



The Evolution of Enterprise Information Systems

David L. Olson

James & H.K. Stuart Professor of MIS

University of Nebraska - Lincoln

1972-1990



- The industry sees a plethora of computer systems developed for many applications
 - Firms hire large IT staffs, to write their own code
- SAP develops their accounting-oriented system
 - Business process reengineering
 - Best practices



The 1990s

- Industry so successful in generating software that they cannot link them into a cohesive system
- ERP vendors (SAP, PeopleSoft, BAAN, JD Edwards) move in to provide integrated software



Late 1990s

- 1999 industry panics with respect to fears of Y2K
- ERP vendors prosper
 - Proactive in marketing Y2K?



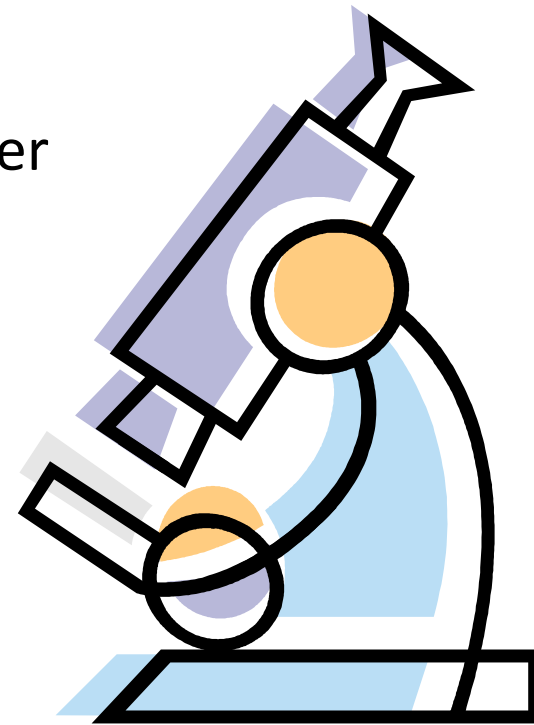
2000

- Y2K survived
 - US Government – see, we prepared you well!
- ERP market plummets
 - Large organization market saturated in Y2K scare



ERP Research

- New area
 - By necessity, research base is weaker
 - Start with **Vendor claims**
 - Marketing material, not scientific
 - **Cases**
 - There are many
 - Hard to generalize
 - **Surveys**
 - Categorical scales (hard to anchor)
 - **Theory development & testing**
 - Hard to be convincing in MIS in general
 - Too dynamic an environment



Reasons for Implementing ERP

1-5 scale

Extracted from Mabert et al. (2000), Olhager and Selldin (2003), Katerattanakul et al. (2006)

Reason	US	Sweden	South Korea
Replace legacy systems	4.06	4.11	3.42
Simplify and standardize systems	3.85	3.67	3.88
Improve interactions w/suppliers & customers	3.55	3.16	3.45
Gain strategic advantage	3.46	3.18	3.63
Link to global activities	3.17	2.85	3.54
Solve the Y2K problem	3.08	2.48	NA
Pressure to keep up with competitors	2.99	2.48	2.94
Ease of upgrading systems	2.91	2.96	3.55
Restructure organization	2.58	2.70	3.33

Relative Module Use

Extracted from Mabert et al. (2000), Olhager and Selldin (2003), Katerattanakul et al. (2006)

Module	US	Sweden	South Korea
Financial & Accounting	<i>91.5%</i>	87.3%	<i>92.5%</i>
Materials Management	89.2%	<i>91.8%</i>	<i>94.1%</i>
Production Planning	88.5%	<i>90.5%</i>	<i>91.5%</i>
Order Entry	87.7%	<i>92.4%</i>	<i>90.5%</i>
Purchasing	86.9%	<i>93.0%</i>	<i>93.1%</i>
Financial Control	81.5%	82.3%	85.0%
Distribution/Logistics	75.4%	84.8%	85.9%
Asset Management	57.7%	63.3%	81.4%
Quality Management	<i>44.6%</i>	<i>47.5%</i>	77.6%
Personnel/Human Resources	<i>44.6%</i>	57.6%	78.4%
Maintenance	<i>40.8%</i>	<i>44.3%</i>	72.2%
R&D Management	<i>30.8%</i>	<i>34.2%</i>	69.5%

Expected Installation Time

Extracted from Mabert et al. (2000), Olhager and Selldin (2003), Katerattanakul et al. (2006)

Installation Time	US	Sweden	South Korea
12 months or less	34%	38%	49%
13 to 24 months	45%	49%	40%
25 to 36 months	11%	8%	7%
37 to 48 months	6%	4%	2%
Over 48 months	2%	1%	3%

Installation Cost Proportions

Extracted from Mabert et al. (2000), Olhager and Selldin (2003)

Category	US	Sweden
Software	30%	24%
Consulting	24%	30%
Hardware	18%	19%
Implementation team	14%	12%
Training	11%	14%
Other	3%	1%

Proposal Evaluation Technique Used

Extracted from Mabert et al. (2000), Olhager and Selldin (2003), Katerattanakul et al. (2006)

	US	Sweden	South Korea
ROI	53%	30%	37%
Payback	35%	67%	36%
Expected NPV/value added	15%	12%	15%
Other	11%	20%	16%

Relative Use of Implementation Strategies

Mabert et al. (2000), Katerattanakul et al. (2006)

Strategy	US	South Korea
Single ERP package with modifications	50	43
Single ERP package	40	
Vendor packages with modifications	5	
Best-of-breed	4	27
In-house plus specialized packages	1	14
Total in-house system	0.5	16

Implementation Strategies Adopted

Mabert et al. (2000), Olhager and Selldin (2003)

