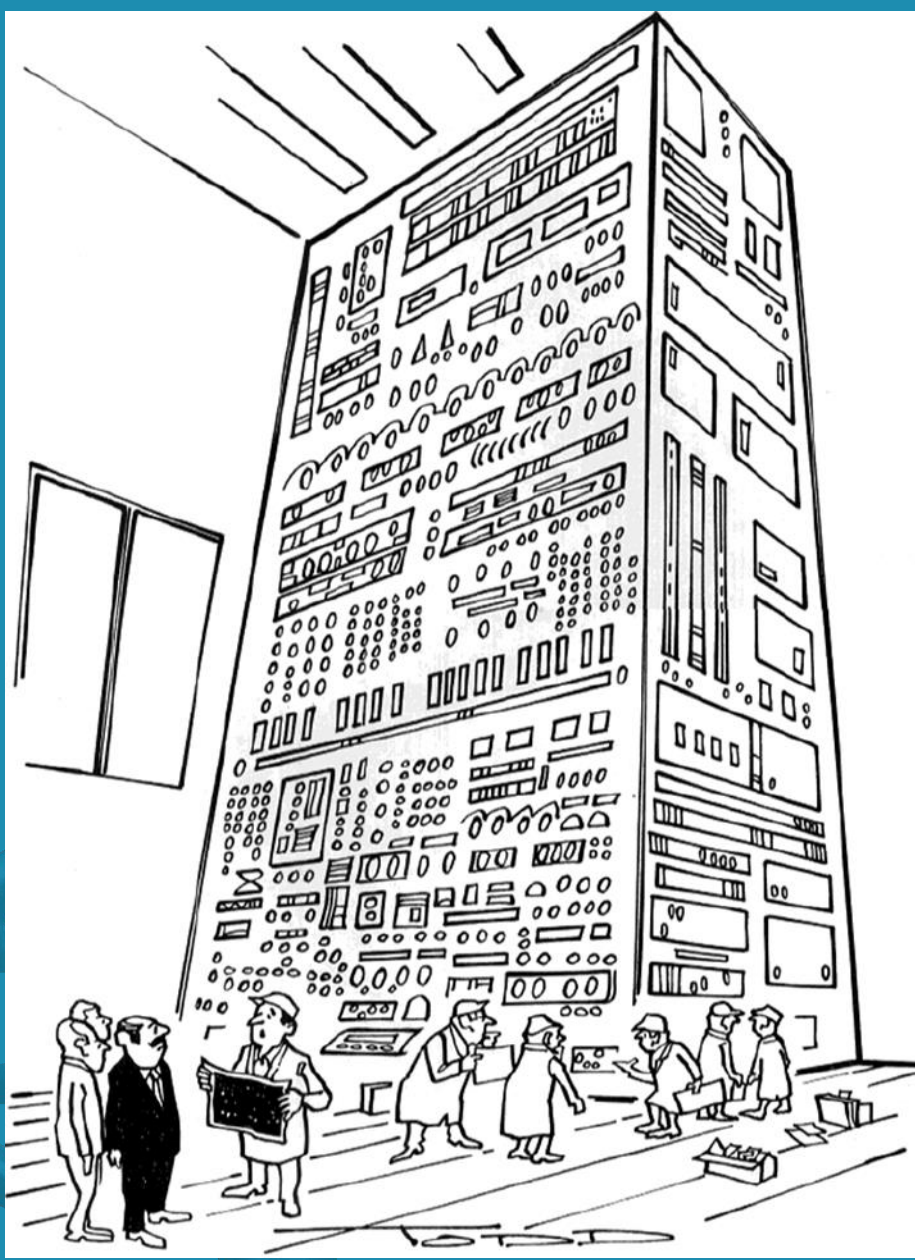




LLSMS2903 – Digital Transformation Management

LLSMF2903 – Digital Business Systems

KEY CONCEPTS IN ENTERPRISE IS
Yves Wautelet (yves.wautelet@kuleuven.be)



I. Computer Systems and Information Systems

"I know it's been three days since installation, as soon as we find the OFF-ON switch you can start operations."

A computer system is a “single unit”



Personal Computer



Game computer



Mobile phone



Mainframe

An information system is a composite system



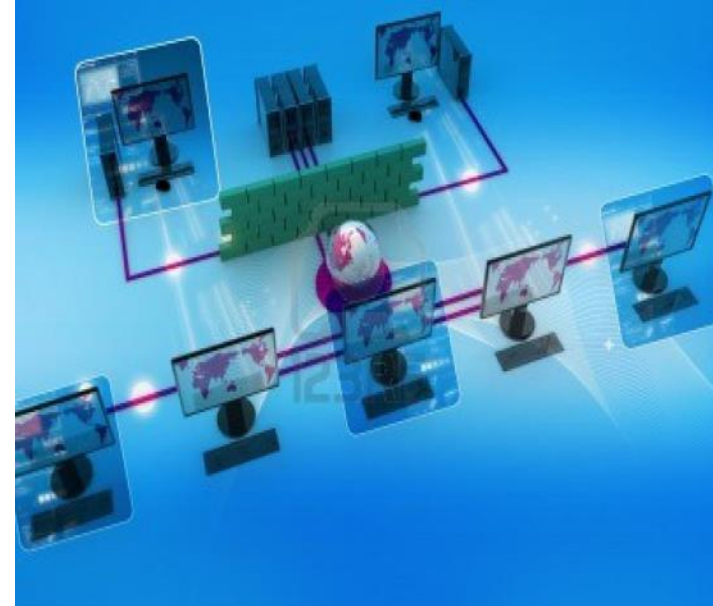
Equipment (computer systems)



Human effort



Services

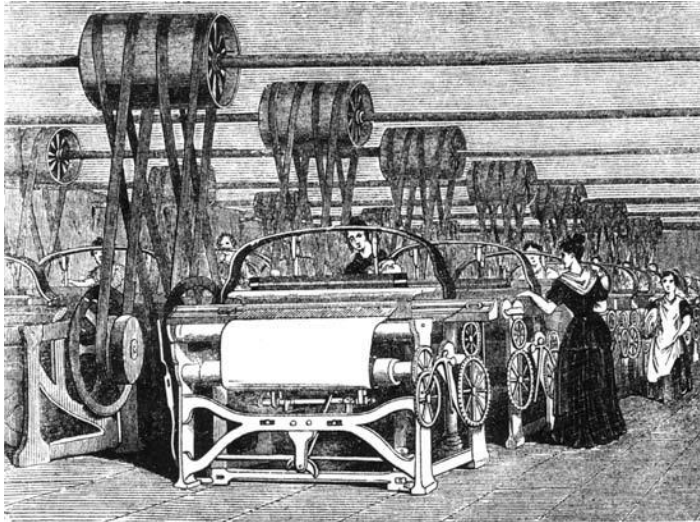




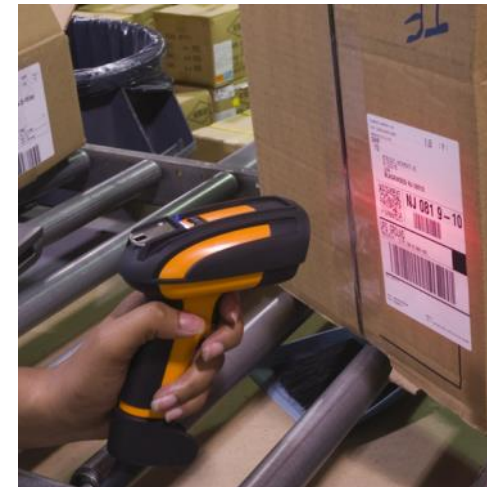
II. Information Technology in Businesses

Manage Innovation

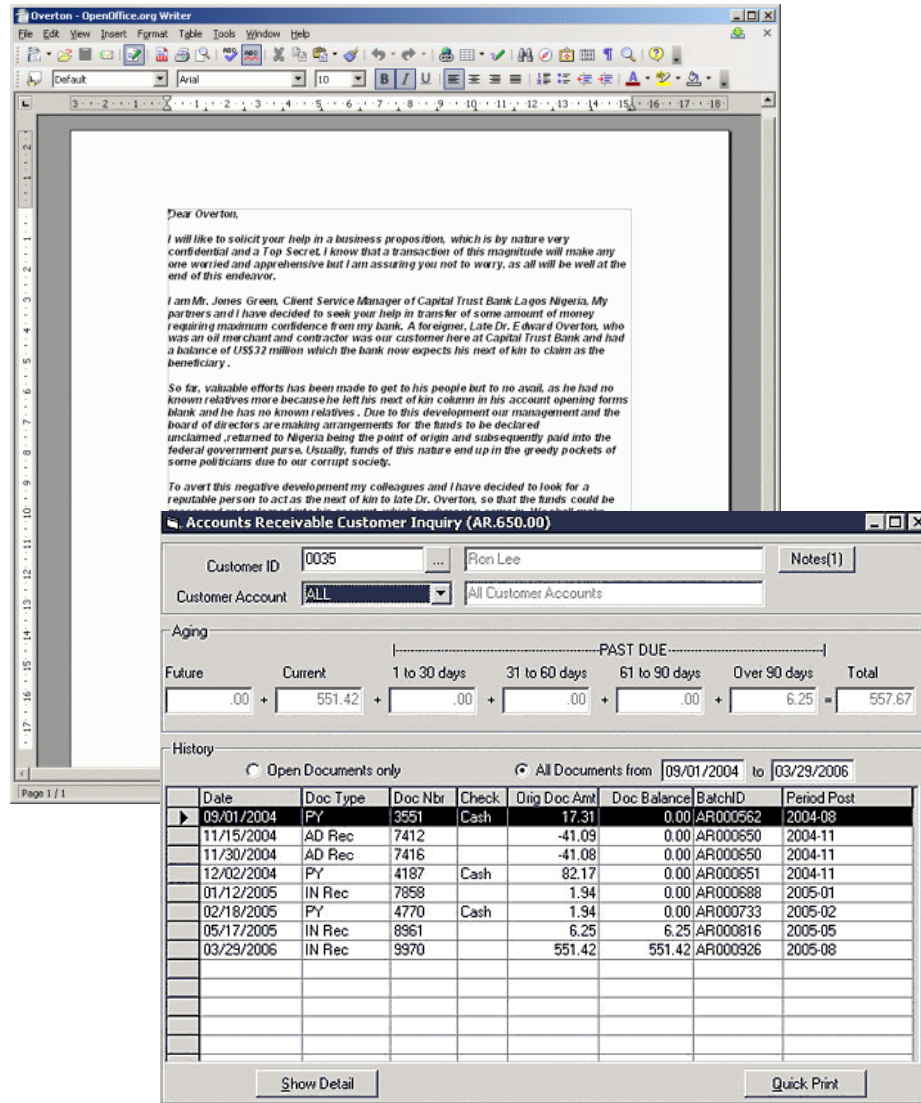
(Information) technology supports (business) processes



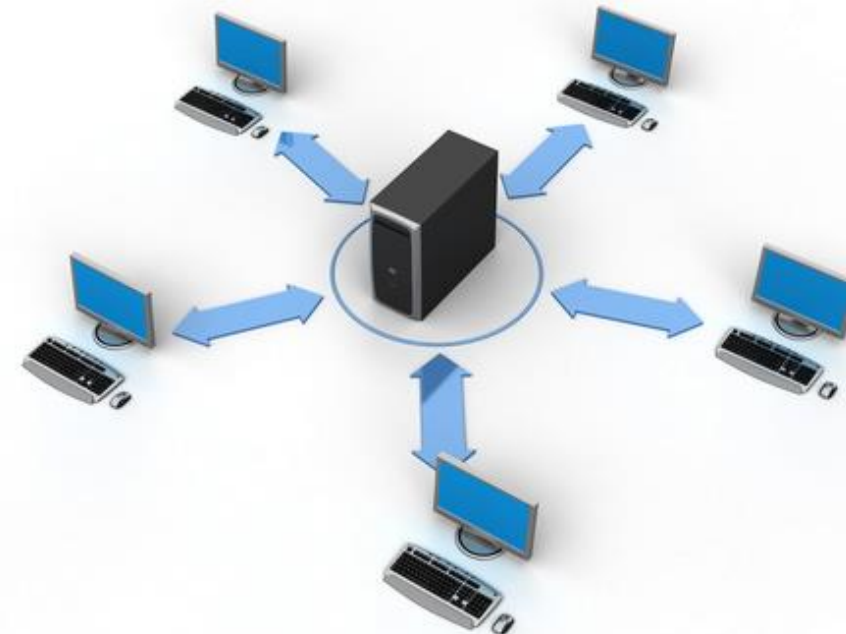
...technology supports (manufacturing) processes...



