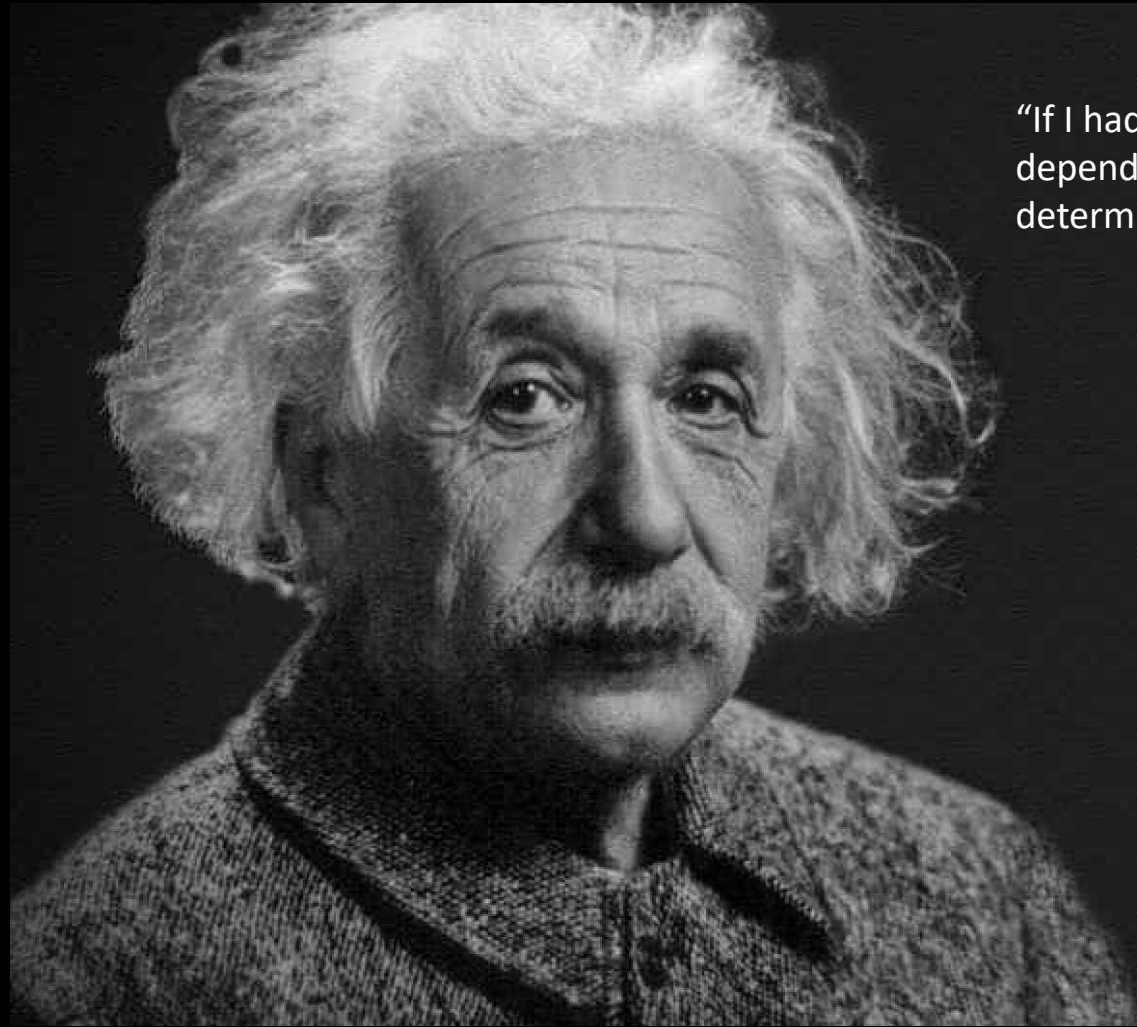


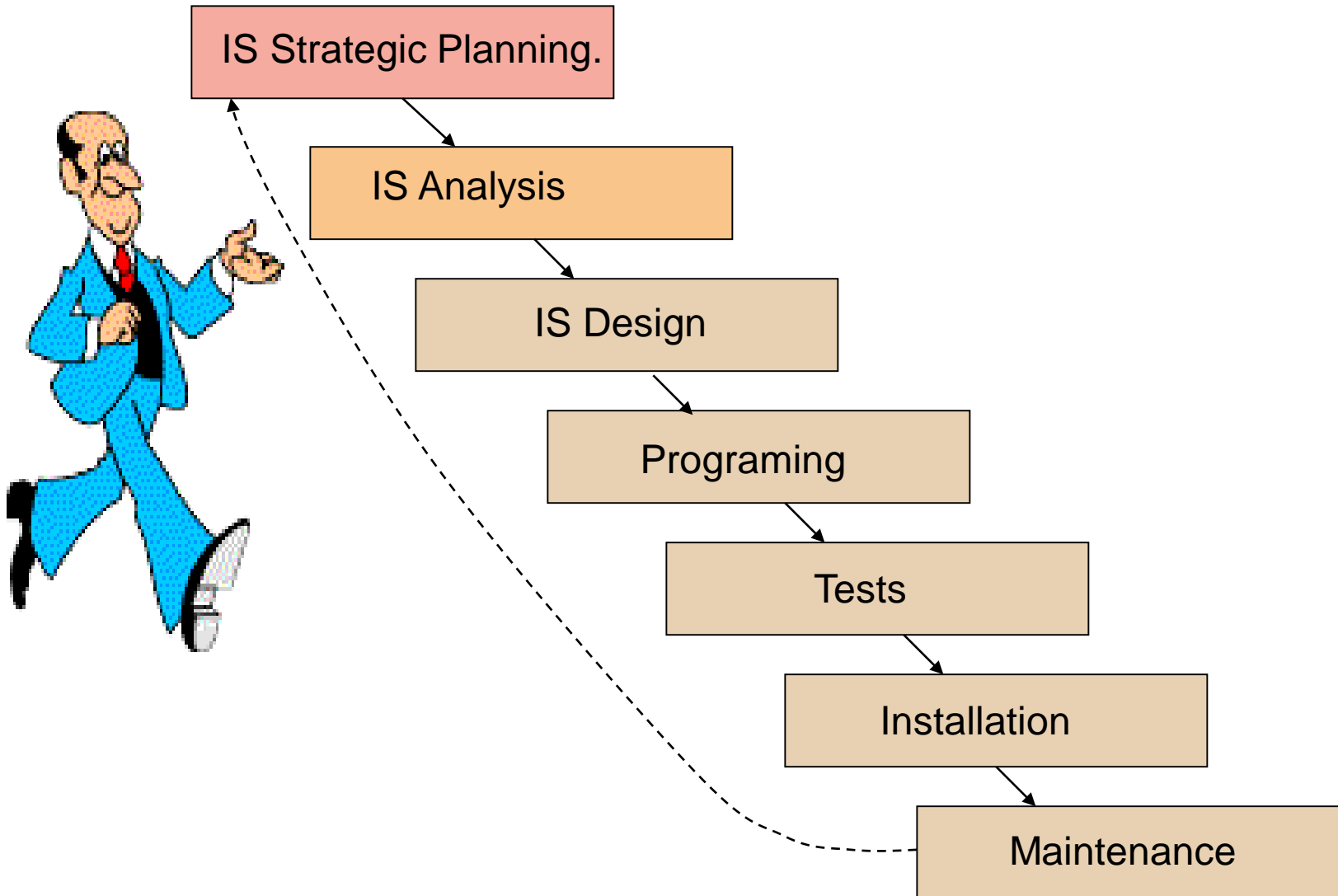
**Strategic Planning
for
Information Systems**



“If I had an hour to solve a problem, and my life depended on it, I would use the first 55 minutes determining about the proper question to ask.”

