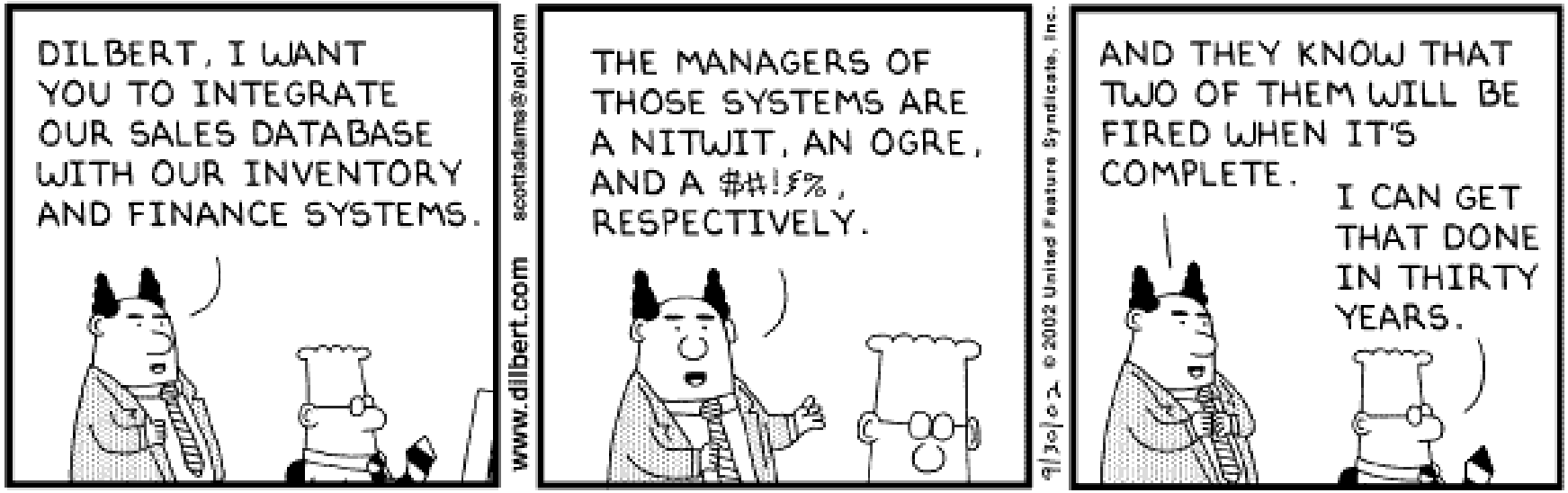
Enterprise Resource Planning systems



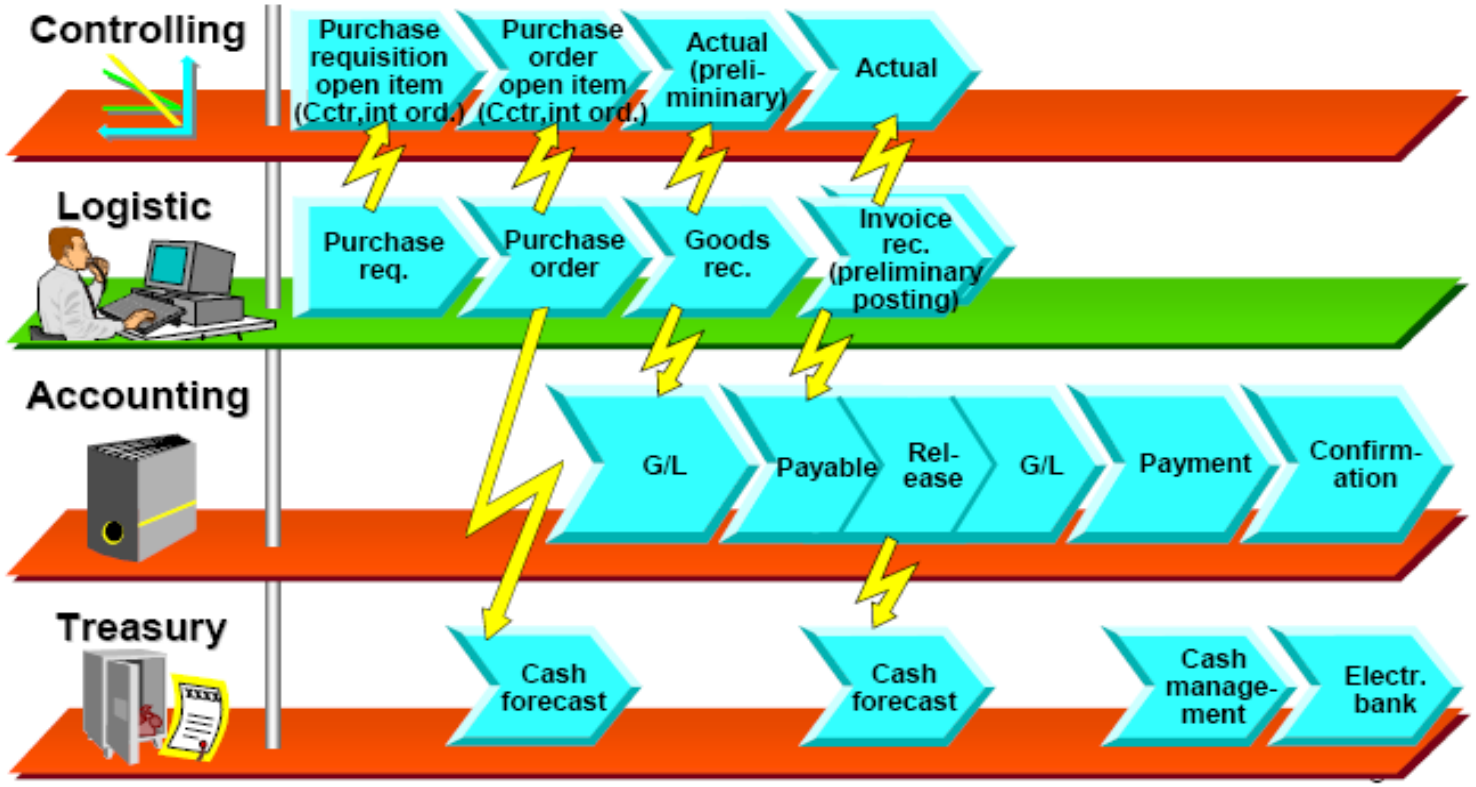
Motivation to learn about ERP:s

- You cannot avoid them – at least you need to use them in the future
- Challenging projects, where you might work in future
- ERP system implementation and application is key to the survival of global organizations
- The choices made when implementing these systems could make or break your business
  - Businesses have gone down due to failed projects
  - Systems have been abandoned
  - But on the other hand many leading companies could not be so profitable without them

