INFO-H420
Management of Data Science and Business Workflows
Part I: Introduction

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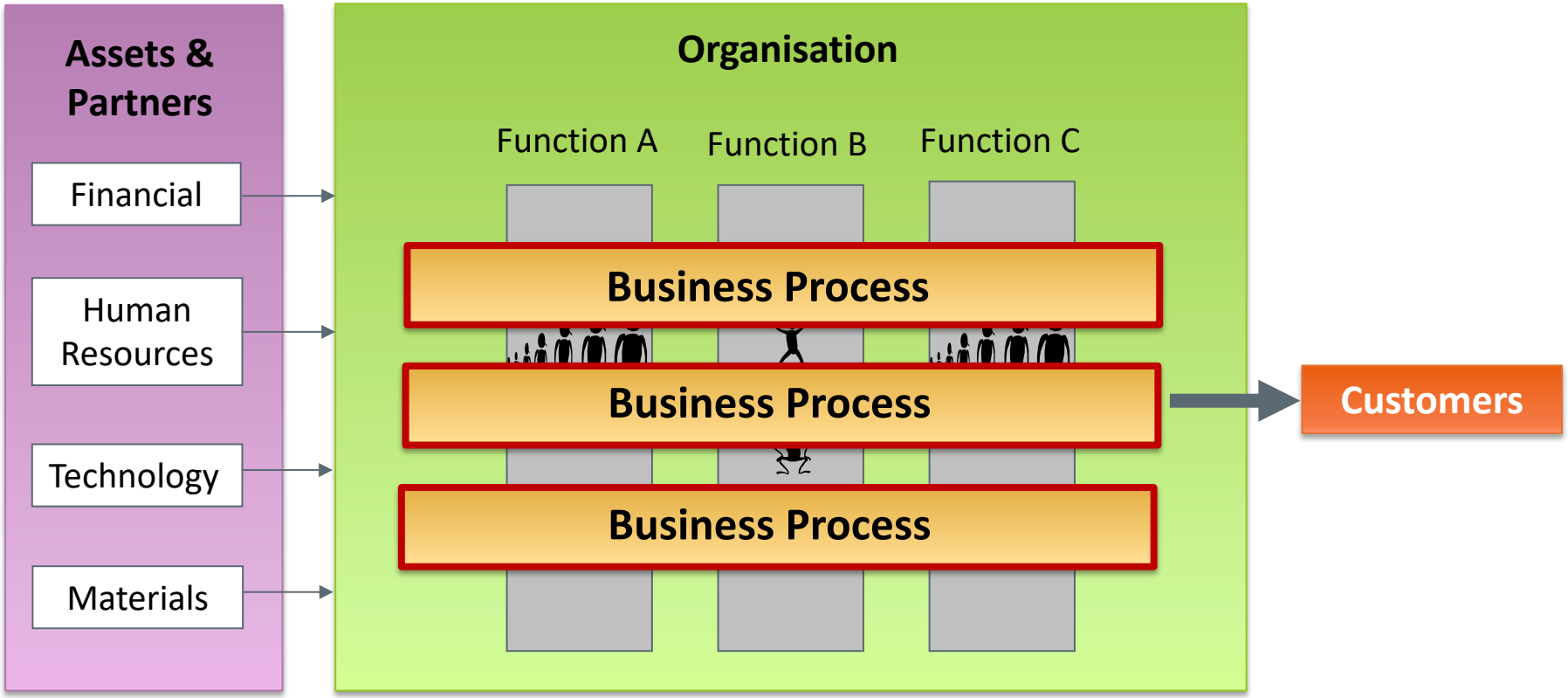
2023-2024

What is a Business Process?

Issue delivery receipt
Load truck
Package products
Issue invoice
Prepare shipment
Schedule payment
Schedule delivery
Check & confirm PO
Unload truck
Notify shipment
Obtain PO confirm.
Check Invoice
Request PO change
Match incoming payment

Business processes



PO received
Check & confirm PO
Package products
Load truck
Notify shipment
Issue invoice
Match payment
Payment made
P.O.
7465 8792
D. KAPIKA
PO issued
Obtain PO confirm.
Schedule delivery
Unload truck
Issue delivery receipt
Check invoice
Schedule payment
Goods arrived
P.O.
7465 8792
D. KAPIKA

Your turn…

Load dish-washer

Serve meal

Bring menu

Take order

Collect payment

Collect laundry

Brush grills

Unload dish-washer

Collect laundry

Clean kitchen surfaces

Sweep & mop

Greet & seat

Present bill

Customer arrived
Greet & seat
Take order
Bring menu
Serve meal
Present bill
Issue invoice
Customer paid
Kitchen is dirty
Load dish-washer
Clean kitchen surfaces
Brush grills
Collect laundry
Sweep & mop
Unload dish-washer
Kitchen is clean

A business process is…

a chain of events, activities and decisions
…involving a number of actors and objects,
…triggered by a need
and leading to an outcome that is of value to a customer.

Examples:

- Order-to-Cash
- Procure-to-Pay (aka Purchase-to-Pay)
- Application-to-Approval
- Issue-to-Resolution

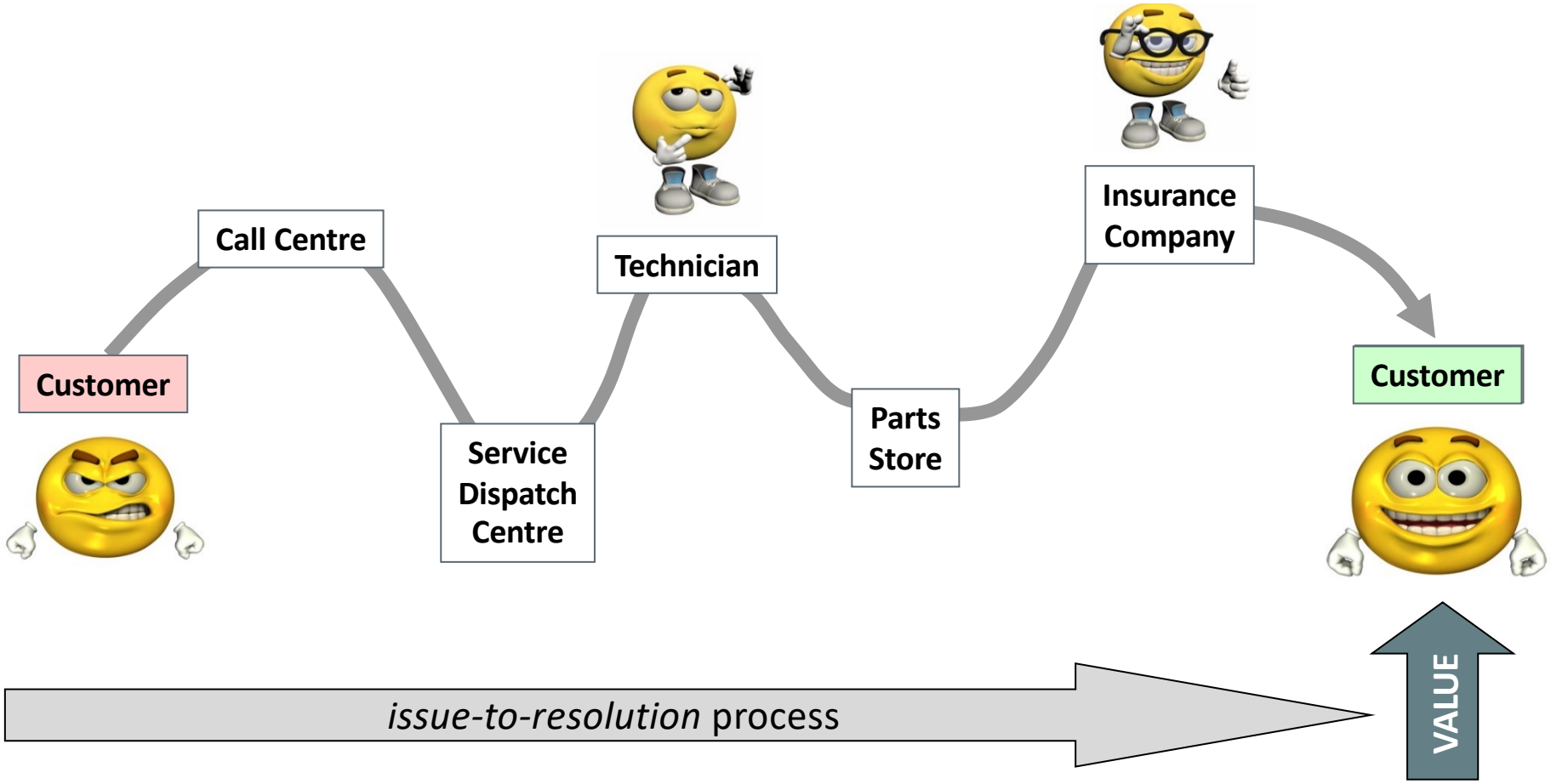
“My washing machine doesn’t work…”

Negative outcomes (value-reducing):

- Fault not repaired in a timely manner
- Fault repaired but customer pays more than expected

Positive outcomes (value-adding):

- Fault repaired immediately with minor intervention
- Fault repaired, covered by warranty



Your turn

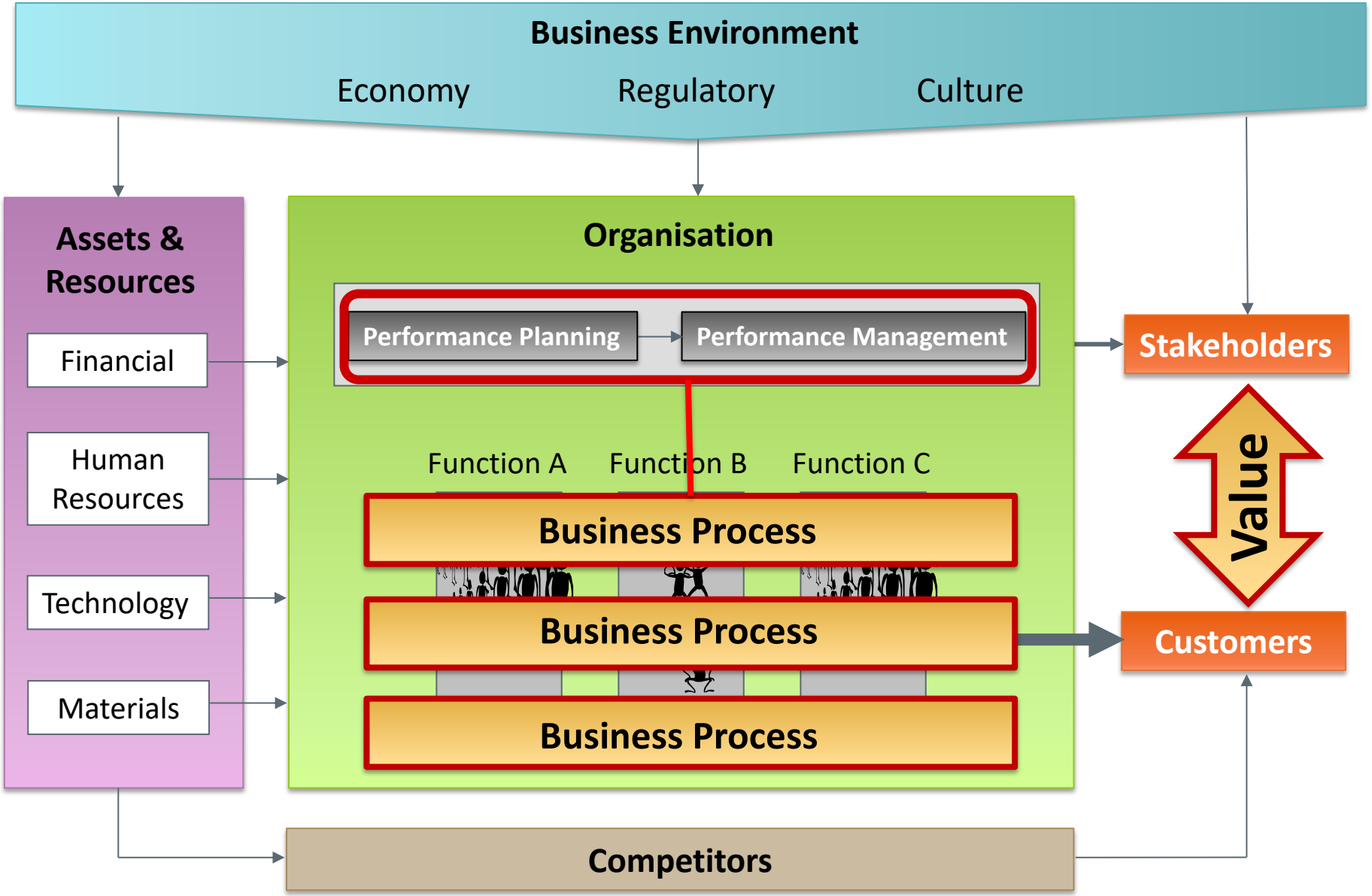
- Think of an organization and a process in this organization:
  - Is it order-to-cash, procure-to-pay, application-to-approval, issue-to-resolution…
  - Who is/are the customer(s)?
  - What value does this process deliver to its customer?
  - Who are the key actors of the process?
  - List at least 3 outcomes of the process.

ULB

What is Business Process Management?

And why should I care about it?

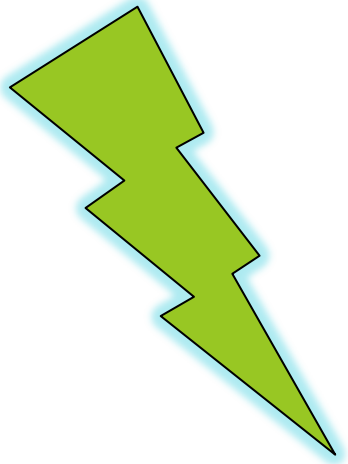
Improving Performance (Rummler's Framework)



Process performance

If you had to choose between two services, you would typically choose the one that is:

- F…
- C…
- B…



Process performance

If you had to choose between two services, you would typically choose the one that is:

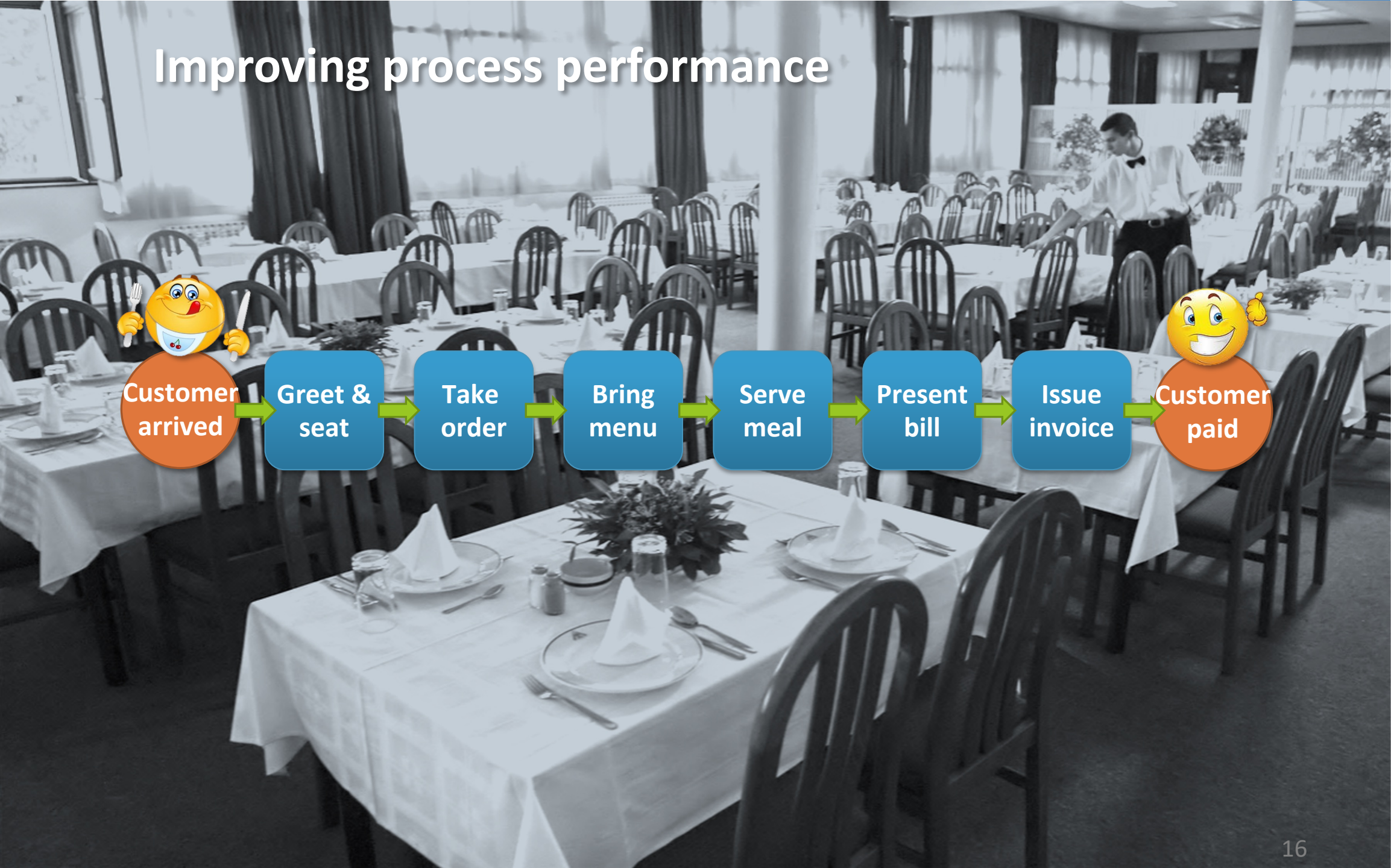
- Faster
- Cheaper
- Better

Process performance

Three dimensions of process performance

- Time
- Cost
- Quality

Improving process performance



How would you improve this process?