Albert Einstein

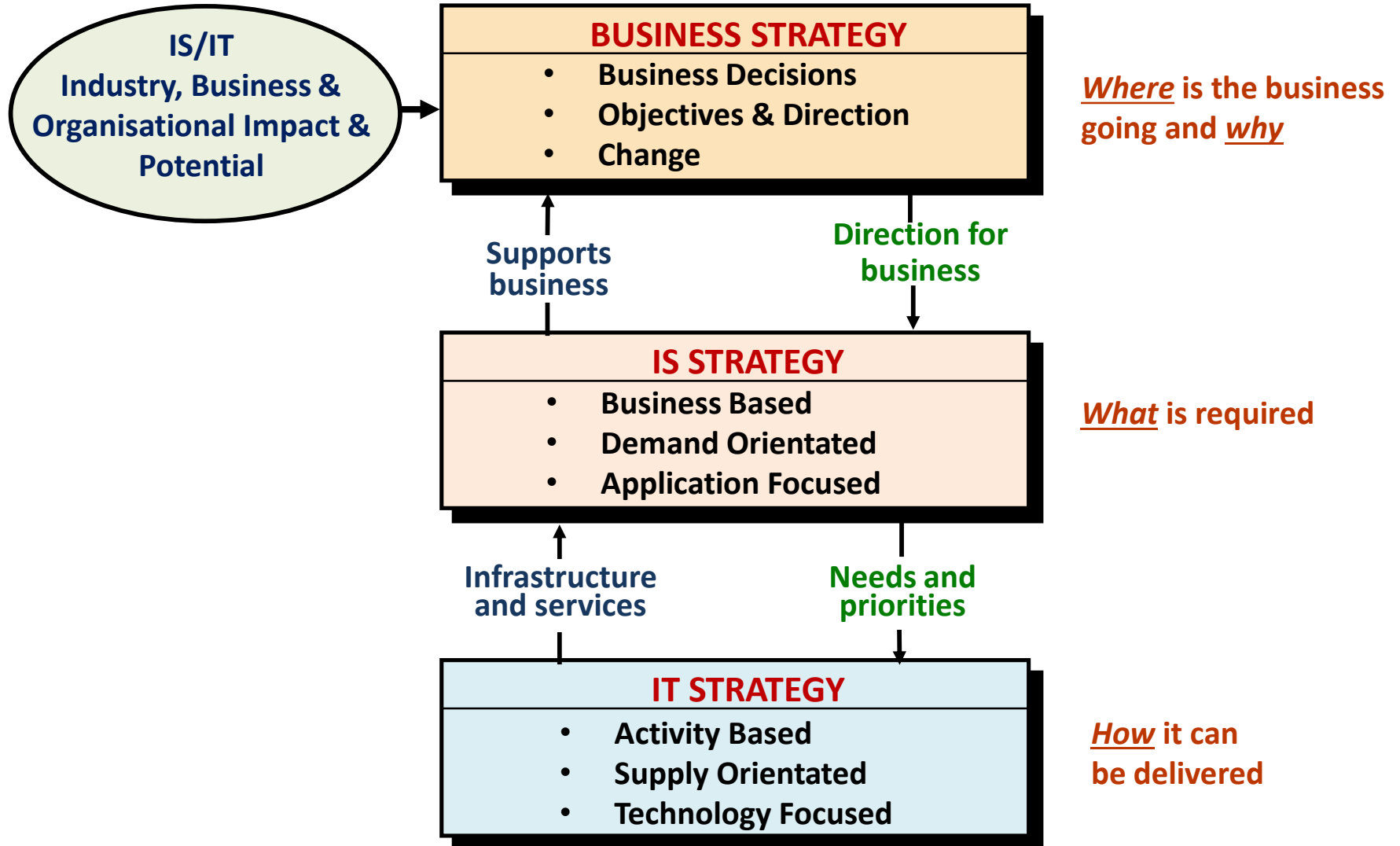
Software Development Life Cycle



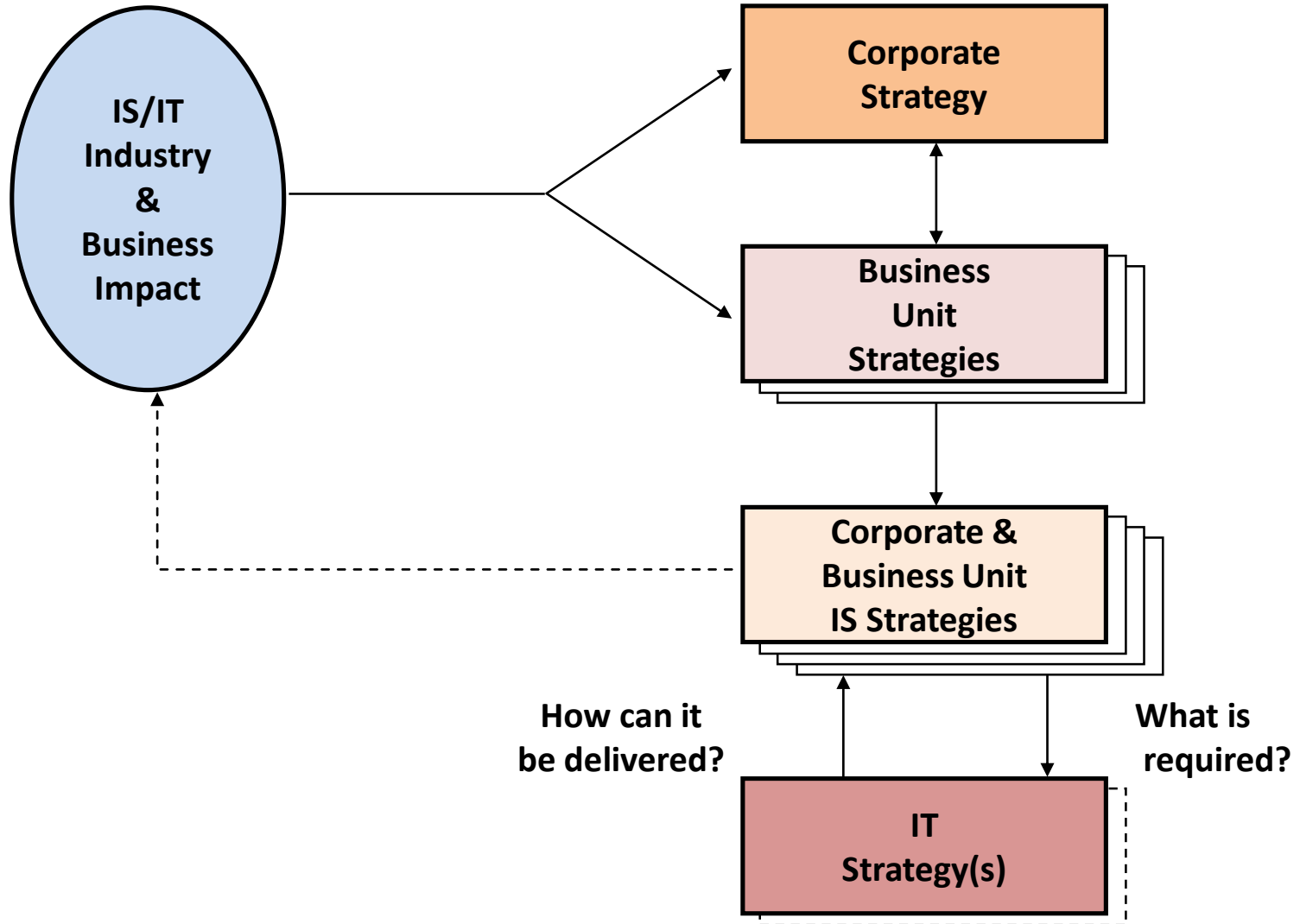
OBJECTIVES OF STRATEGIC PLANNING FOR INFORMATION SYSTEMS

- **Aligning IS/IT investments with business objectives;**
- Exploiting IS/IT for competitive advantage;
- Effective management of IS/IT resources;
- Developing IS/IT policies and architectures.

THE RELATIONSHIP BETWEEN BUSINESS, IS & IT STRATEGIES



IS/IT STRATEGY IN MULTI-BUSINESS UNIT ORGANISATIONS



OBJECTIVES OF STRATEGIC PLANNING FOR INFORMATION SYSTEMS

- Aligning IS/IT investments with business objectives;
- **Exploiting IS/IT for competitive advantage;**
- Effective management of IS/IT resources;
- Developing IS/IT policies and architectures.

INFORMATION SYSTEMS APPLICATION PORTFOLIO

	STRATEGIC	HIGH POTENTIAL
High	<ul style="list-style-type: none">- applications which <i>are critical to</i> sustaining future business strategy	<ul style="list-style-type: none">- applications which <i>may be important</i> in achieving future success
CONTRIBUTION TO BUSINESS OBJECTIVES	<ul style="list-style-type: none">- applications on which the organisation <i>currently depends</i> for success	<ul style="list-style-type: none">- applications which <i>are valuable but not critical to</i> success
	Low	
	KEY OPERATIONAL	SUPPORT
	High	Low
	BUSINESS RELEVANCE	

ADVANTAGE & DISADVANTAGE FROM THE PORTFOLIO

**Gain
Advantage**

STRATEGIC	HIGH POTENTIAL
Delivers the business advantage	Identifies the advantage and how to get it
In the short term - due to ineffective systems	In the longer term - due to increasing inefficiency
KEY OPERATIONAL	SUPPORT

**Avoid
Disadvantage**

Iberomoldes Group

3D CAD/CAM, in 1984

Rapid Prototyping

SET – Simultaneous Engineering Technology



IBEROMOLDES

HOME

COMPANIES

MISSION

PHILOSOPHY

TECHNOLOGY

MARKETS

NEWS

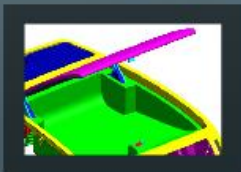
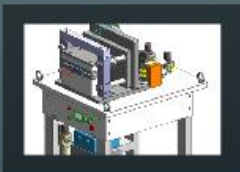
JOBS

CONTACTS

PORTUGUÊS ENGLISH

PRODUCT DEVELOPMENT

As innovation, quality and time-to-market are determining factors for every company's success, IBEROMOLDES has created a company whose motto is Simultaneous Engineering Technology (SET), i.e., complete and integrated service, ranging from concept and design, engineering, developing and prototyping, to industrialization through production of pilot production or large series. Integrating the different phases of the product development, with the best and most advanced simulation techniques, errors and failures of the products are minimized, as well as, time necessary to execute and introduce a certain product in the market.



PRODUCT DEVELOPMENT

RAPID PROTOTYPING

RAPID TOOLING

MOULDS

CONTROL GAUGES

PRODUCTS

INDUSTRIAL EQUIPMENTS

TURNKEY PROJECTS

AMAZON GO

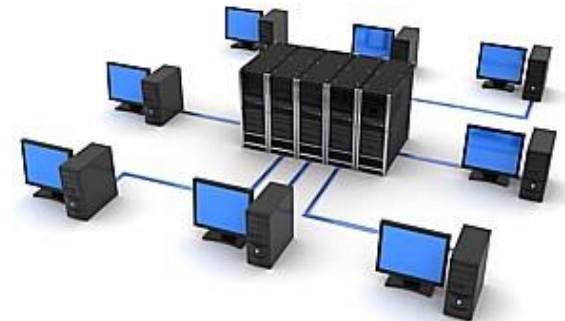


OBJECTIVES OF STRATEGIC PLANNING FOR INFORMATION SYSTEMS

- Aligning IS/IT investments with business objectives;
- Exploiting IS/IT for competitive advantage;
- **Effective management of IS/IT resources;**
- Developing IS/IT policies and architectures.

RESOURCE MANAGEMENT

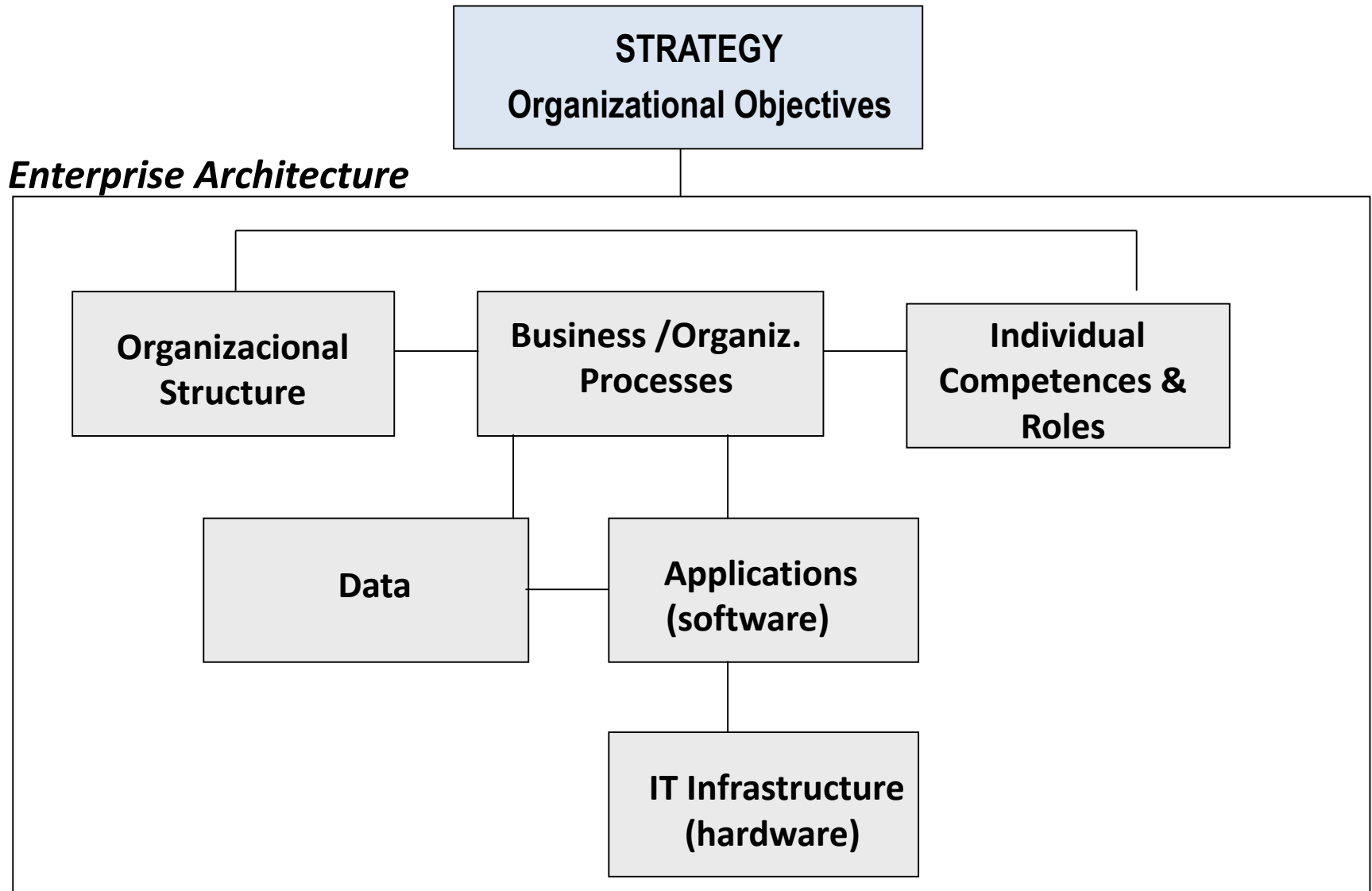
- Resource Capacity;
- Resource Allocation;
- Resource Work Management;
- Resource Collaboration;
- Resource Task Management.