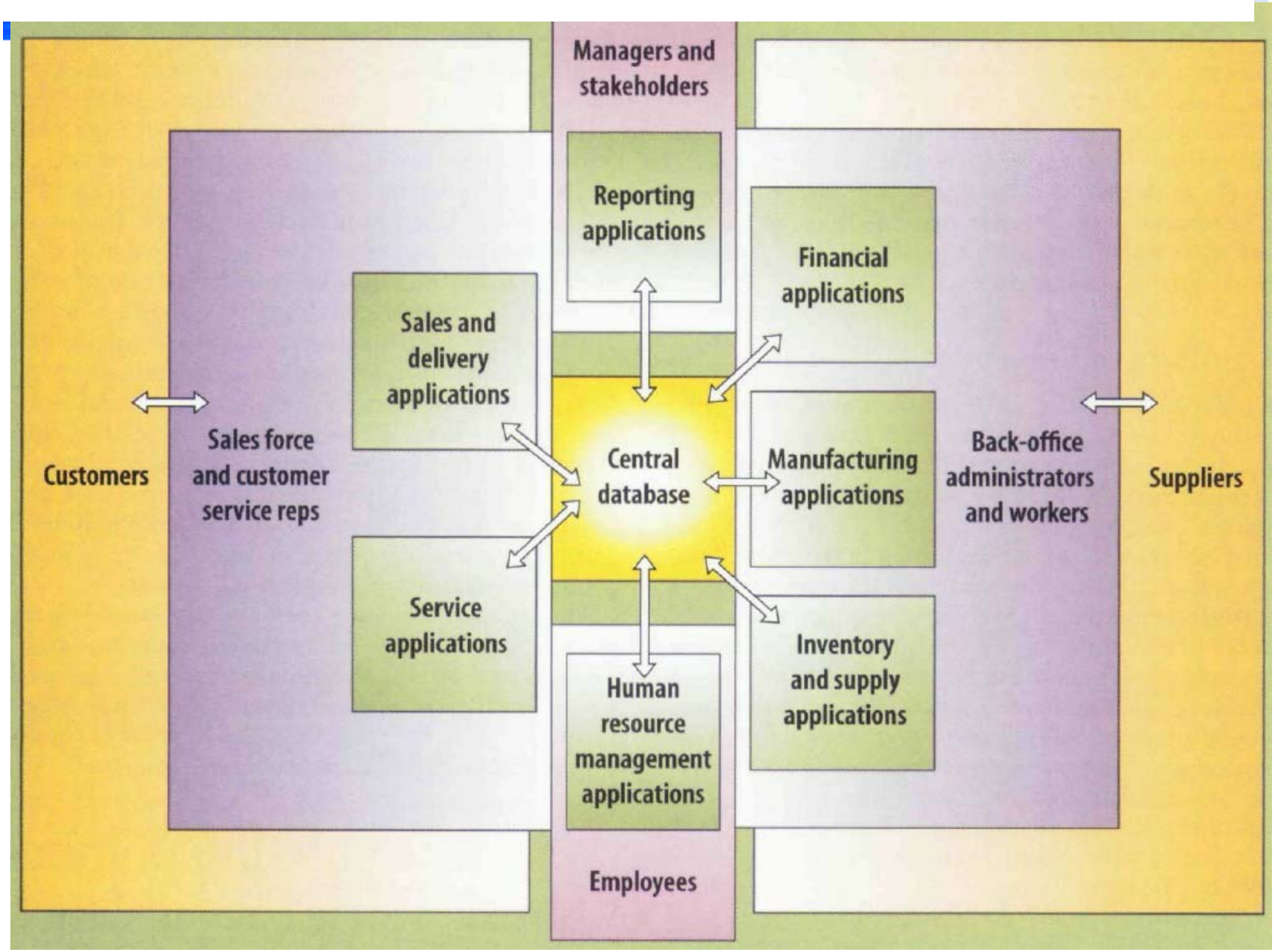
ERP definition

- **Enterprise Resource Planning** systems (ERPs) integrate (or attempt to integrate) all data and processes of an organization into a unified system. A typical ERP system will use multiple components of computer software and hardware to achieve the integration. A key ingredient of most ERP systems is the use of a unified database to store data for the various system modules (wikipedia)
- ERP – Integrates Logistics and Finance
- Objective is to integrate all departments & functions across a company onto a single computer system

Processes integrated across functions



Basic architecture (Davenport)



Implementing an ERP

- From big to huge project (depends on company size, number of locations, how many modules taken)
  - The process takes from few months to even years
  - ERP is not just an IT project
- Companies often use help of consulting companies for consulting, customization and support
- Every project in unique (packaged software but always some customization)
- In Finland SAP is the most popular ERP for bigger companies – Oracle is the second big vendor (have bought other big vendors)
  - There are very many companies and consultants specialized for customizing SAP
  - The competition makes it easy for companies to take SAP as they still have a lot of choice in choosing consultants

Advantages of ERP

- Integration of different functions – data input once and reused
- Full control of processes
  - order tracking from acceptance through fulfillment
  - tracking the 3-way match between Purchase orders (what was ordered), Inventory receipts (what arrived), and Costing (what the vendor invoiced)
- Replacing inventory with real time information
- Replacing many existing older system with one integrated system
- Can create reports on how firm is doing – one set of figures
- Support for e-business

