

Typical ERP Implementation Objective

- **Integration**: financial, customer order, accounting, purchasing
- **Standardization**: HR information, merge processes, eliminate variation
- **Visualizing inventory**: realtime inventory, Smooth business process flow & WIP,
# ERP myths VS realities

<table>
<thead>
<tr>
<th>Myths</th>
<th>Realities</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Holy grail of IS</td>
<td>• no: ∃ improvement/replacement, legacy system</td>
</tr>
<tr>
<td>• Simplified process</td>
<td>• depend: lv. customization, adopting of best practice</td>
</tr>
<tr>
<td>• Reducing costs &amp; workers</td>
<td>• depend: BPR,</td>
</tr>
<tr>
<td>• Integrating all, locally &amp; globally</td>
<td>• depend: scopes &amp; scales of implementation</td>
</tr>
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</table>
Failed ERP Projects

- **Hershey**: a classical IT/IS failure
  - **Effects**: delayed shipments → 12% sale decline & 29% inventory cost
  - **Root causes**: high expectation, multiple IT vendors, project scheduling

- **FoxMeyer Drug**: a classical ERP failure
  - **Effects**: late order, incorrect & lost shipments → $15 million lose
  - **Root causes**: high expectation, project management scheduling

- **Nike**: a shoes giant stumbled
  - **Effects**: failed order system → $80-100 million lose sales
  - **Root causes**: high customization, no testing plan

- **Whirlpool**: ERP stumble (Hershey II)
  - **Effects**: failure in full scale system & delay shipments → ordering mistake
  - **Root causes**: high expectation, communication
ERP RISK FACTORS

- **Organization fit**: insufficient of resources & failures of redesign process and data integration
- **Skill mix**: insufficiencies of staffs, re-skilling, internal expertise, business analysis, and retain ERP qualified developer
- **Management**: lacks of champion, communication, and control
- **Software design**: lacks of requirements & integration
- **Involvement & training**: lack of full time commitment, end-user training, change management
- **Technology integration**: attempt to build bridge with legacy system
- **Project management**: lack of measurement system
- **Social commitment**: inability to recognize problem

*source: “Risk factors in enterprise-wide/ERP project” Sumner, M 2000.*
ERP success factors

5 most important factors:

1. Budget reliability:
2. Company expectation:
3. Implementation time:
4. Schedule reliability:
5. Process knowledge:

# Strategic & Tactical Success Factors

<table>
<thead>
<tr>
<th>Strategic</th>
<th>Tactical</th>
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<tbody>
<tr>
<td>• Top management support</td>
<td>• BPR &amp; software configuration</td>
</tr>
<tr>
<td>• Change management</td>
<td>• Training &amp; job redesign</td>
</tr>
<tr>
<td>• Implementation strategy</td>
<td>• Project team</td>
</tr>
<tr>
<td>• Consultant selection</td>
<td>• Balanced team</td>
</tr>
<tr>
<td>• Visioning &amp; planning</td>
<td>• Communication plan</td>
</tr>
<tr>
<td>• Project champion</td>
<td></td>
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</table>

**source:** 'ERP implementation' Finny, S & Corbett, M. 2007
Terminology

**Best Practice** application deemed the best way for a certain process (coined by SAP)

**Best-of-breed** mixing ERP modules form different vendor

**Positive Disaster** technically successful, but get criticism from key users

**Negative Disaster** total failure (abandonment or major reversal) of project

**Vanilla ERP Project** a basic version of ERP with no or minimal customization

**Customization** modified software to meet specific requirements of an organization

**Federalization** tailor ERP differently for each regional unit of an organization
IT/IS PROJECT LIFE CYCLE

What to do & Why
- Strategy
  - Architecture
  - Requirement

How to do; Cost; Justification
- Framework
  - Standard
  - Model

Appropriation line

Within time & budget
- Implementation
  - Project Mgt
  - Maintenance
  - HelpDesk

business change
- Support
  - BPR

**System Development Life Cycle**

- **Investigate**
  - Verify problem
  - Study feasibility
  - Convert new Sys
  - Review process

- **Design**
  - Gather user Req
  - Develop logic
  - Develop spec.
  - Identify skills

- **Implement**
  - Install hardware/software
  - Test Sys/Train people

- **Analyze**

- **Maintain**

**Source:** Motiwalla, L. and Thompson, J.
**Implantation Method**

- **Phased**
  - Old
  - New
  - "Go Live"

- **Parallel**
  - Old
  - New
  - "Go Live"

- **Pilot**
  - New
  - Old
  - "Go Live"

- **Big Bang**
  - Old
  - New
  - "Go Live"

*source: Motiwalla, L. and Thompson, J.*
**Three-tier Architectures**

- **Pro**: scalable, flexibility, security,
- **Con**: hardware, complexity

*source: Motiwalla, L. and Thompson, J.*
What is requirement?