Three ways to use IT in businesses

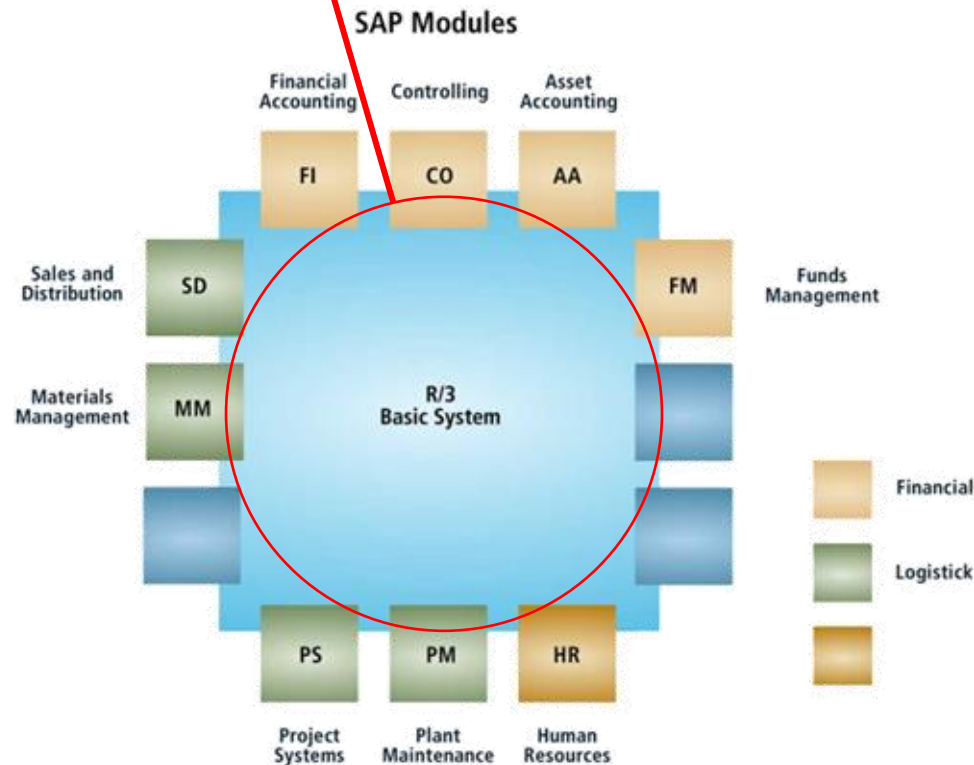


1. Data processing
2. Task automation
3. Integrated information systems

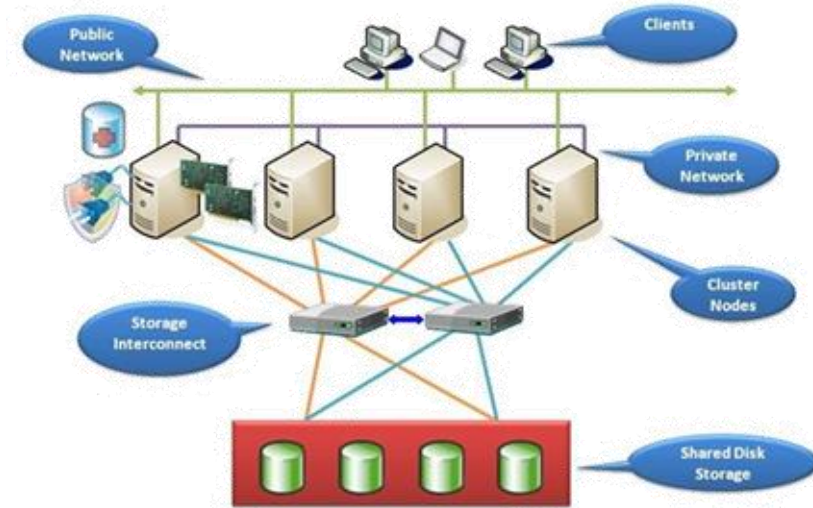


Integrated information systems are complex

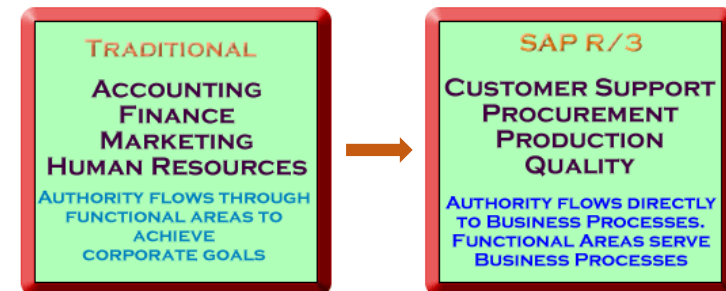
Integration: all parts work together



Business processes adjusted to information systems



Complex infrastructure



III. Benefits of Information Systems



Information systems yield three kinds of benefits



Operational benefits

Daily business processes more efficiently
E.g. time savings, better supply management,
lower communication costs, ...



Tactical benefits

Organization can better realize its goals
E.g. marketing campaigns, on-line knowledge
databases, on-line parcel tracking



Strategic benefits

The business develops a better strategy
E.g. Internet companies

Not all benefits can be expressed in terms of money



Quantifiable benefits

Represent an amount of money

Can be estimated in advance

Can be compared to the cost

E.g. Stock decreases, personnel savings



Non-quantifiable benefits

Cannot (or can hardly) be expressed in money

May however be important

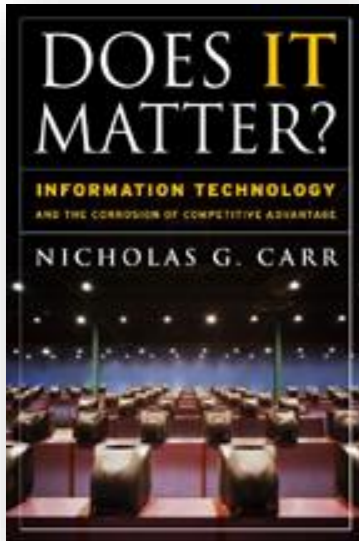
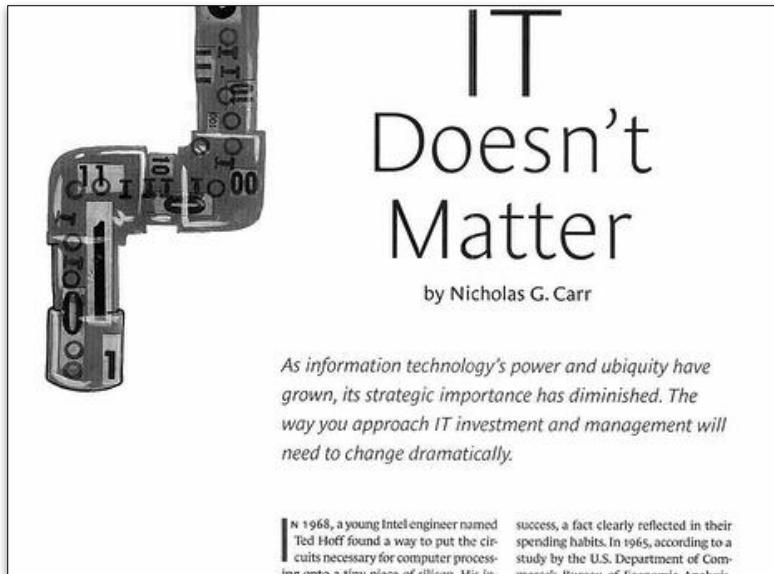
Should also be weighed in against the cost

E.g. Better customer service, high tech image

IV. IT and Competitive Advantage



IT doesn't matter...?



Information technology is ubiquitous and universally available

Information technology is a commodity

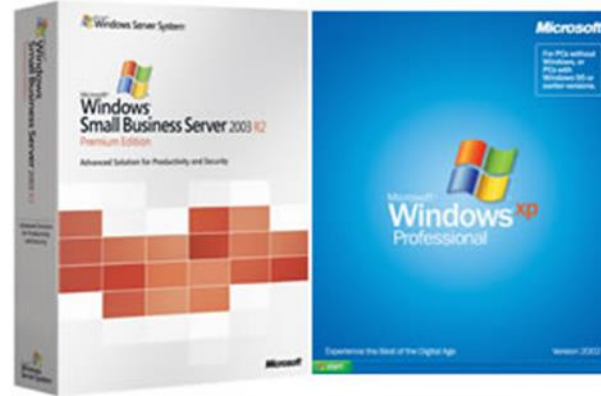
All competitors can acquire the same information systems

All competitors can benefit in the same way from information systems

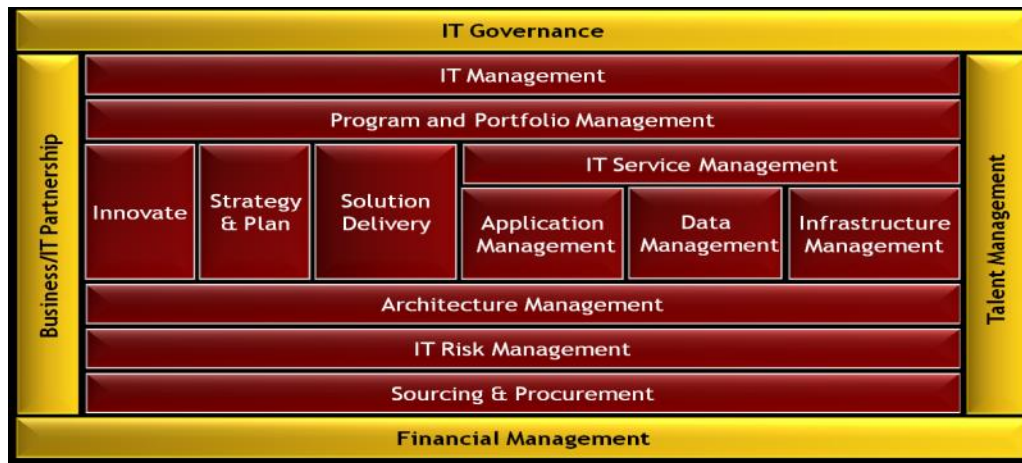
You cannot gain a competitive advantage by using information systems

Spend less on IT!

