

Master Degree Programme in Computer Science

Enterprise Information Systems

5. Key Performance Indicators – Design Issues



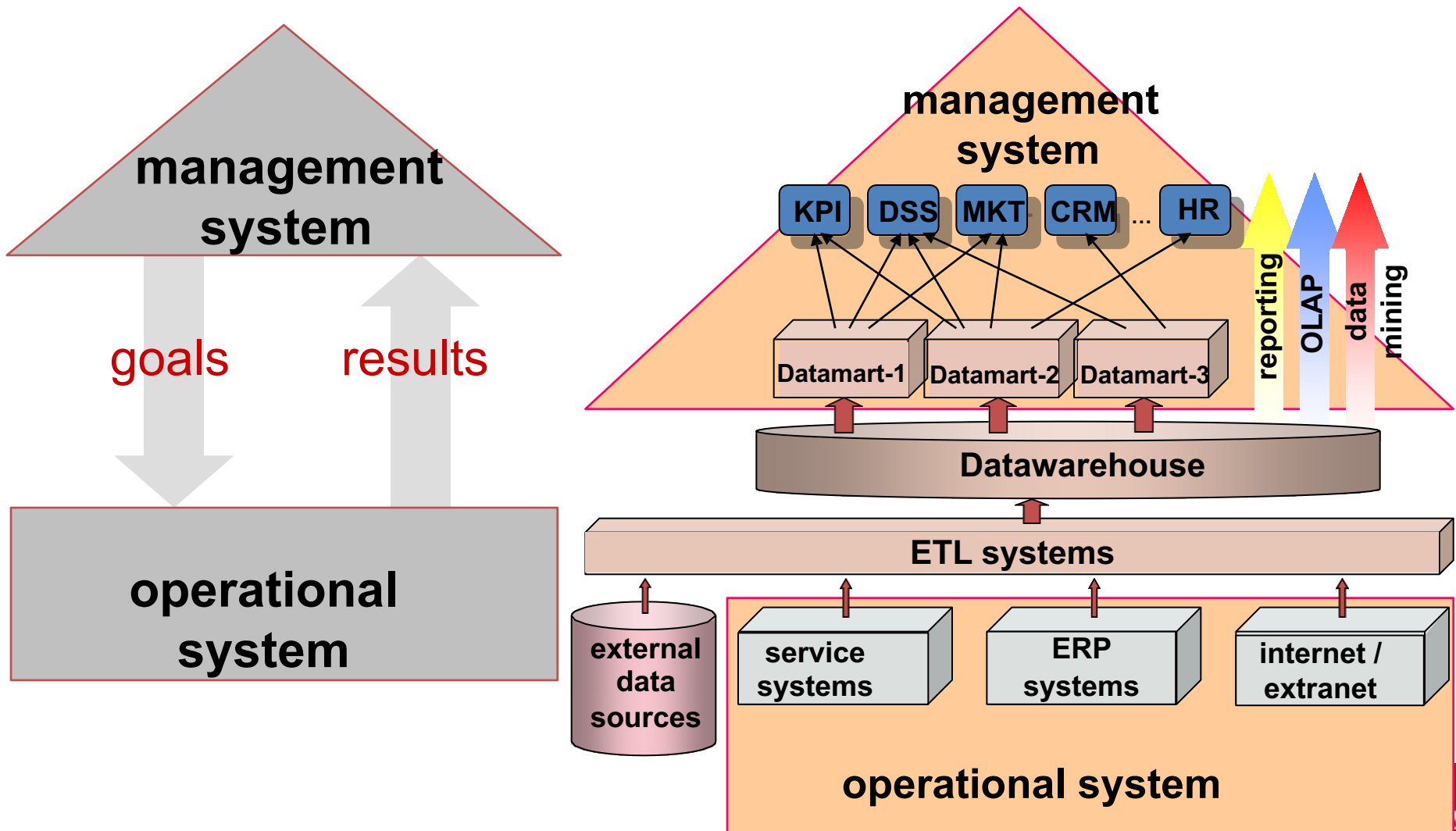
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Architecture for Business Intelligence



Enterprise Management

(Robert) Anthony's Pyramid (Triangle)

- strategic decisions
 - overall objectives of the enterprise
 - positioning, scenarios, ...
- management decisions
 - economic objectives & BUDGET
- operational decisions
 - planning and control of operational activities

Strategic Management

“Strategic management is an ongoing process that evaluates and controls the business and the industries in which the company is involved; assesses its competitors and sets goals and strategies to meet all existing and potential competitors; and then reassesses each strategy annually or quarterly [i.e. regularly] to determine how it has been implemented and whether it has succeeded or needs replacement by a new strategy to meet changed circumstances, new technology, new competitors, a new economic environment., or a new social, financial, or political environment.” (Lamb, 1984)



Critical Success Factors (CSF)

“Critical Success Factors (CSFs) - CSFs are the limited number of areas in which satisfactory results will ensure successful competitive performance for the individual, department or organization.

