

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

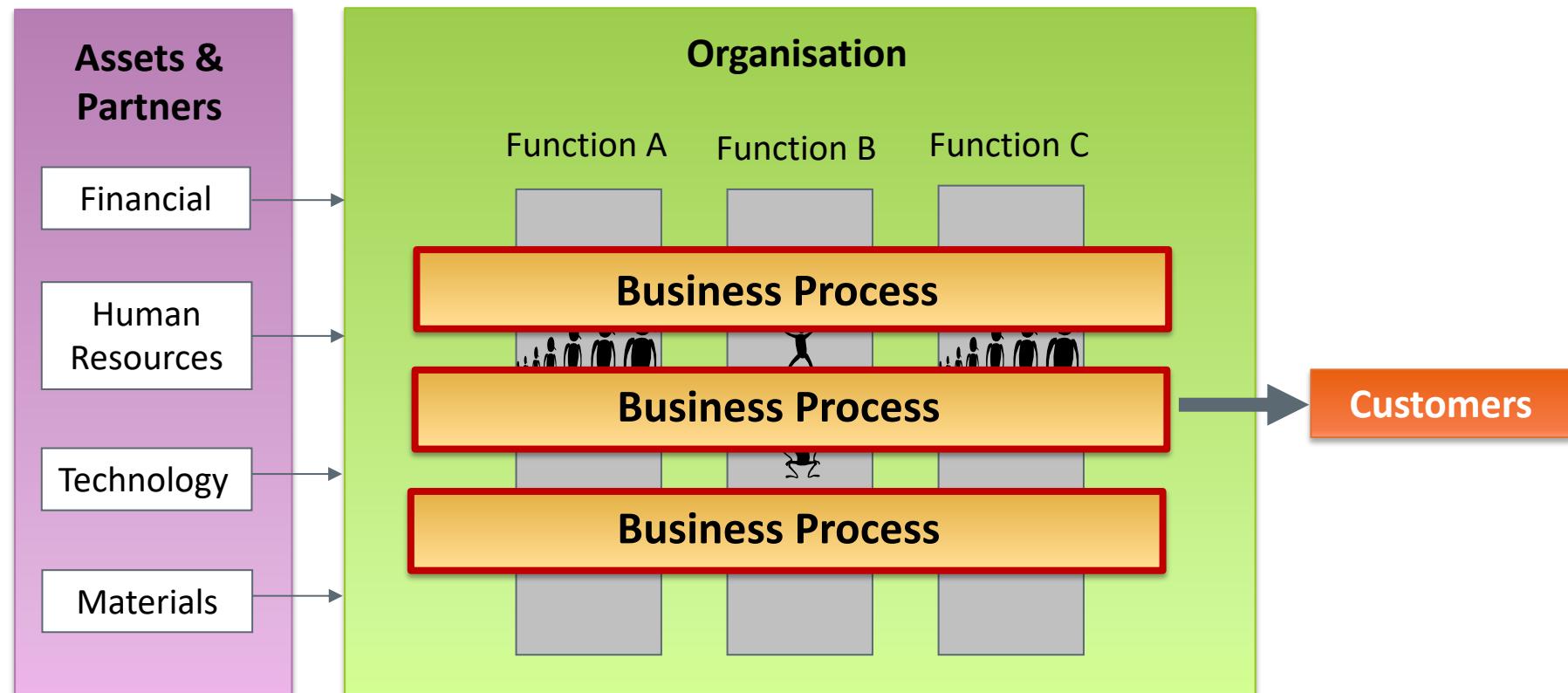
Obtain
PO
confirm.