OBJECTIVES OF STRATEGIC PLANNING FOR INFORMATION SYSTEMS

- Aligning IS/IT investments with business objectives;
- Exploiting IS/IT for competitive advantage;
- Effective management of IS/IT resources;
- **Developing IS/IT policies and architectures.**

A Model for Enterprise Architecture (Caldeira & Pedron, 2007)



Zachman framework

Sowa and Zachman (1992) presented 5 views (planner, project owner, designer, builder and subcontractor) and 6 different aspects of an IS project: data, functions, network, people, time and motivations.

	DATA	FUNCTIONS	NETWORKS	PEOPLE	TIME	MOTIVATIONS	
Planner							Planner
Project Owner							Project Owner
Designer							Designer
Builder							Builder
Subcontractor							Subcontractor
	DATA	FUNCTIONS	NETWORKS	PEOPLE	TIME	MOTIVATIONS	

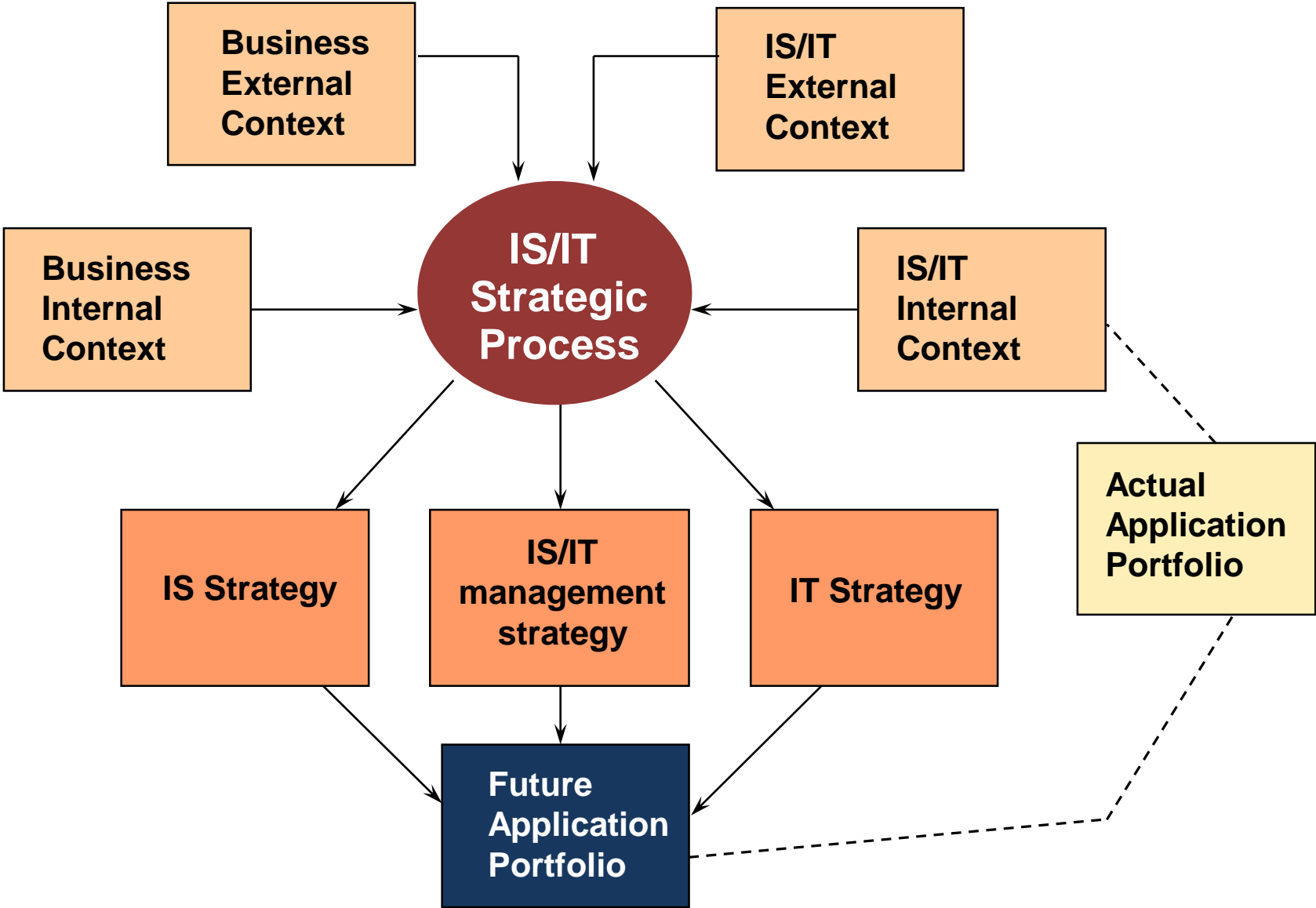
Comparing information systems with other industries



- **Complex products require a rigorous architecture;**
- **Components are built separately and then assembled;**
- **The architecture is a reference for product change and development.**



Strategic Planning for Information Systems



INFORMATION SYSTEMS PLANNING

IS/IT Strategic Planning Tools & Techniques

ORGANIZATION	INFORMATION TECHNOLOGY	
<ul style="list-style-type: none"> - Mission, objectives, CSF; - Enterprise Value-Chain; - Business Processes and Data. 	<ul style="list-style-type: none"> - Information Resource Catalog: software, hardware & peopleware; - IS Architecture. 	INTERNAL
<ul style="list-style-type: none"> - PEST analysis; - SWOT Analysis; - Competitive Forces; - Porter Generic Strategies. 	IT (software & hardware) available in the market: ERP, CRM, SCM, AI software, Blockchain, Relational DBMS, NoSQLDBMS, Virtual & Augmented Reality ...	EXTERNAL

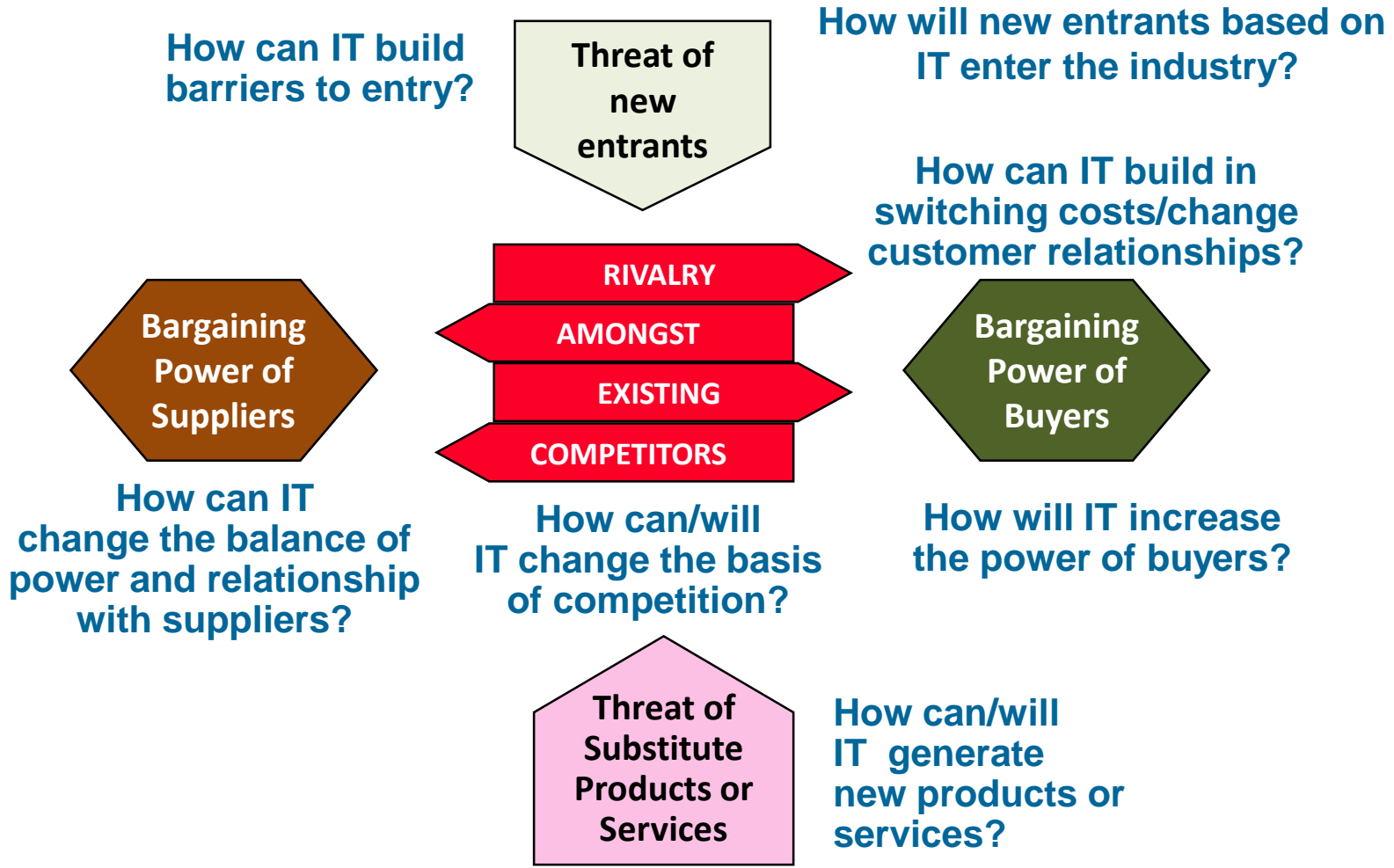
IS/IT Strategy & Management

- Future Application Portfolio & priorities;
- Benefits Management approach;
- Future IS Architecture: IT, Data, Processes & Human Resources;
- Policies and procedures for information manag.