CSFs are “the few key areas where ‘things must go right’ for the business to flourish and for the manager's goals to be attained.”
[Rockart, 1979]

CSF = areas of excellence / attention

note:

- **corporate objectives:** what to do (goals to be achieved)
- **CSF:** how to achieve the objectives (second level goals, subject to the previous ones)

Key Performance Indicators (KPI)

Performance measurement for business processes

Review of:

- effectiveness
 - degree of compliance to a target
- efficiency
 - productivity, unit costs (analogous to audit)
- quality
- resources
- input
 - evaluation of the service in this process is "customer"
- output according to the expectations of the "customer" of the process
- level of service
 - response times to the "customer", average delays, flexibility



KPI – methodological scheme

1. selection of the processes
2. identification of KPIs
3. CSF and “coverage” by KPI
4. refinement of the indicators
5. dimensional analysis
6. completing requirements



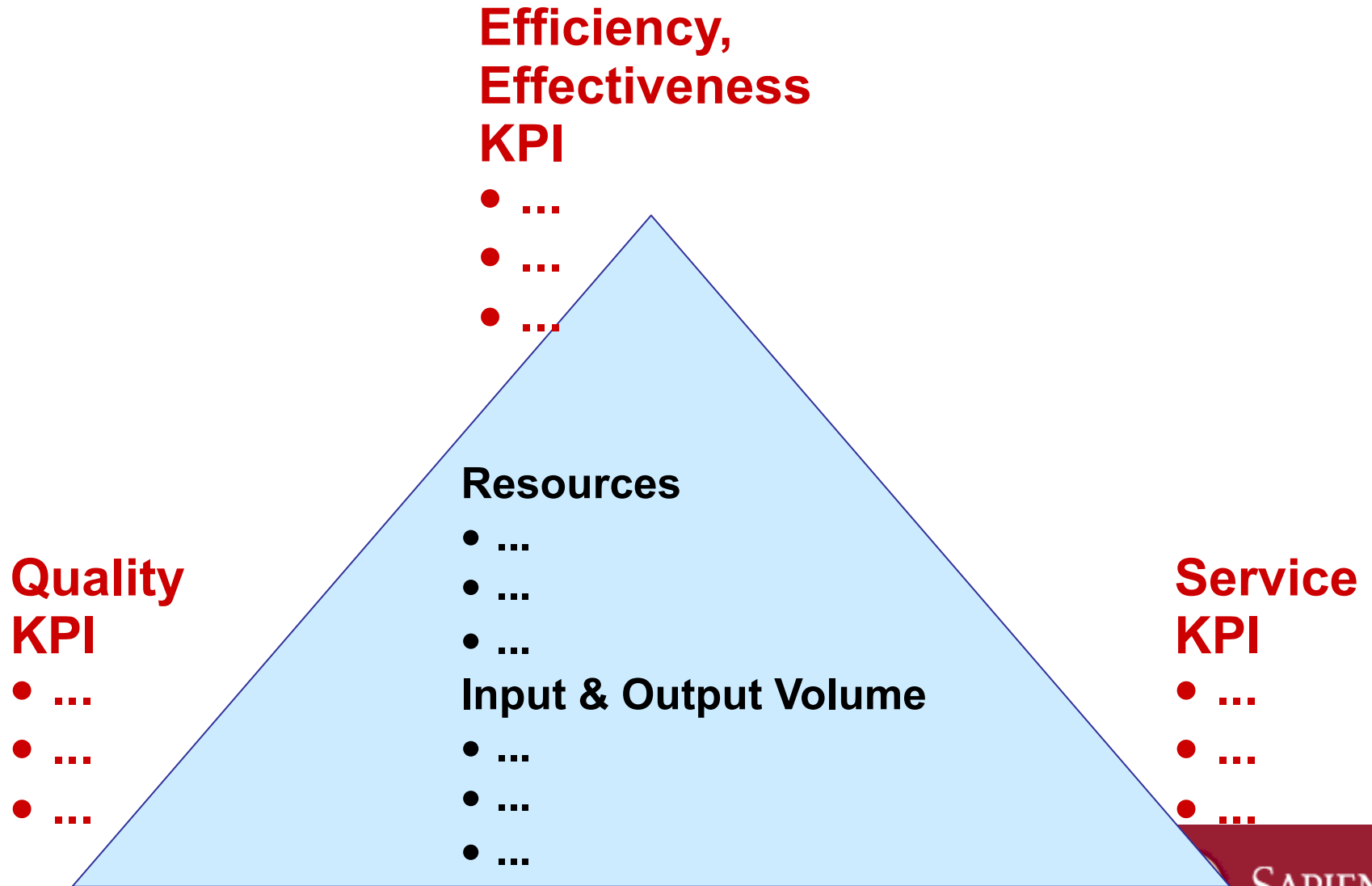
KPI method: 1 – selection of processes

- identification of business processes ...
- selection process to be controlled
- for each process:
 - name
 - description
 - motivation
 - priority