Outsource to Customer

Standardize

Eliminate Cooking

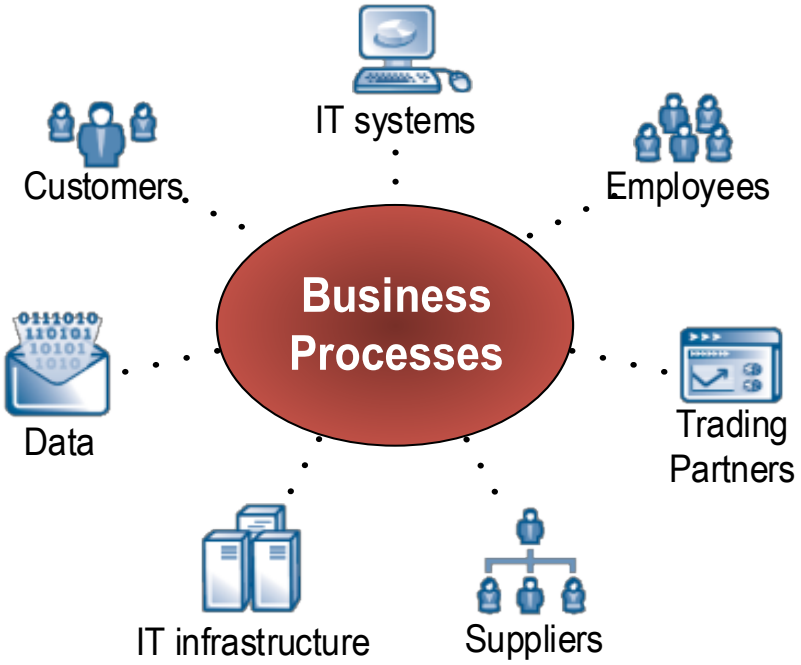
Automate

Invest and Build

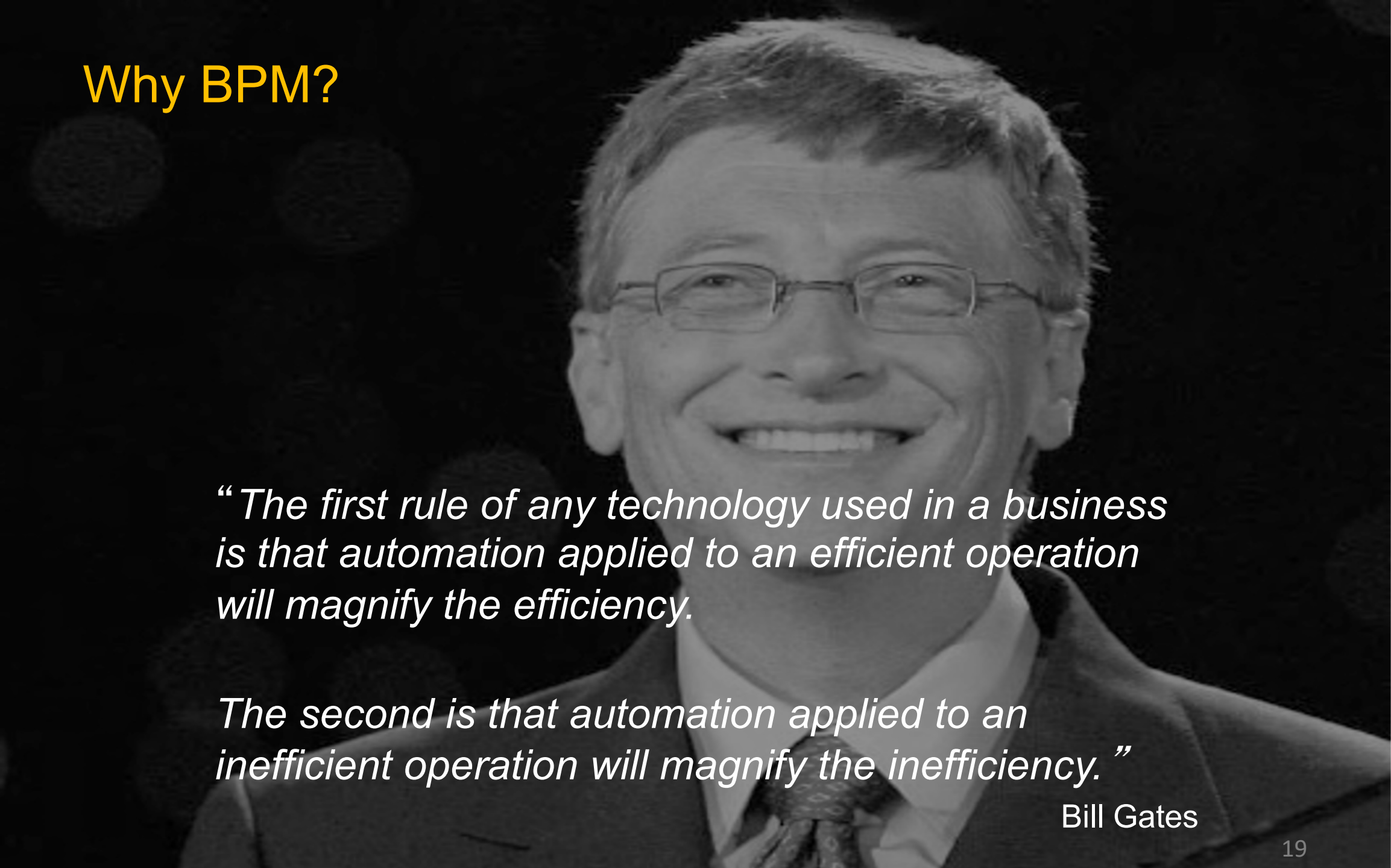
Re-sequence

Business Process Management (BPM)

Body of principles, methods and tools to design, analyze, execute and monitor business processes, with the aim of improving their performance.



Why BPM?

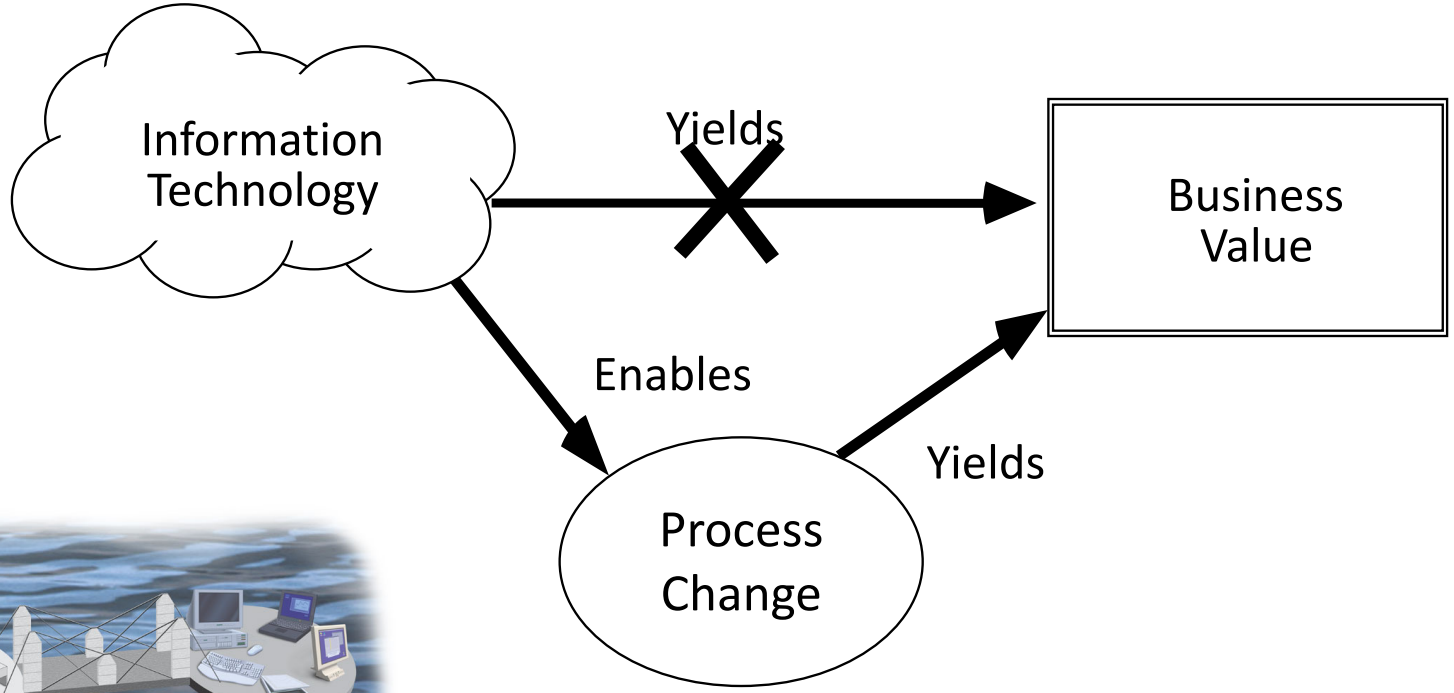


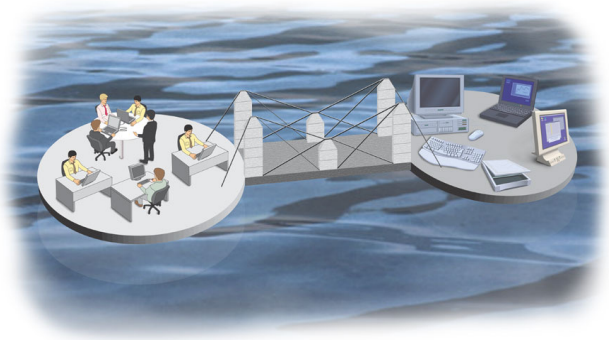
"The first rule of any technology used in a business is that automation applied to an efficient operation will magnify the efficiency.

The second is that automation applied to an inefficient operation will magnify the inefficiency."

Bill Gates

In other words…

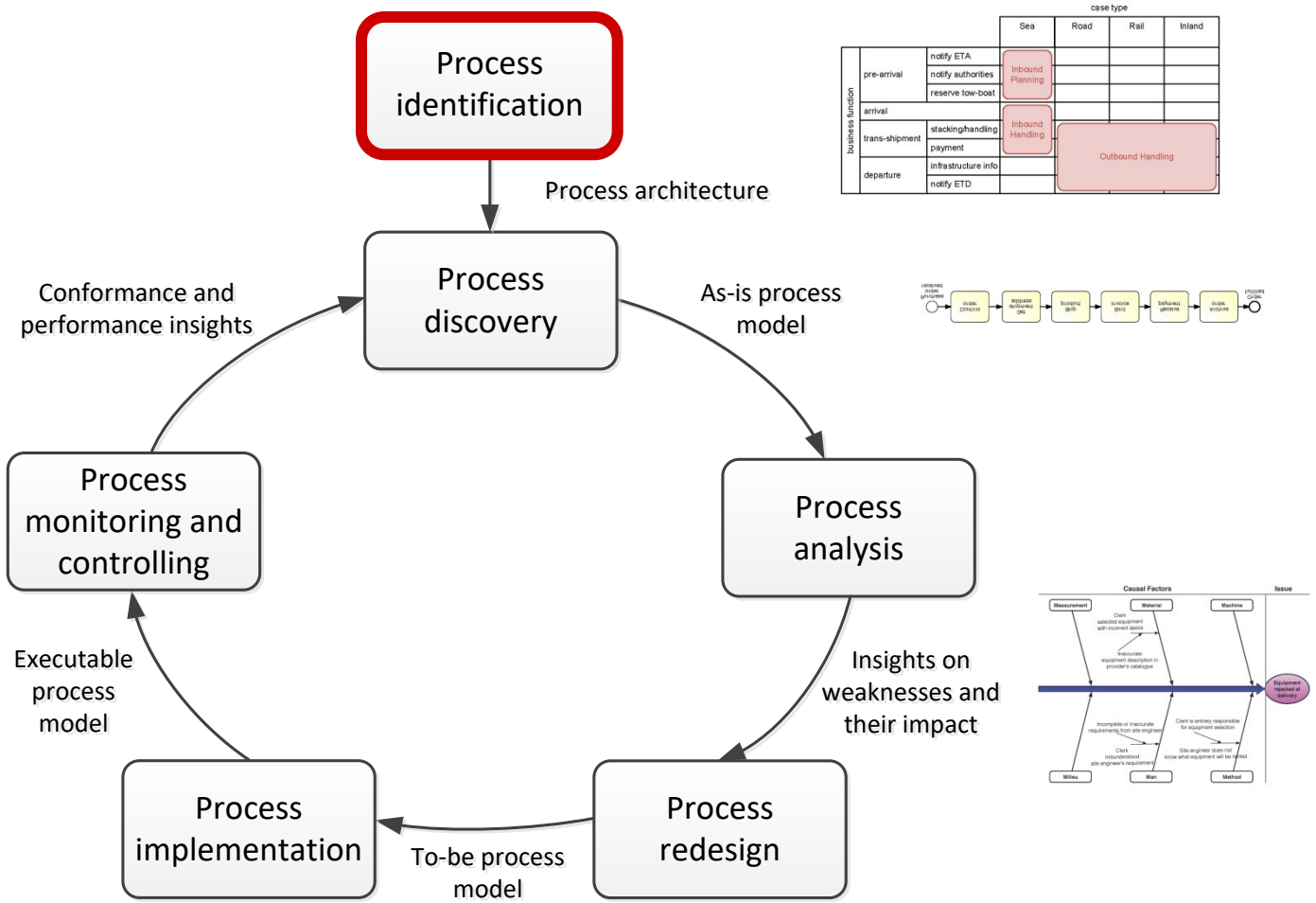




Index Group (1982)

How to go about BPM?

The BPM lifecycle



Process identification steps

1. Designation step
   - Enumerate main processes
   - Determine process scope

→ Process Architecture

2. Prioritization step (aka Process selection)

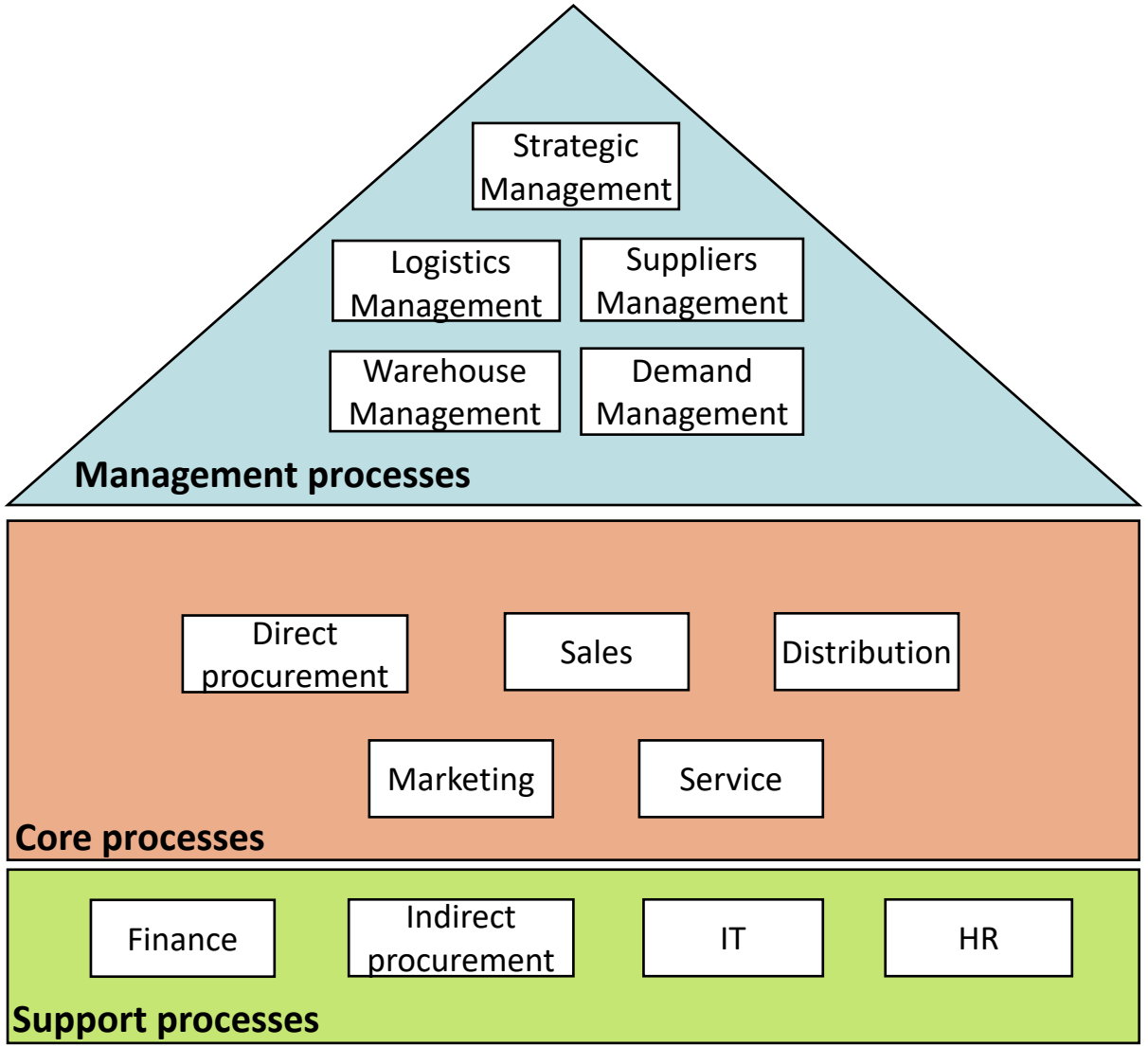
   Prioritize processes based on:
   - Importance
   - Health
   - Feasibility

→ Prioritized Process Portfolio

After Davenport (1993)

Example: process architecture

Wholesaler



Prioritization (aka Process Selection)

1. **Importance**

   Which processes have greatest impact on the organization‘s strategic objectives?

2. **Health (or Dysfunction)**

   Which processes are in deepest trouble?

3. **Feasibility**

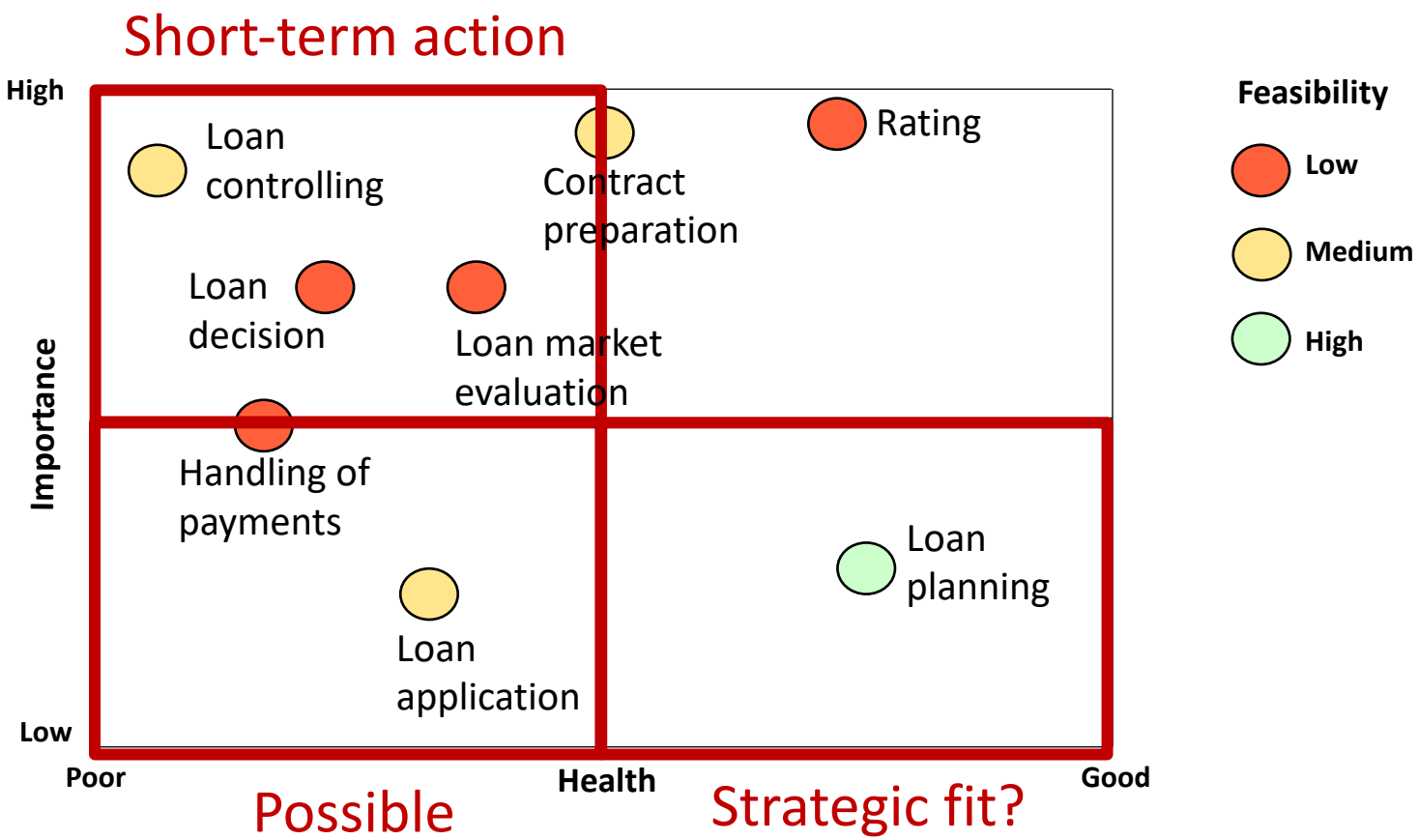
   Which processes are most susceptible to successful process management?