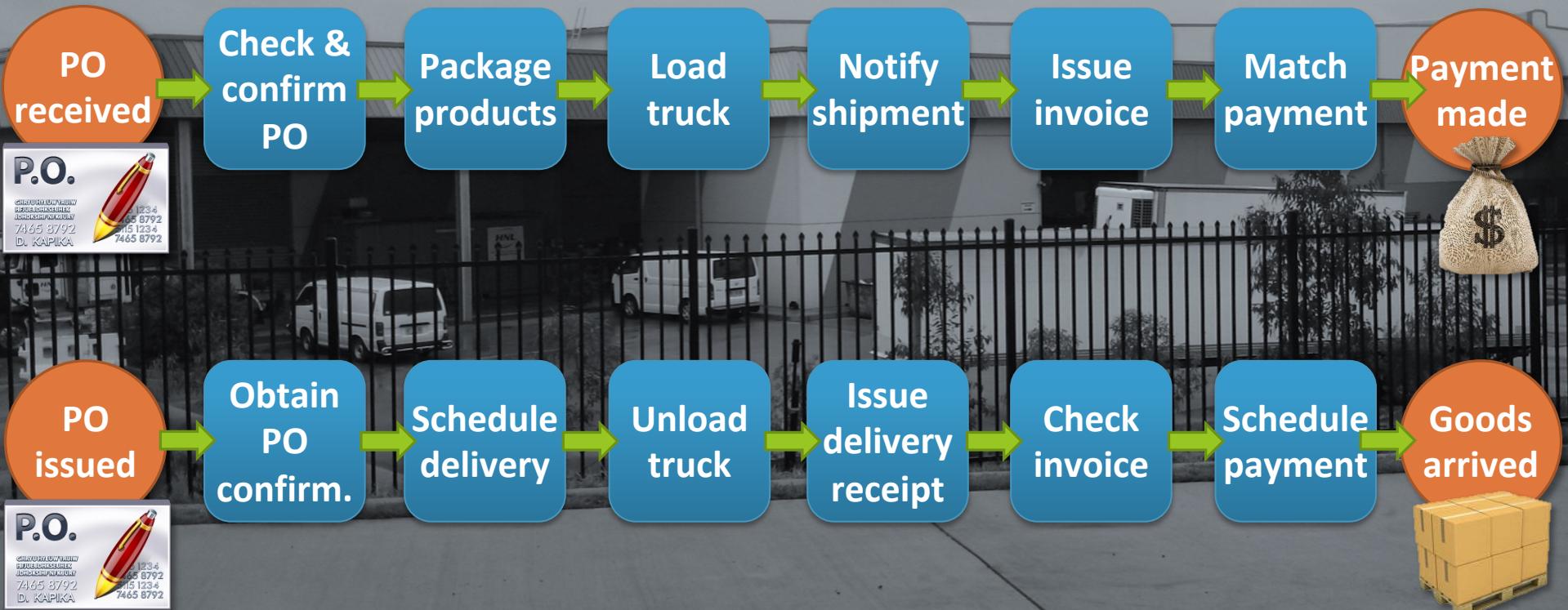
Check
Invoice

Request
PO change

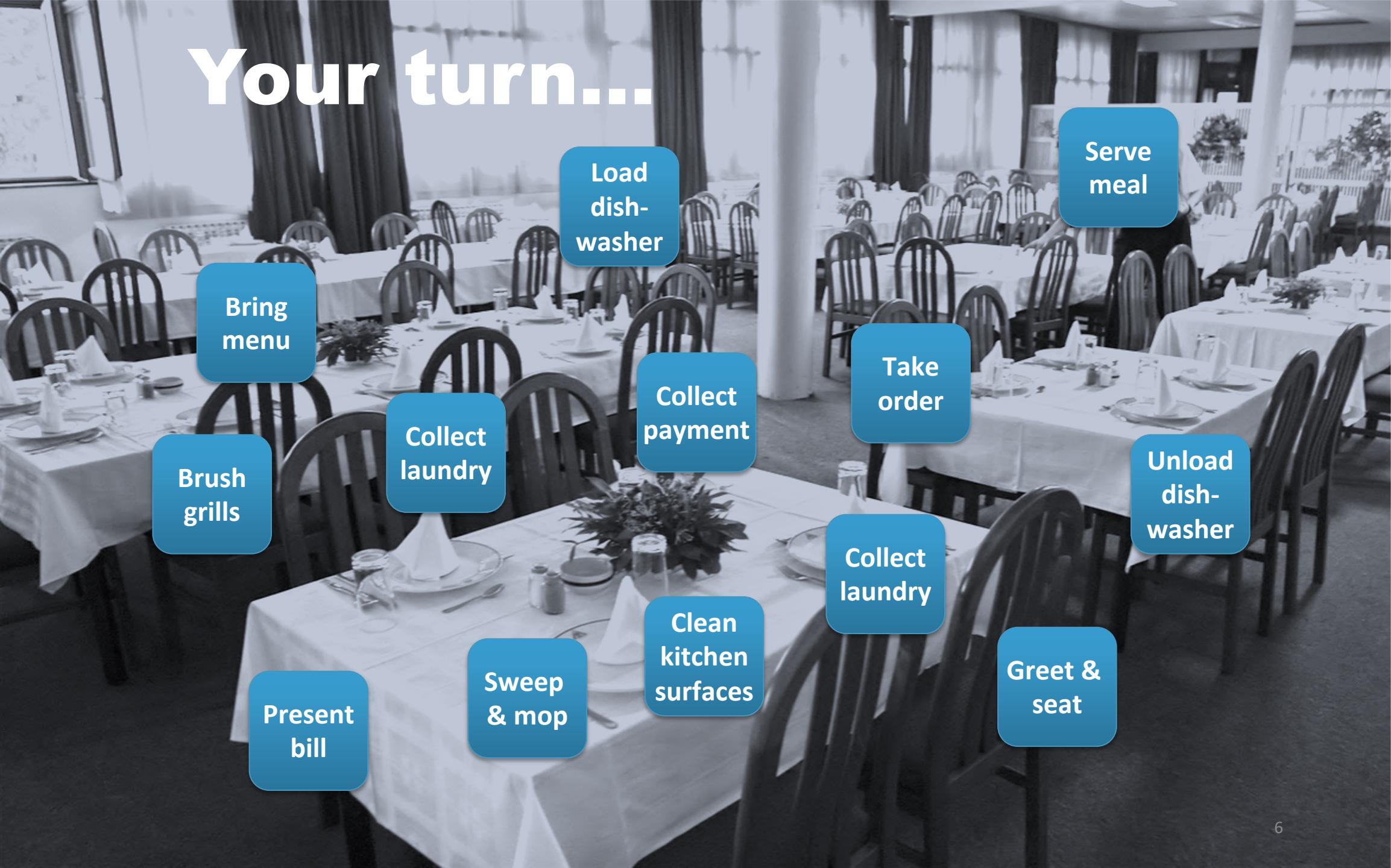
Match
incoming
payment

Business processes





Your turn...