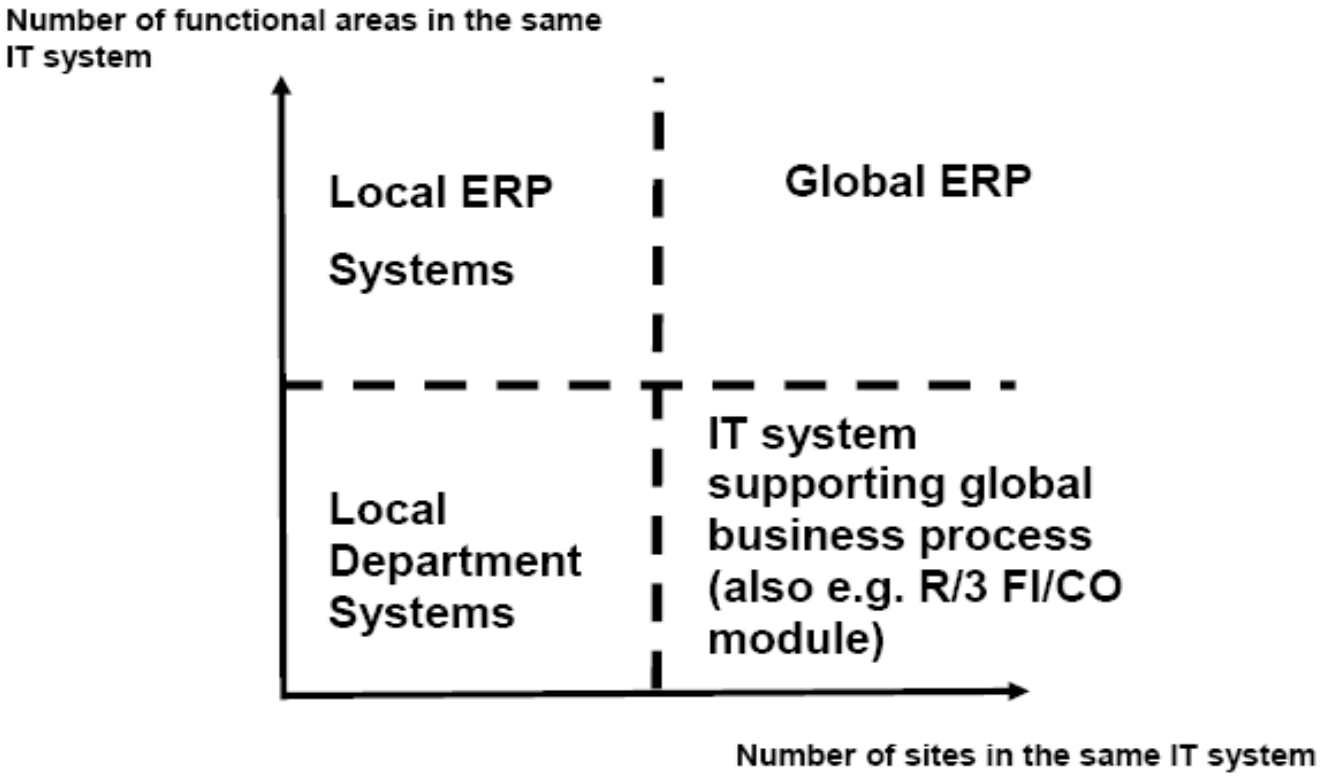
Disadvantages

- Risks and costs are huge
  - Most projects fail (do not complete in time or within budget)
  - Costs measured in thousands of euros per user
  - Maintenance and license costs even after the project (can run 2-3% on revenues)
- ERP system can be too rigid for changes
- Usability often a barrier
  - May lead to incostistency and bad data
  - Severe changes into operation of the company and employee skill needs
- Once a system is established, switching costs are very high

Putting the enterprise into the enterprise system

- ERP implementation usually forces business process re-engineering
- ERP is an electronic “harness” for your business processes
  - The processes need to be tailored and streamlined before the ERP implementation!
- The ERP can enable or constraint the implementation
- Although a lot can be configured, the ready-made processes do not support all needs and are not easy to change
- When you change the ERP more than basic configuration, you run a risk of having problems upgrading the system as such changes are not supported
- If you use basic processes, how do you differentiate between your competitors

ERP functionality & coverage



ERP modules (wikipedia)

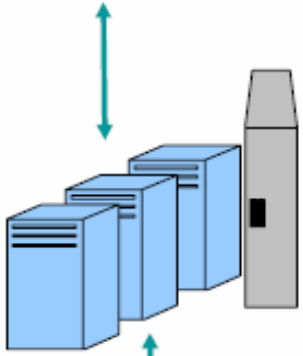
- Manufacturing
  - Engineering, Bills of Material, Scheduling, Capacity, Workflow Management, Quality Control, Cost Management, Manufacturing Process, Manufacturing Projects, Manufacturing Flow
- Supply Chain Management
  - Inventory, Order Entry, Purchasing, Product Configurator, Supply Chain Planning, Supplier Scheduling, Inspection of goods, Claim Processing, Commission Calculation
- Financials
  - General Ledger, Cash Management, Accounts Payable, Accounts Receivable, Fixed Assets
- Projects
  - Costing, Billing, Time and Expense, Activity Management
- Human Resources
  - Human Resources, Payroll, Training, Time & Attendance, Benefits
- Customer Relationship Management
  - Sales and Marketing, Commissions, Service, Customer Contact and Call Center support
- Data Warehouse
  - and various Self-Service interfaces for Customers, Suppliers, and Employees