Building a Digital Strategy

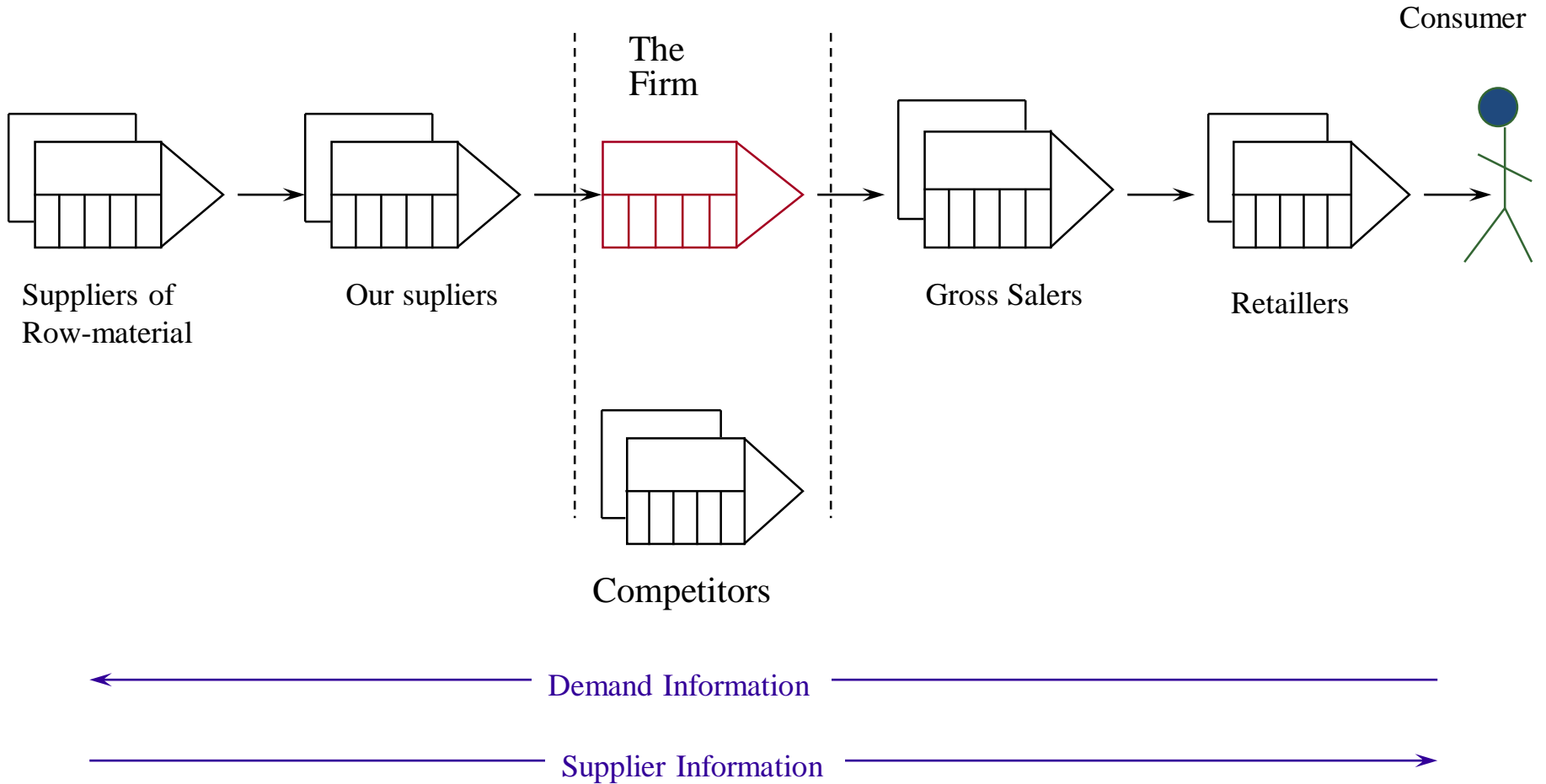
- Business Analysis

FIVE COMPETITIVE FORCES IN AN INDUSTRY – M. Porter

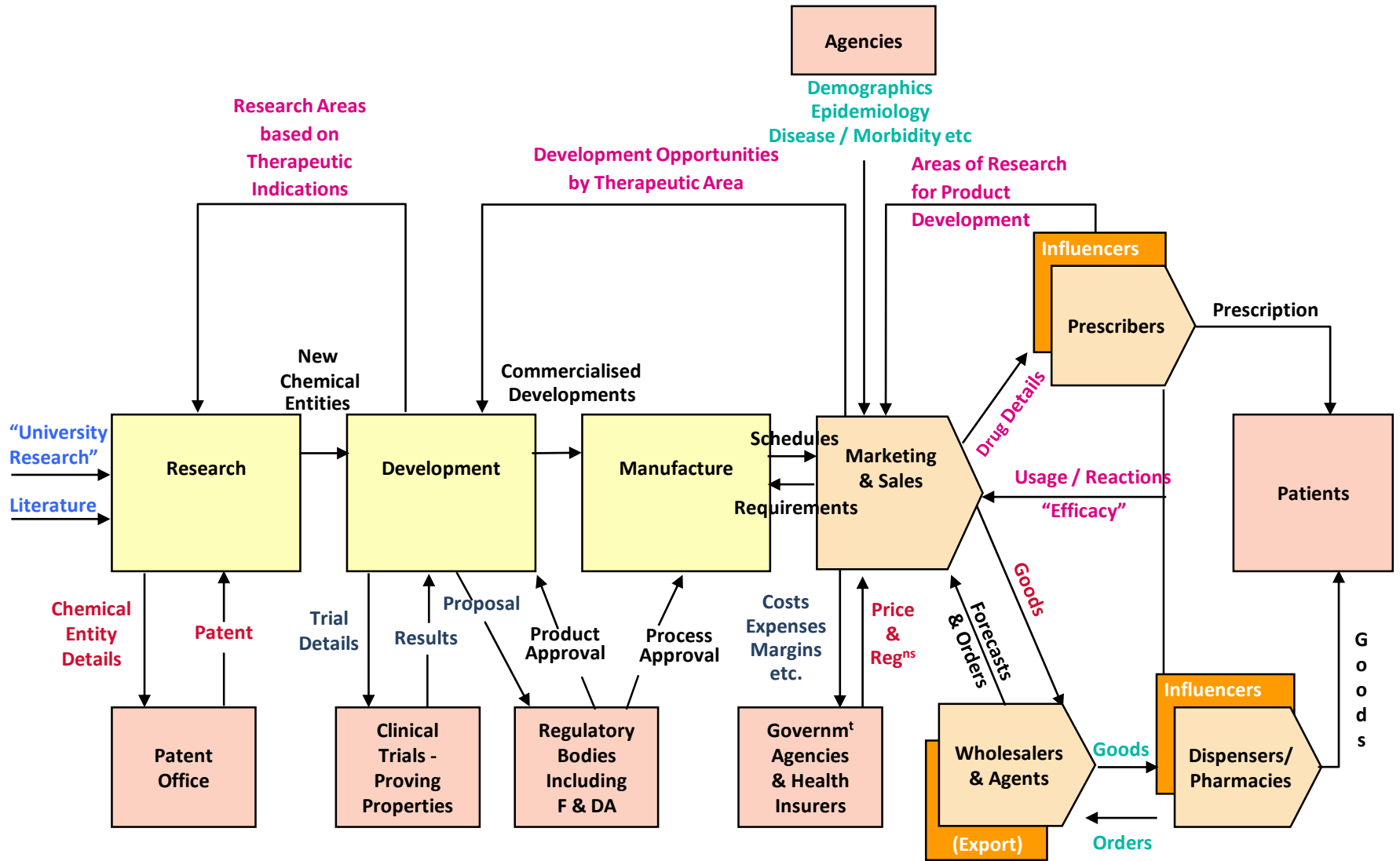


Industry Value Chain

Shows opportunities created by IT.



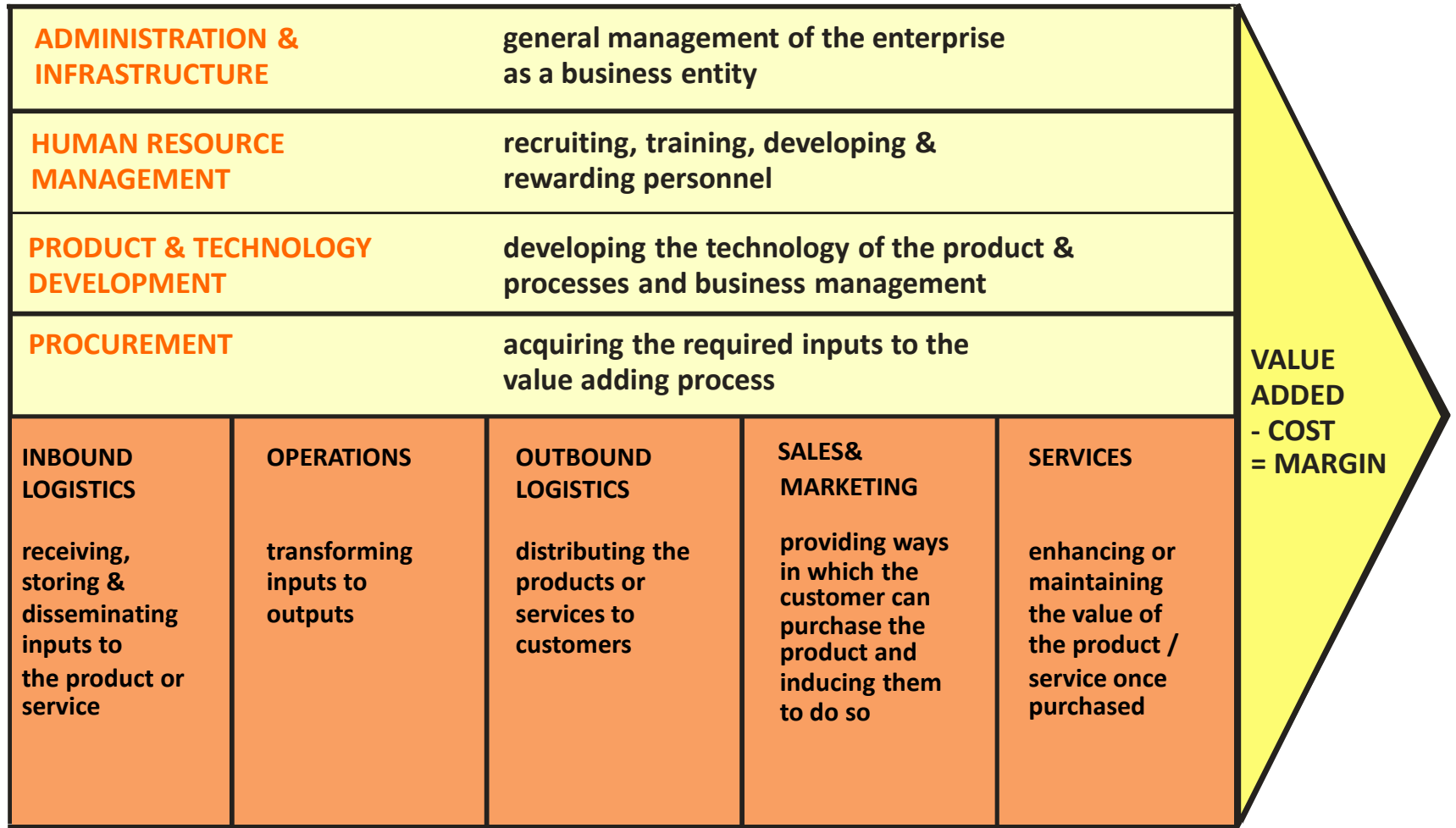
VALUE CHAIN FOR A PHARMACEUTICAL COMPANY