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



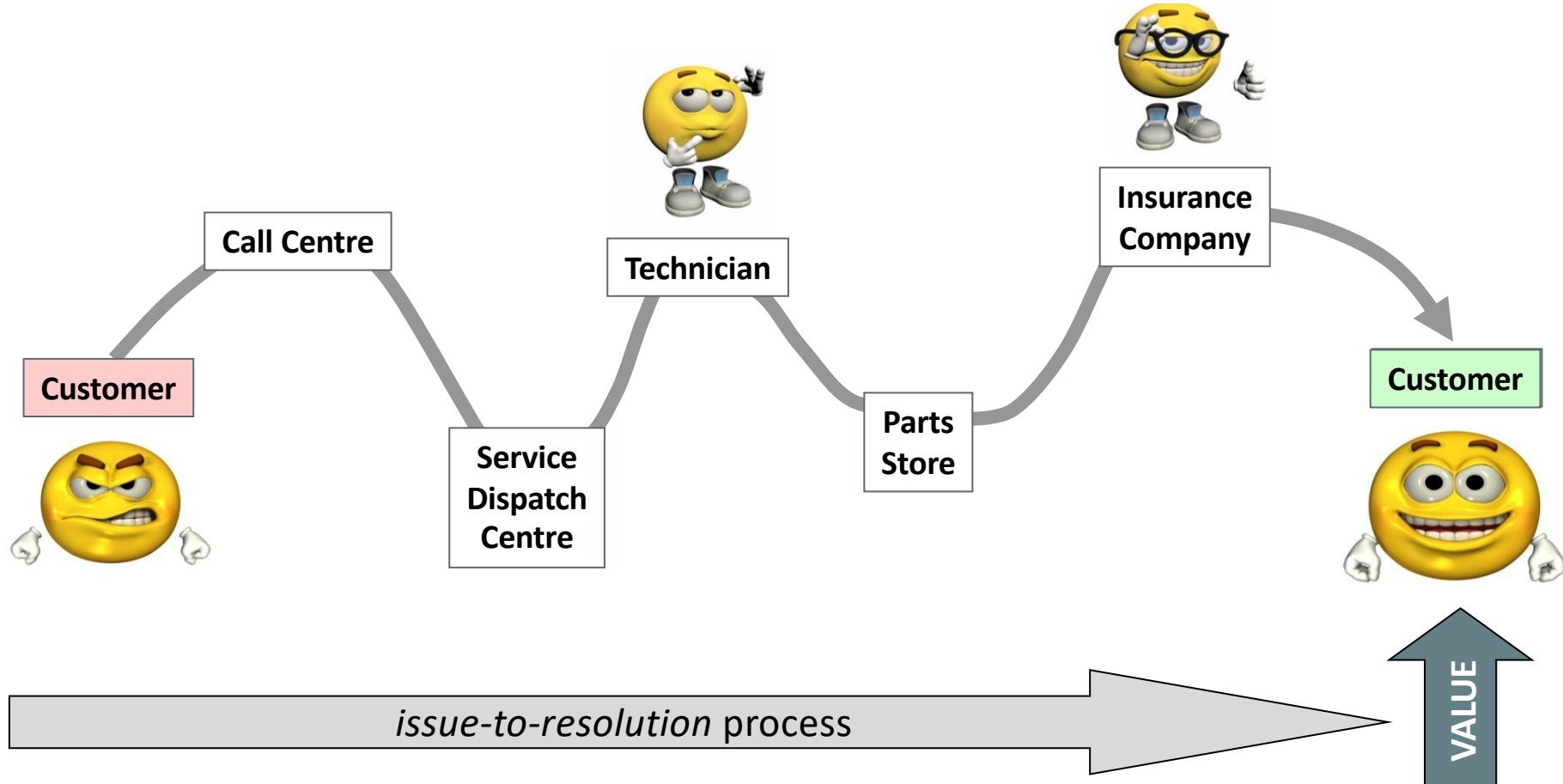
“My washing machine doesn’t work...”