Prioritized process portfolio

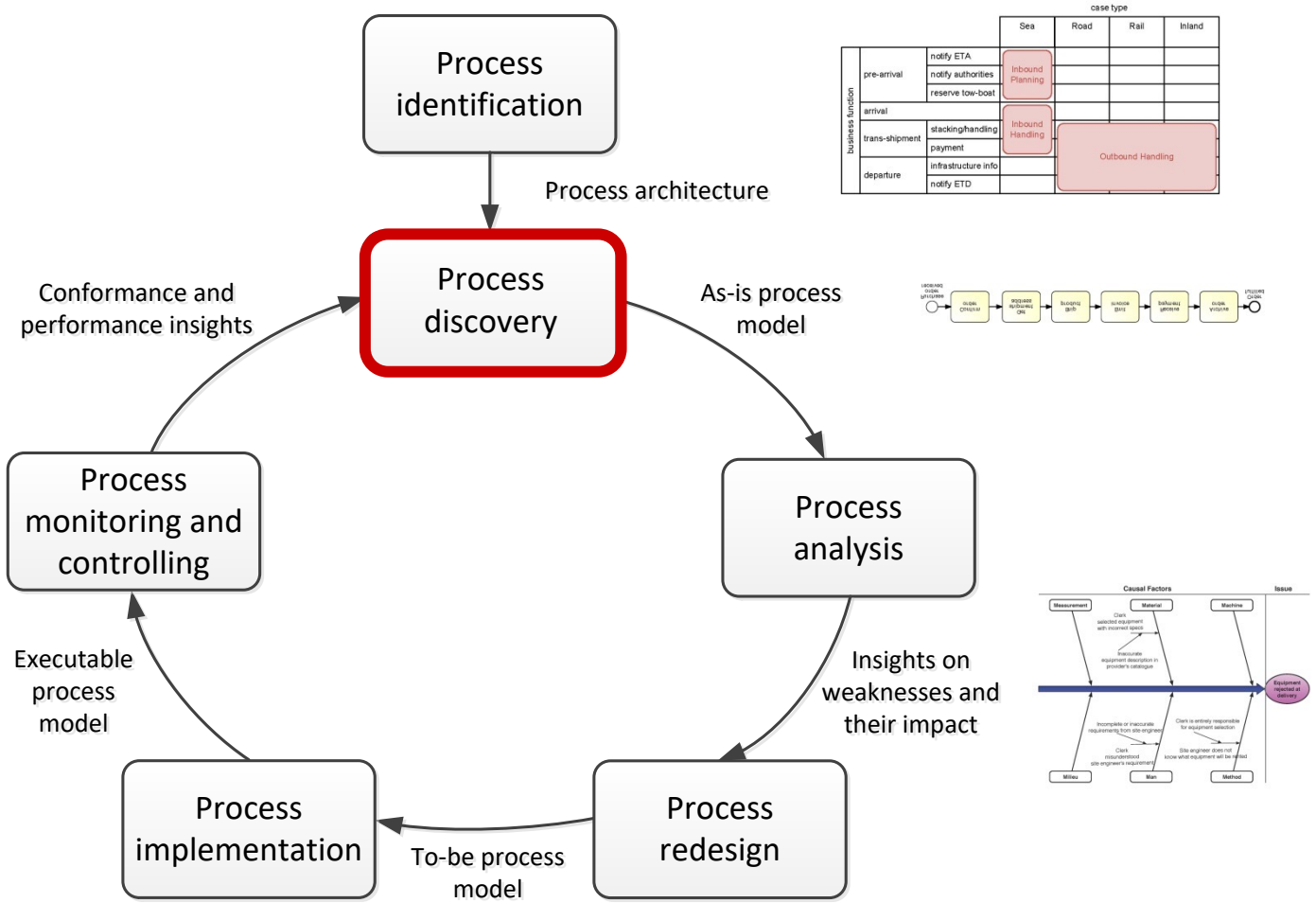
Hammer, Champy (1993)

Example: prioritized process portfolio

Financial institution

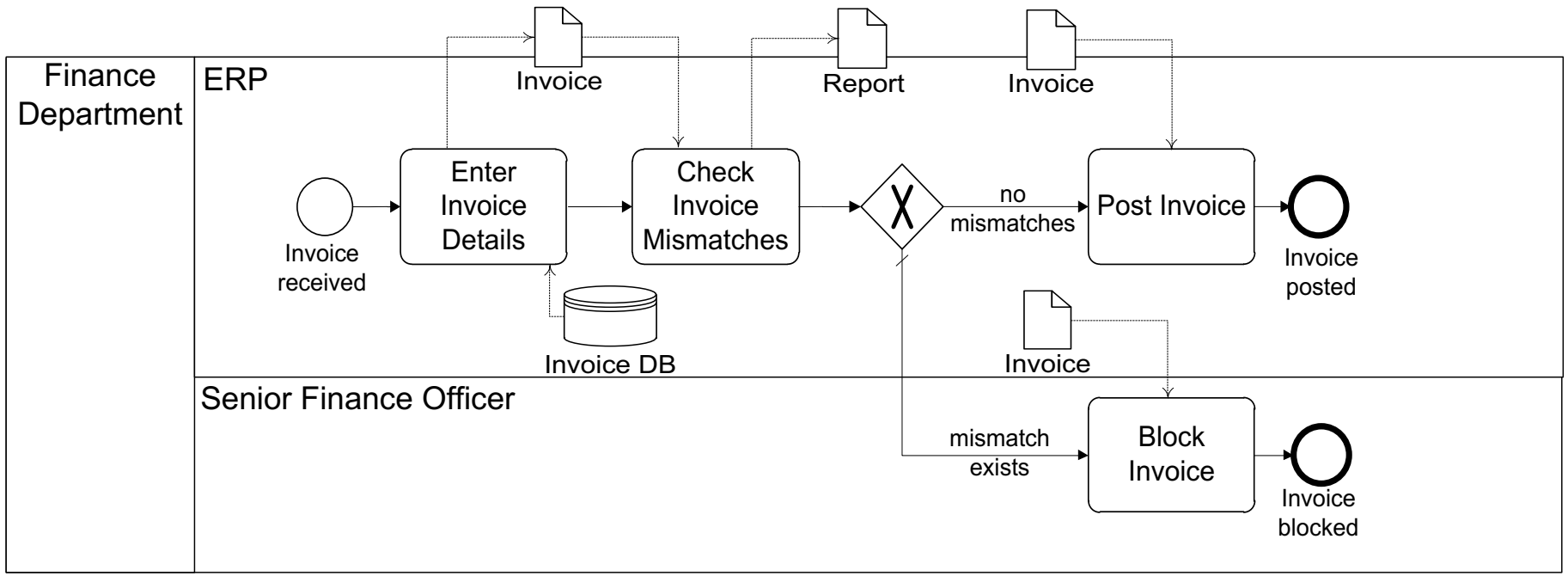


The BPM lifecycle



Business process model

Invoice handling example



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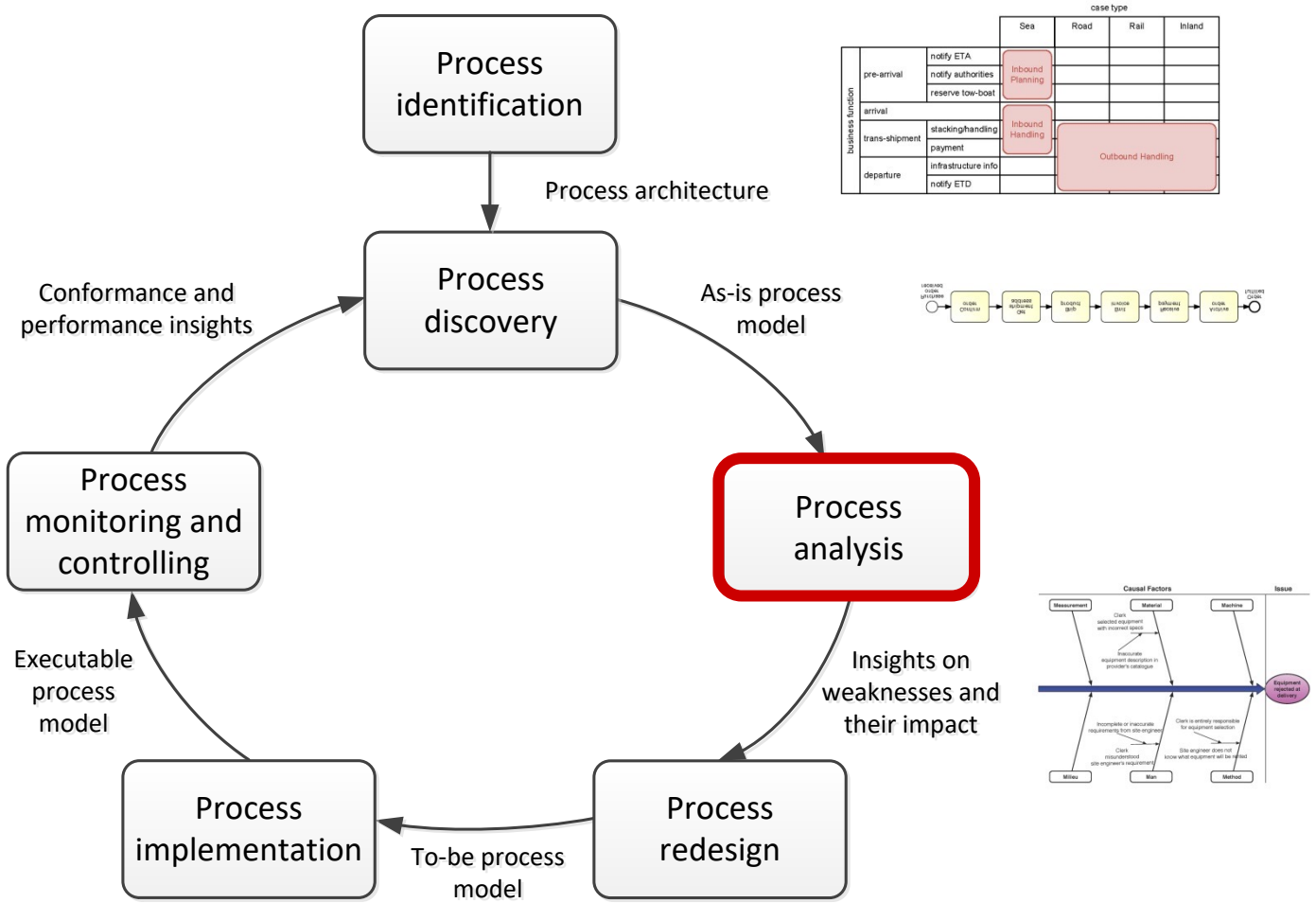
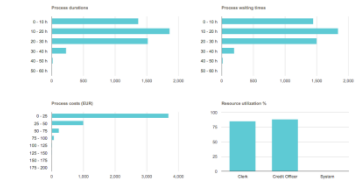
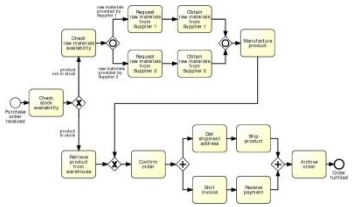
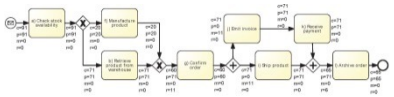