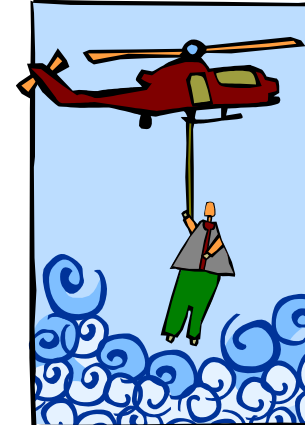
Strategy	Time US	Time Sweden	% US	% Sweden
Big Bang	15 mos.	14 mos.	41%	42%
Phased rollout by site	30 mos.	23 mos.	23%	20%
Phased rollout by module	22 mos.	20 mos.	17%	17%
Mini big bang	17 mos.	16 mos.	17%	20%
Phased rollout by module & site	25 mos.		2%	

2001



- Dot.com bubble bursts
- Firms need to downsize
 - IT especially vulnerable
 - ERP makes it possible to do more computing with less staff
- ERP firms change tactics
 - Redesign products
 - Seek more of **SME market**
 - More open systems (**portals**, to support supply chains, mobile users)
 - Focus on industry applications
 - Including non-profits

c. 2005



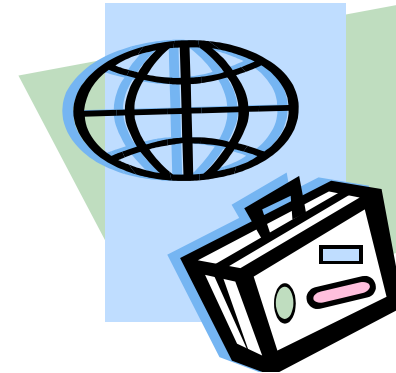
- Recovery
- ERP consolidation
 - Oracle acquires PeopleSoft (who acquired JDEdwards)
 - Upgrades
 - SAP discontinues R/3 support to focus on MySAP (backed off)
 - System expansion
 - Oracle purchases Siebel Systems
 - SAP adds CRM module
- Entry of Microsoft
 - Focus on SME

Upgrades

- Driven by vendor system improvement
 - SAP announced dropping R/3 support
 - Outcry from customers
 - Delayed support drop until 2011
- Upgrades go much smoother than initial installations
 - Olson & Zhao (2007)
 - A risk factor
 - Vendors hold clients at their mercy

Lately: International ERP

- Each country finds a market internally
- Taiwan, South Korea, China
 - Many local vendors
 - More attuned to culture
 - Much less cost



Open Source Software

- Operates under license allowing release of source code **free of charge** for others to **use & modify**
 - Free redistribution
 - Open source code allowing modifications
 - Modifications to be distributed same as source code



Open Source

- Linux: 24% market share
 - 52% replacing Windows with Linux
- Gains
 - **Constant testing & improvement**
 - Better quality & security
 - **Break Vendor Lock-in**
 - **Cost**, obviously



SourceForge.net

- Large online community
- Over 1000 open source ERP projects registered
- Sampled 447
 - Looked at focus
 - More support (human resources, accounting, finance)
 - Less value-chain (materials management, operations, sales & distribution)

Open Source ERP Benefits

- **Agility & Scale**

- Can modify, grow
- Paypal increased server farm to meet demand
 - Linux enabled upward scalability
- Chicago Mercantile Exchange
 - Switched to Linux
 - 20% drop in time to process trades
 - Higher customer satisfaction

Open Source ERP Benefits

- **Quality & Security**
 - Constant testing & improvement
- **Breaking Vendor Lock-in**
 - High investment in vendor software leads to stickiness
 - Open source avoids this
 - Compiere maintains list of available consulting partners

Open Source ERP Benefits

- **Cost**

- Blue-Star reengineered, switched to new open platform
- Total investment \$2.5 to 3 million
 - Much lower than proprietary would have been
- Saved \$100,000 to \$150,000 per year
 - Streamlined processes
 - Updated best practices
 - Eliminated third-party vendors
- Save \$25 million in license & maintenance fees

Open Source Risks



- **ADOPTION NOT WIDESPREAD**
- Licensing issues
 - Often written by software engineers, not lawyers
 - License-detection agents exist
- Competitive worries
 - Any competitor can obtain the same system
 - Can customize
- Expertise required
- Documentation
- Support

Open source ERP

- **ERP: Compiere**

- Don't sell software – sell security & support
- Over 1..4 million downloads (don't know degree of commitment)

OpenMFG allows users to participate in developing

OpenOffice – plug & play

- **SCM**

- **CRM**

Content Analysis: **SourceForge.net**

- Web community for open source projects
- Over 348,000 software projects
- 15 groups
 - One group is **ERP**
 - In ERP about 1,000 projects
 - **Selected 450 biggest**

SourceForge.net Results

- Used Mabert et al., other surveys for modules
- Categorized modules into:
 - **Value adding:** (Materials Management, Production Planning, Distribution/Logistics)
 - **Supporting:** (Financial & Accounting, Maintenance, Personnel/HR)
- INFERENCE:
 - **Open source used more for supporting category**

Conclusion

- **Open source ERP projects are increasing**
 - Not all projects are highly structured
- Reluctance to use open source ERP in firm's core activities
- **PROVIDES OPTION FOR SME**
- **VENDORS CAN USE TO REFINE THEIR SYSTEMS**
 - Open source an access to free labor

ERP's Future

- SAP, Oracle prospering
 - **High end of the market will continue to be strong**
 - Upgrades
- Microsoft moving into **SME market**
 - Very large potential
- **International** vendors finding niche
 - Local advantages
- **Open Source opportunities**
 - Parallel to Linux