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



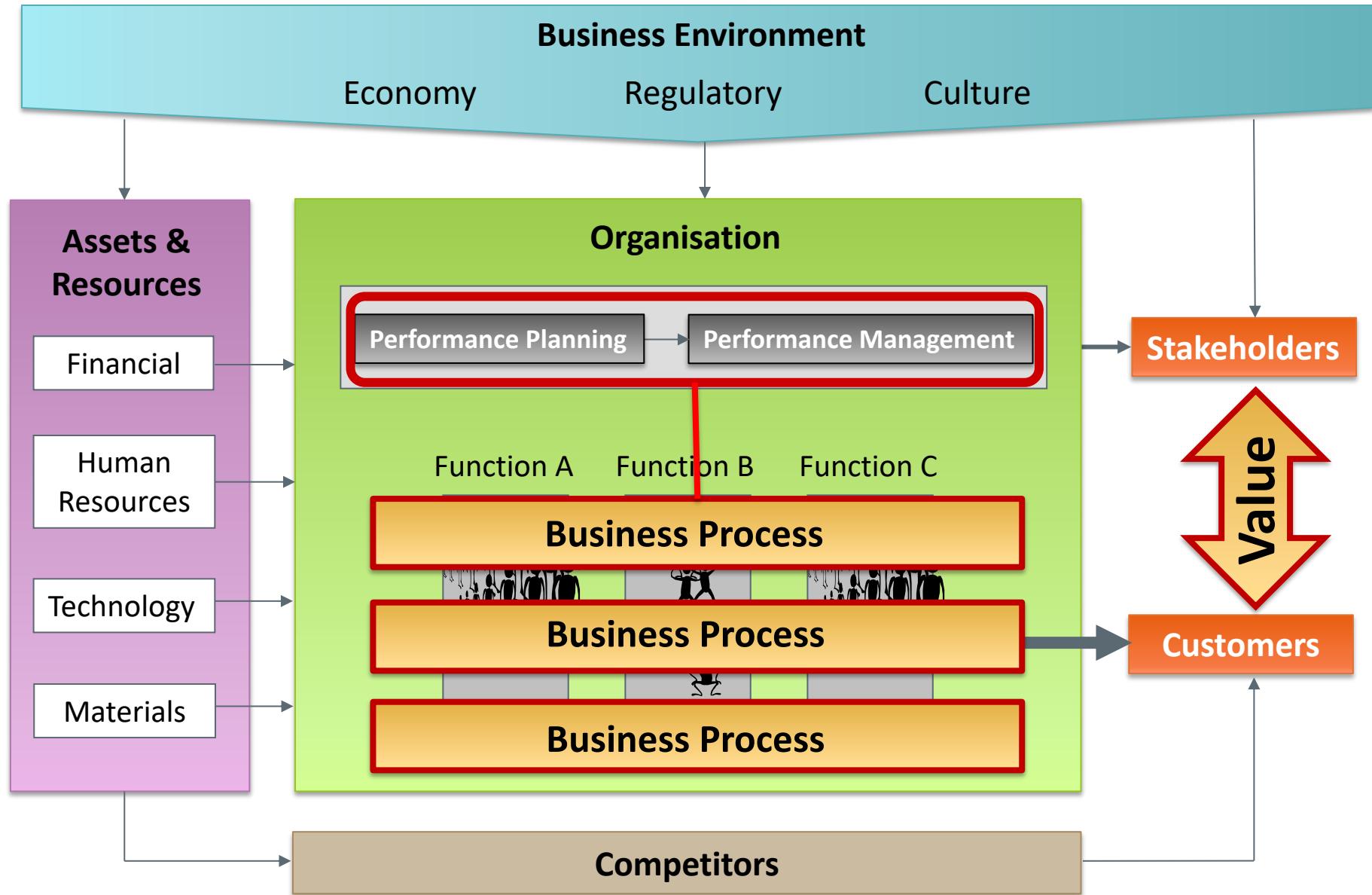
Your turn

- 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.

What is Business Process Management?

And why should I
care about it?

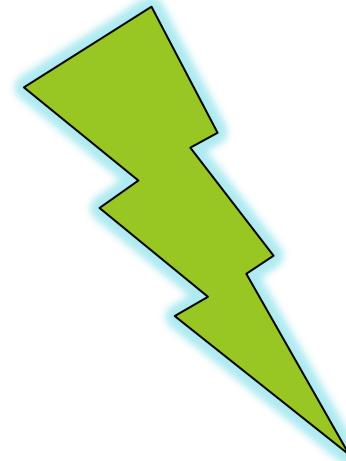
Improving Performance (Rummel's Framework)