A FIRM'S VALUE CHAIN

- TRADITIONAL MODEL FOR PRODUCT BASED FIRMS

SUPPORT ACTIVITIES



PRIMARY ACTIVITIES

Porter Generic Strategies

STRATEGIC ADVANTAGE

Uniqueness Perceived
by the Customer

Low Cost Position

STRATEGIC TARGET

Industrywide

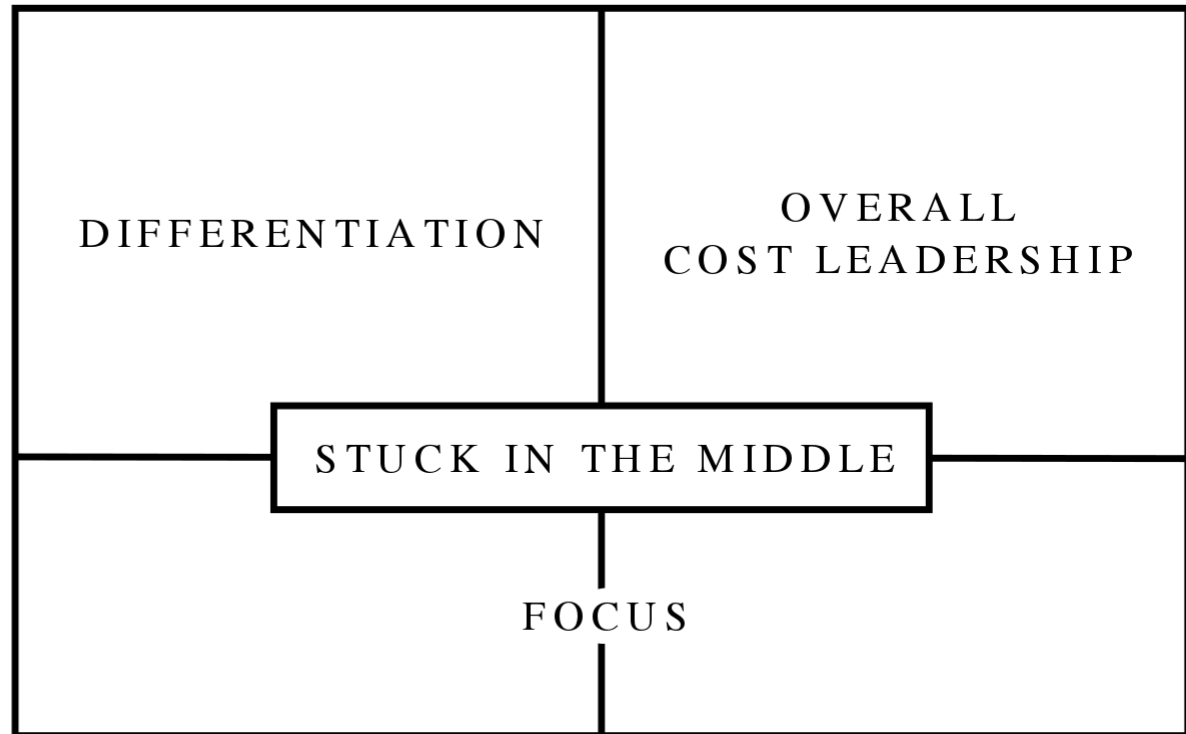
DIFFERENTIATION

OVERALL
COST LEADERSHIP

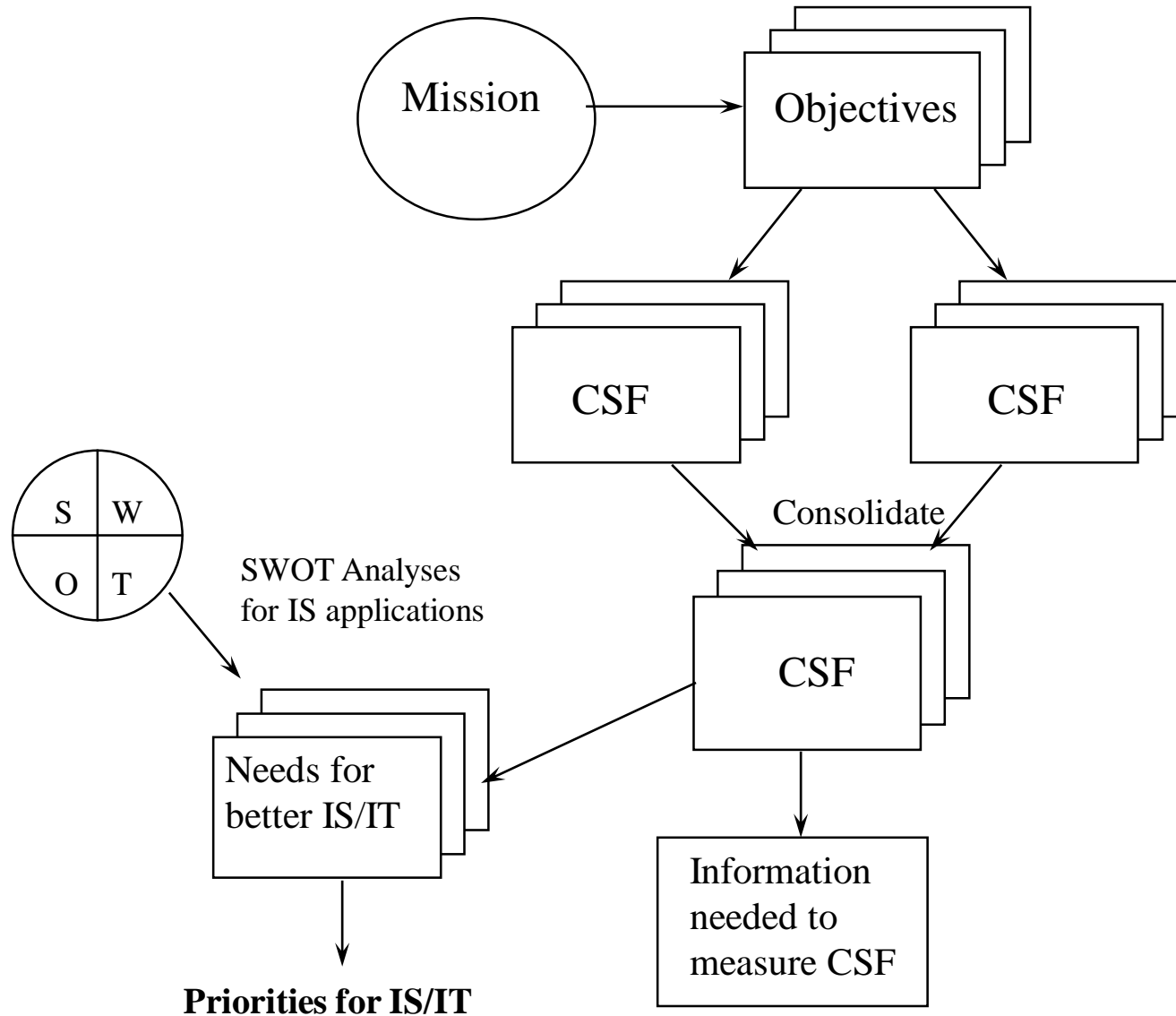
STUCK IN THE MIDDLE

Particular
Segment Only

FOCUS

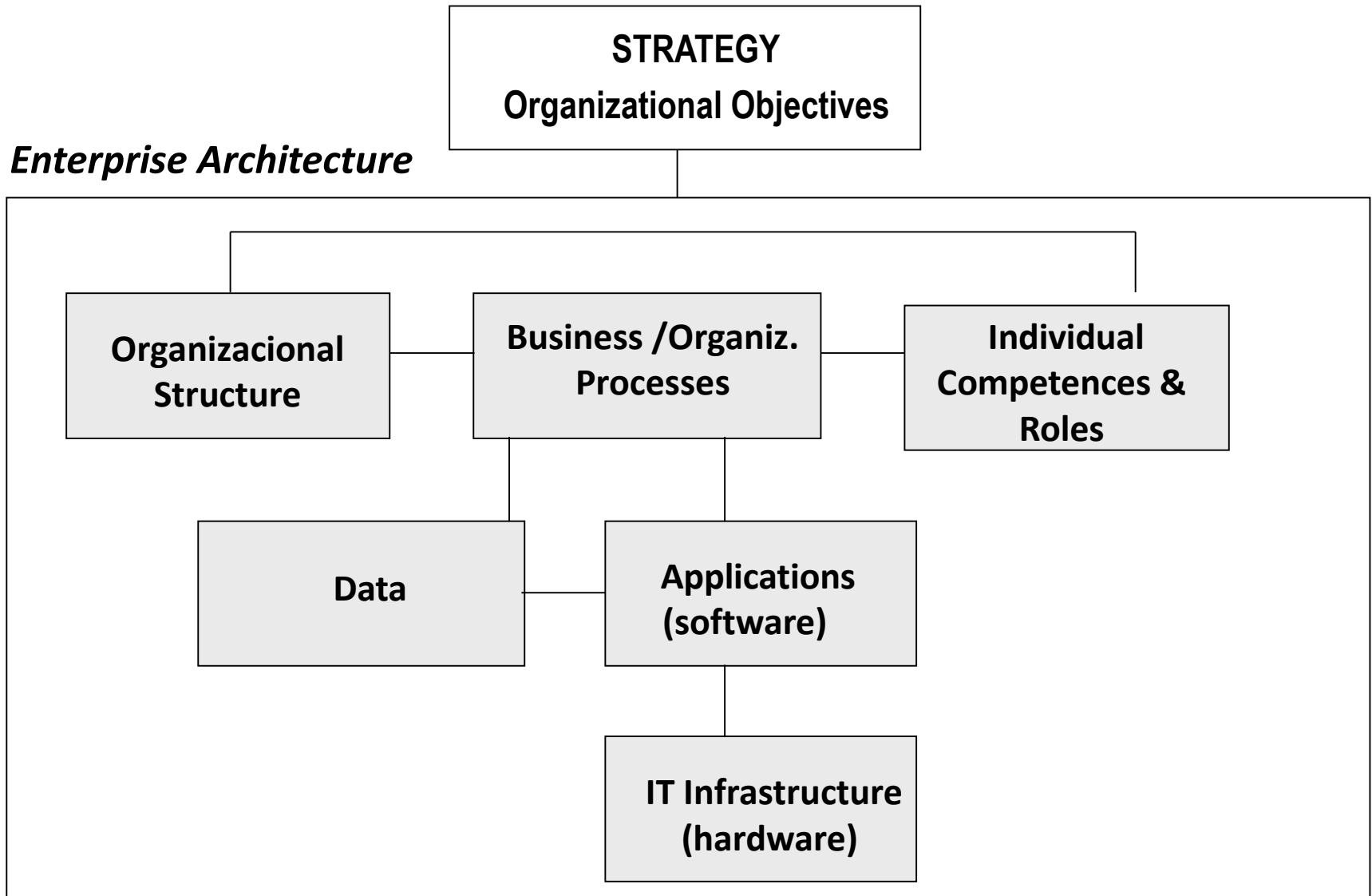


Critical Success Factors



Enterprise Architecture

A Model for Enterprise Architecture (Caldeira & Pedron, 2007)



Zachman framework

Sowa and Zachman (1992) presented 5 views (planner, project owner, designer, builder and subcontractor) and 6 different aspects of an IS project: data, functions, network, people, time and motivations.

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Comparing information systems with other industries



- **Complex products require a rigorous architecture;**
- **Components are built separately and then assembled;**
- **The architecture is a reference for product change and development.**



Enterprise Architecture

The concept of Enterprise Architecture has been developed in the academic literature in the last 20 years. John Zachman (1987) and presented a framework to help the management of information systems projects, which were increasing in size and complexity.

An **information systems architecture** is a logical construct for defining and controlling the interfaces and the integration of all of the components of an information systems (Zachman, 1987).

A framework de Zachman

PERSPECTIVES

Planner - establishes the background, scope and purpose of the enterprise;

Owner – the user of the enterprise product or service;

Designer – the engineer or architect who acts as an intermediary between what is desirable (by the owner) and what is technically and physically available;

Builder – general constructor who oversees the production of the end product or service;

Sub-contractor – responsible for building and assembling the parts of the end product or service.