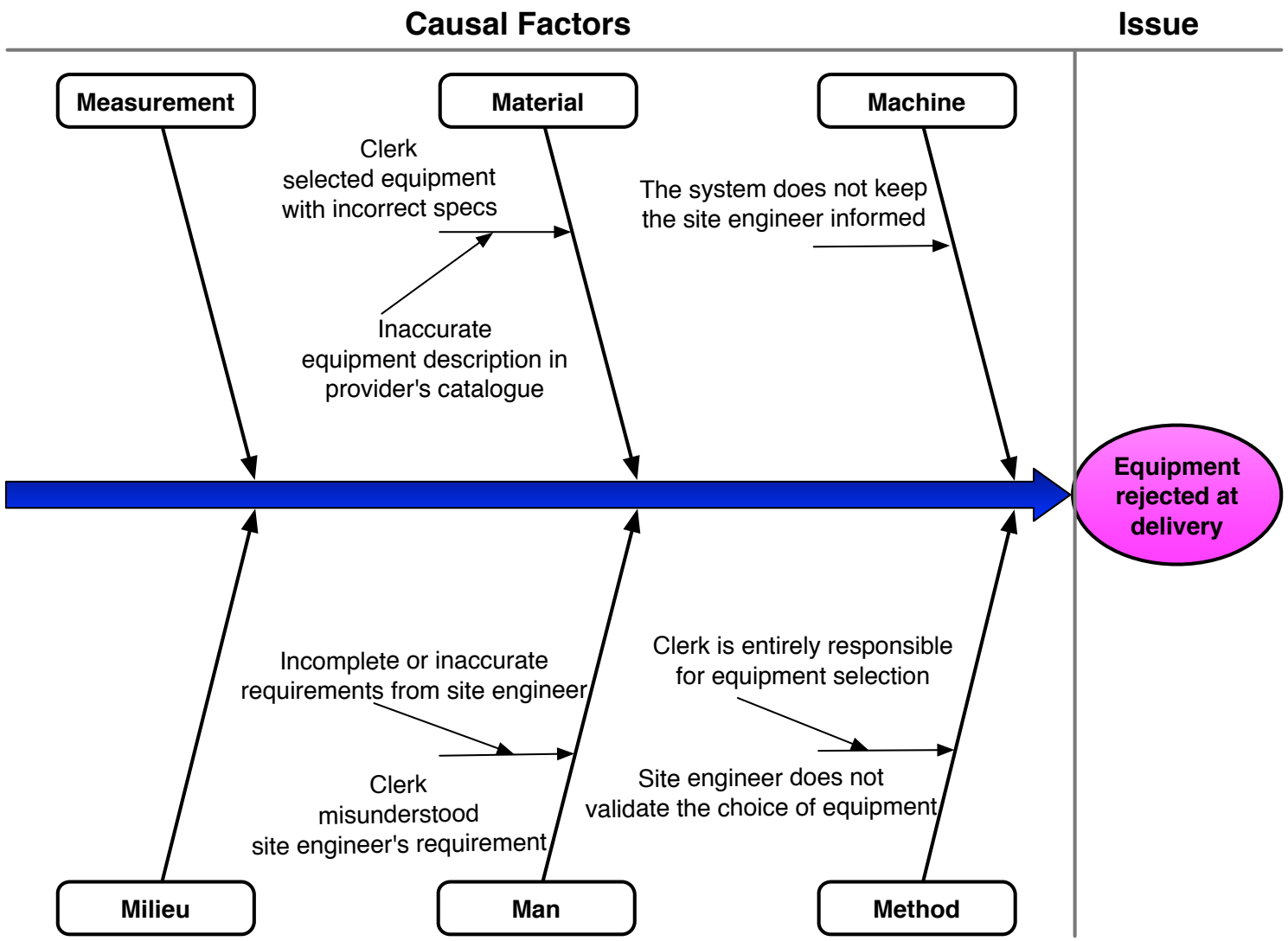






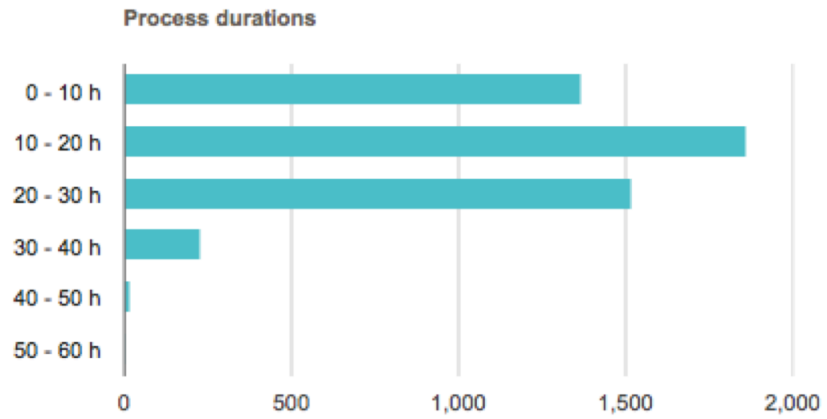
Qualitative process analysis

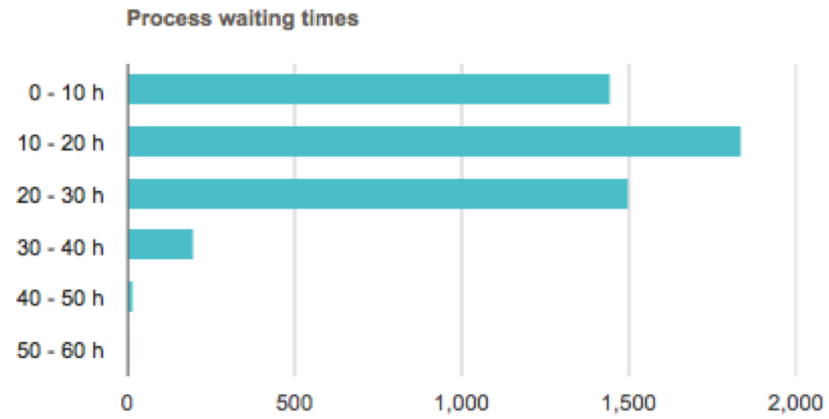
Root-cause analysis example

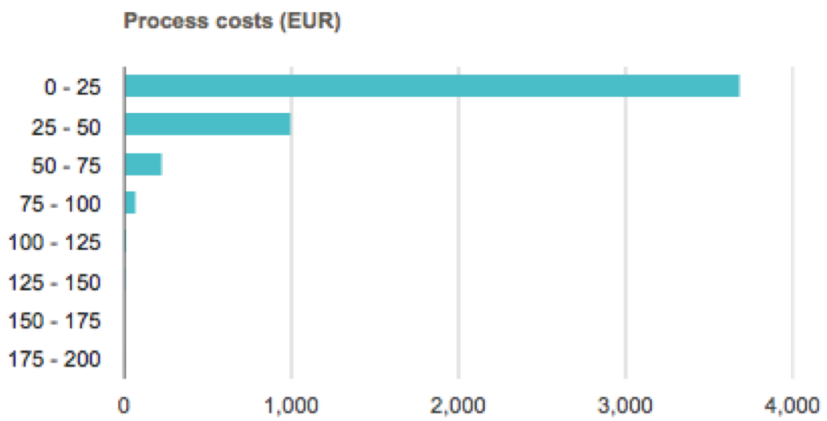


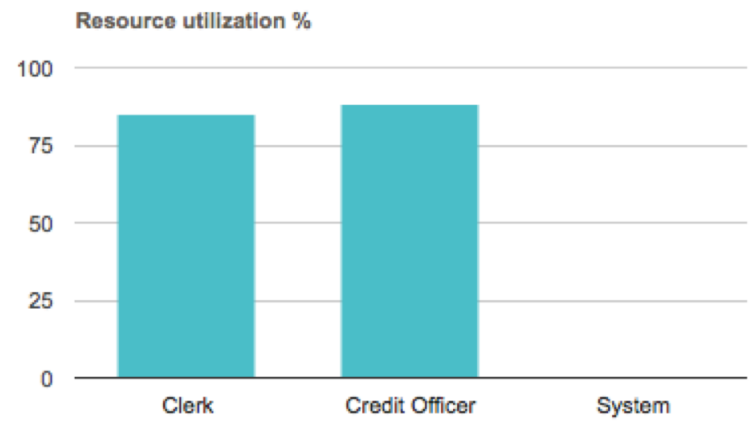
Quantitative process analysis

Process simulation example

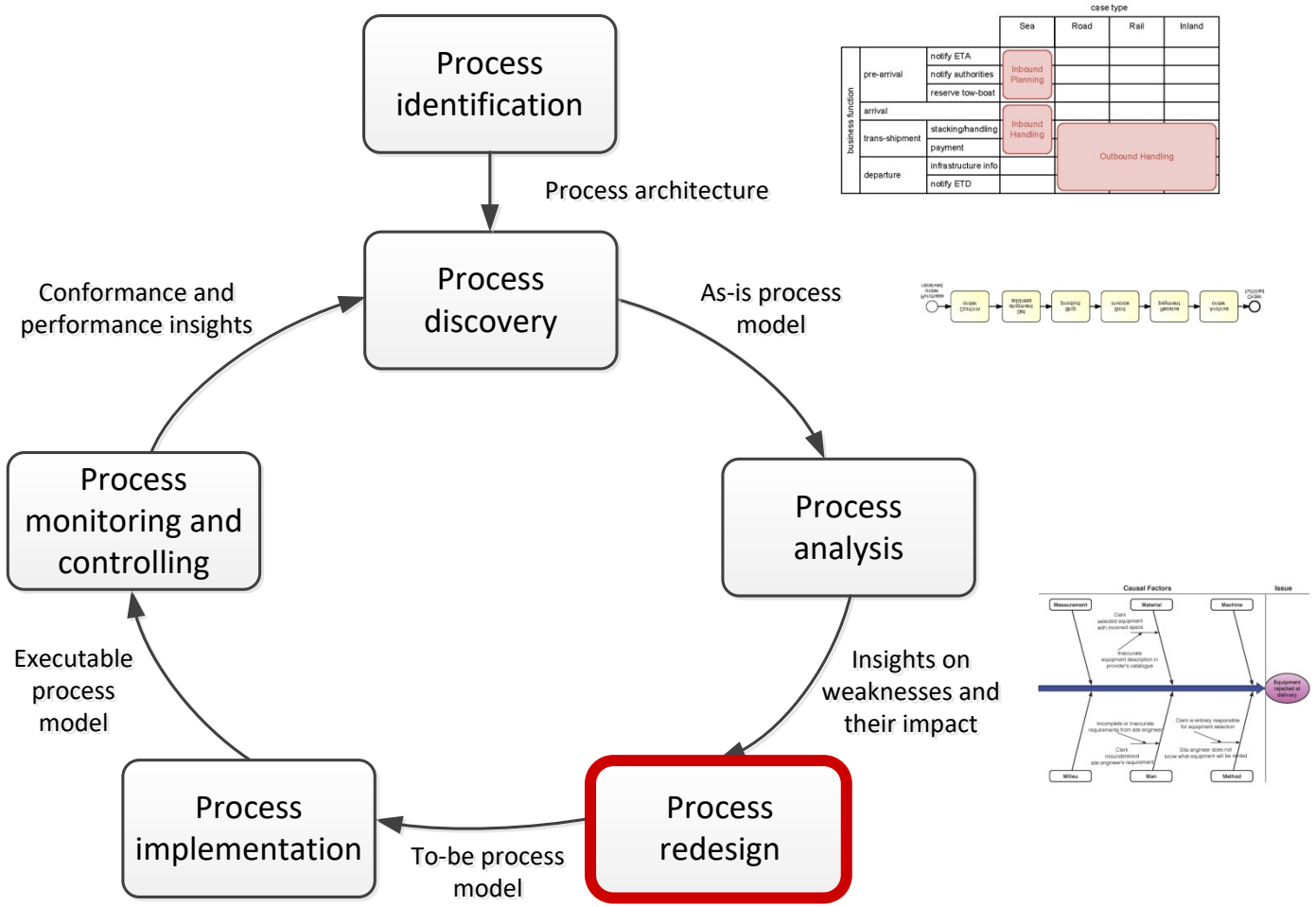


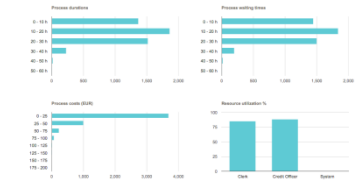


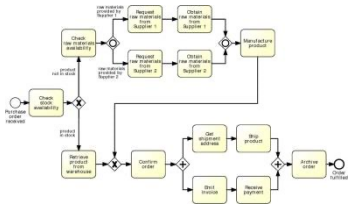


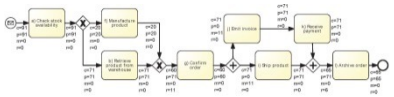


The BPM lifecycle



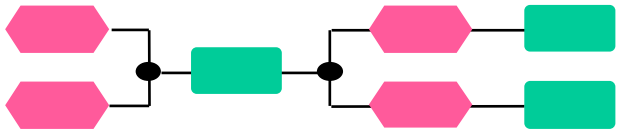




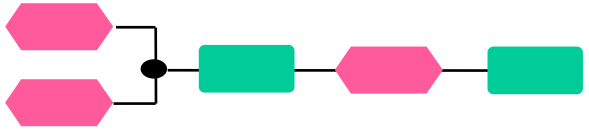


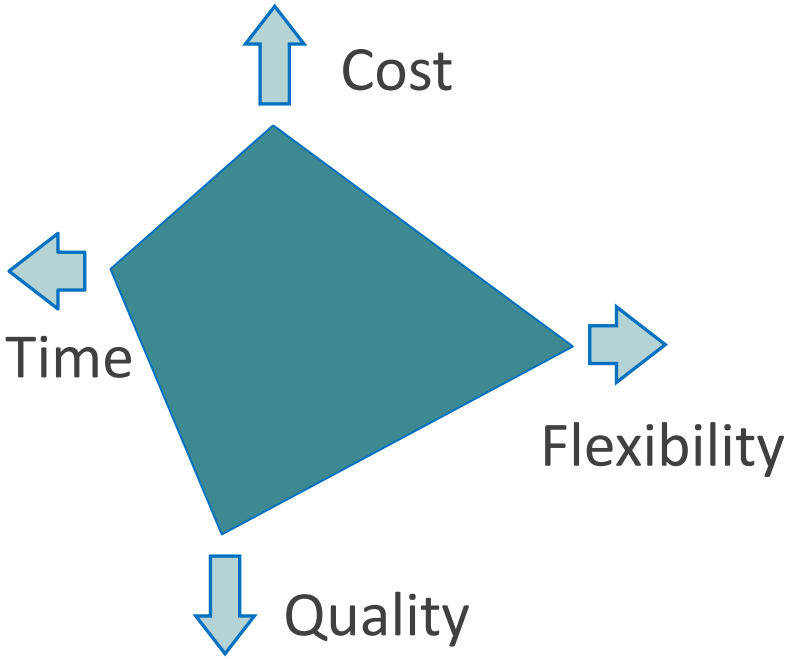
Process redesign

AS-IS process model

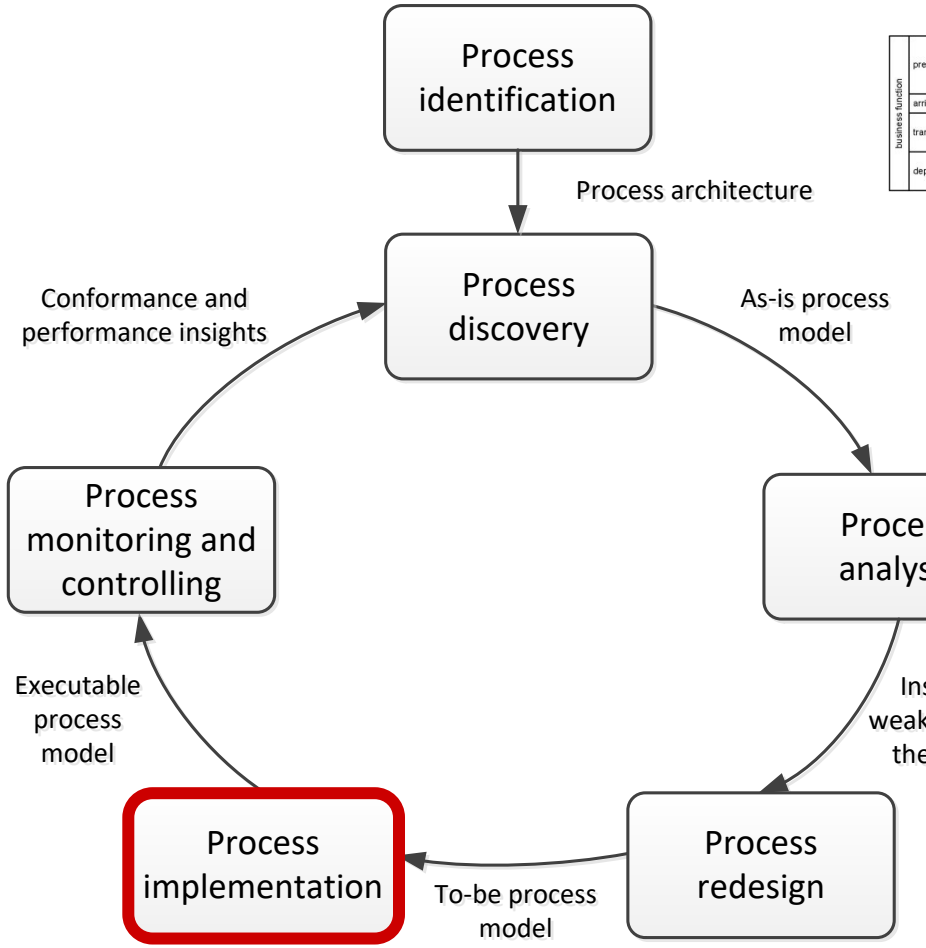


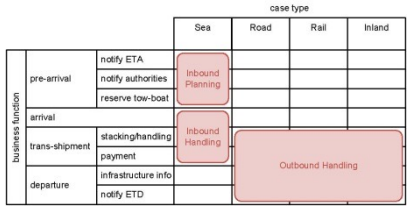
TO-BE process model

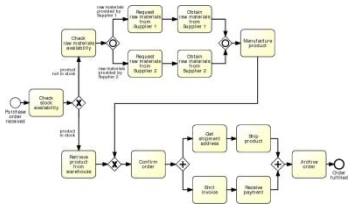


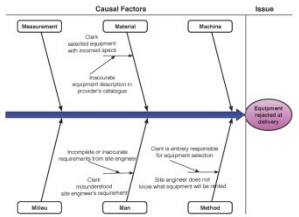


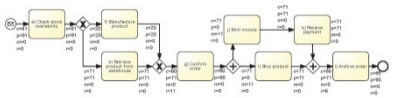
The BPM lifecycle



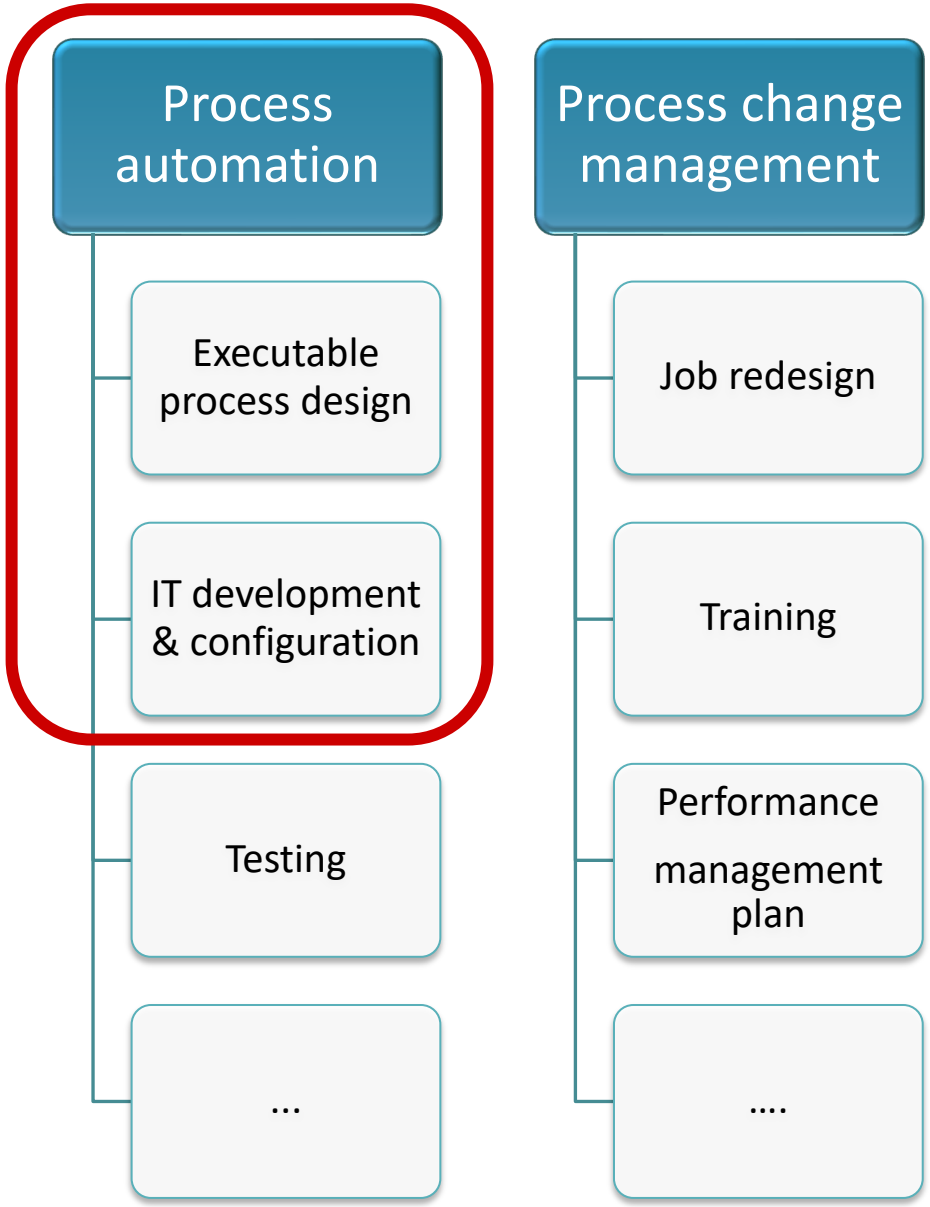




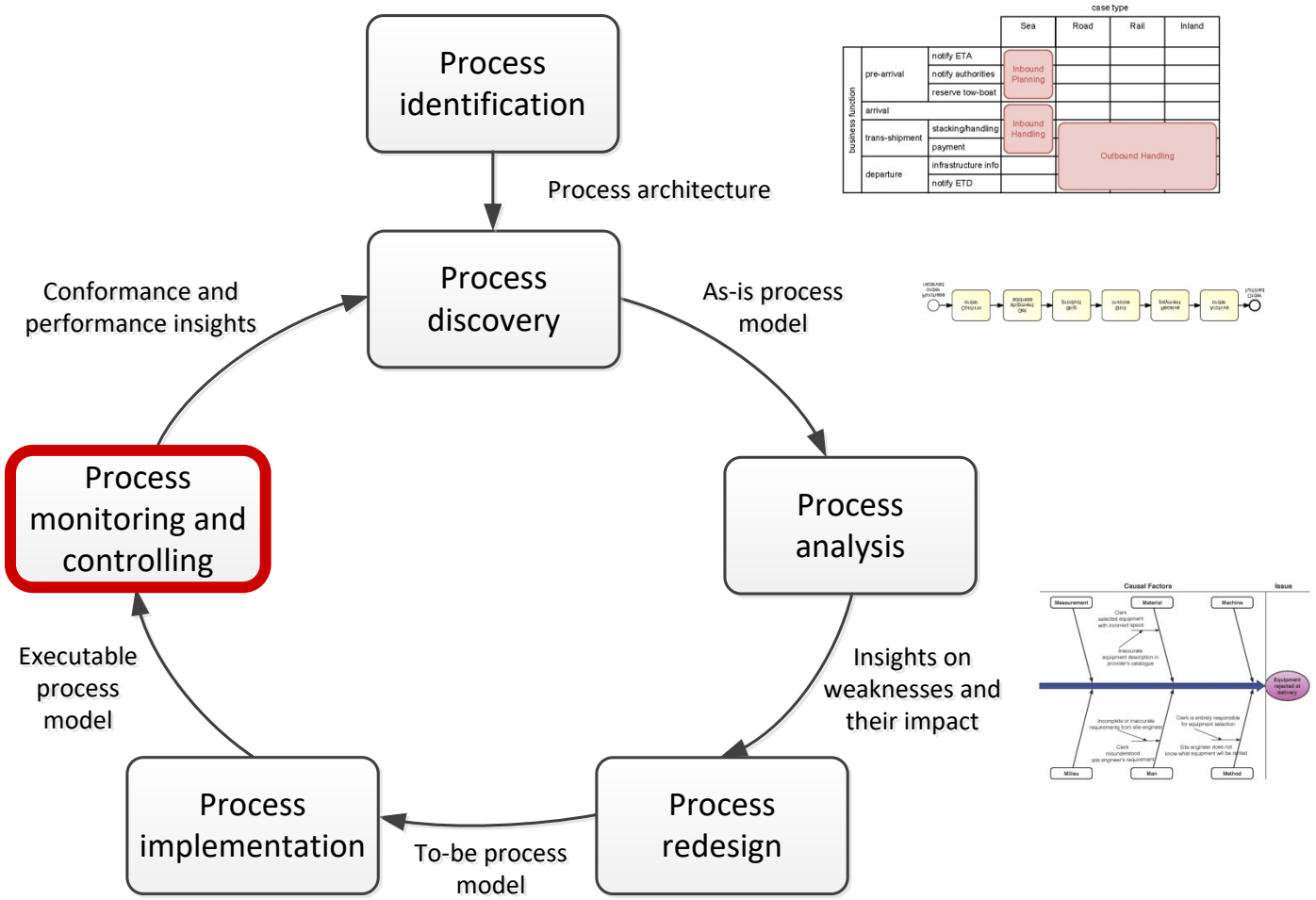




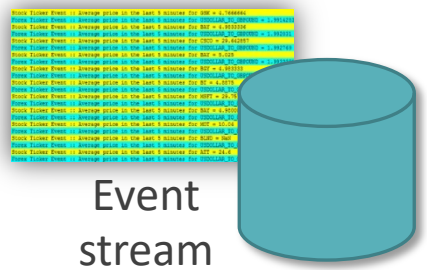
Process implementation



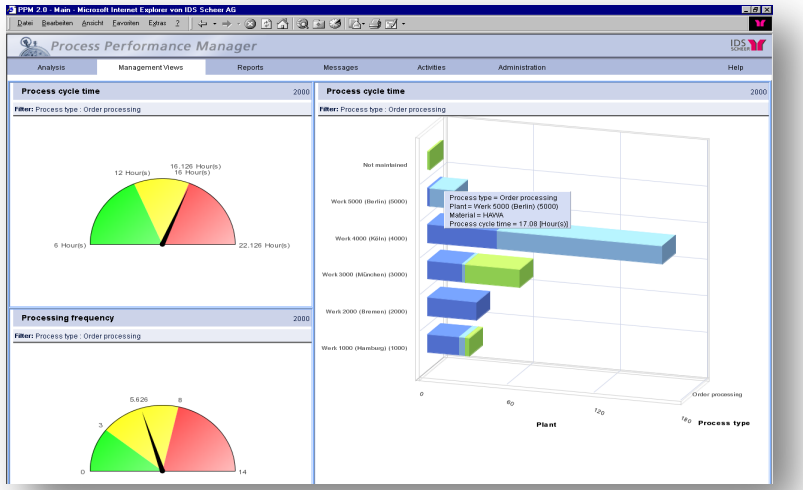
The BPM lifecycle



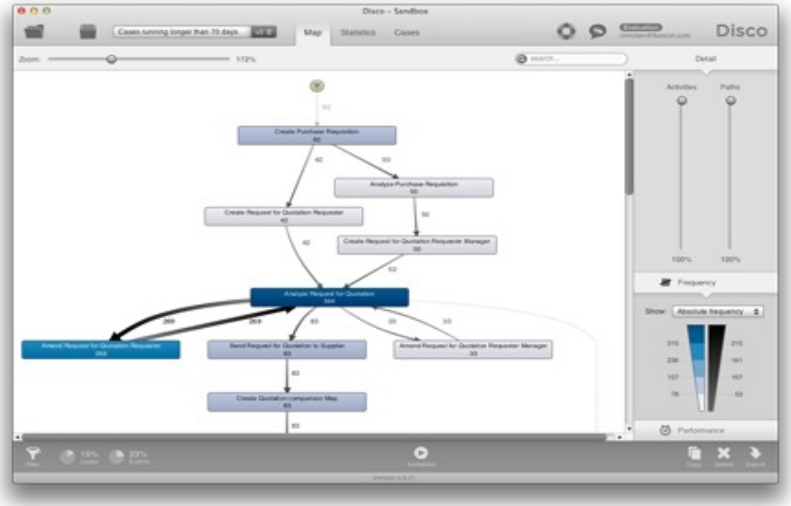
Process monitoring



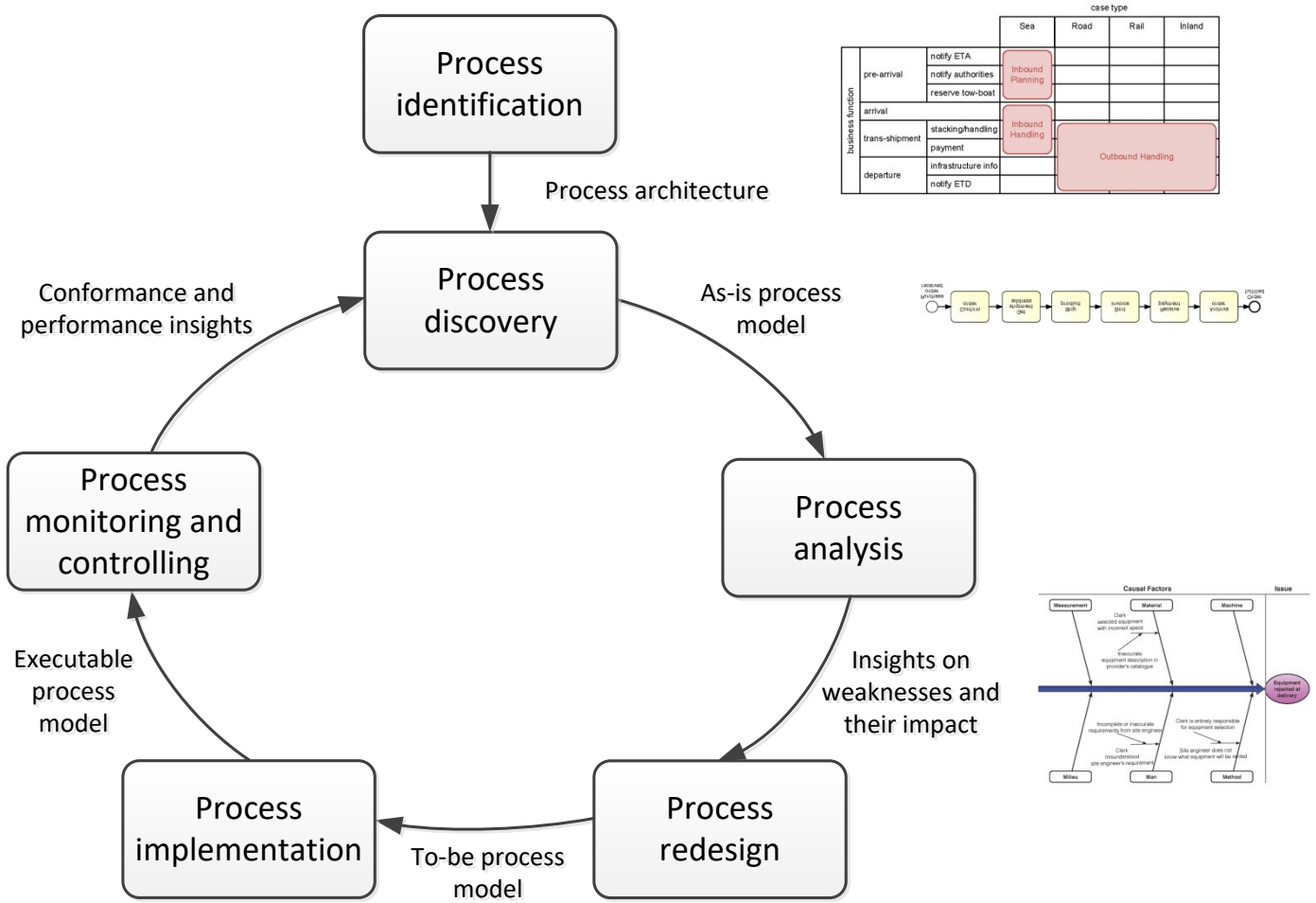
Dashboards, alerts & reports



Model-based analytics (p. mining)