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

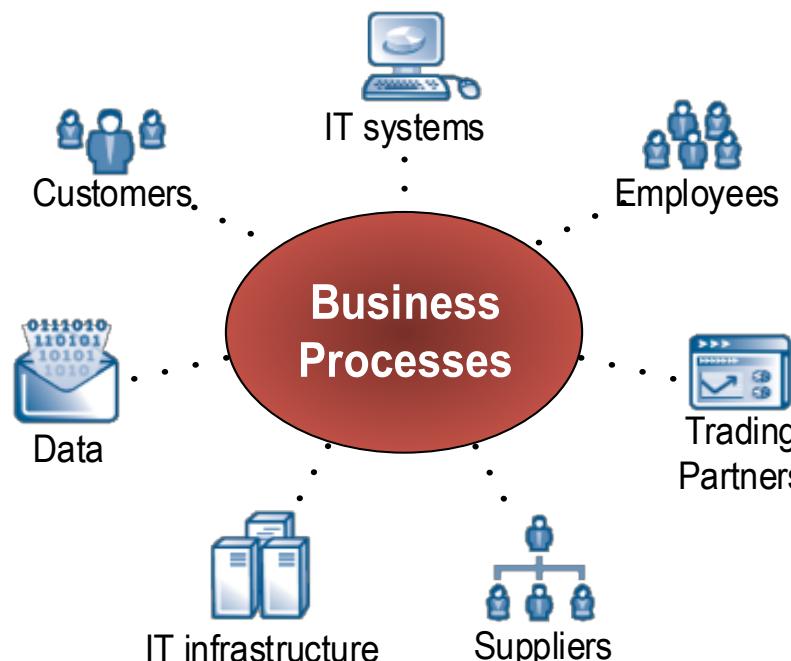


Eliminate Waiters

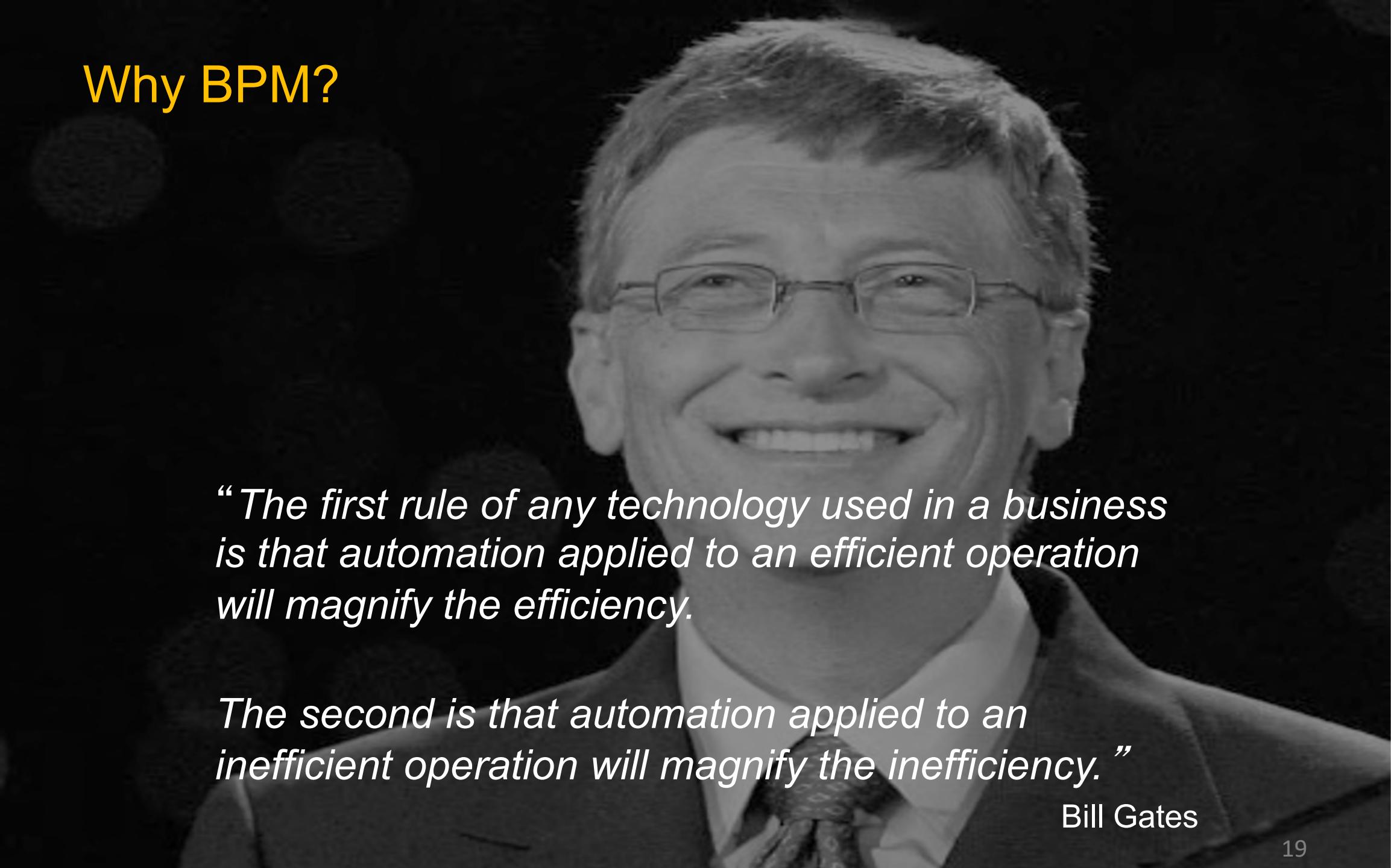


Business Process Management (BPM)

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



Why BPM?