ASPECTS

Data (*What*) - important items, entities and databases;

Function (*How*) – processes and specifications;

Network (*Where*) – locations;

People (*Who*) – workflows, operating instructions;

Timing (*When*) – events and schedules;

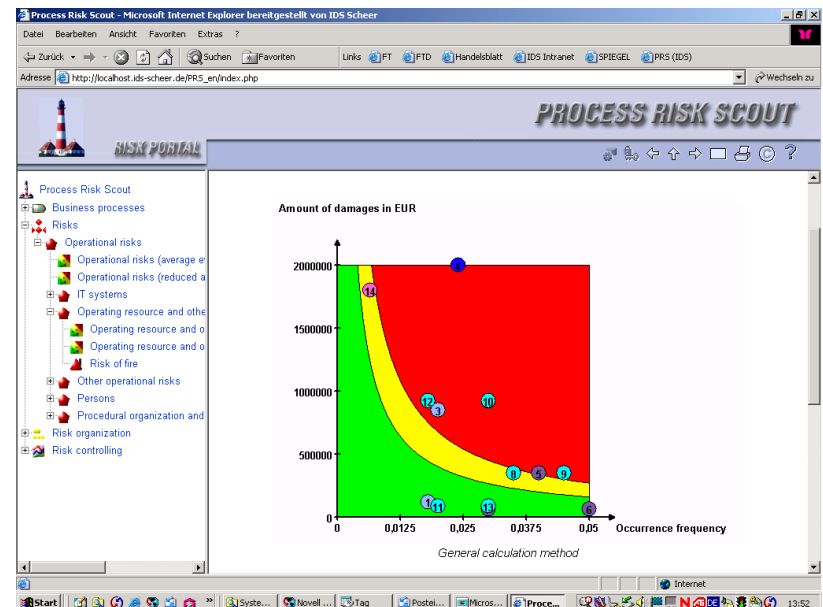
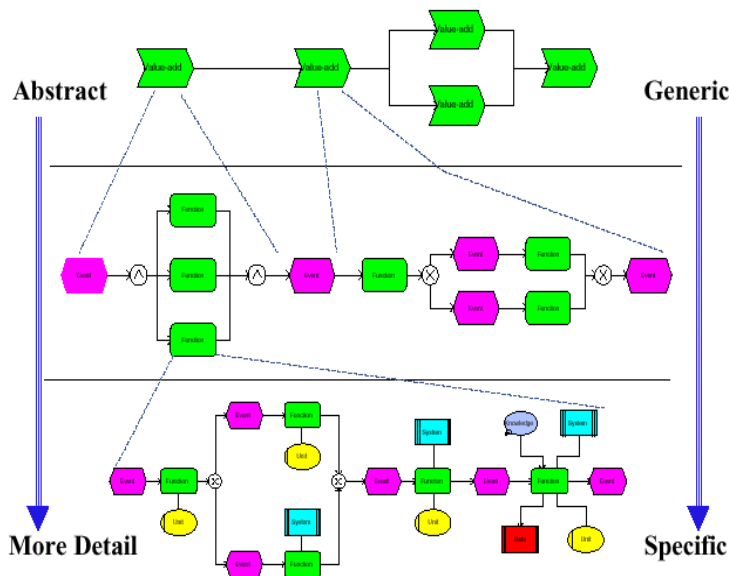
Motivation (*Why*) – desired results and means to achievement.

Problems developing an Enterprise Architecture

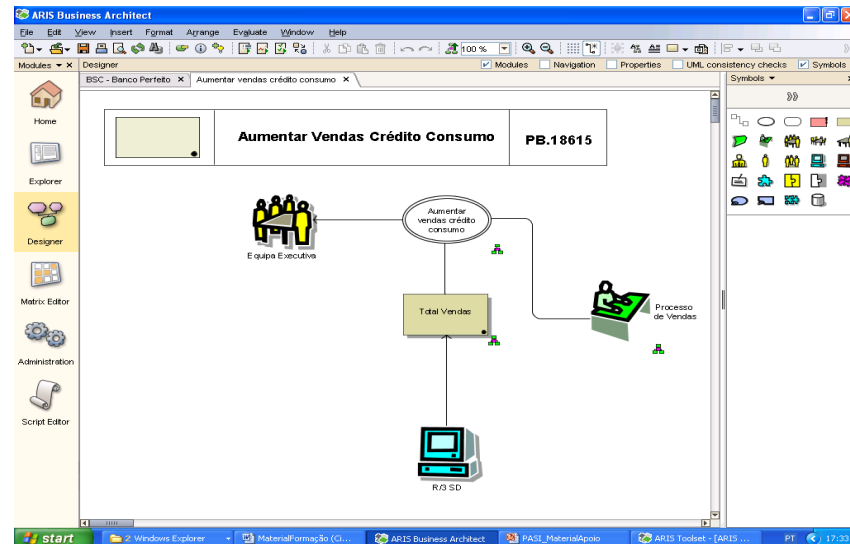
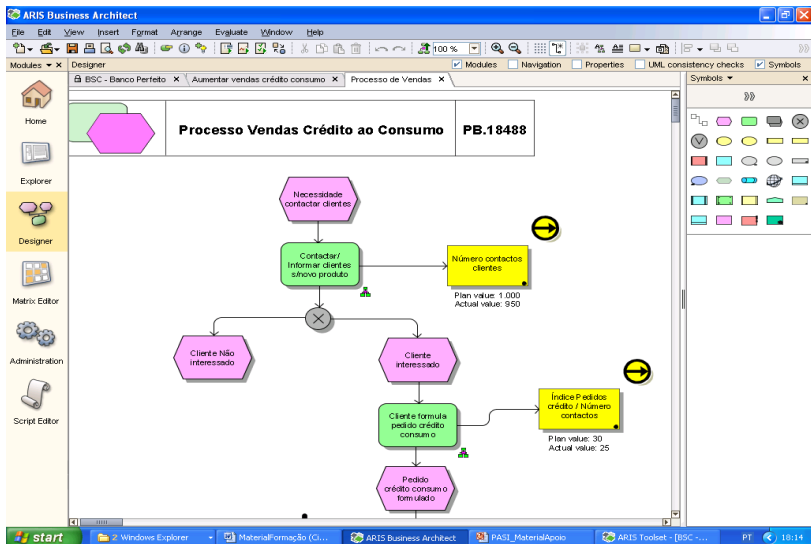
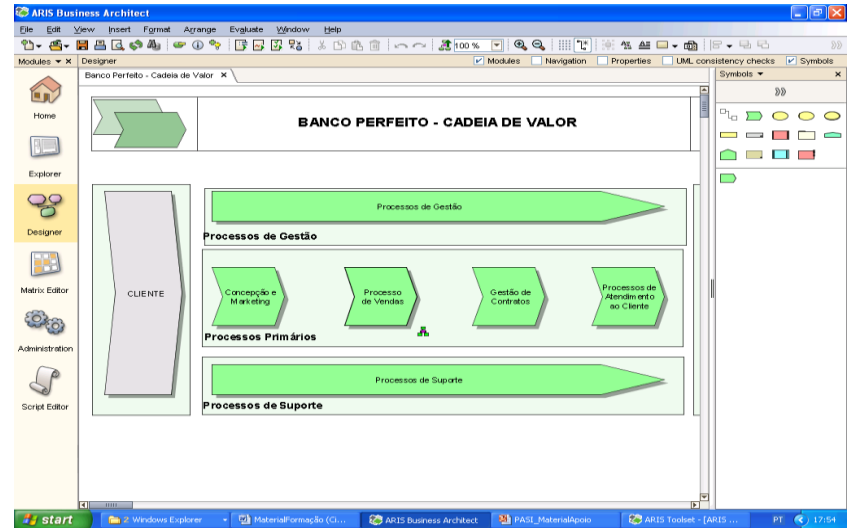
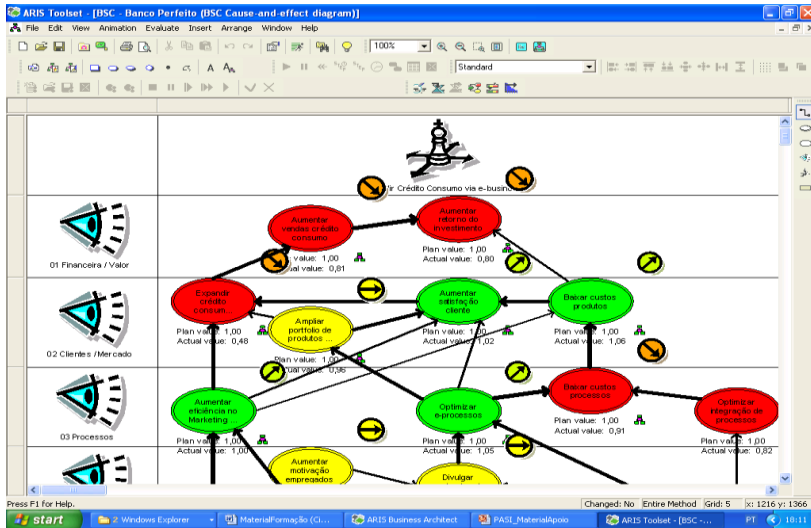
Organizations are complex systems and it is not easy to model and integrate all the dimensions of an organization.

Many organizations have a poster with Zachman's framework on the wall and they believe they have an enterprise architecture!

IT provides nowadays a significant contribution: Enterprise Architecture tools, including risk management, ...



IT and Enterprise Architecture



Benefits Management

Benefits Realisation: the problems

Many previous surveys show that a large number of IS/IT (Information Systems / Information Technology) investments fail to deliver the expected benefits.

This has been the same for 30 years! Why?

- We are implementing more complex and sophisticated IS/IT applications;
- The applications are often enterprise-wide and impact more people and external trading partners and customers;
- The range of benefits are more diverse and less easy to identify, describe, measure and quantify;
- It is difficult to relate business performance improvements directly to specific IS/IT investments.

Benefits Management

The process of organizing and managing such that the potential benefits arising from the use of information technology are actually realised.

Traditional criteria to evaluate IS/IT investments

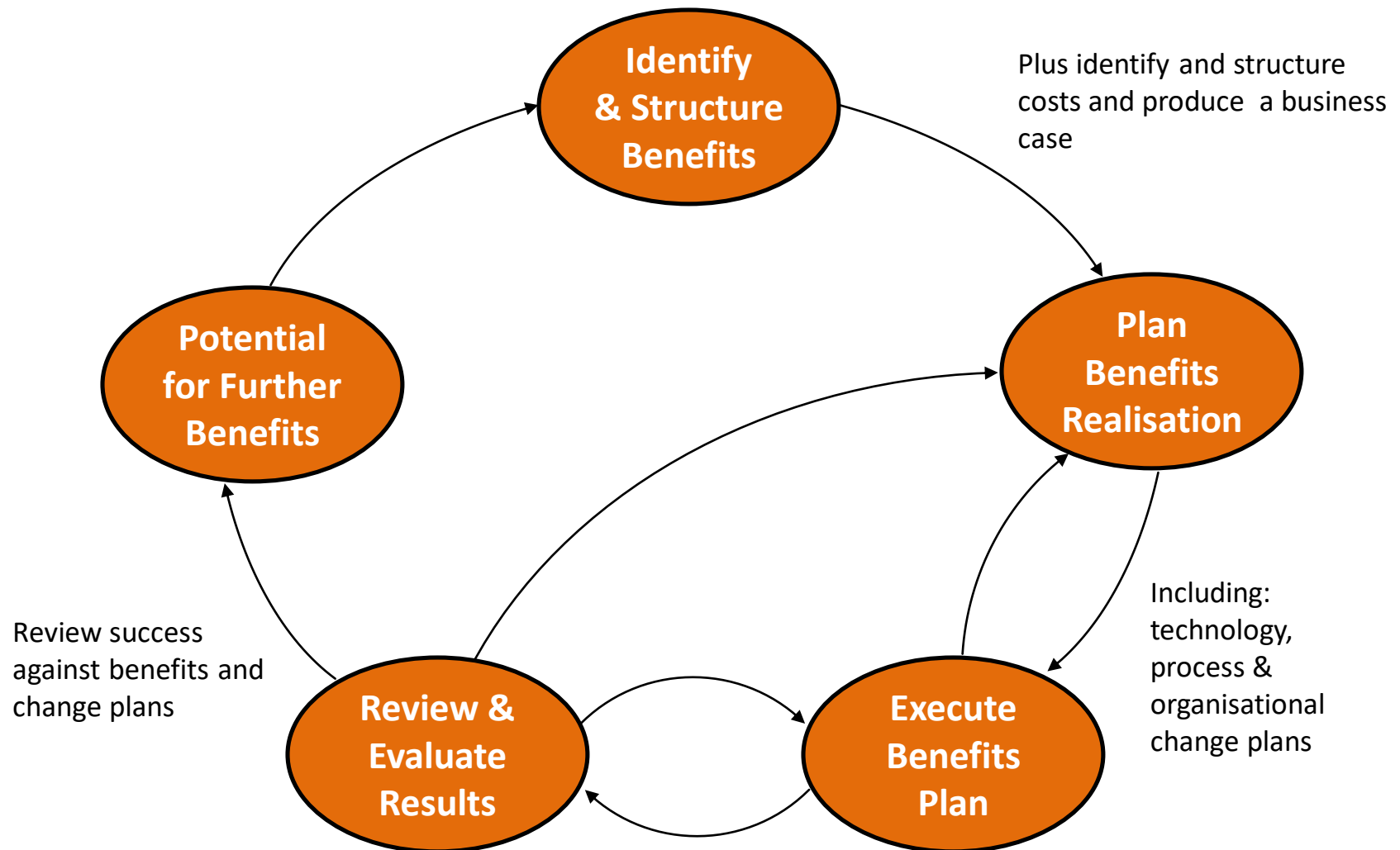
Financial indicators ?