The BPM lifecycle



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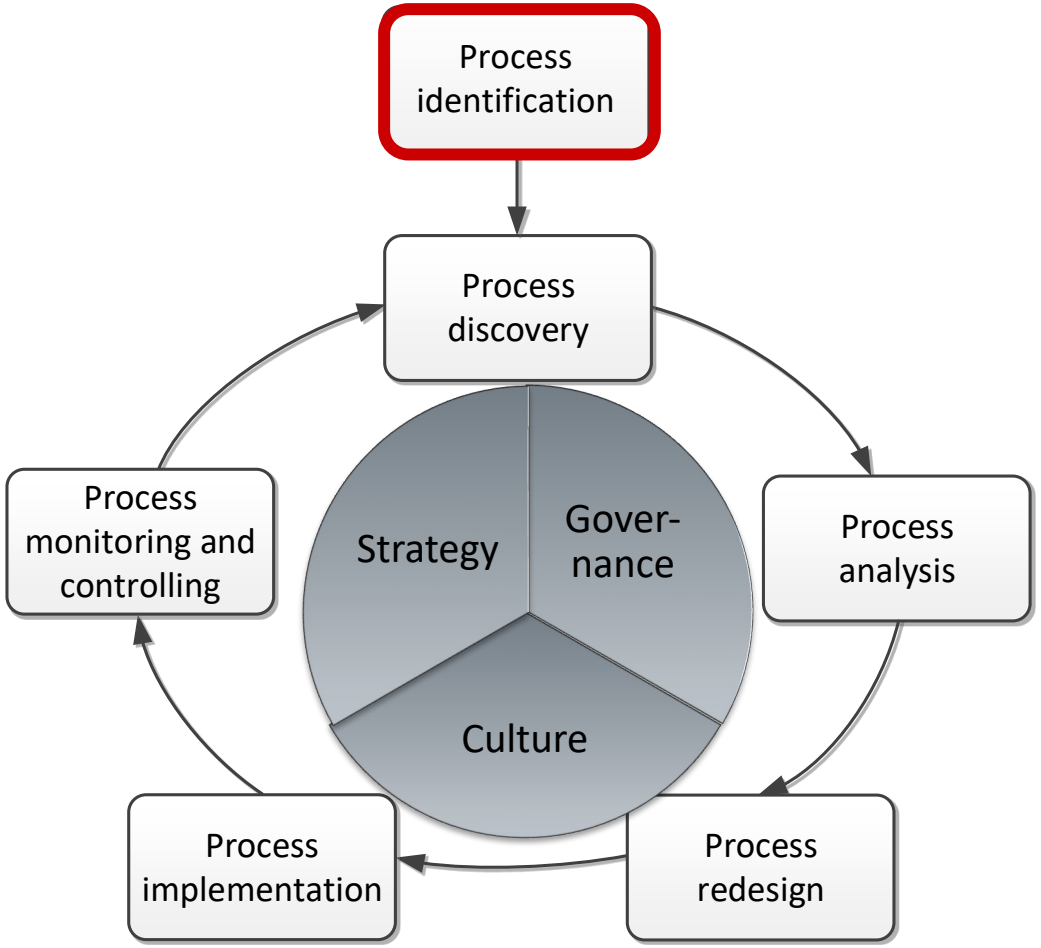


Process identification

What?

1. Identify an organization's business processes
2. Prioritize their management based on certain criteria

Why?

1. Understand the organization
2. Maximize value of BPM projects

Process identification steps

1. Designation step
   - Enumerate main processes
   - Determine process scope

→ Process Architecture

2. Prioritization step (aka Process selection)

   Prioritize processes based on:
   - Importance
   - Health
   - Feasibility

→ Prioritized Process Portfolio

After Davenport (1993)

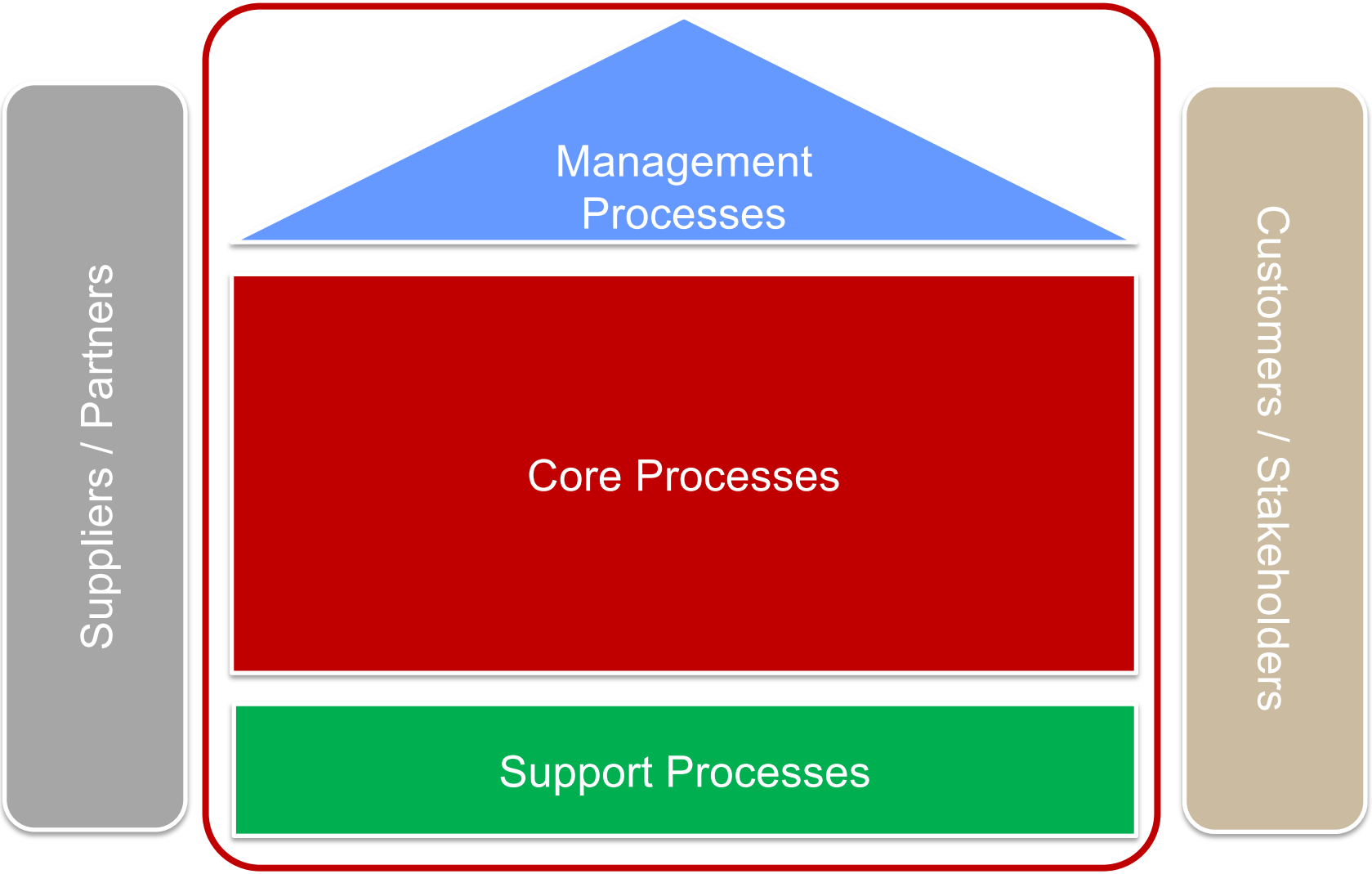
Process Enumeration

"Most businesses have just three core processes:

1. Sell stuff
2. Deliver stuff
3. Making sure you have stuff to sell and deliver"

Geary Rummler

Porter: Types of processes



After Michael Porter (1985)

Example: core, support and management processes

Wholesaler

Core processes

- Sales (lead-to-quote, quote-to-order, order-to-cash)
- Purchase-to-Pay (direct procurement, e.g. supplies replenishment)
- …

Support processes

- Purchase-to-pay (indirect procurement, e.g. parts replenishment, operational resources replenishment…)
- HR (policies update, recruitment, induction, probation…)
- …

Management processes

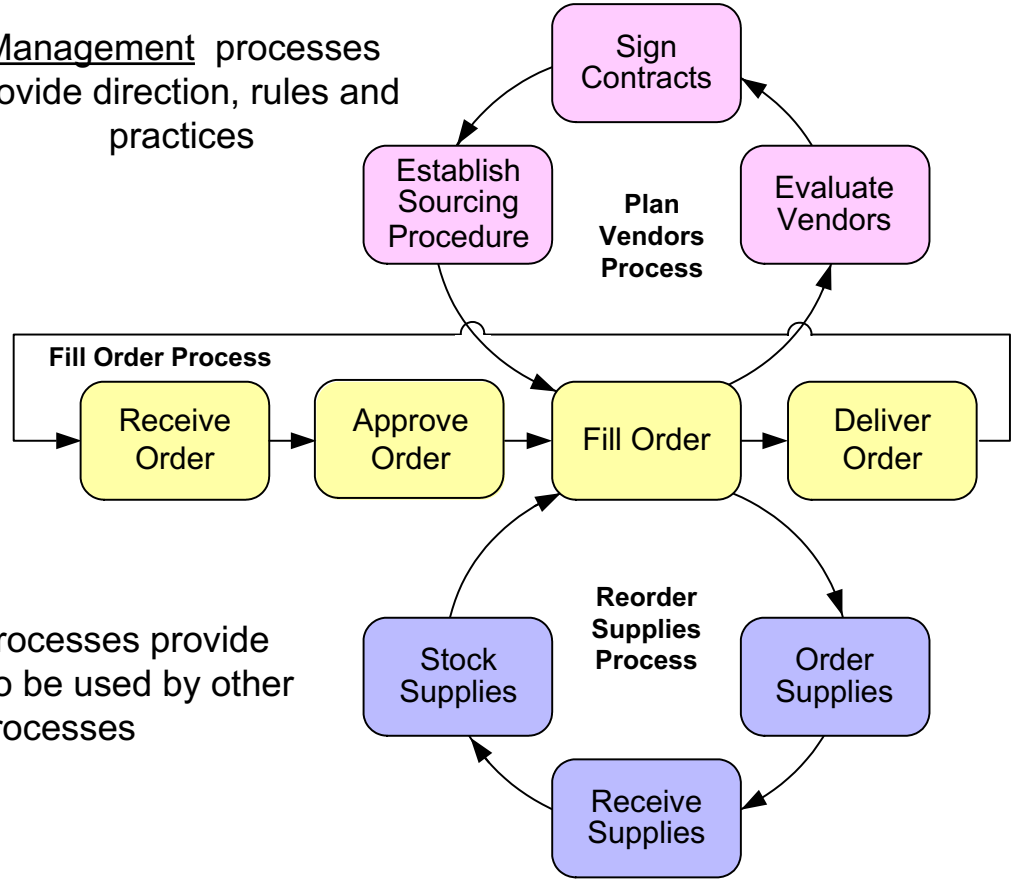
- Suppliers management (suppliers planning, suppliers acquisition…)
- Logistics management (logistics planning, logistics controlling…)
- …

Relations between core, support, mgt processes

<u>Management</u> processes provide direction, rules and practices

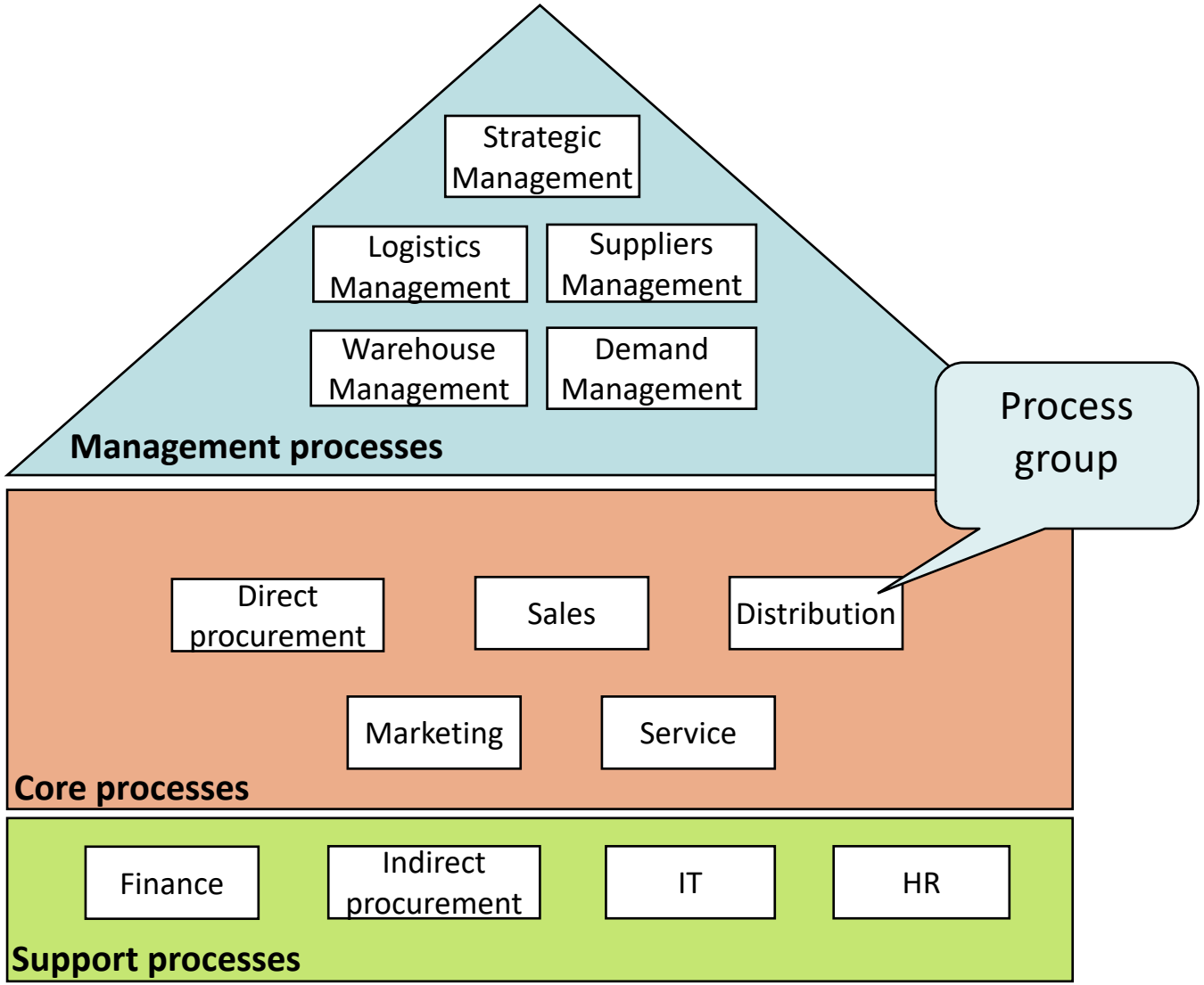
<u>Core</u> processes generate value as they are directly linked to external customers