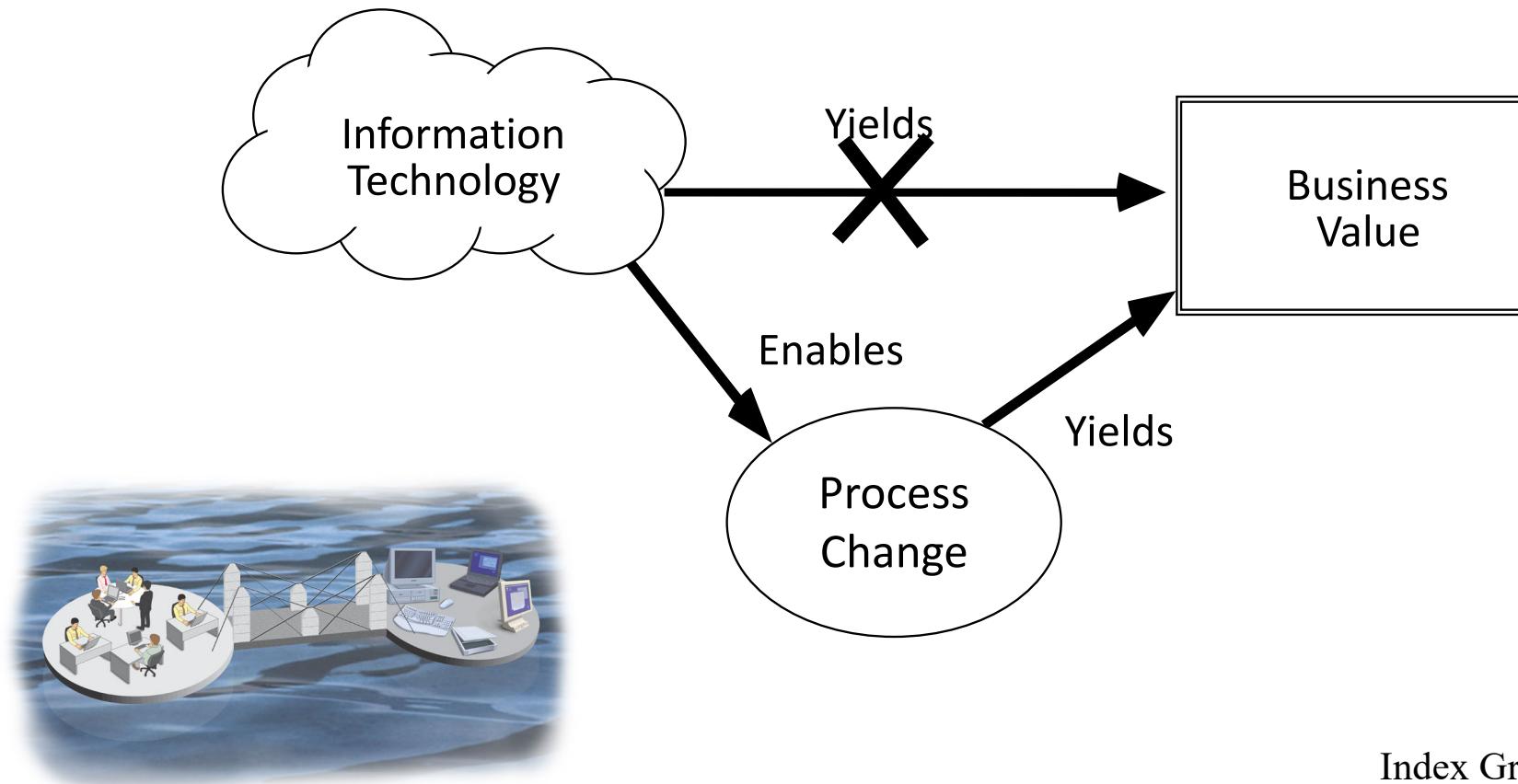
A black and white photograph of Bill Gates, smiling and wearing glasses and a suit. He is positioned on the right side of the slide.