Pay-back, IRR, NPV, ...

Possible to use when both costs and income can be estimated. For example, replacing an old technology and perform the same tasks in a more efficient way.

Problem: What is the value of a system that helps saving lives?

Process Model of Benefits Management



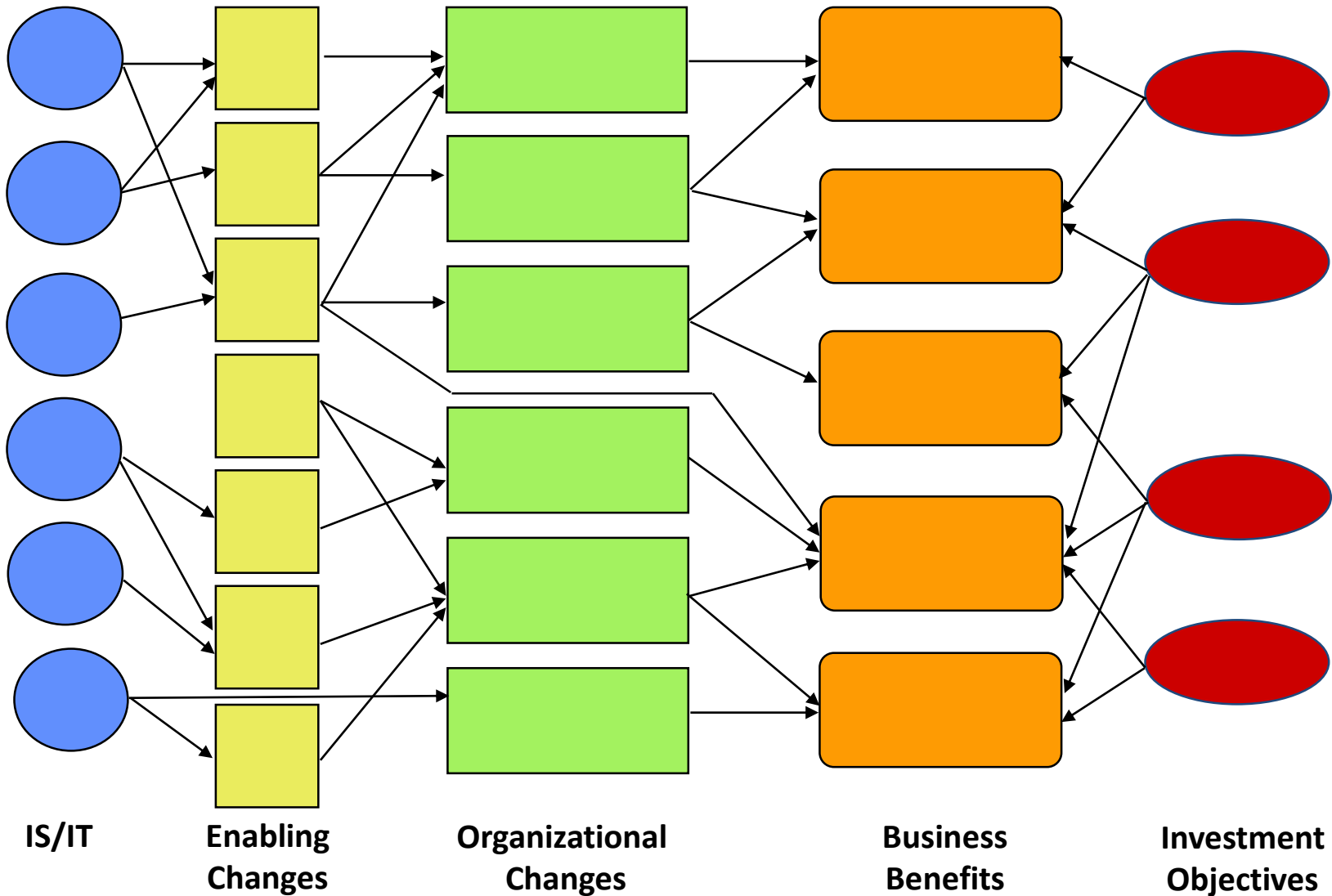
Stages of the Benefits Management Process

STAGE		ACTIVITIES
1.	Identify and Structure Benefits	<ul style="list-style-type: none"> - Analyse Business Drivers to determine the objectives for the investment - Determine the types of Benefits that will result by achieving the Objectives and how they will be measured - Establish Ownership of the benefits - Identify Changes required and Stakeholder implications - Develop outline Investment/Business Case
2.	Plan Benefits Realisation	<ul style="list-style-type: none"> - Finalise measurements of benefits and changes - Determine the Change Actions that will produce the improvements with stakeholders - Submit Investment Case for funding
3.	Execute Plan	<ul style="list-style-type: none"> - Manage the Change Programmes - pursuing benefit delivery as well as technical implementation
4.	Evaluate and Review	<ul style="list-style-type: none"> - Formally assess whether the Investment Objectives and Benefits were achieved - Initiate Action to gain outstanding benefits still achievable - Identify lessons for other projects
5.	Potential for Further Benefit	<ul style="list-style-type: none"> - Use the project team and other key stakeholders to identify any new Benefits and initiate action to realise them.

Structuring Benefits

<i>Degree of explicitness</i>	Do new things	Do things better	Stop doing things
Financial (€)			
Quantifiable			
Measurable			
Observable			

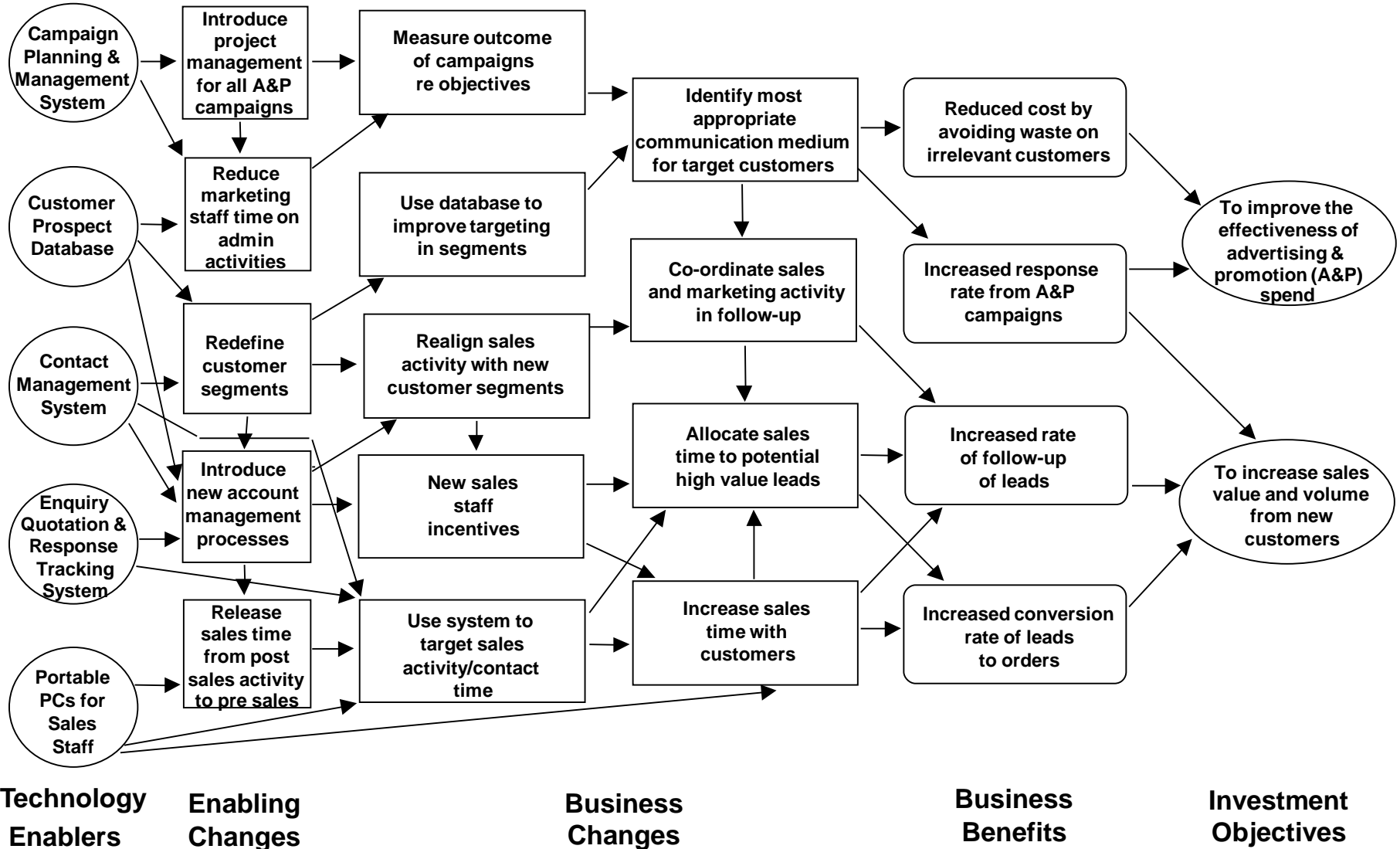
Benefits Dependency Network



**B
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EXAMPLE OF (part of) BENEFITS DEPENDENCY NETWORK - Sales and Marketing System