<u>Support</u> processes provide resources to be used by other processes



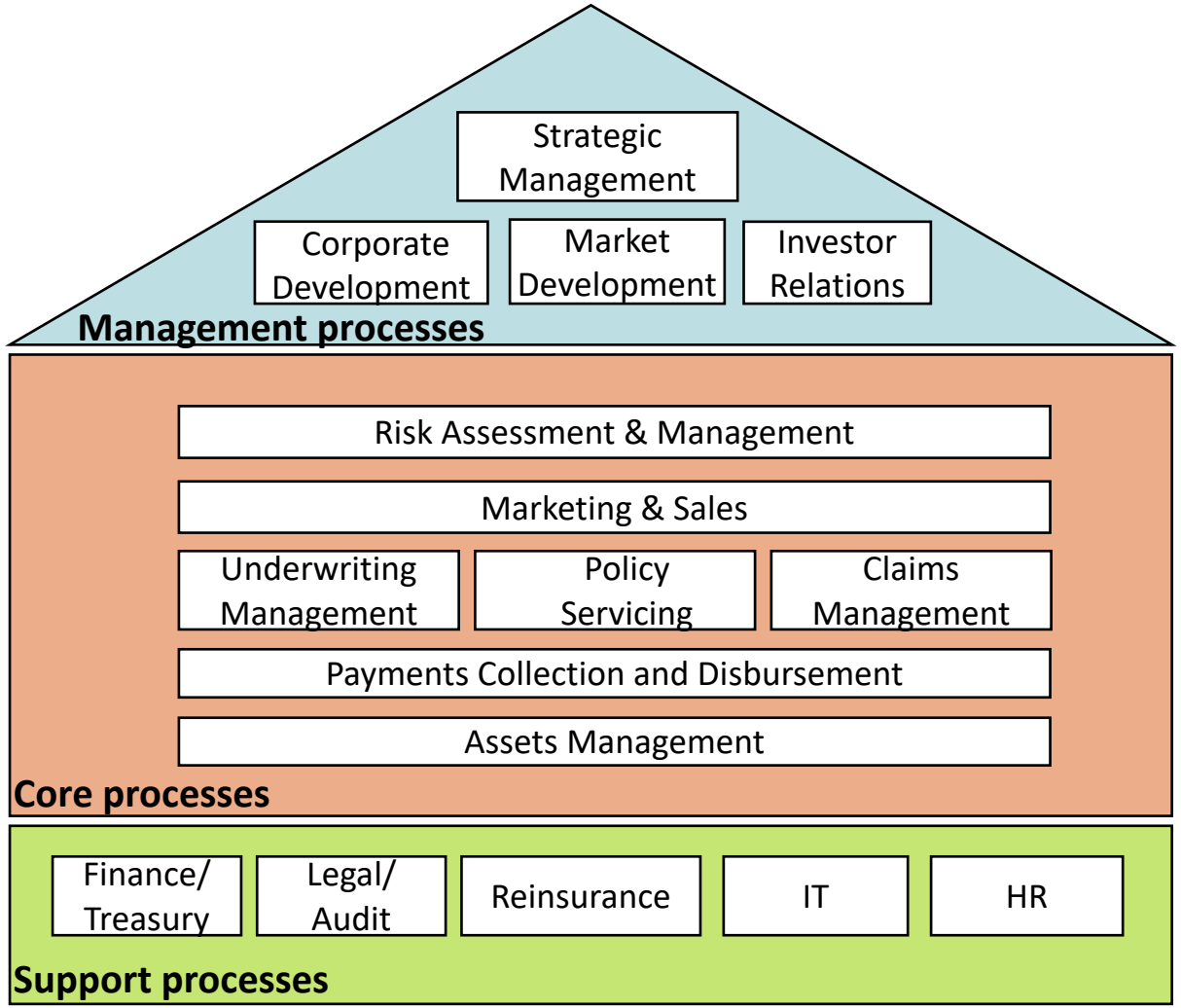
Example: process architecture

Wholesaler



Example: process architecture

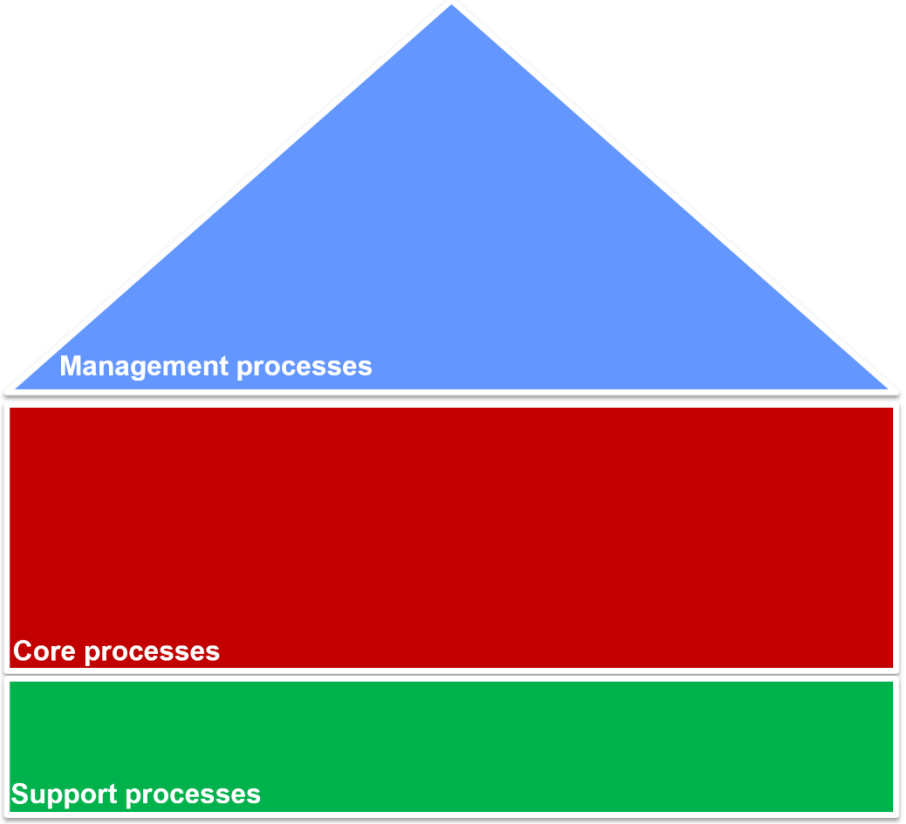
Insurance company



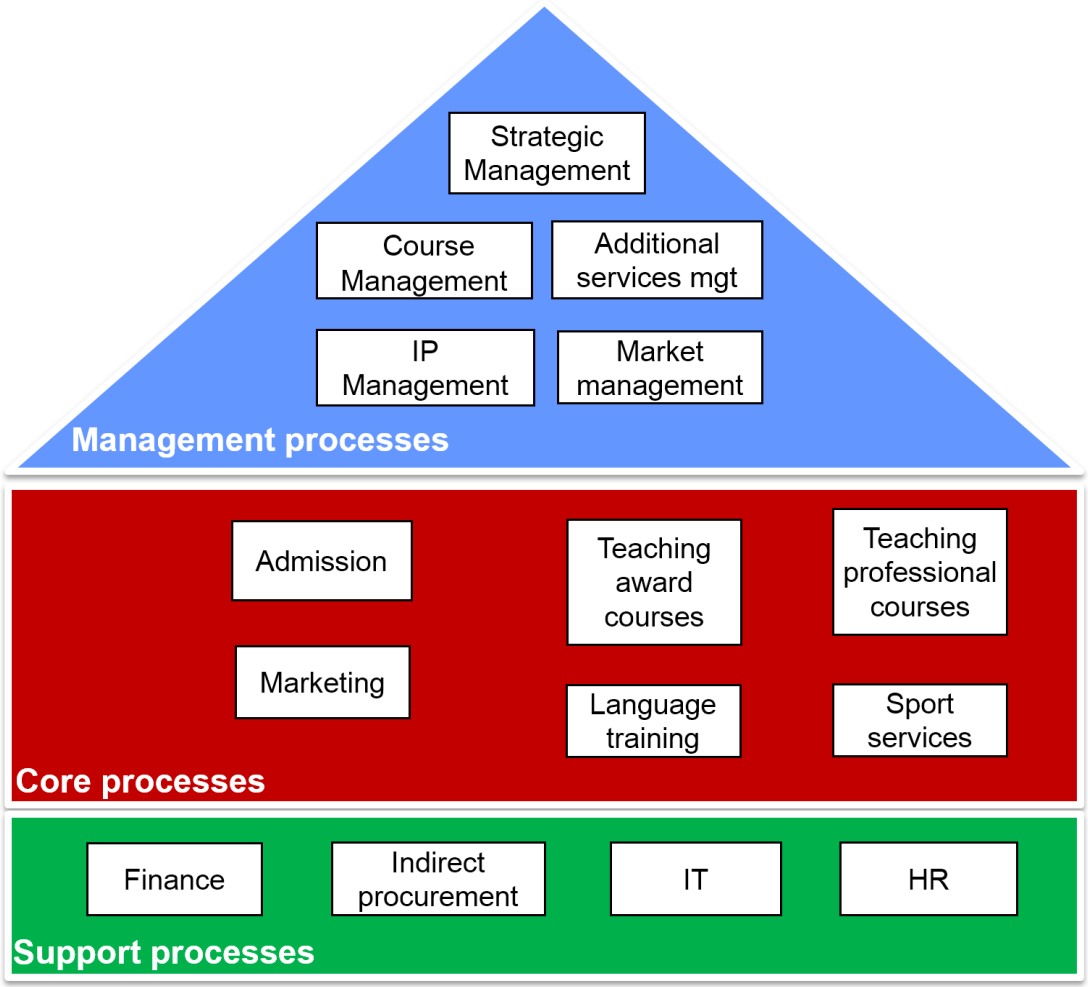
Exercise: classify by process type

These groups of processes are typically performed at a university. Categorize each process group as core, support or management

- Sport services
- HR
- Indirect procurement
- Strategic Management
- Teaching award courses
- IP Management
- Marketing
- Course Management
- Additional services mgt
- Language training
- Admission
- IT
- Market management
- Teaching professional courses



Solution: identify process types



Process scoping

Processes are interdependent → insights into interrelations required

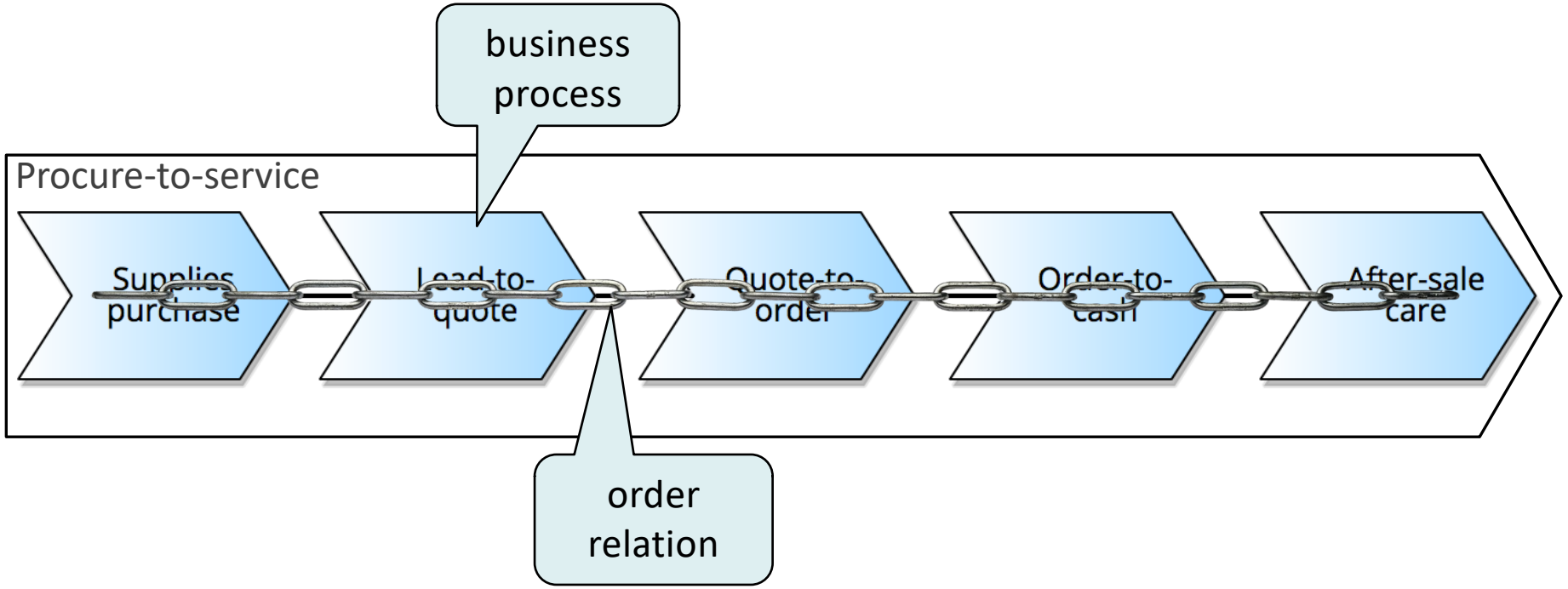
- Specialization: general – special product/service
- Horizontal: upstream – downstream processes and their value chains
- Vertical: main processes – sub-processes

↓

Process architecture

Value chain modeling

- Chain of *processes* an organization performs to deliver value to customers and stakeholders
- More generally, a mechanism to group high-level business processes according to an order relation (can be applied to core, support and management processes)



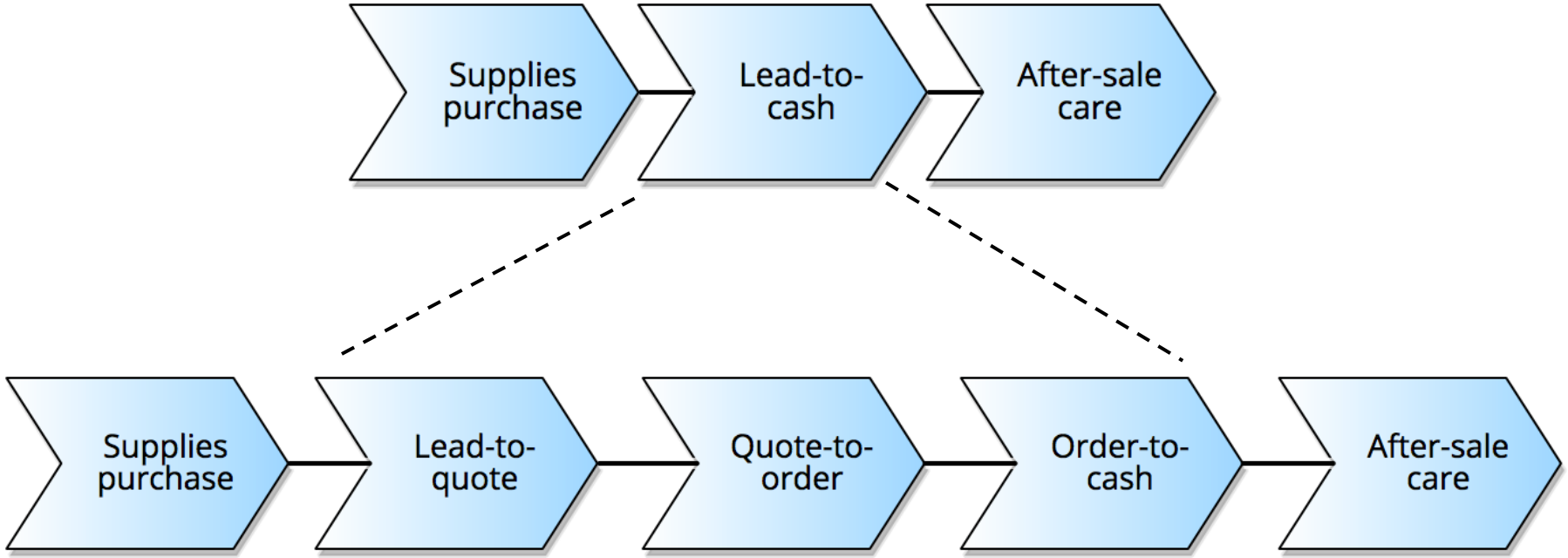
Guidelines to identify horizontal boundaries in value chains

1. Change of key business object in the process
2. Change of granularity of main business object
3. Change in frequency/time
4. Change in intermediate outcome/resolution/objective

Example: value chain

Wholesaler

Core processes

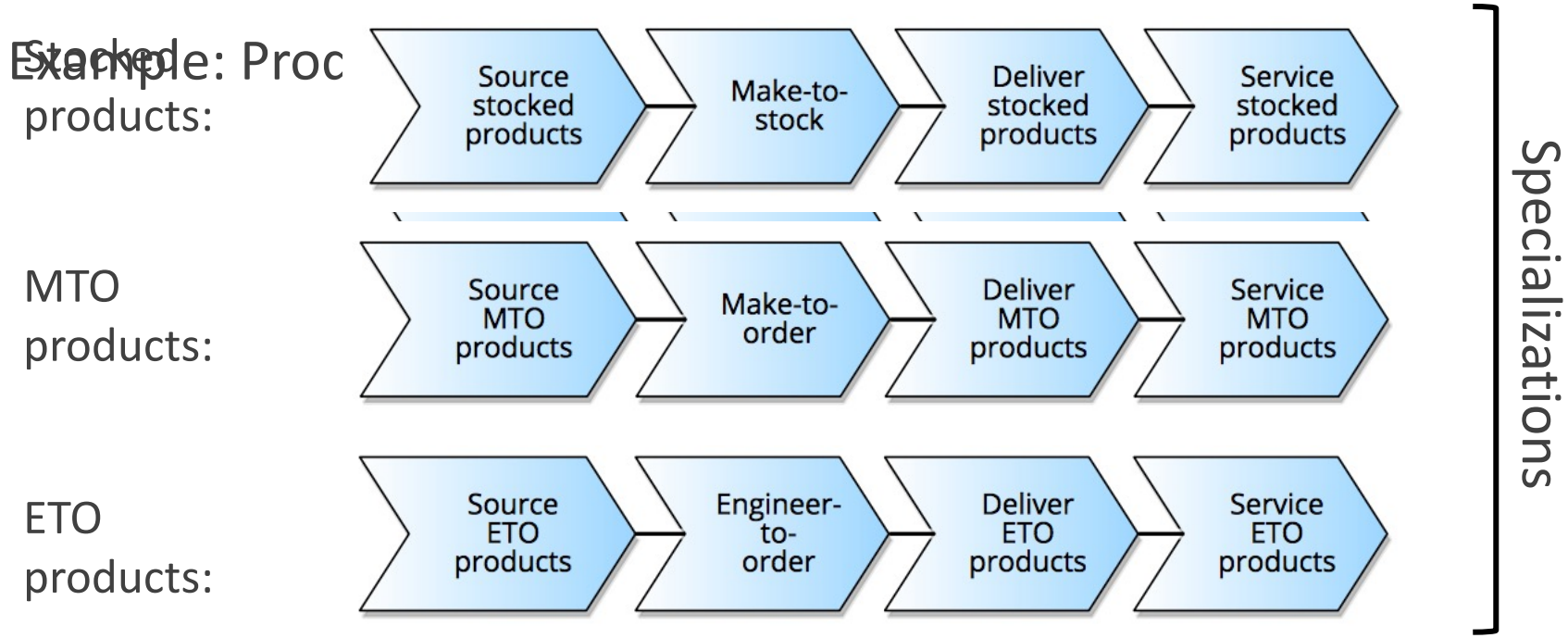


Typical value chains for core processes

Think around three main steps:

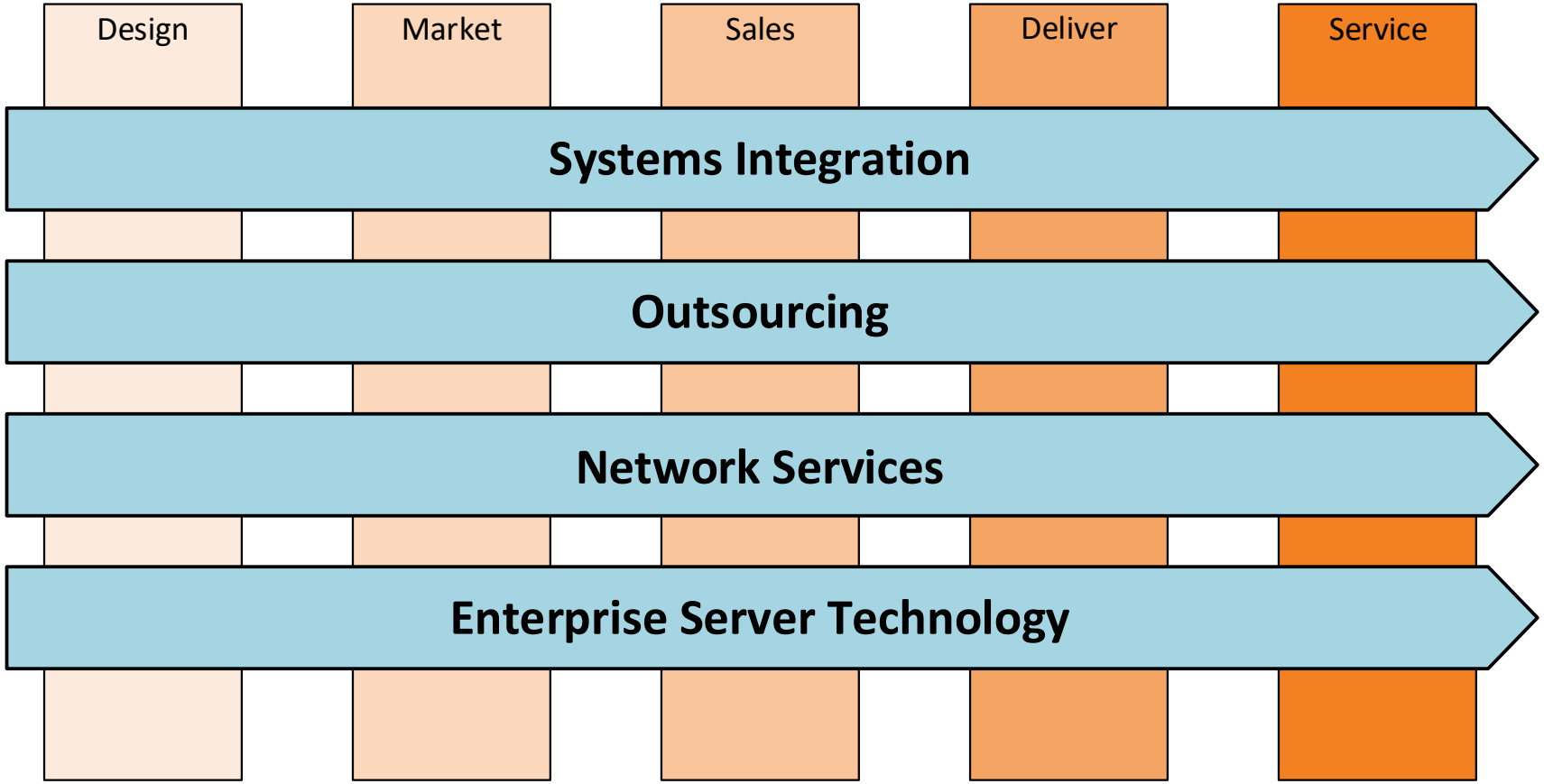
- Imagine it (design new product/service)
- Build it (source, assemble, deliver product/service)
- Sell it (market, sell, service product/service)