IT doesn't matter... or does it?



IT RESOURCES, abundantly available on the market

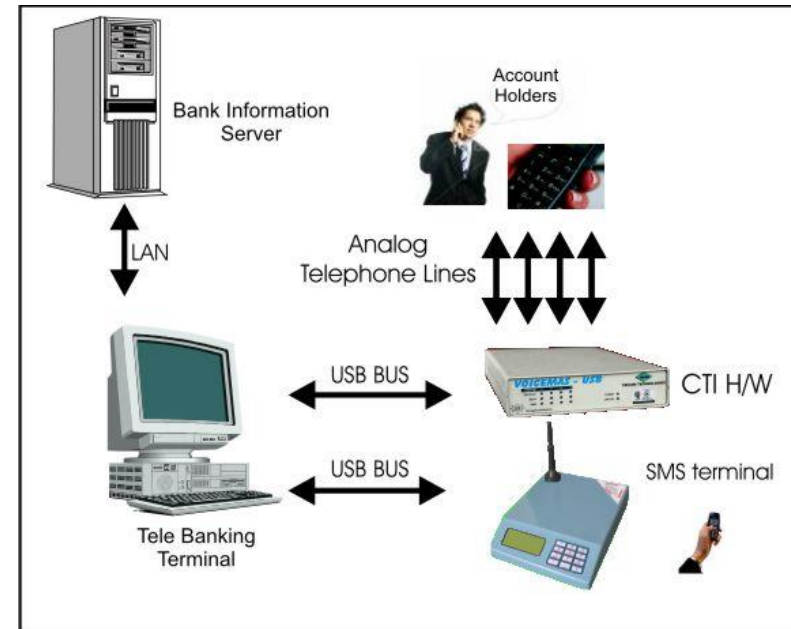


IT CAPABILITIES: take years to develop, make a difference!

IT can be used for competitive advantage

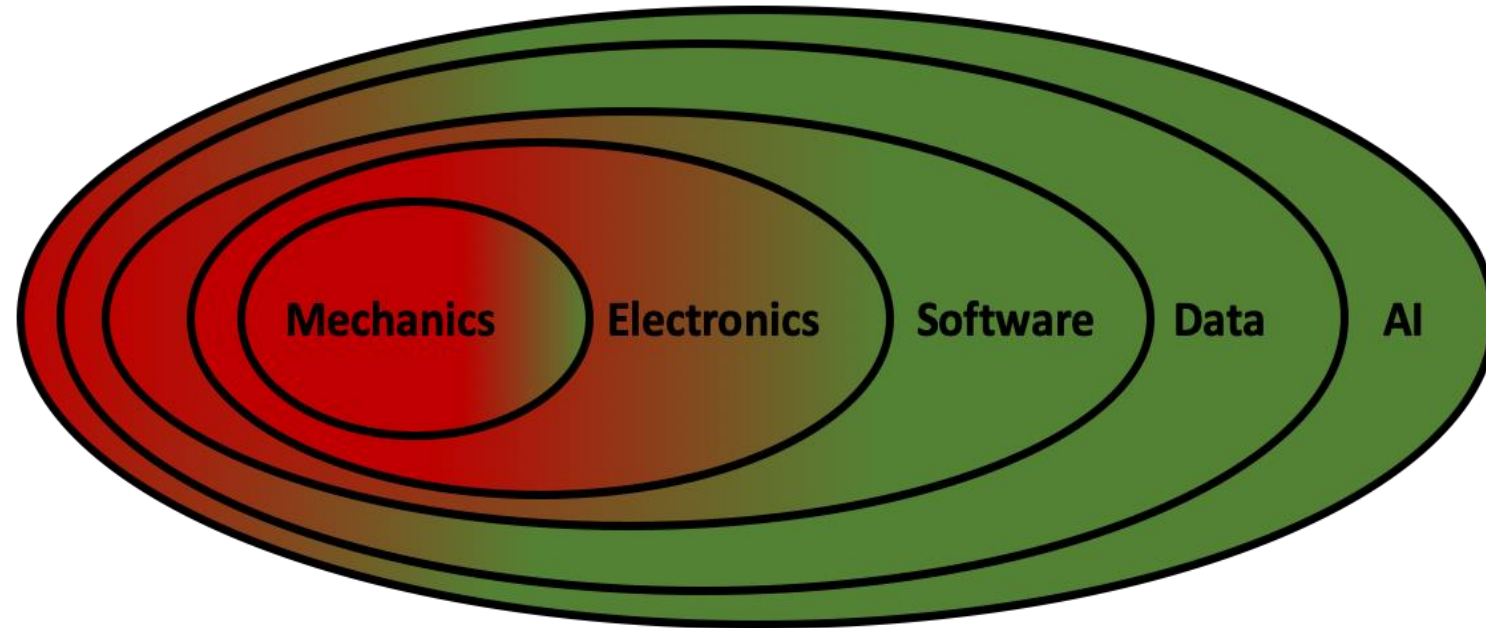
UPS aggressively uses information technology in all stages of its package-distribution activity. Packages are traced throughout the complete distribution and delivery process. Customers can consult the tracking information on-line. UPS is leveraging its capabilities by offering supply chain solutions to other companies⁷.

The first banks offering telebanking attracted customers because of this unique service.



Business Evolution

- : Commodity functionality
- : Differentiating/innovative functionality



V. IT Governance VS IT Management: A Framework



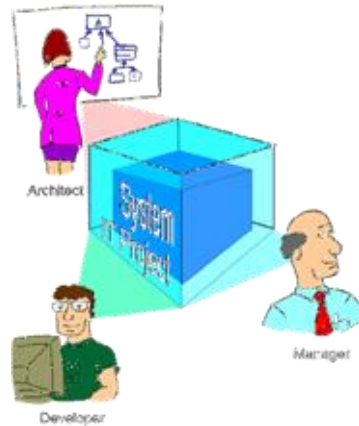
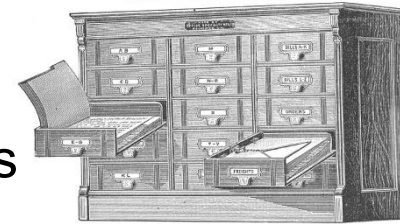
Why do we need a framework?



Structure thinking

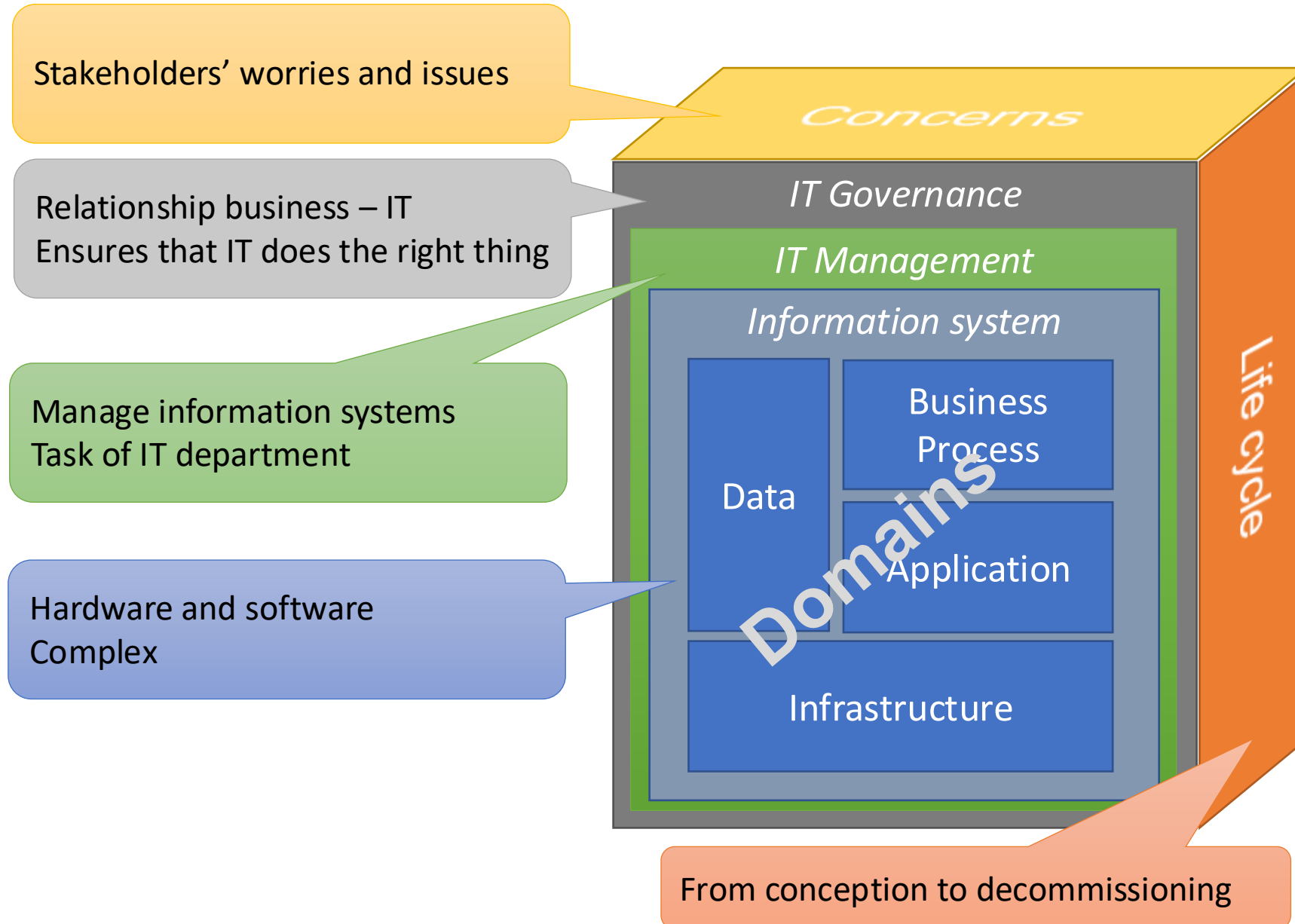


Organize activities
Organize work products
("Methodology")