Business Drivers, Organizational Changes and Investment Objectives



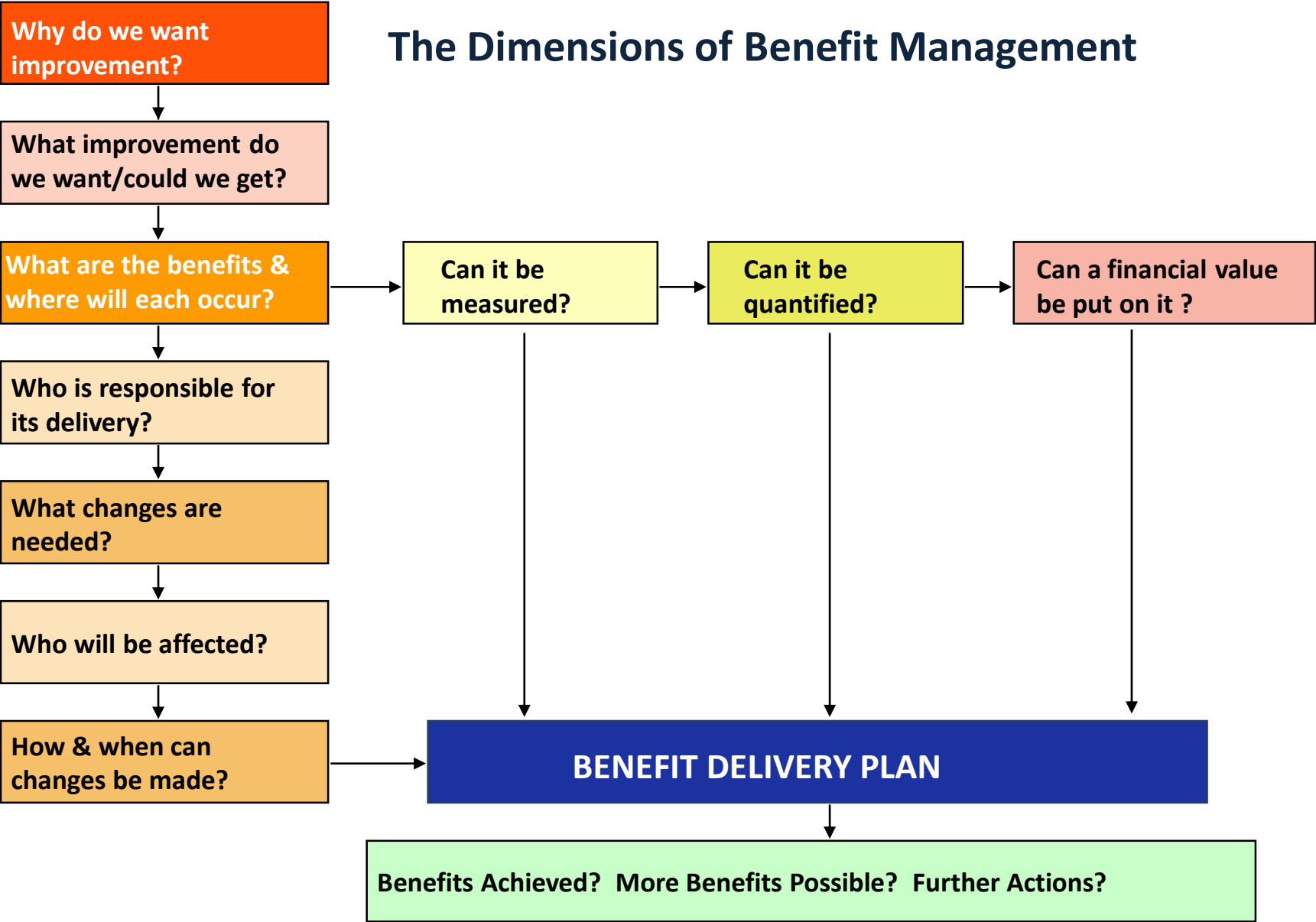
Basic Principles

- Each benefit must have an owner;
- Intangible benefits ? Unless a benefits is, at least, observable, it doesn't exist;
- Performance only increases when tasks (organizational processes) are performed in a more efficient way.

Example: structuring benefits, responsibilities and measures

Benefit number, type & related objectives	Benefit definition	Benefit owner	Changes and responsibilities	Measures	Expected value (if applicable)	Date of realization

The Dimensions of Benefit Management



STAKEHOLDER ANALYSIS

(after Benjamin & Levinson)

Stakeholder Group	Perceived Benefits (Disbenefits)	Changes Needed	Perceived Resistance	Commitment (Current & Required)				
				Anti	None	Allow it to happen	Help it happen	Make it happen
Customers	Configuration tailored exactly to needs - no testing / reject	None	None					
Sales & Marketing Managers	Improved customer service and product quality image	New incentives to get Sales Reps to use system with customers	Reluctance to change Reps reward systems			C	Action required?	R
Sales Reps	(Extra work in preparing requirements and quotes)	To use system and improve quality/accuracy of quotes	No time available to use/ learn system. Loss of autonomy	C			Action required?	R
Manufacturing / Logistics	Removes need for configuration checking. Less returns/queries	Stop current checks to put onus on Reps to get it right	Do not trust Sales Reps' accuracy in requirements/ quote	C			Action required?	R
IT Developers	New advanced system - remove old difficult to maintain system	Skills in Expert System Development	None					

Based on a project to implement an expert system for Product Configuration

A study of the impact of Alert® in the Hospital of Espirito Santo in Évora, Portugal

- A Benefits Management approach

The Hospital of Espírito Santo, in Évora

(October 2006 – July 2010)

In **2008**:

Number of Employees: 1.400

Beds: 350

Number of potencial users of the hospital: 173.646 people (directly)
500.000 people (indirectly)

Outpatient appointments: 158.673

Emergency episodes: 77.524

Surgeries: 8.921

Diagnosis & therapy (X rays, blood analysis, etc) : 1.805.327

Services where Alert[®] was implemented:

- Emergency room;
- Outpatient appointments;
- Inpatient care;
- Surgery room.

Generic Benefits Dependency Network

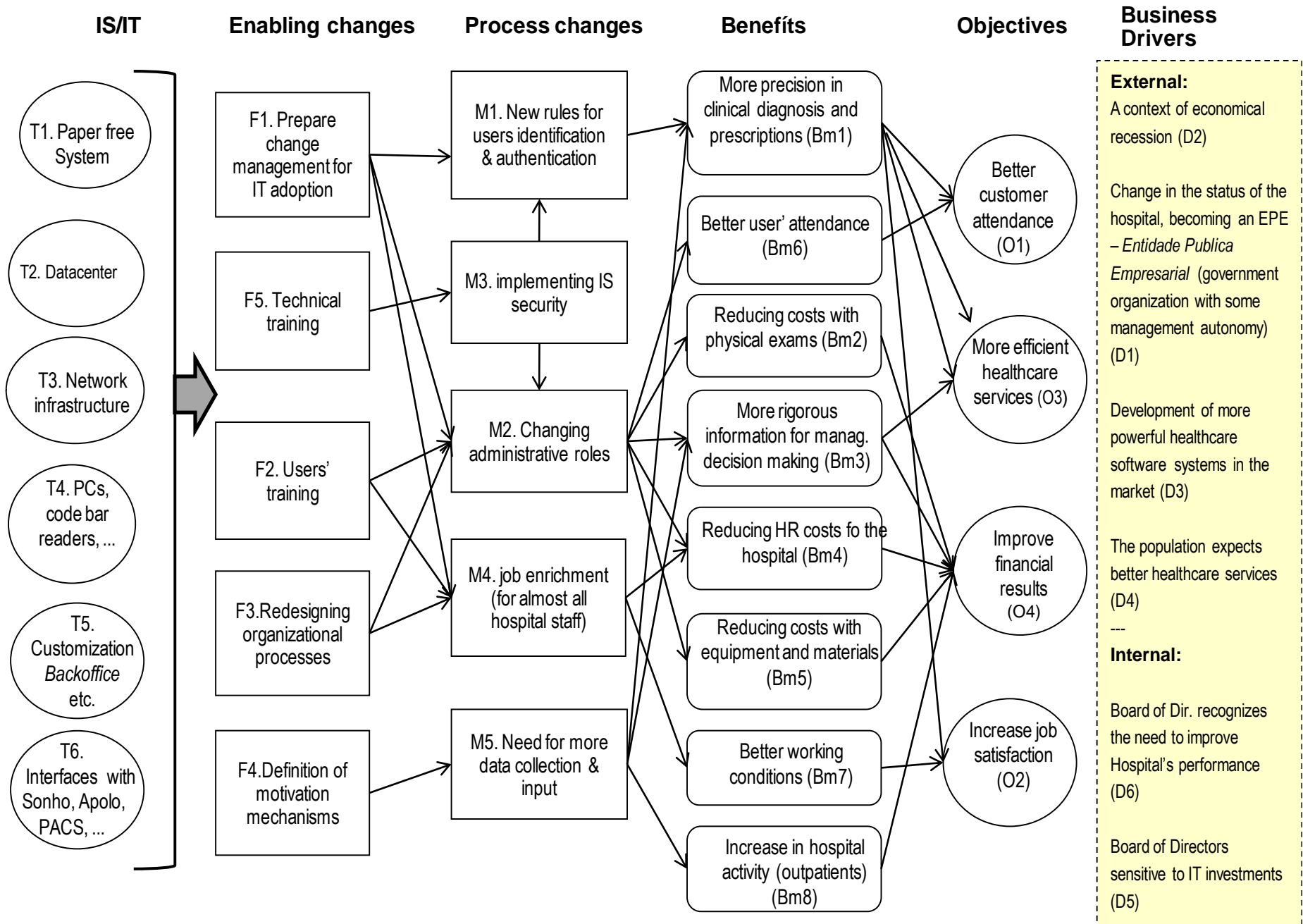


Table 1 – Potential Benefits due to Alert® systems implementation.

ID	Benefit definition	Macro Benef.	Measure	Initial value	Expected value	Data Source	Type Benefit	Resp.	Major Stake-Holder	Secund. Stake-holders.	Result
B1	Reducing time & cost of auditing Manchester triage.	Bm1	Average time to audit a process & its cost	6m 24s (€2/ process)	EV:3m 12s R: 1m58s (1 € / process)	Nurse AD	F	AT	AT	DE; M	€ xxxxx /year
B2	Reducing the cost of clinical analysis	Bm2	Number of analyses and its value (sample: 6 days)	42 analyses (8h-16h) 47 analyses (16h-24h)	10% Reduction Not achieved	Dr. RG	F	M	DL	CA; M; DC; MS; P	€ xxxx /year
B3	Reducing the number of X rays	Bm2	Number of X rays (sample: 6 days)	52 x rays (8h-16h) 49 x rays (16h-24h)	5% Reduction Not achieved	Dr. LF	Q	M	DI	CA; M; DC; MS; P	Not significant
B4	Reduction in the number of computer-assisted tomography (CT)	Bm2	Number of CTs and its value (6 days)	5 TACs (8h-16h) 6 TACs (16h-24h)	5% Reduction Achieved	Dr. LF	F	M	DI	CA; M; DC; MS; P	€ xxxx /year
B5	Reduction in the number of ecographies	Bm2	number of ecographies (sample: 6 days)	5 Ecogr.. (8h-16h) 1 Ecograf. (16h-24h)	5% Reduction Achieved	Dr. JD	F	M	DI	CA; M; DC; MS; P	€ xxxxx/year

Potencial Financial Benefits Identified:

• Auditing Manchester triage	xxxxx €
• Reduction in the number of physical/medical exams	xxxxx €
• Reduction in the number of computer-assisted tomogr.	Xxxxx €
• Reduction in the number of ecographies	xxxx €
• Reduce the cost of data input	xxxx €
• Decrease of storage costs	xxxxx €
• Paper reduction	xxxx €
• Reduction in office material	xxxx €
• Reduction in imagiology costs	xxx €
• Reduction in tags for ID (cost)	xxx €
• Reduction of printing costs (tags)	xxx €
• Reduction of lab staff costs	xxxxx €
• Elimination of printing forms	xxxx €
• Reduction of printing staff	xxxxx €
• Increase in invoicing	xxxxx €
▪ Increase in outpatient appointm. without extra staff	xxxx €
<u>Expected value (from 2010):</u>	<u>€ 3.869.896 / year</u>

Other relevant non-financial benefits:

- **Integration & availability of historical personal health records/data;**
- **Availability of business indicators for decision making;**
- Reduction in the number of X rays and radiation received by patients;
- Reduction in patient waiting time, especially between the Manchester triage and the first clinical observation (around 12%);
- Increase in confidentiality and security of clinical data;
- Better attendance and information provided to patients and their relatives.