Specification **physically** and **functionally** that a particular product or service must be or perform (to ensue **satisfaction** and **success** of clients)

- **Business requirements**: what value created
- **Product requirements**: properties of product/service created (how to accomplish business requirements)
- **Process requirements**: activities to deliver such properties
Why do we need requirements?

- **Reducing project efforts:** reveal hidden issues & key persons
- **Establishing functional baseline:** agreement between users & project team
- **Estimating project cost:** 'peer' comparison
- **Documenting thought process for future changes:**
- **Defining test, validation, and verification:** milestones,


“One can end-up doing a prefect job of building the wrong product”

source: Wiegers, K. 2004. ‘In search of excellent requirements.’
**Key Questions in Software Requirement**

- Who are **stakeholder** of this software?
- What the software **must do** and **must be** to **add value** for the stakeholder?
- What **limitations** and necessary **documents** throughout development life cycle?
- How software compliment with **surrounding issues**?
- How to **validate requirement** using peer review?

**Good Requirement Should Cover**

- **Strategic**: expansion, practice, response time, & control
- **Analysis tool**: executive report, decisions
- **Functional**: e.g., support Silver-Meal
- **Technological**: e.g., support RF, RFID, # users/group

TECHNIQUES FOR REQUIREMENTS GATHERING

- **Requirements-Driven**: most popular, slowest defining
- **Solution-Driven**: rapid ERP implementations
- **Configuration-Driven**: old system $\subseteq$ new system, good for replacement, existing system limitations

**Iterative Method**:

1. **Listen to your customer**: high-level requirements $\rightarrow$ software supporting business
2. **Lead your customer**: illustrate software, gathering exceptions, validate business requirements
3. **Negotiate with your customer**: defining value-added business requirements, addressing all business exceptions and scenarios

*source: Best approach for gathering ERP requirements.*
Why do we need framework?

- 'Focus' & scope tasks:
- Comply with standard: existing, communication, flexibility
- Speed implementation & avoid pitfalls: selecting 'right' project consulting & software vendor

Component of a good framework: understand inside-out of framework

- Assumption & constraint:
- Data & process flow:
- Data migrations & achieving: storing historical data & make use of it
- User interface: prioritize users
Frameworks of ERP & ERP II

- **Core (foundation):** integrated database → ER diagram
- **Central (process):** business process → documents
- **Corporate (analytical):** decision support → data mining
  - SCM production & distribution of goods
  - CRM customer service & patterns
  - SRM supplier evaluation & patterns
  - CPM KPI matrices, gap analysis
- **Collaborative (portal):** to customers, to business, to employees,

**source:** Moller. 2005. “ERP II: a conceptual framework for next-generation enterprise system?”
**Standard: Does it matter?**

- Standard ≠ permanently established practices
- Standard is **transient** (constantly change)

**Live within transient of standards**

- Stay tuned to the market:
- Understand technology **infrastructure**: benefits & necessity
- Establish ’meaningful’ company standards: few exceptions, not too rigid, key process,
- Avoid last legs technology:

Why do we need model?

- **Simplification**: understand, remove factor, communication
- **Convey messages**: show trade-off, reason & connection
- **Prediction**: capture ideal world

**Model Awareness**

- Model is starting point and evaluation tool, not absolute
- Model $\neq$ Real environment
- Model $\not\rightarrow$ Success
- Model must fit in 'right' context
- Model serves as communication and organization tool, check list, & ideal
CIM Pyramid model

AMR 3 & MESA

**SCOR model: Overview**

**What:** hierarchy business process model

**Scopes:** all customer’s interaction, product transactions, market interactions

**Benefit:** ∃ best practice, matrices for benchmark, communication

**Issues:** no details operation, ignored sale and markets, R&D

**Trivial:** developed by PRTM and endorsed by the Supply-Chain Council

**SCOR model: Level 1 Scope**

- **Plan**: balance aggregate demand and supply to all requirements
  - balance **resources** with requirements
  - manage business rules, data, performance, capital, transportation
  - communicate plans for the whole supply chain

- **Source**: procure components of goods
  - **schedule** deliveries, receive, verify, transfer
  - select & assess suppliers

- **Make**: transform product to a finished goods to meet demands
  - schedule production

- **Deliver**: provide finished goods to meet demand
  - perform order management i.e., quote, warehouse, route, ship, verify

- **Return**: returning or receiving returned products
  - manage return business & rules
  - perform return, substitution, refund, restock

**Source**: [http://supply-chain.org/scor](http://supply-chain.org/scor)