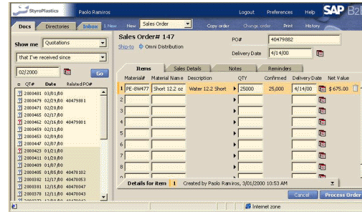


Indicate who is responsible for what

Framework



Framework

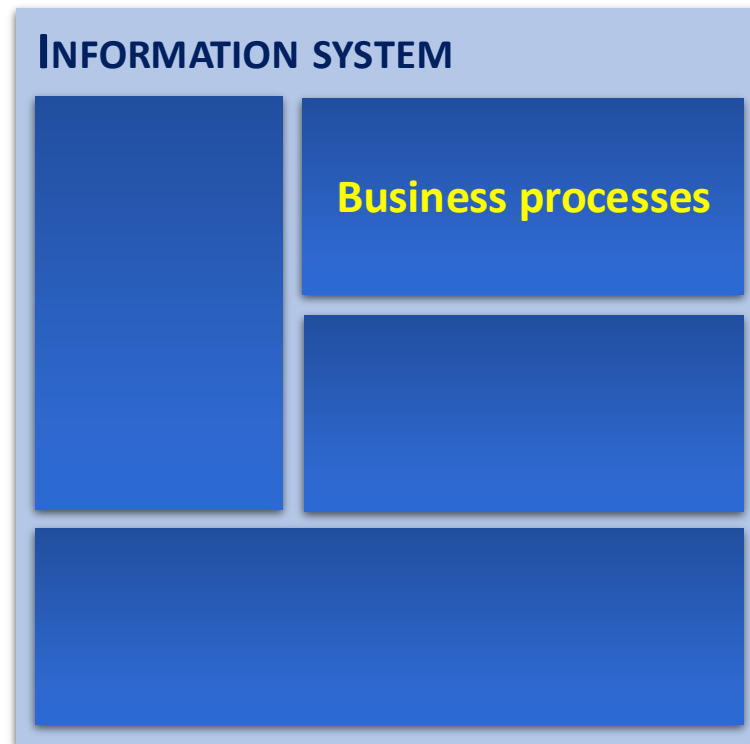


- **Domains**
Different aspects of information systems
- **Life cycle**
Different phases of system development
- **Management & Governance**
- **Concerns**
Worries of stakeholders
- Masonry, Electricity, Heating
- Design, build, live in, demolish
- Increase property value
Do repairs
Pay taxes
- Beautiful, practical, durable,
ecological, burglarproof



V.I. The Information Systems

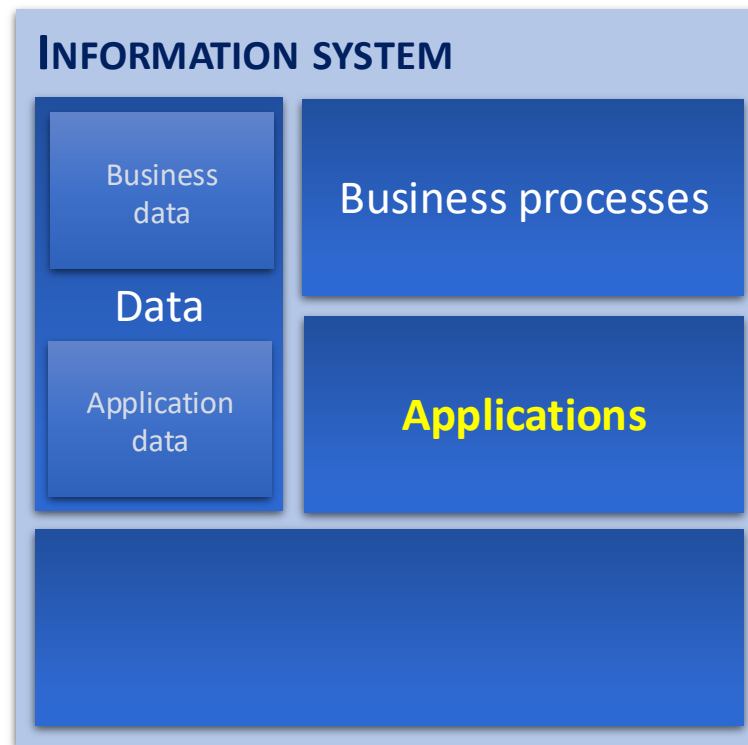
Information systems are split into four domains



What happens in the organization?
How are activities carried out?
What rules and constraints are there?
What are the results?

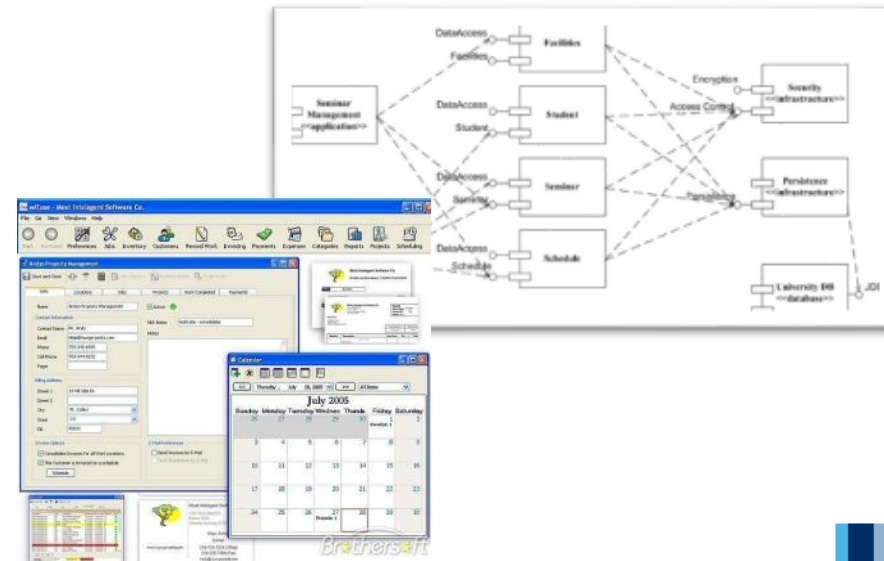


Information systems are split into four domains

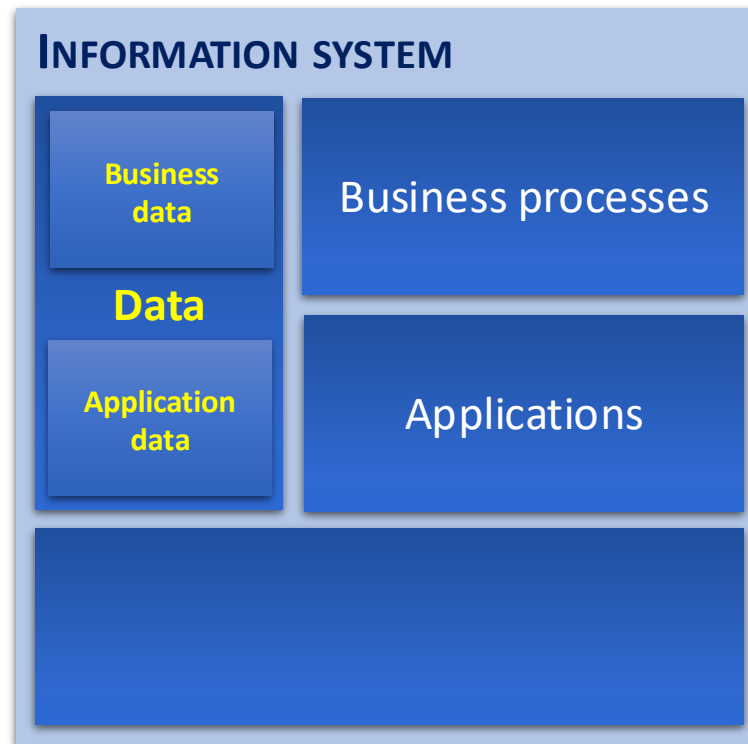


Microsoft DynamicsTM NAV

Applications = software
Structure and functionality



Information systems are split into four domains



Demo Company		INVOICE	
Demo Company 1234 Main Street Astoria, NY 41102	Phone: 111-222-3333 Fax: 222-333-4444 Email: 1-sals@ex-ample.com	Invoice #	11021
		Account #	C1000
		Date	01-05-2009
		Due By	02-05-2009
		Terms	On Receipt

BILL TO

Demo Customer 1
1111 South 4th Street
Los Angeles, CA 90210

Code	Description	Date
SHU1234	Test Product 1 - Descr1	
	Small Black Widget - D	

3 G's Sharpening

P.O. Box 564
Tomsen, New Jersey
07082
973-666-2067
Email: japhotential@aol.com

Please complete this form and enclose it with your knives, chisels or scissors.

Name: _____

Address: _____

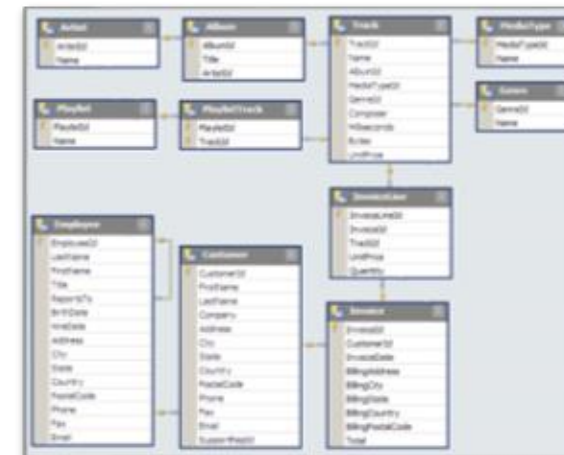
City: _____ State: _____ Zip: _____

Your email: _____

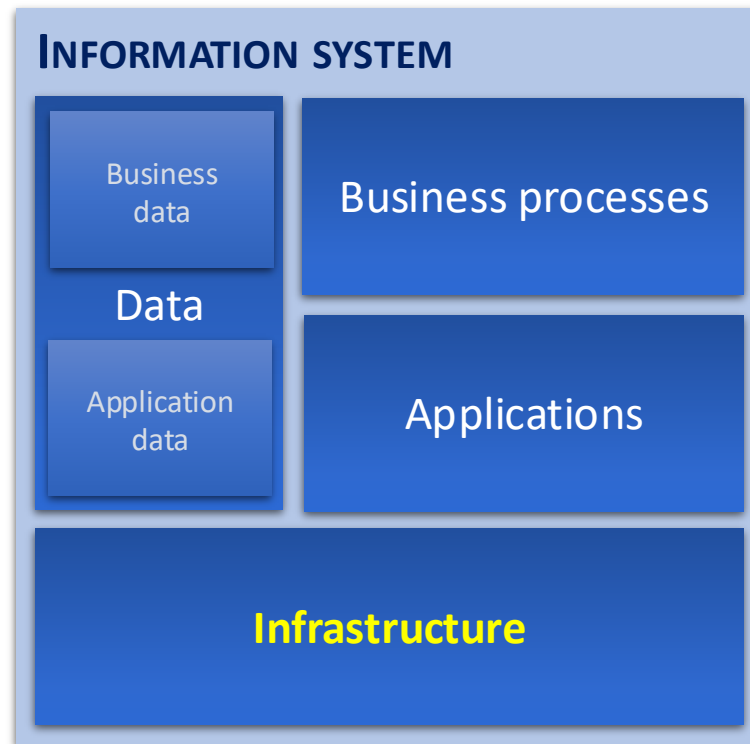
<u>Item</u>	<u>Quantity</u>	<u>Price each</u>	<u>Total</u>
Knives (all items)		\$ 5.00	\$



- Content and structure of data
- Relations, rules, constraints
- Business data → business processes
- Application data → applications