KPI method: 2 – identification of KPIs

Triangle of indicators



KPI method: 3 – identification of CSFs

- Product: Preliminary CFS
- Source: experience / specific area of business

type of CSF	description	CSF samples
sector	common to all companies	<ul style="list-style-type: none">• consulting firm: quality of staff• company sales: prices
competitive factors	competitive situation of the company	<ul style="list-style-type: none">• competition on CRM: processing regular customer• competition on price: agreements with companies
environmental factors	constraints outside the company	<ul style="list-style-type: none">• certified products• compliance with specific legislation
time factors	contingent situation	<ul style="list-style-type: none">• promotion/recover of reputation

KPI method: 3 – CSF and levels – One Example

LEVEL	CSF
Company	<ul style="list-style-type: none"> • Press Relations
	<ul style="list-style-type: none"> • Dealer network
	<ul style="list-style-type: none"> • Security of vehicles
	<ul style="list-style-type: none"> • Product Reliability
Function: production	<ul style="list-style-type: none"> • After-sales service
	<ul style="list-style-type: none"> • Costs of the process
	<ul style="list-style-type: none"> • Quality of Product
	<ul style="list-style-type: none"> • Environmental Concerns
Role: Responsible for certific.	<ul style="list-style-type: none"> • Image quality to other business functions
	<ul style="list-style-type: none"> • Technical Skills
	<ul style="list-style-type: none"> • Certification of processes
	<ul style="list-style-type: none"> • Control Technology
	<ul style="list-style-type: none"> • Cost of certification

KPI method: 3 – CSF - interviews

- Input: Candidate / Preliminary CFS
- Source: company executives
- Activities: interviews
- Product: CFS + indicators + Details

for each CSF:

for each KPI:

- name
- description
- metrics
- data sources
- motivation

KPI method: 3 – KPI vs. CSF (“coverage”)

With the lists of KPI and CFS, verify the “coverage” of CSF by means of KPI

		CSF	
KPI	cost	quality	environment
direct unit cost	X		
overhead unit	X		
defects in production		X	
defects in service		X	
customer rating		X	
comparison competition	X	X	
comparing the past	X	X	
waste products			X
recyclable material			X
energy consumption	X		X

KPI method: 4 – refinement of the indicators

- metrics
- notes on processing / aggregation
- source
- final / budget



KPI method: 4 – refinement of the indicators – Robustness

Subjective evaluation and qualitative of the identified indicators metrics (1 = best, 5 = worst):

- a. **simplicity**: otherwise not used
- b. **cost of information**: resources used
- c. **significance**: a contribution to the measure of CSF
- d. **frequency**: how many updates/time
- e. **determinedness**: accuracy of measurement



KPI method: 4 – refinement of the indicators – Robustness

An example

metrics (1 = best, 5 = worst)

CSF	indicator	simplicity	cost	significance	frequency	determinedness	AVG (robustness)
cost	direct unit cost	1	2	2	1	1	1,4
	overhead unit	2	1	2	2	2	1,8
quality	defects in production	1	1	2	1	1	1,2
	defects in service	1	2	2	1	1	1,4
	customer rating	1	4	1	3	3	2,4
	compare with competitors	2	4	2	4	3	3
	comparing the past	3	2	3	4	3	3
environment	waste products	2	1	2	2	2	1,8
	recyclable material	3	2	2	2	2	2,2
	energy consumption	2	1	2	4	2	2,2

KPI method: 5 – Dimensional Analysis

For each KPI:

- applicable dimensions

For each dimension of an indicator:

- purpose
- elements of the domain
- applicable hierarchies (? bottom-up?)



KPI method: 6 – Finishing requirements

For each indicator:

- data sources
- processes of aggregation / calculation
- description of the properties (dimensions)
- distribution within the organization
- correlation with CSF (step 4)

as CSF

Balanced Scorecard (BSC)

- Kaplan & Norton 1996
- Integration of many previous concepts:
 - customer orientation
 - BPR
 - MBO (Management By Objectives)
- Performance Measurement System (“scorecard”), based on the “balance” of various classes of indicators, each geared to specific analysis perspective"



Identification of KPI: Balanced Scorecard (BSC)



BSC: general structure