Example: Proc



Example: value chains for service provider

IT service provider

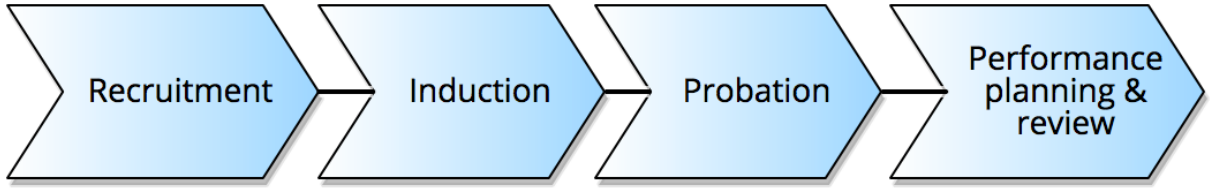


Example: value chain of non-core processes

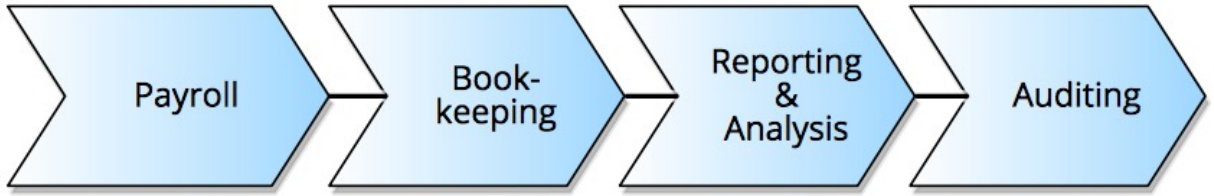
ULB

Support processes

HR:



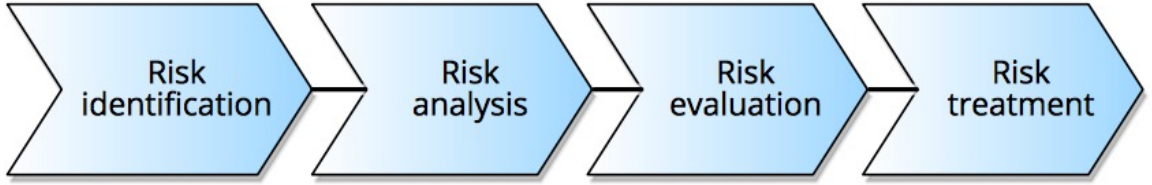
Accounting:



Management processes

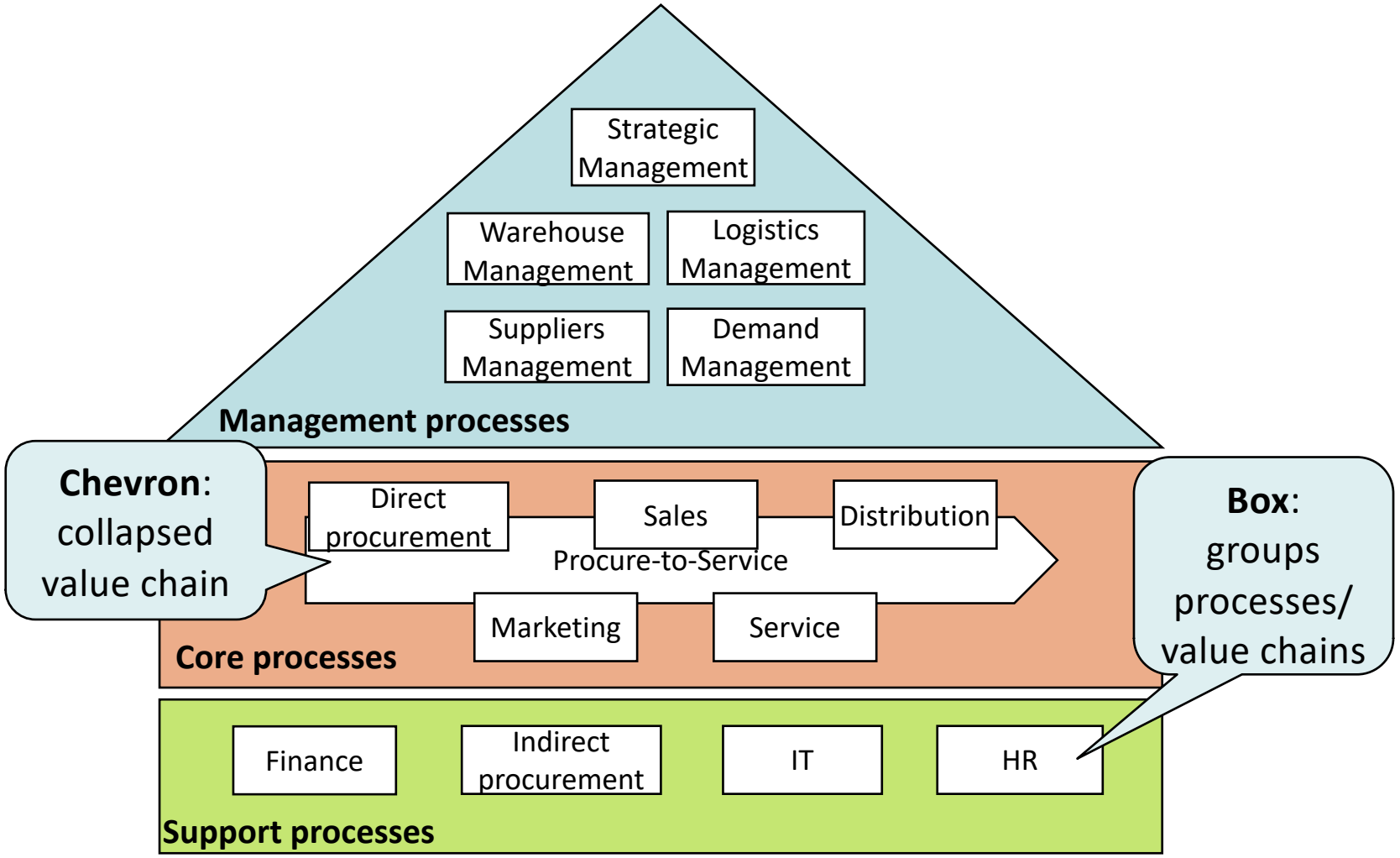
Suppliers management:

Risk management:



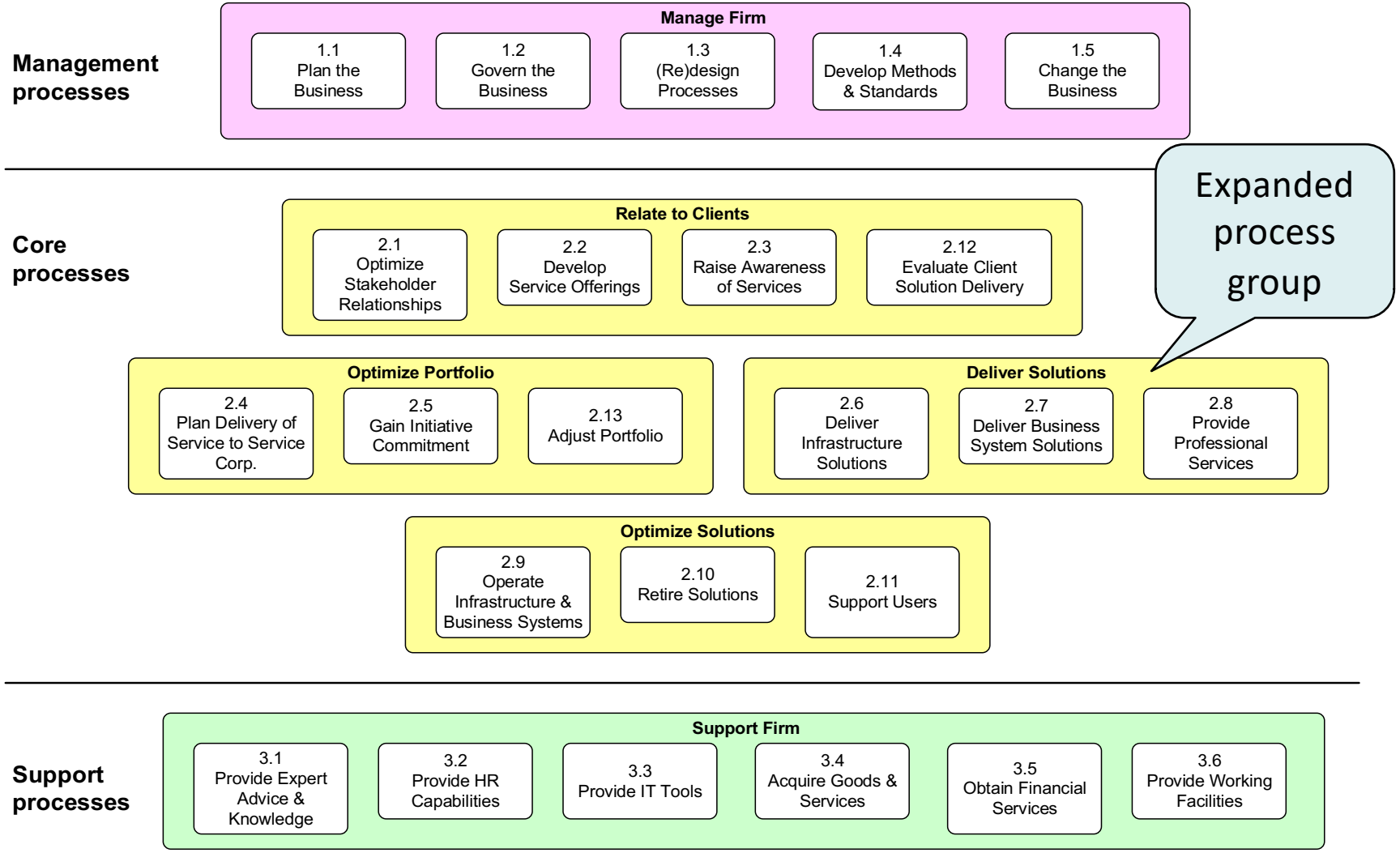
Example: process architecture & value chains

Wholesaler



Alternative: process architecture – groups

Consultancy Firm



Typical artifacts for vertical scoping

Value chains

Chains of processes. Stay at a high level. Rule of thumb: 3-7 processes

- *Procure-to-service, Risk management*

(Root/Main) Processes

Build up value chains and affect each other. They are abstract

- *Lead-to-quote, Quote-to-order, Order-to-cash*

Typical focus of Process enumeration

Subprocesses

Build up processes. They are detailed, involve multiple activities and can be layered on different levels of abstraction (i.e. sub-subprocesses)

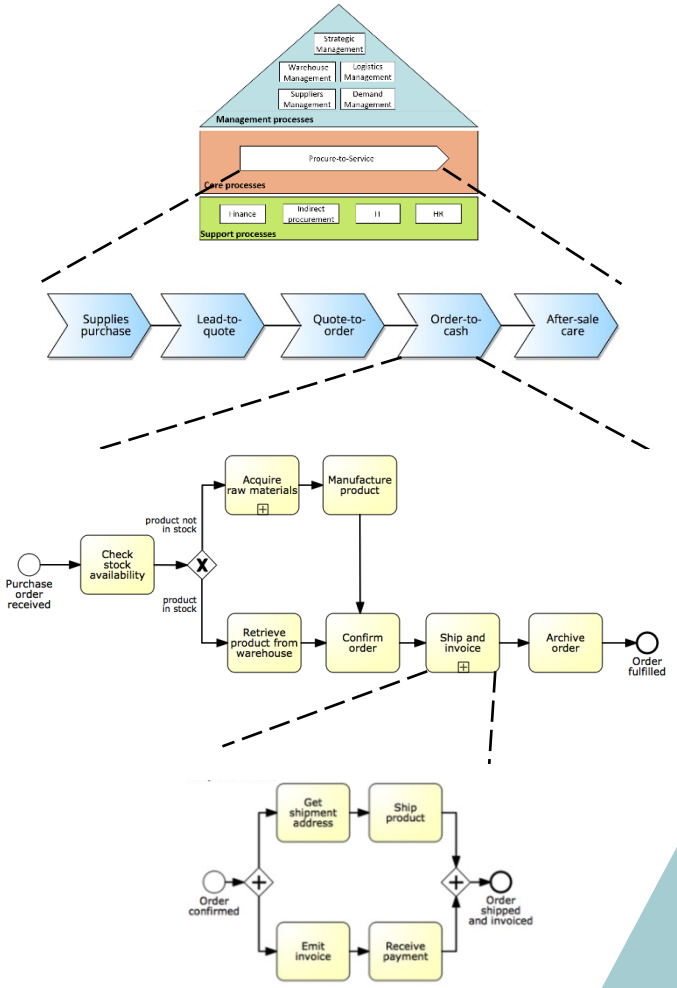
- *Order shipment, invoicing*

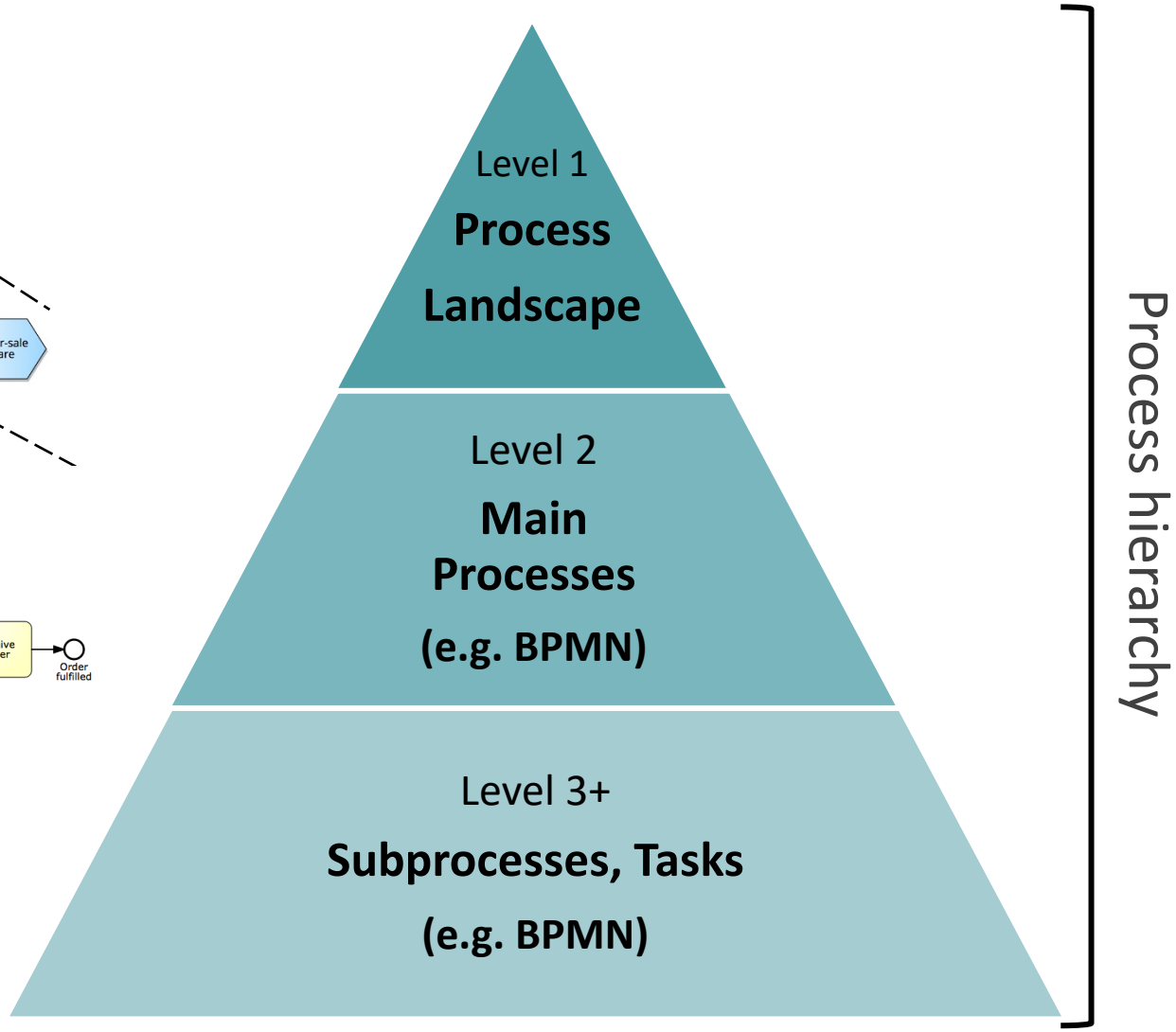
Process tasks

Build up processes and sub-processes. They are atomic and performed by human beings, IT systems or equipment

- *Approve invoice*

Process architecture: hierarchical view



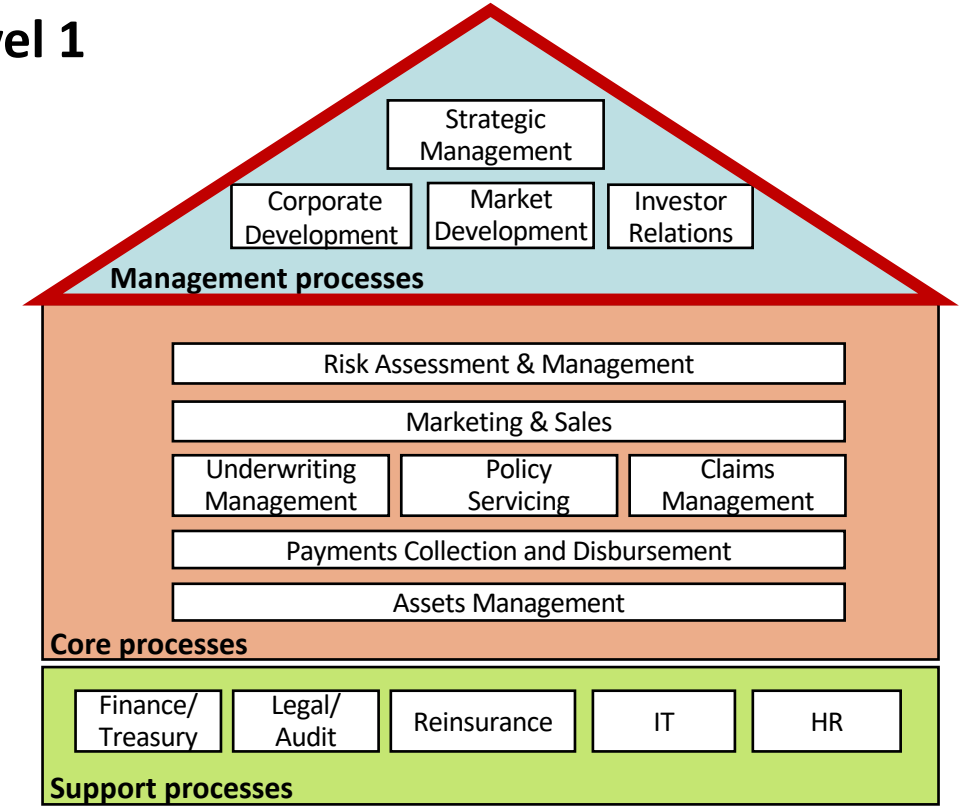


How many levels in the process architecture?