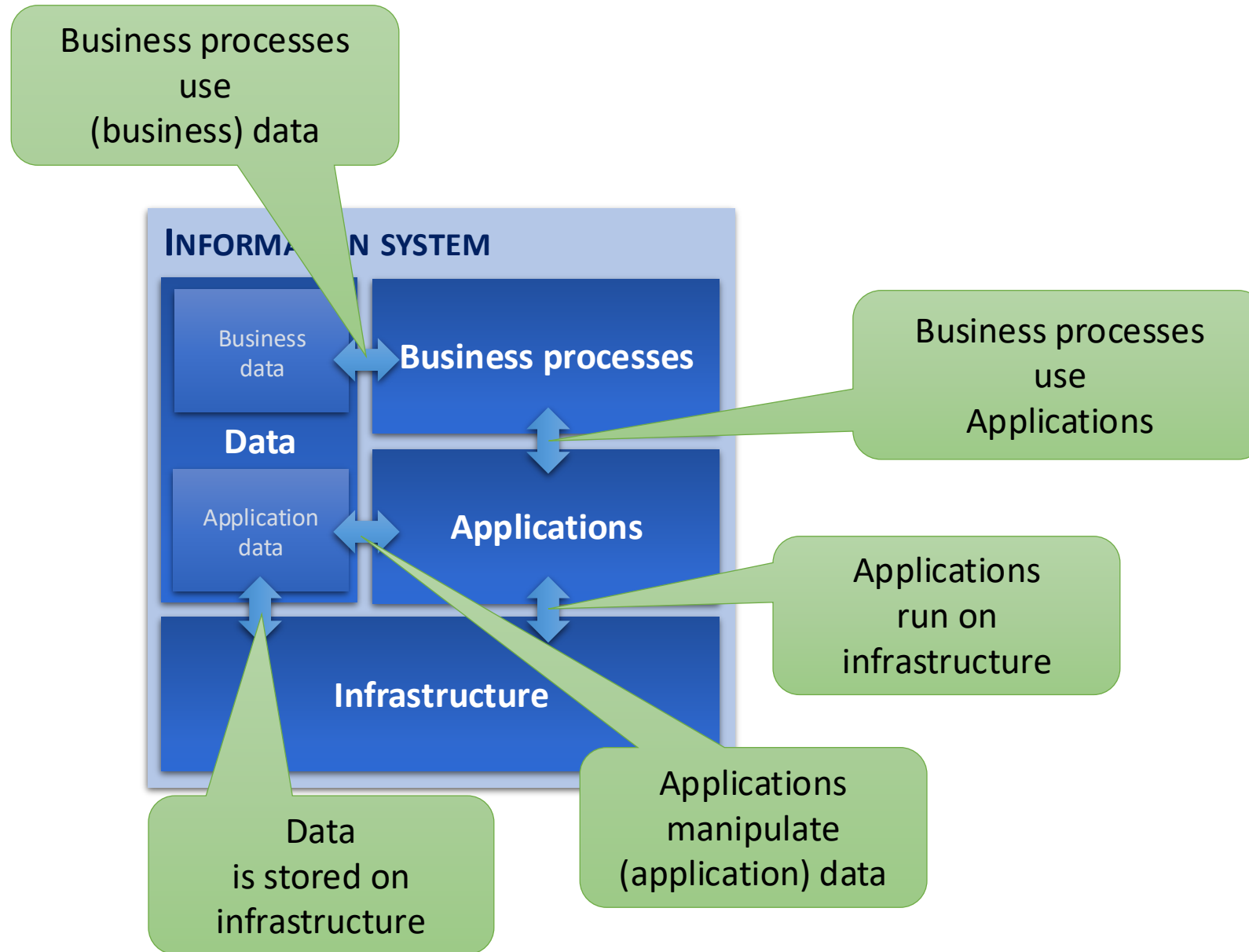
Information systems are split into four domains



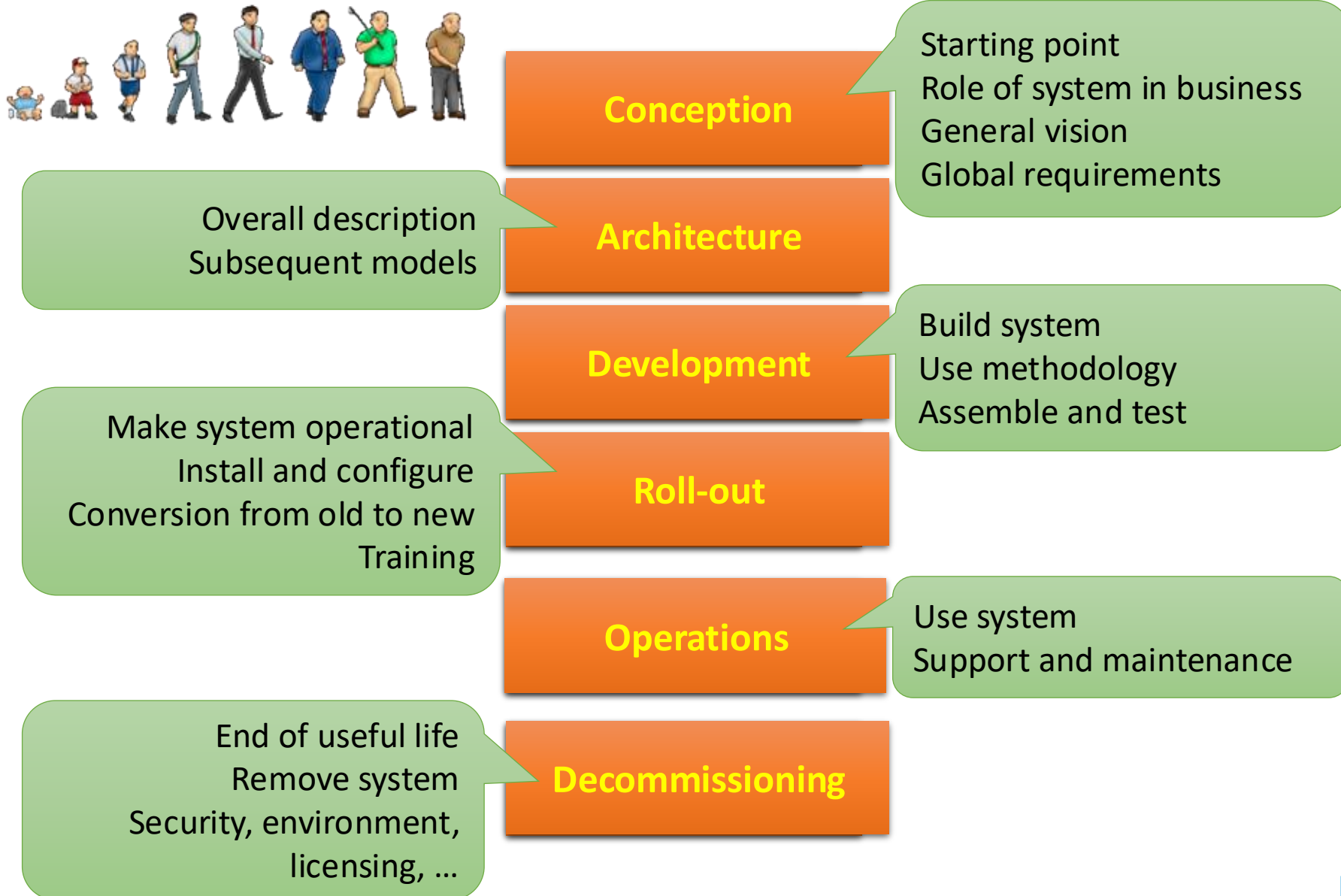
Hardware
Software
Communications (networks)



The domains are related to each other



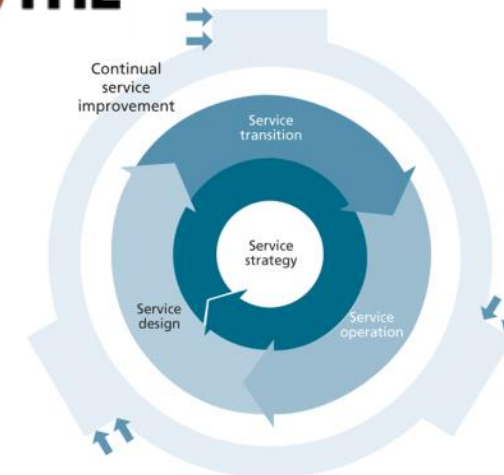
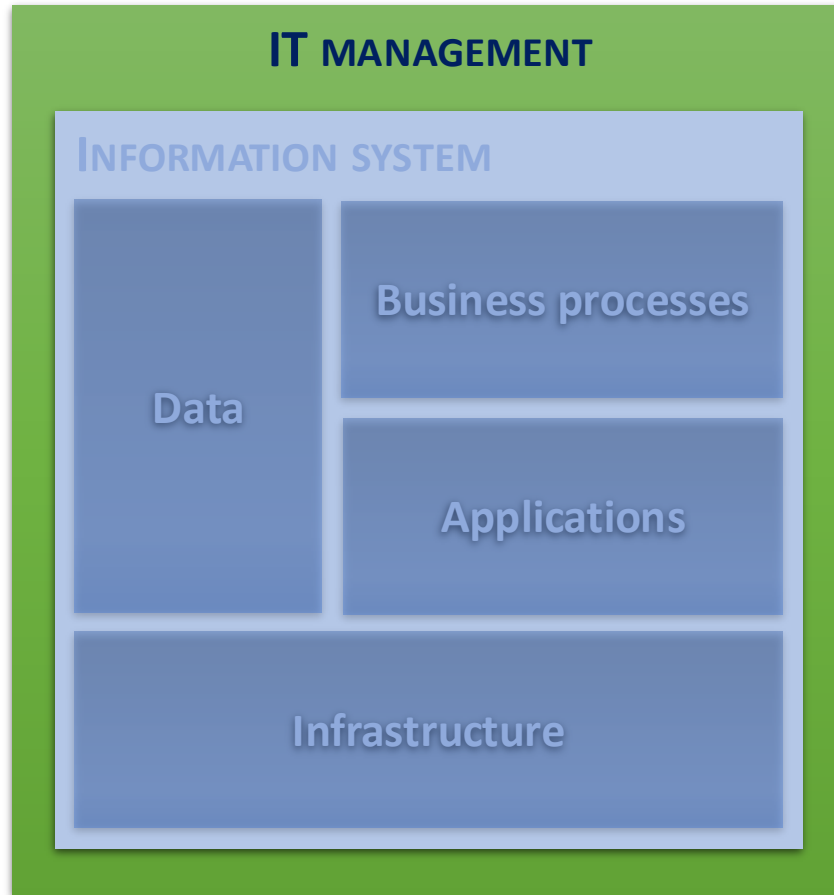
Information systems evolve through a life cycle