ERP as a technical challenge

- Large number of concurrent users (up tens of thousands)
  - Scalability
  - Older data needs to be archived to keep the database fast
- Users are located globally
  - Fast connection not available everywhere
  - Multi-language, multi-currency
  - Local legal requirements (e.g. Accounting)
  - Time zones
- Large enterprises have need to customize IT systems
  - How to customize standard ERP package also a technical challenge
  - Need to connect also with business partners systems – external integration
  - Every change needs a lot of testing (major new releases only 1-2 a year)

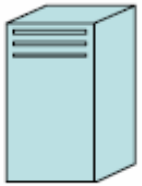
SAP basic architecture – can be browser access through SAP portal as well

SAP Windows GUI Client; Very thin, presentation only – no bsiness logic, very low network bandwidth requirement (e.g. 50 kbs modem is VERY suitable), Browser type "terminal" -> screen layout NOT fixed in GUI, also HTML Web GUI available



Interface layer; Security and data integrity, realtime (programming interface e.g. for system <-> human integration, messaging (EDI, XML) for system <-> system

Application Server(s); Business rules (security, validation), scalable (servers can be added easily), platform independent code (UNIX, NT, OS/400, OS/390, Linux platforms available), manages user connections + self build transaction processing monitor



Data Base Server; Integrated – all ERP data in one DB, simple and efficient – no stored procedures, secure – individual users are not DB users, simple usage DB –> several options available DB2, Oracle, Informix, SQL Server

Source: Kari Pietiläinen 2005.

Things to consider - the ERP risk factors (Sumner)

Table 4 Summary of the risk factors in enterprise-wide/ERP projects

Risk category	Risk factor	Unique to ERP
Organizational fit	Failure to redesign business processes	Yes
	Failure to follow an enterprise-wide design which supports data integration	Yes
Skill mix	Insufficient training and reskilling	Yes
	Insufficient internal expertise	Yes
	Lack of business analysts with business and technology knowledge	Yes
	Failure to mix internal and external expertise effectively	Yes
	Lack of ability to recruit and retain qualified ERP systems developers	
Management structure and strategy	Lack of senior management support	
	Lack of proper management control structure	
	Lack of a champion	
	Ineffective communications	
Software systems design	Failure to adhere to standardized specifications which the software supports	Yes
	Lack of integration	Yes
User involvement and training	Insufficient training of end-users	
	Ineffective communications	
	Lack of full-time commitment of customers to project management and project activities	
	Lack of sensitivity to user resistance	
	Failure to emphasize reporting	
Technology planning/integration	Inability to avoid technological bottlenecks	
	Attempting to build bridges to legacy applications	Yes

Strategies to control risk factors in Enterprise Systems projects (Sumner)

Table 6 Strategies for controlling risk factors in enterprise-wide/ERP projects

Type of risk	Strategies for minimizing risk
Organizational fit	Commitment to redesigning business processes Top management commitment to restructuring and following an enterprise-wide design which supports data integration
Skill mix	Effective use of strategies for recruiting and retaining specialized technical personnel Effective reskilling of the existing IT workforce Obtaining 'business analysts' with knowledge of application-specific modules Effective use of external consultants on project teams
Management structure and strategy	Obtaining top management support Establishing a centralized project management structure Assigning a 'champion'
Software systems design	Commitment to using project management methodology and 'best practices' specified by vendor Adherence with software specifications
User involvement and training	Effective user training Full-time commitment of users to project management roles Effective communications
Technology planning/integration	Acquiring technical expertise Acquiring vendor support for capacity planning and upgrading Planning for client–server implementation including client workstations

Conclusions and discussion

- ERP systems provide packaged software solutions that still need customization work – no two ERPs are exactly the same and no ERP covers all systems needs
- ERP foundation for e-business and typically contain good integration interfaces
- ERP vendors (biggest ones SAP and Oracle) continuously develop the products to more model-driven

- Risky projects as they require changes to organizations – not only a technical challenge
- Companies can also choose more ERP or EAI driven approach