Example: hierarchical process architecture

Insurance company

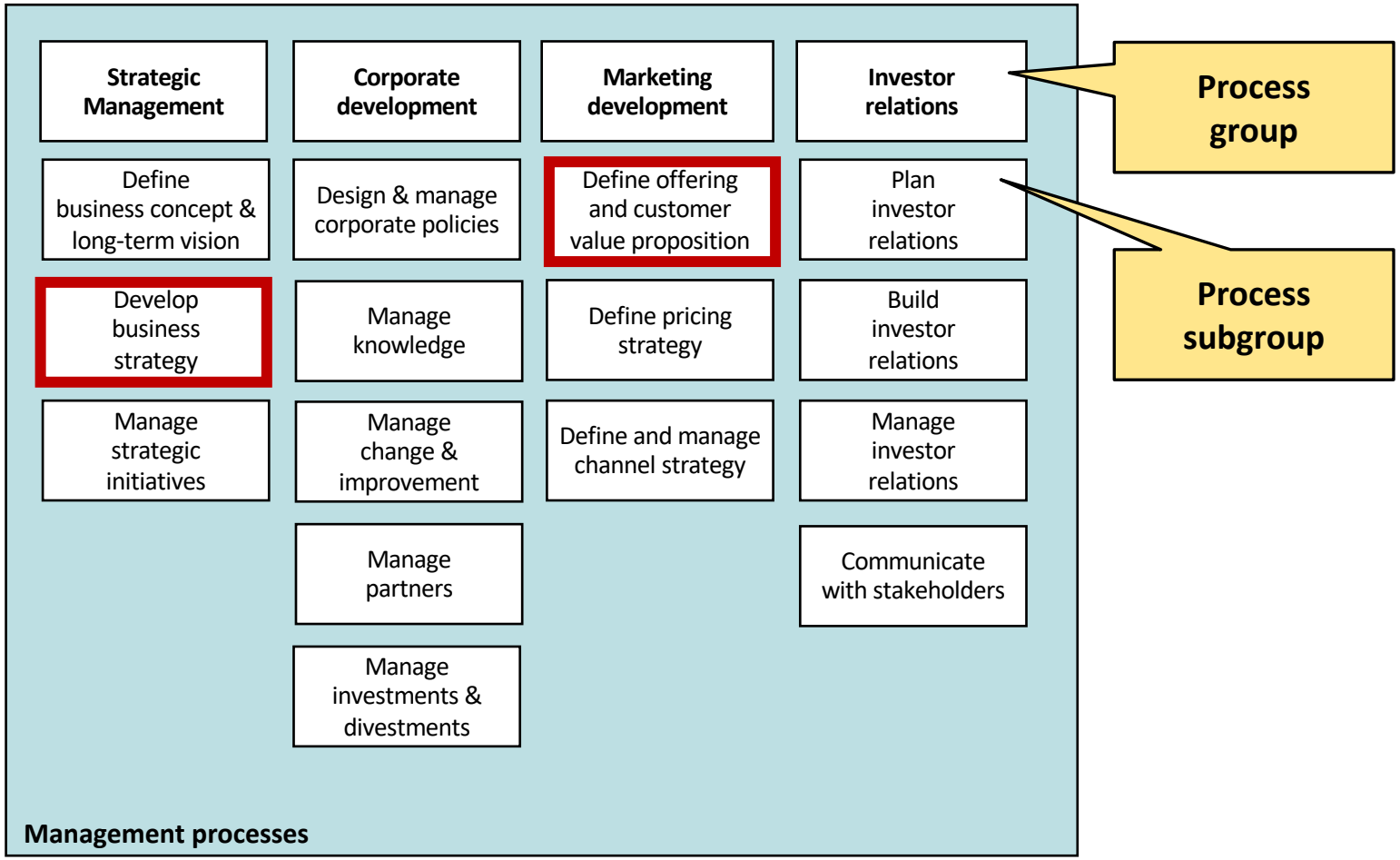
Level 1



Example: hierarchical process architecture

Insurance company

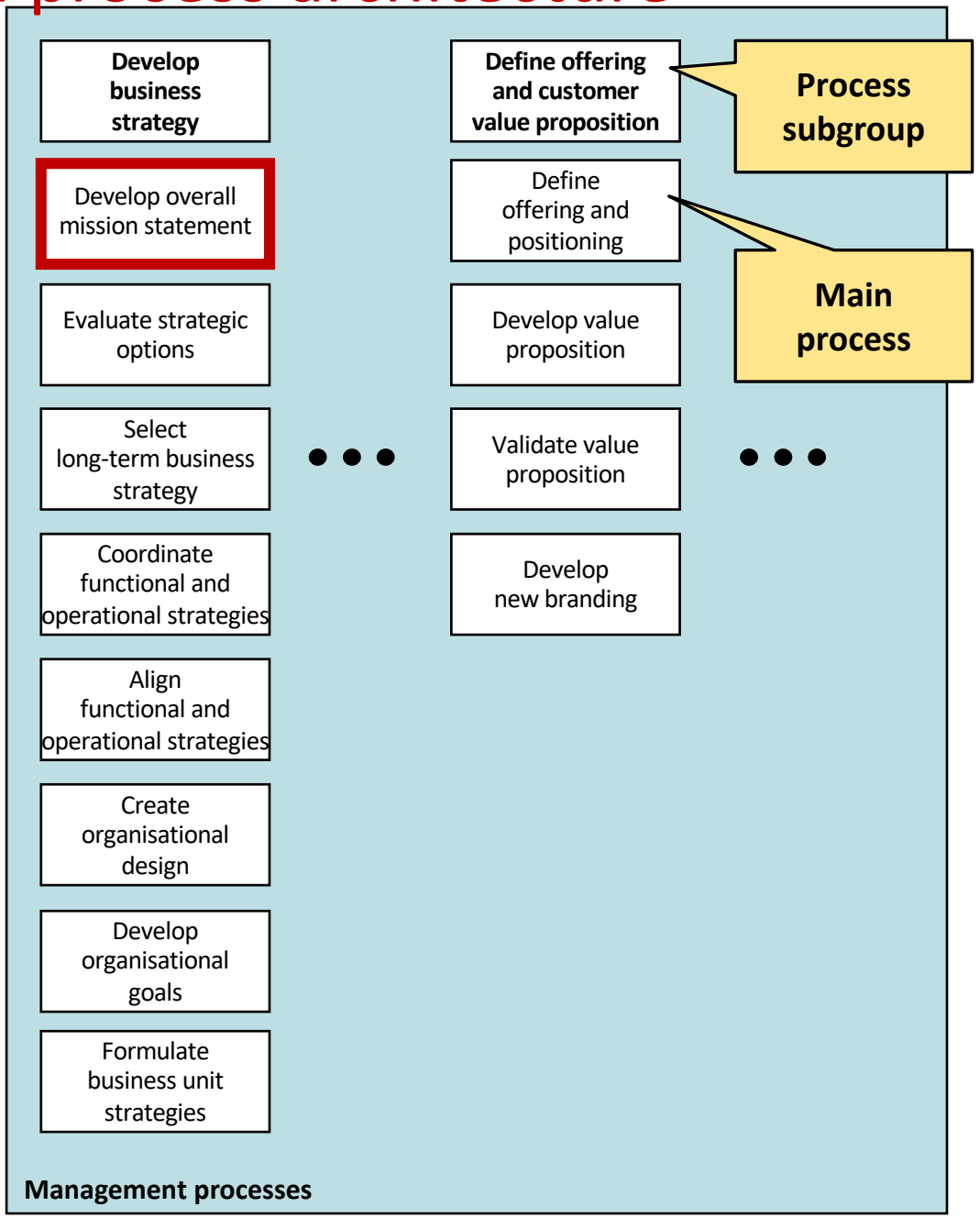
Level 2



Example: hierarchical process architecture

Insurance company

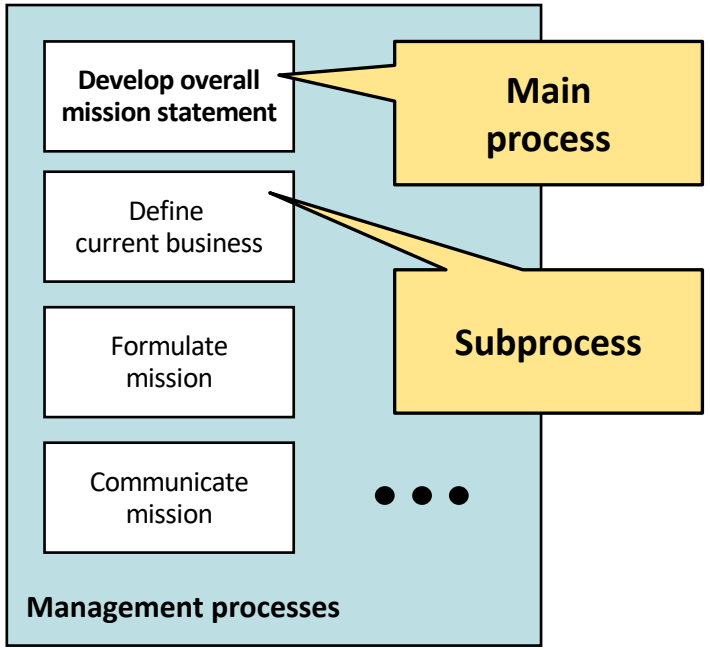
Level 3



Example: hierarchical process architecture

Insurance company

Level 4



Designation via reference models

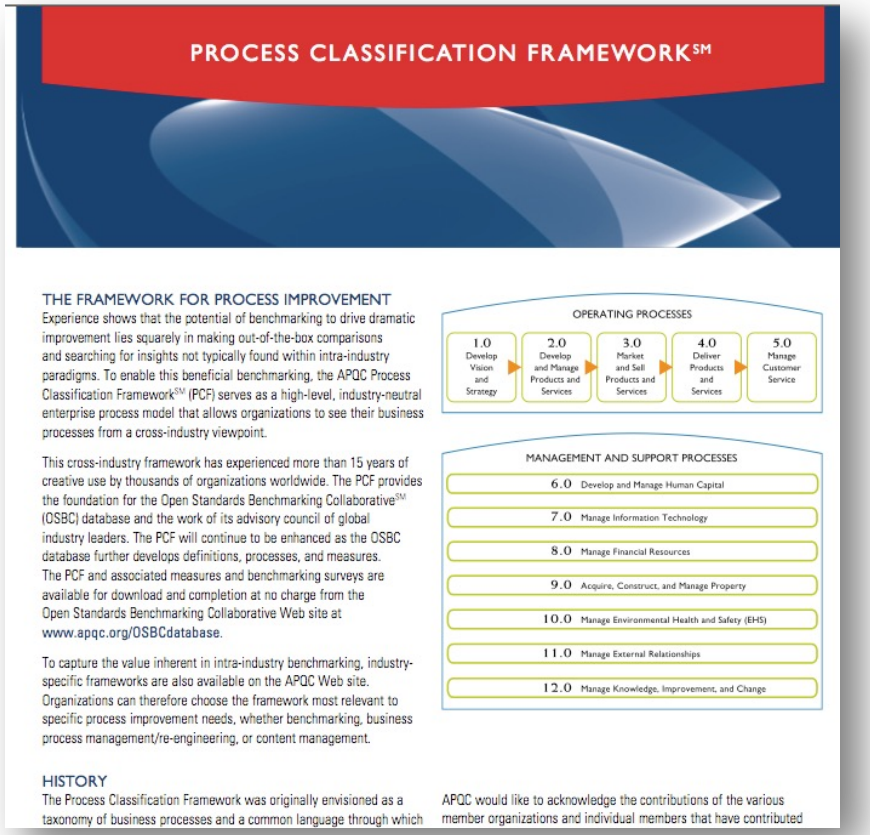
A reference model is used as a template to design the process architecture

Examples:

- Information Technology Infrastructure Library (ITIL)
- Supply Chain Operations Reference Model (SCOR)
- Process Classification Framework (PCF)
- Control Objectives for Information Technology (COBIT)
- Value Reference Model (VRM)
- Voluntary Interindustry Commerce Solutions (VICS)
- eTOM Business Process Framework
- Performance Framework

Example: APQC Process Classification Framework (PCF)

- Industry-neutral enterprise model
- Open standard for benchmarking
- Four levels
  - Categories
  - Process group
  - Process
  - Activity



PROCESS CLASSIFICATION FRAMEWORK℠

THE FRAMEWORK FOR PROCESS IMPROVEMENT

Experience shows that the potential of benchmarking to drive dramatic improvement lies squarely in making out-of-the-box comparisons and searching for insights not typically found within intra-industry paradigms. To enable this beneficial benchmarking, the APQC Process Classification Framework℠ (PCF) serves as a high-level, industry-neutral enterprise process model that allows organizations to see their business processes from a cross-industry viewpoint.

This cross-industry framework has experienced more than 15 years of creative use by thousands of organizations worldwide. The PCF provides the foundation for the Open Standards Benchmarking Collaborative℠ (OSBC) database and the work of its advisory council of global industry leaders. The PCF will continue to be enhanced as the OSBC database further develops definitions, processes, and measures. The PCF and associated measures and benchmarking surveys are available for download and completion at no charge from the Open Standards Benchmarking Collaborative Web site at www.apqc.org/OSBCdatabase.

To capture the value inherent in intra-industry benchmarking, industry-specific frameworks are also available on the APQC Web site. Organizations can therefore choose the framework most relevant to specific process improvement needs, whether benchmarking, business process management/re-engineering, or content management.

OPERATING PROCESSES

1.0 Develop Vision and Strategy
2.0 Develop and Manage Products and Services
3.0 Market and Sell Products and Services
4.0 Deliver Products and Services
5.0 Manage Customer Service

MANAGEMENT AND SUPPORT PROCESSES

6.0 Develop and Manage Human Capital
7.0 Manage Information Technology
8.0 Manage Financial Resources
9.0 Acquire, Construct, and Manage Property
10.0 Manage Environmental Health and Safety (EHS)
11.0 Manage External Relationships
12.0 Manage Knowledge, Improvement, and Change

HISTORY

The Process Classification Framework was originally envisioned as a taxonomy of business processes and a common language through which

APQC would like to acknowledge the contributions of the various member organizations and individual members that have contributed

APQC PCF Overview

Category

APQC Classification Framework

ULB

4.1.8.4 Identify performance trends (10273)
4.1.8.5 Analyze performance benchmark gaps (10274)
4.1.8.6 Prepare appropriate reports (10275)
4.1.8.7 Develop performance improvement plan (10276)
4.1.9 Develop quality standards and procedures (10368)
4.1.9.1 Establish quality targets (10371)
4.1.9.2 Develop standard testing procedures (10372)
4.1.9.3 Communicate quality specifications (10373)

4.2 Procure materials and services (10216) Group

4.2.1 Develop sourcing strategies (10277)
4.2.1.1 Develop procurement plan (10281)
4.2.1.2 Clarify purchasing requirements (10282)
4.2.1.3 Develop inventory strategy (10283)
Activity 4.2.1.4 Match needs to supply capabilities (10284)
4.2.1.5 Analyze company's spend profile (10285)
4.2.1.6 Seek opportunities to improve efficiency and value (10286)
4.2.1.7 Collaborate with suppliers to identify sourcing opportunities (10287)

4.2.2 Select suppliers and develop/maintain contracts

Process

4.3.1.4 Release production orders and create lots (10309)
4.3.2 Produce product (10304)
4.3.2.1 Manage raw material inventory (10310)
4.3.2.2 Execute detailed line schedule (10311)
4.3.2.3 Rerun defective items (10313)
4.3.2.4 Assess production performance (10314)
4.3.3 Schedule and perform maintenance (10305)
4.3.3.1 Determine process for preventive (planned) maintenance (Preventive Maintenance Orders) (10315)
4.3.3.2 Determine process for requested (unplanned) maintenance (Work Order Cycle) (10316)
4.3.3.3 Execute maintenance (10317)
4.3.3.4 Calibrate test equipment (10318)
4.3.3.5 Report maintenance issues (10319)
4.3.4 Perform quality testing (10369)
4.3.4.1 Perform testing using the standard testing procedure (10374)
4.3.4.2 Record test results (10375)
4.3.5 Maintain production records and manage lot traceability (10370)
4.3.5.1 Determine lot numbering system (10376)

Prioritization (aka Process Selection)

1. **Importance**

   Which processes have greatest impact on the organization‘s strategic objectives?

2. **Health (or Dysfunction)**

   Which processes are in deepest trouble?

3. **Feasibility**

   Which processes are most susceptible to successful process management?

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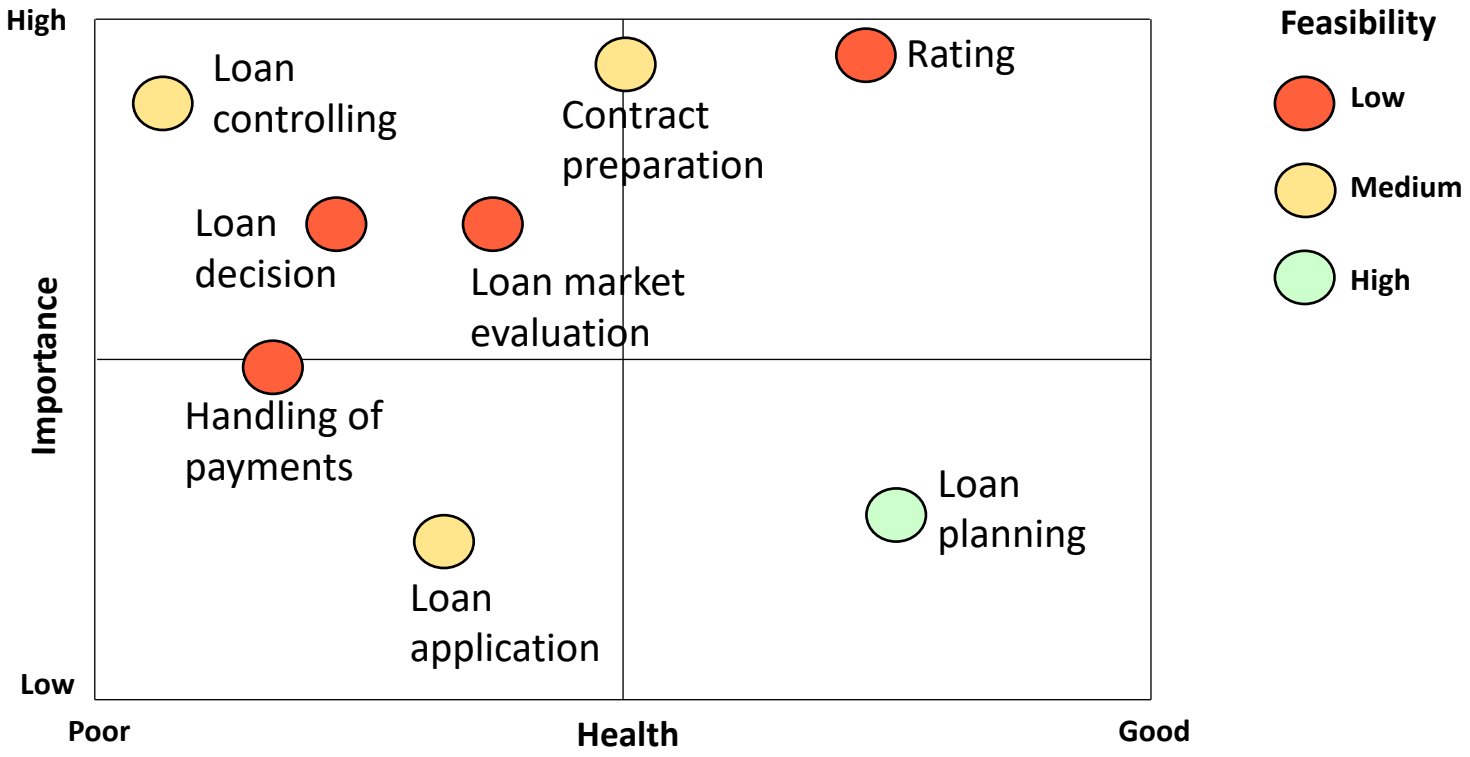
Prioritized process portfolio

Hammer, Champy (1993)

Example: prioritized process portfolio

Financial institution



Acknowledgements

- All material comes from Marlon Dumas, Marcello La Rosa, Jan Mendling, Hajo A. Reijers, authors of the “Fundamentals of Business Process Management” book.