V.II. IT Management

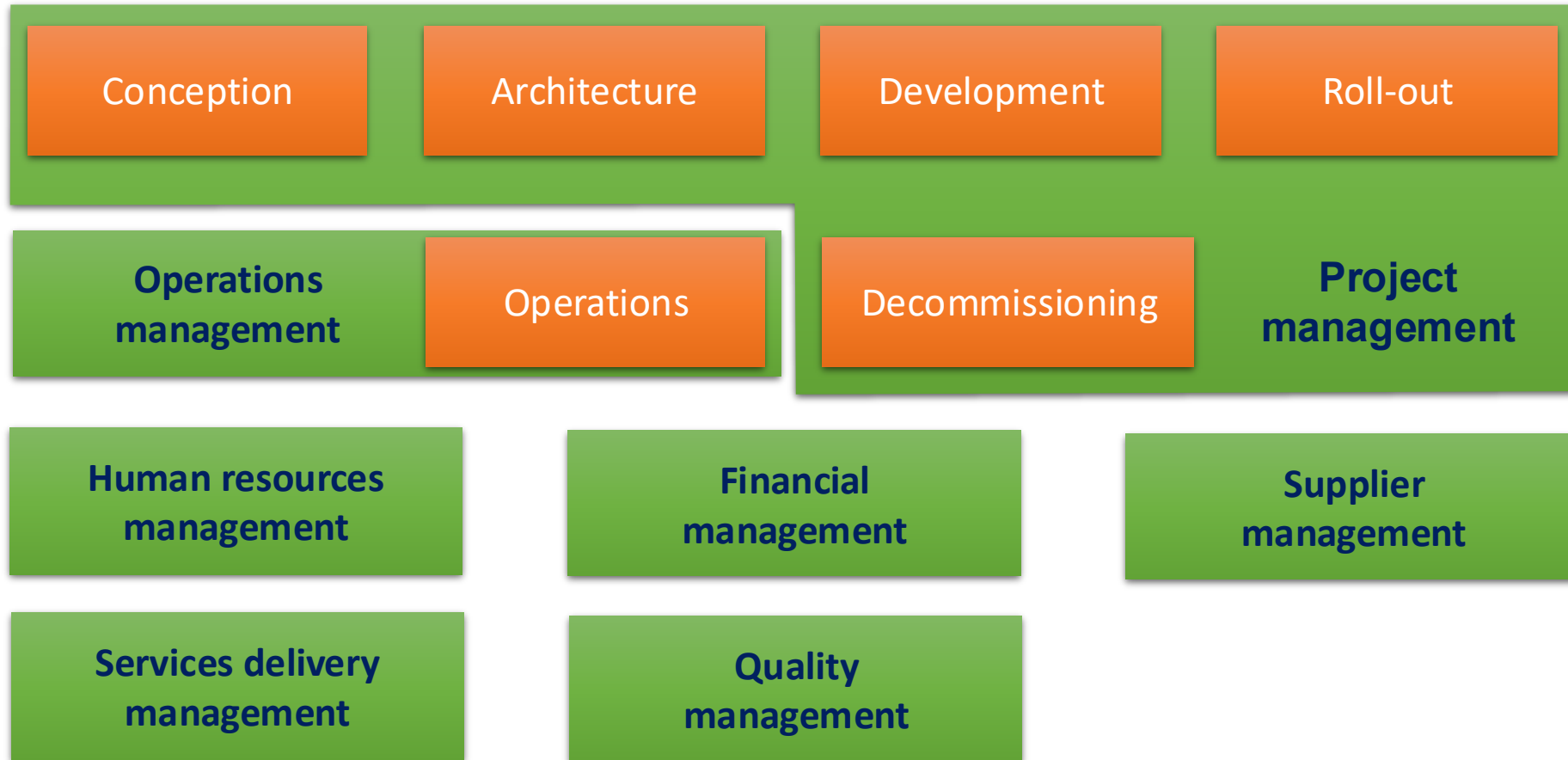


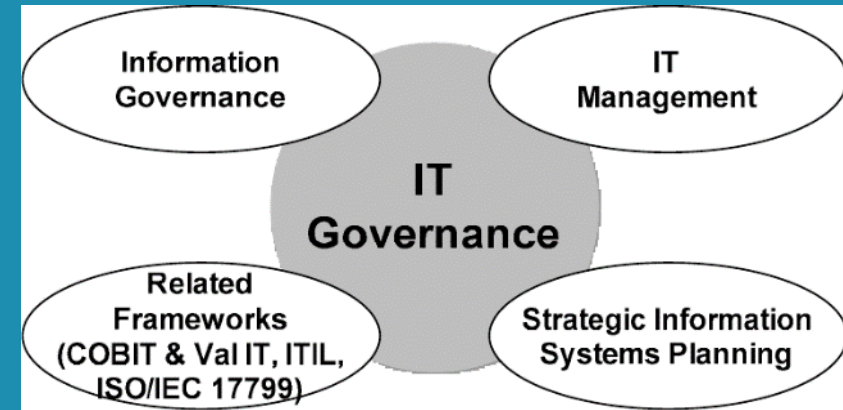
Information systems should be properly managed



Information systems should be properly managed

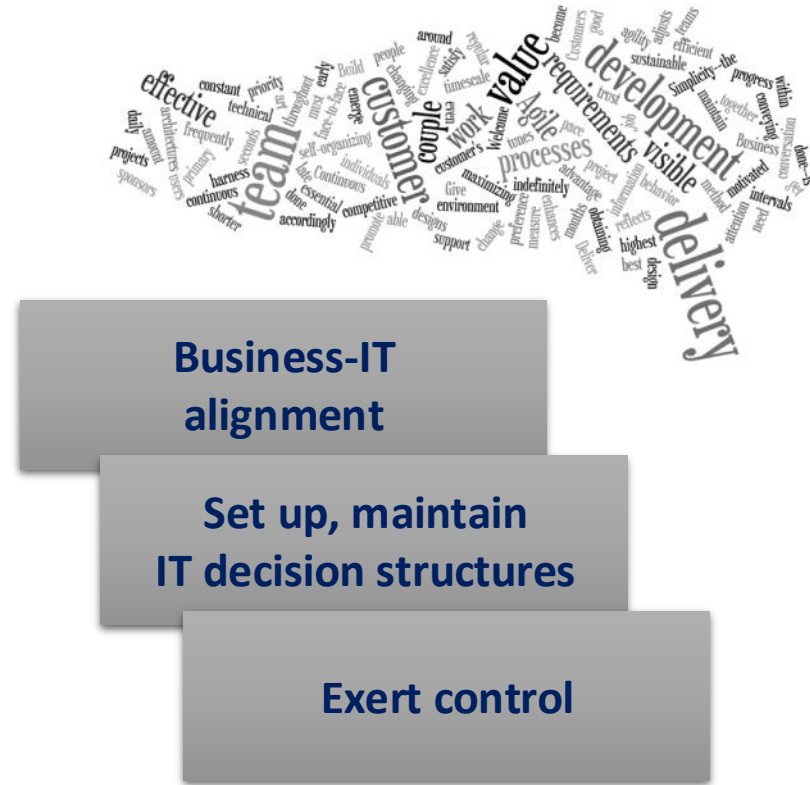
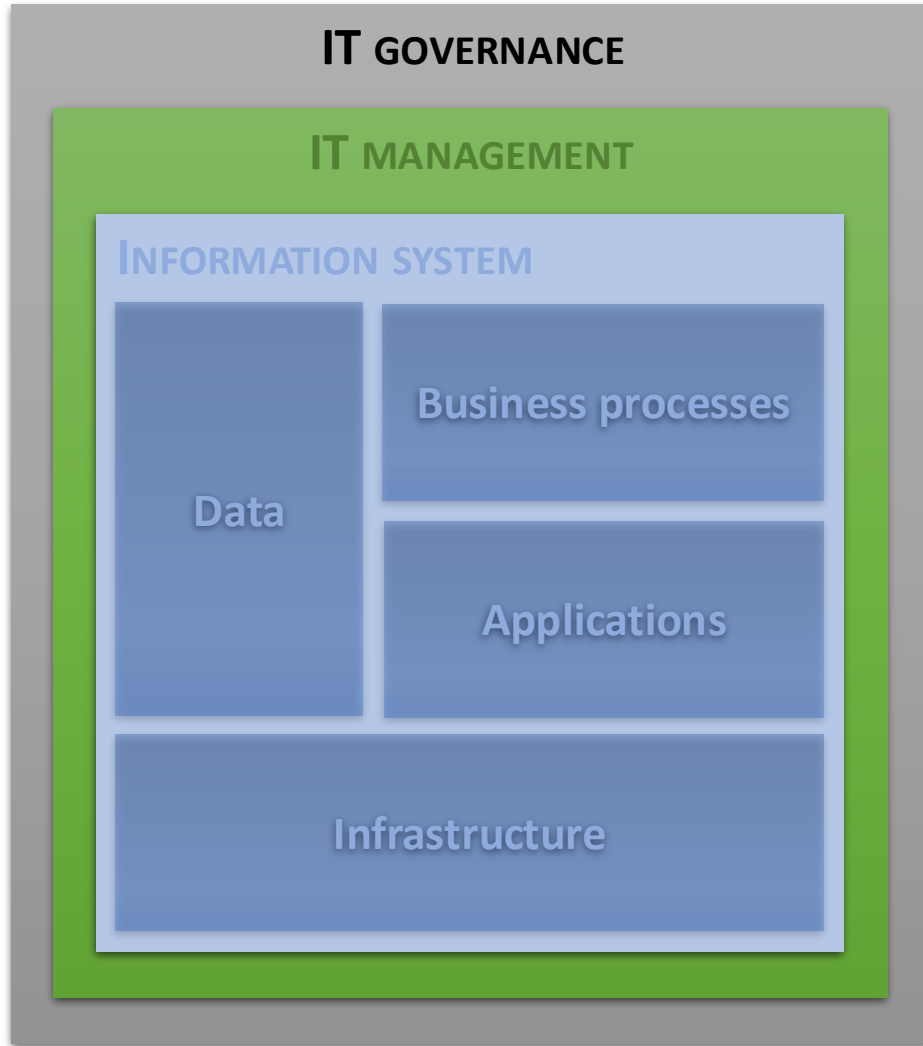
INFORMATION SYSTEMS LIFE CYCLE



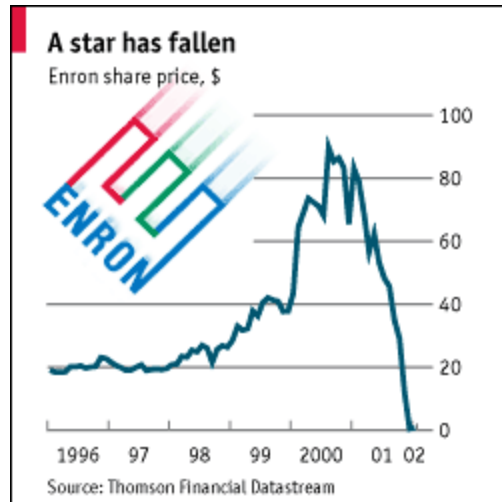
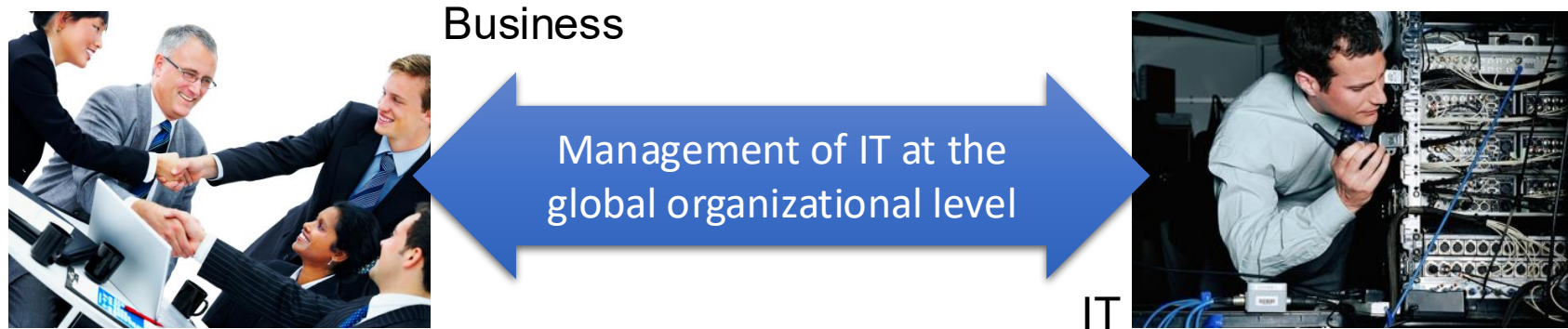


V.III. IT Governance

IT governance: interaction business – IT



IT Governance is part of corporate governance



Avoid financial debacles

Sarbanes-Oxley
Simplified

- 1) Is it accurate?
- 2) Are you sure?
- 3) Can you prove it?

IT Governance

- An informal but intuitive definition: *IT Governance is concerned with auditing if the Service Provider (SP) respects the defined service levels: how can the SP prove it?*
- **"... leadership, organizational structures and processes to ensure that the organization's IT sustains and extends the organization's strategies and objectives."** The IT Governance Institute.
- **"The system by which the current and future use of ICT is directed and controlled. It involves *evaluating and directing the plans for the use of ICT to support the organization and monitoring this use to achieve plans*. It includes the *strategy and policies* for using ICT within an organization."** Australian Standard for Corporate Governance of ICT.

IT Governance

- The interest in IT governance is due to the on-going need within organizations to focus value creation efforts on an organization's strategic objectives and to better manage the performance of those responsible for creating this value in the best interest of all stakeholders.
- An IT Governance framework is used to identify, establish and link the mechanisms to oversee the use of information and related technology to create value and manage the risks associated with using information and technology.
- ISO/IEC 38500, Cobit are IT governance frameworks.
- E.g.:
 - What decisions should be made? New ERP or not, ...
 - Who decides on the budget?
 - How to implement? Using PRINCE II, ASAP,...

IT Governance is concerned with decision making

- What decisions should be made?
- Who has the authority to make them?
- How are decisions implemented?
- How are decisions followed-up?



General principles



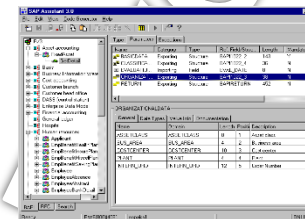
IT investments



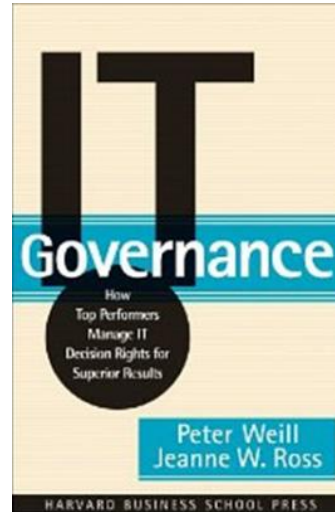
IT architecture



IT infrastructure



Applications



Key IT Governance Decisions

- **General Principles:** *High-level statements about how IT is used in the business;*
- **IT Investments:** *Decisions about how much and where to invest in IT, including project approvals and justification techniques;*
- **IT Architecture:** *Organizing logic for data, applications and infrastructure captured in a set of policies, relationships, and technical choices to achieve desired business and technical standardization and integration;*
- **IT Infrastructure:** *Centrally coordinated, shared IT services that provide the foundation for enterprise's IT capability;*
- **Applications:** *Specifying the business need for purchased or internally developed IT applications.*

Five domains, three decision makers, two phases



Top management



IT management



General principles



IT investments



User departments



IT architecture



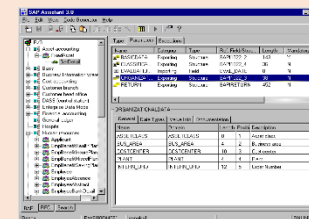
IT infrastructure



Gain advice



Decide



Applications

Decision makers

Domains

Input for all domains is given by all decision makers



Top management



IT management



User departments



Gain advice



General principles



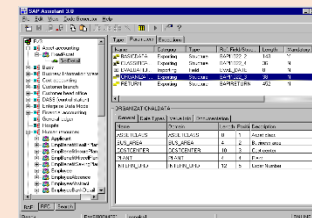
IT investments



IT architecture



IT infrastructure



Applications

Principles & Investments: Top mngmt & IT mngmt decide



Top management



IT management



General principles



IT investments



User departments

Decision makers

Domains

Phases



Decide

Architecture & Infrastructure: IT management decides



Top management



IT management



User departments

Decision makers



Decide

Domains



IT architecture



IT infrastructure

Applications: IT management & User departments decide



Top management (IT management)



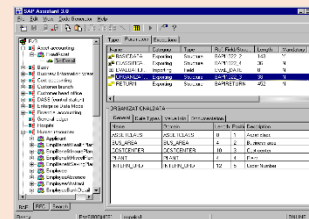
User departments

Decision makers

Domains



Decide



Applications



"Someone calling themselves a customer says they want something called service."

VI. IT as a service

The IT function is organized as a service to the users



Users are **customers**



IT department is **supplier**



A service catalog



Unit service → Unit price



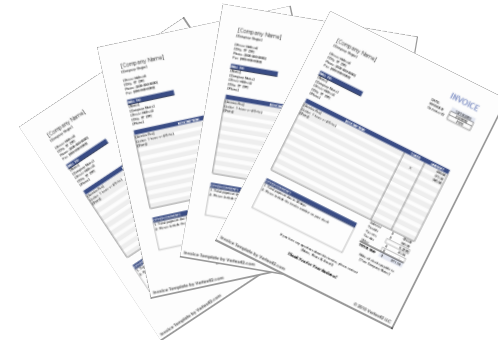
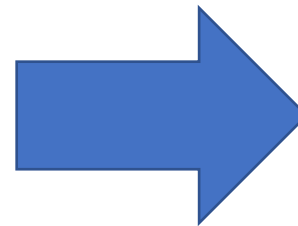
Service level (agreements)

Service: Definition

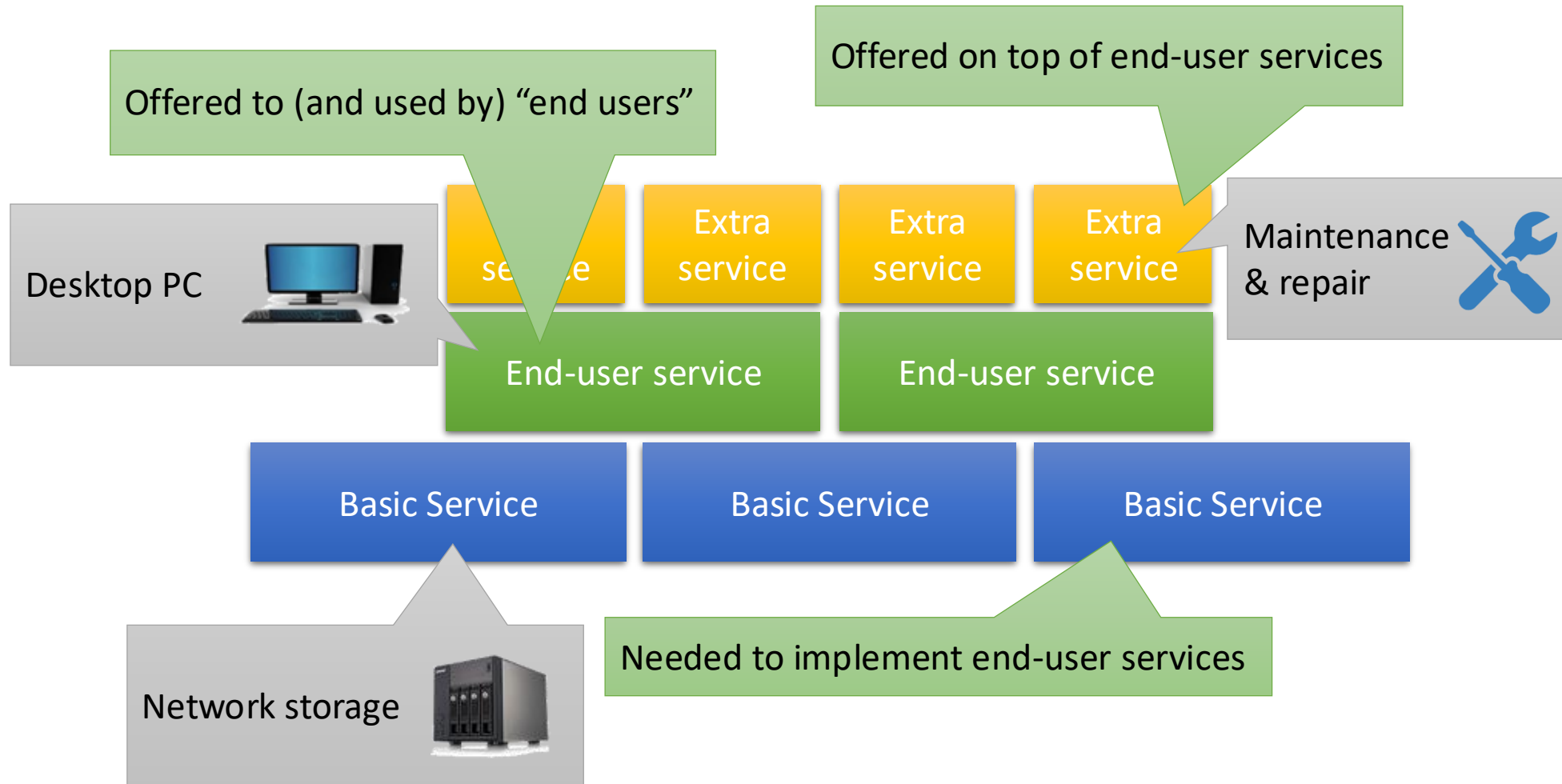
- The *Service* is the common concept to the IT governance and IT management frameworks.
- Service
 - Means of delivering value to the customer by facilitating outcomes the customer wants to achieve without ownership of costs or risks
- IT Service
 - Service, provided by IT service provider
 - Combination of information technology, people and processes

Examples of IT Services and their pricing structure

Office PC	PC x month
Internet access	Access x month
Data storage	Gbyte x day
Database access	Query
Application development	Person-day



Three types of services



Service classes: what IT is offered?



Desktop services

PC, laptop, tablet, smartphone
Hardware, system software, standard applications,
intranet/Internet connectivity

End-user service



Storage

Store documents on internal network
Managed: back-up/restore, security
“Cloud” service: accessible from any device
Supports document sharing

Basic service



Printing

Access printers, usually via network
Scanning

Basic service

End-user service



Network and Internet

Access to intranet and Internet
Protected (firewall), managed security (encryption, certificates)
Cable and wireless

Basic service

Service classes: what IT is offered?



End-user service

Application services – Application usage

The ability to use an application

Shared applications (server): access + use

 Variants according to usage (“light” vs. “heavy”)

Local applications (on client): software license + installation



End-user service

Application services – Application development

Custom development of applications

“Analysts, programmers, testers, ...”



Extra service

Support services

Assistance (service desk)

Maintenance and repair

Service classes: what IT is offered?



End-user service

Application services – Application usage

The ability to use an application

Shared applications (server): access + use

 Variants according to usage (“light” vs. “heavy”)

Local applications (on client): software license + installation



End-user service

Application services – Good practice:

Customized support
“Analysts” Bundle support with end-user services

“Analysts” **Avoid:**

Insufficient subscriptions → expensive support

Non-subscribers demanding service



Basic service

Support services

Assistance (service desk)

Maintenance and repair

Two options for service units: subscription and volume

Most services are subscription-based
Even when volume would be expected (e.g. e-mail, Internet access)

Service



Service unit

Subscription

Services unit = instance of service for a period of time
Independent of intensity of use
e.g. A desktop PC

Service unit

Volume

Services unit = (variable) volume of use
Depends on intensity of use
e.g. CPU second (obsolete!), storage

Measuring volume is (almost) always difficult
Requires monitoring system (hardware, software)
Requires consolidation (adding all volumes of different service uses)
Volumes are difficult to forecast (budgeting, cost calculation)

Two options for service units: subscription and volume

Service



Service unit

Subscription

Services unit = instance of service for a period of time
Independent of intensity of use
e.g. A desktop PC

Service unit

Volume

Services unit = (variable) volume of use
Depends on intensity of use
e.g. CPU second (old!), storage

Typical volume-based services:

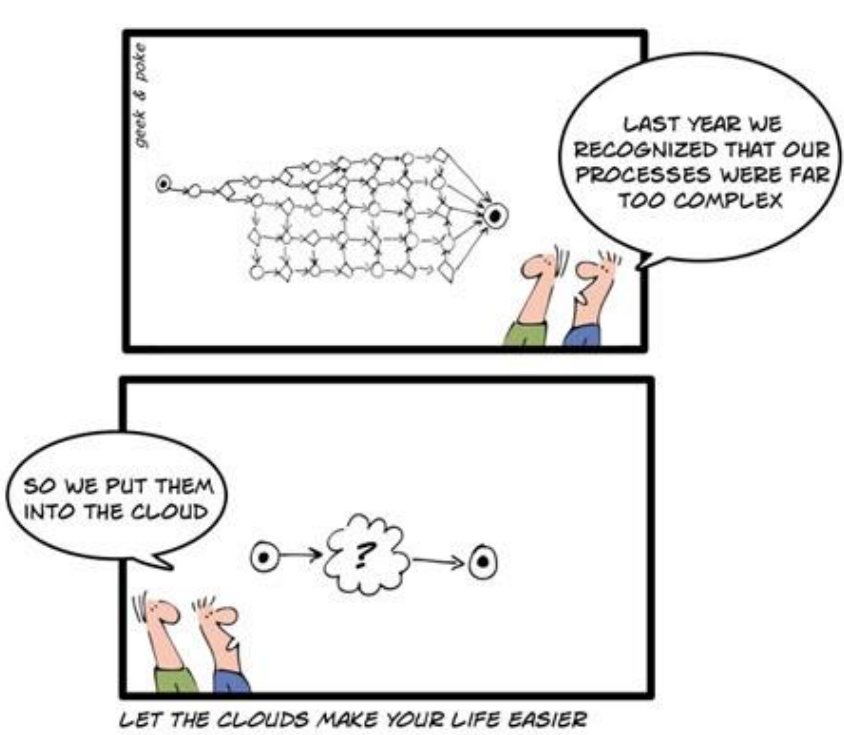
Storage (e.g. Gbyte $\times$ day)

Printing (page)

People-effort related (e.g. development: person $\times$ day)

Service: Pricing Model

- Can be on the basis of access, use per unit of time, ...
- Can be on the basis of a flat fee per day, week, month or year
- Alternatives should be considered to evaluate the best option
- The available pricing models also depend on the service production cost of the service provider, e.g.:
 - Telephony is a fixed cost business, no risk for the SP of offering it in the form of a flat fee to the SC;
 - A 3D printing service is a variable cost business, it could be dangerous (disastrous) to offer it in the form of a flat fee, mostly it will be per item printed.



VII. Cloud Computing



Cloud computing is related to outsourcing

Ubiquitous
Convenient
On-demand

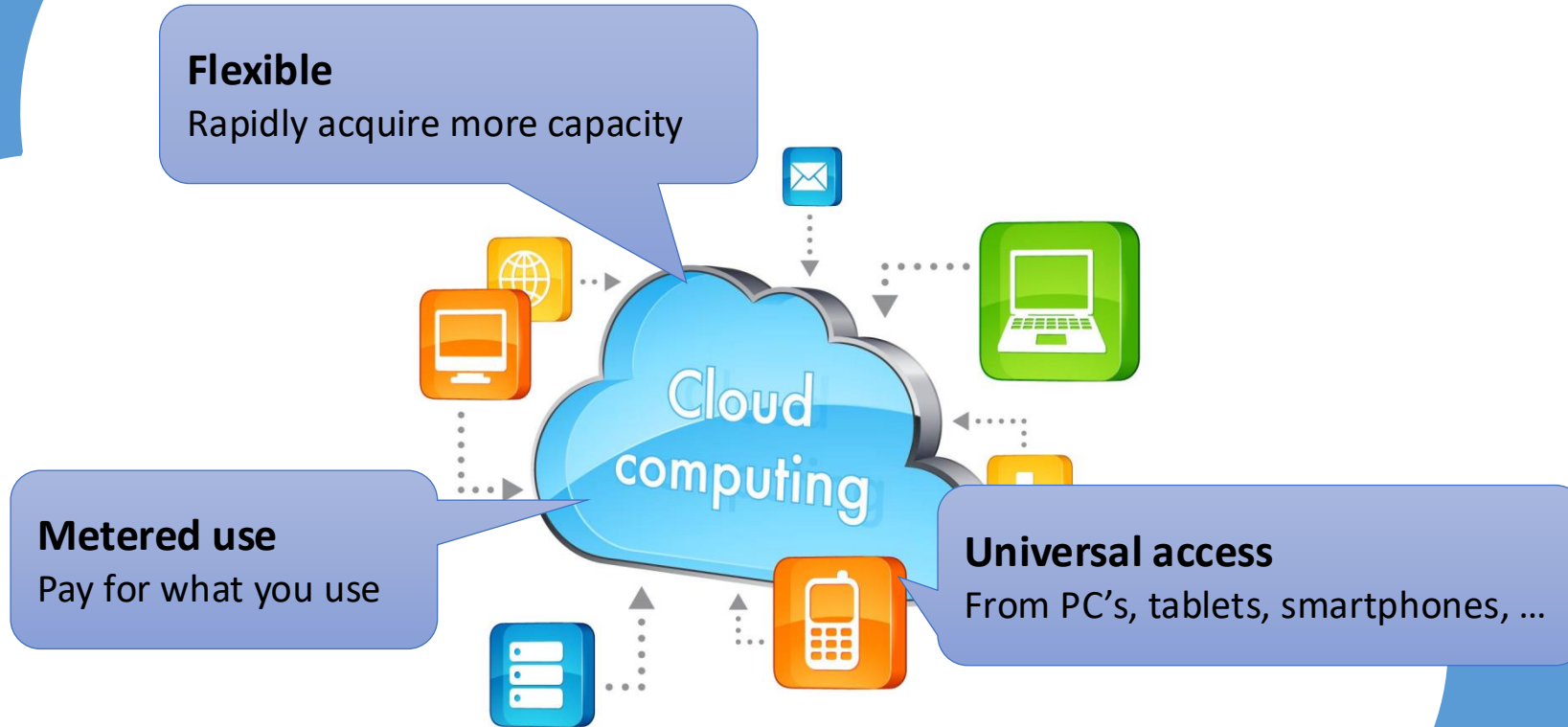
access to shared pool of configurable resources

rapidly provisioned

released with minimal effort



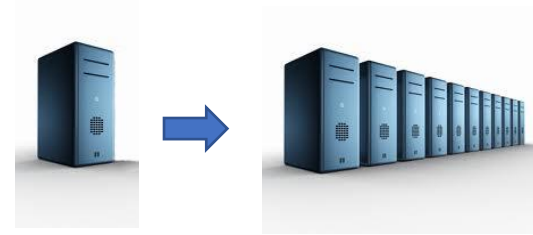
Cloud computing is flexible and versatile



Cloud computing has many advantages



Capital → Expenses



Easily scalable



Cost savings



Limited staff requirements

Where are we in the cloud adoption journey today?

- Study of Ernst & Young
- Point of view of the Chief Technology Officers (strategic view of what the cloud is and should be)



Public cloud adoption continues to accelerate



20 % spend more than **\$12 million** per year on public clouds

More than **50% of enterprise workloads and data are expected to be in a public cloud** within 12 months

59 % expect cloud use to **exceed plans** due to the pandemic



Enterprises embrace multi-cloud



93 % have **multi-cloud strategy**; 87 % have hybrid cloud strategy

41 % integrate **data between clouds**

Only **33 %** use **multi-cloud management tools**



Organizations have to evolve with the cloud



73 % have **central cloud team** or cloud center of excellence (CoE)

57 % of cloud teams are responsible for governing IaaS and PaaS usage and costs

51 % reported using **cloud managed service providers** to manage public cloud use



Need to better understand cloud metrics



73 % plan to **optimize existing use of cloud** (cost savings), making it the top initiative for the fourth year in a row

77 % use **cost efficiency and savings** to measure cloud progress



Top challenges: security, spend, governance and expertise



For cloud beginners, **lack of resources/ expertise** is the top challenge

For advanced cloud users, **managing cloud spend** is the top challenge

For 83 %, **security is a challenge**

Teachings: what should we understand

- The shift to cloud computing is complete; organizations now fully recognize its advantages.
- It's no longer about on-premises vs. cloud; the cloud offers far more than traditional on-premises solutions.
- The market has matured: the question is no longer *Is cloud for us?* but rather *What is our cloud strategy?*
- The COVID-19 pandemic accelerated cloud adoption significantly.

Teachings: what should we understand

- The mutli-cloud strategy is also a sign of maturity. It means more than hybrid cloud, it means using multi-cloud providers (MS Azure, AWS, ...) integrated together. This to get the benefits of each one but also not to be fully dependent of particular cloud providers.
- Better understand the cloud matrix. The debate is getting further than Cloud VS on premise. It is about how the cloud can be **governed**. *How does a company package and manage the required IT services for optimal outsourcing?*