“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

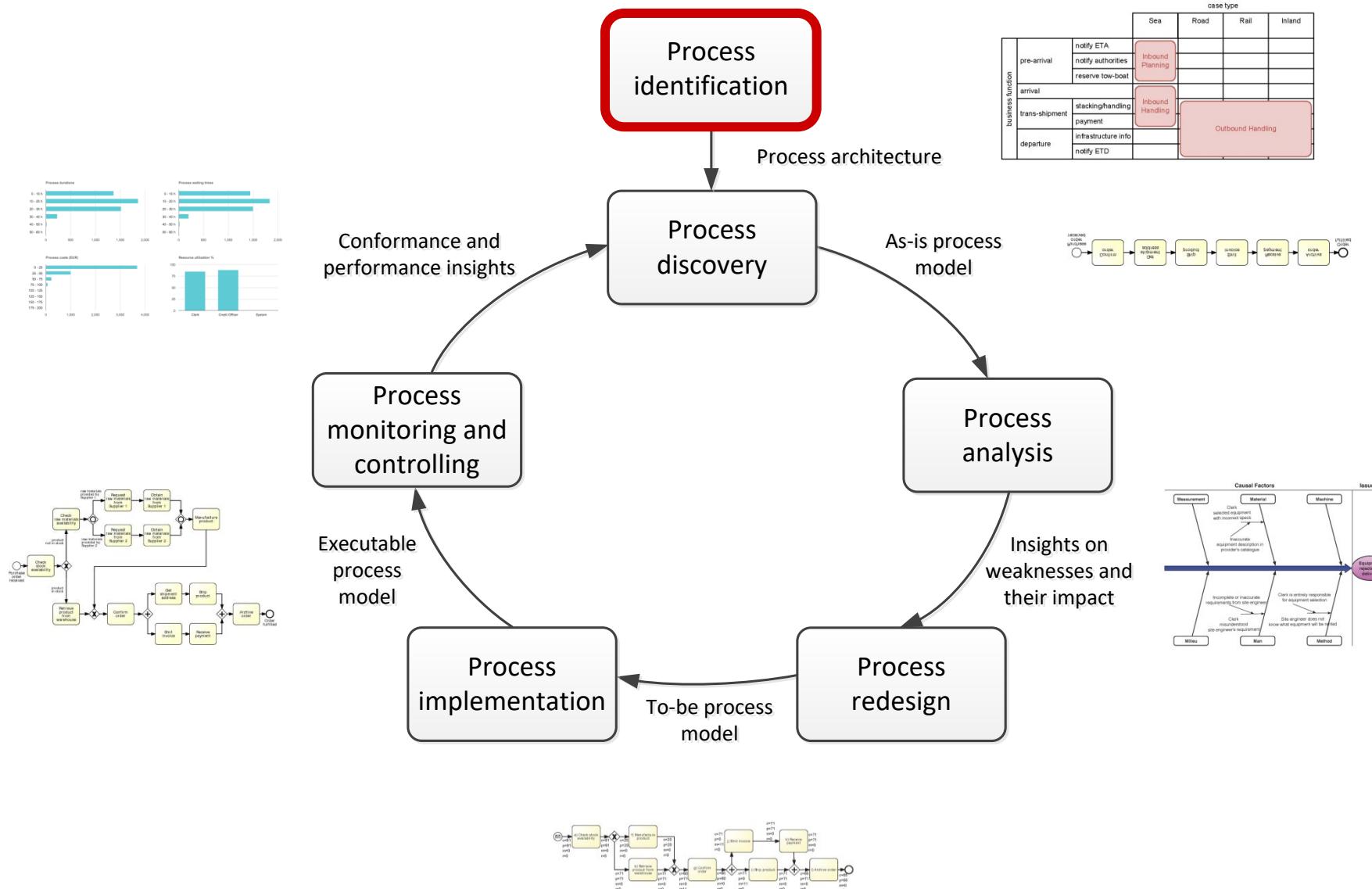
In other words...



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)

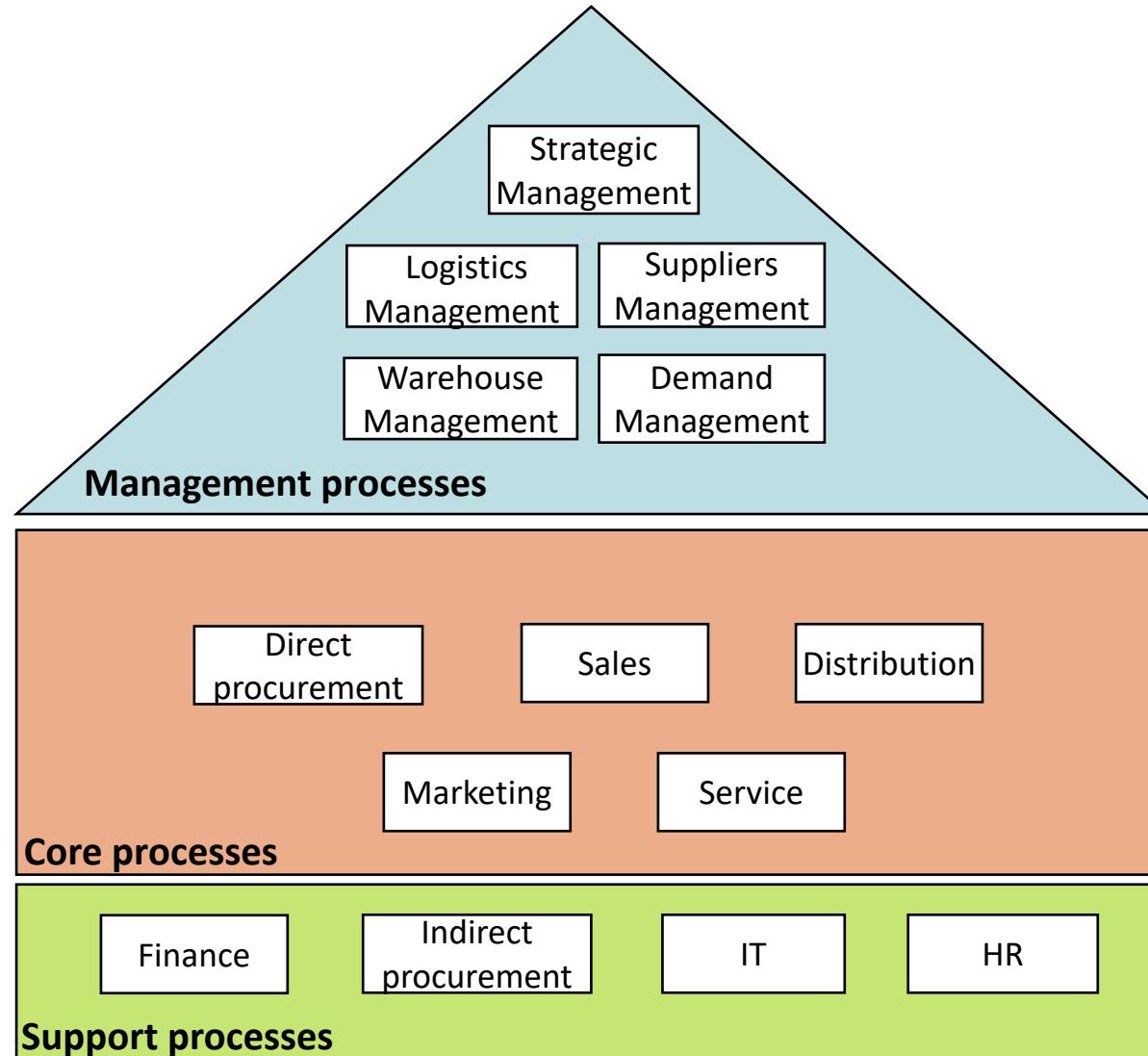
Prioritize processes based on:

- Importance
- Health
- Feasibility

Prioritized
Process
Portfolio

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

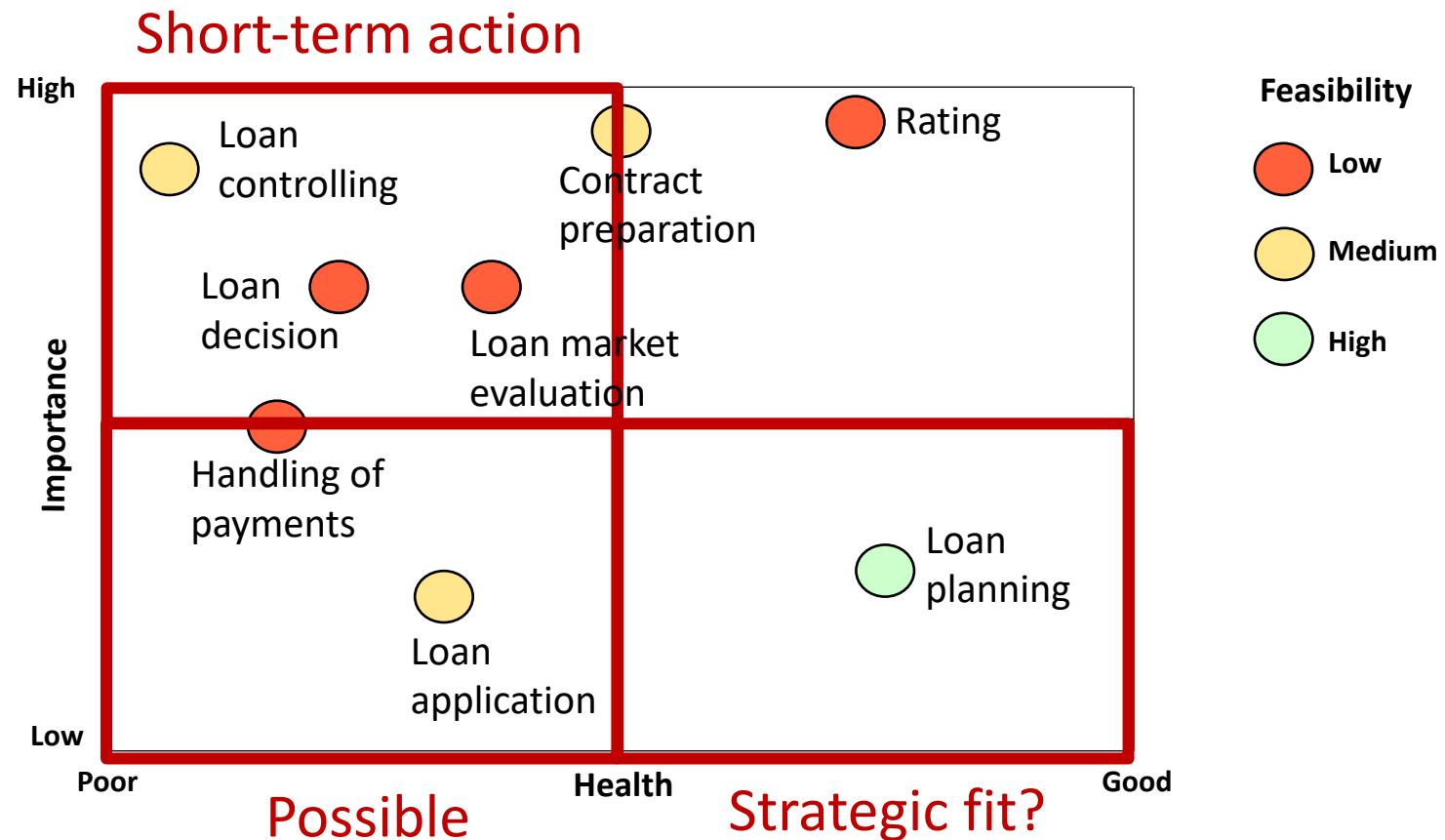
Which processes are most susceptible to successful process management?



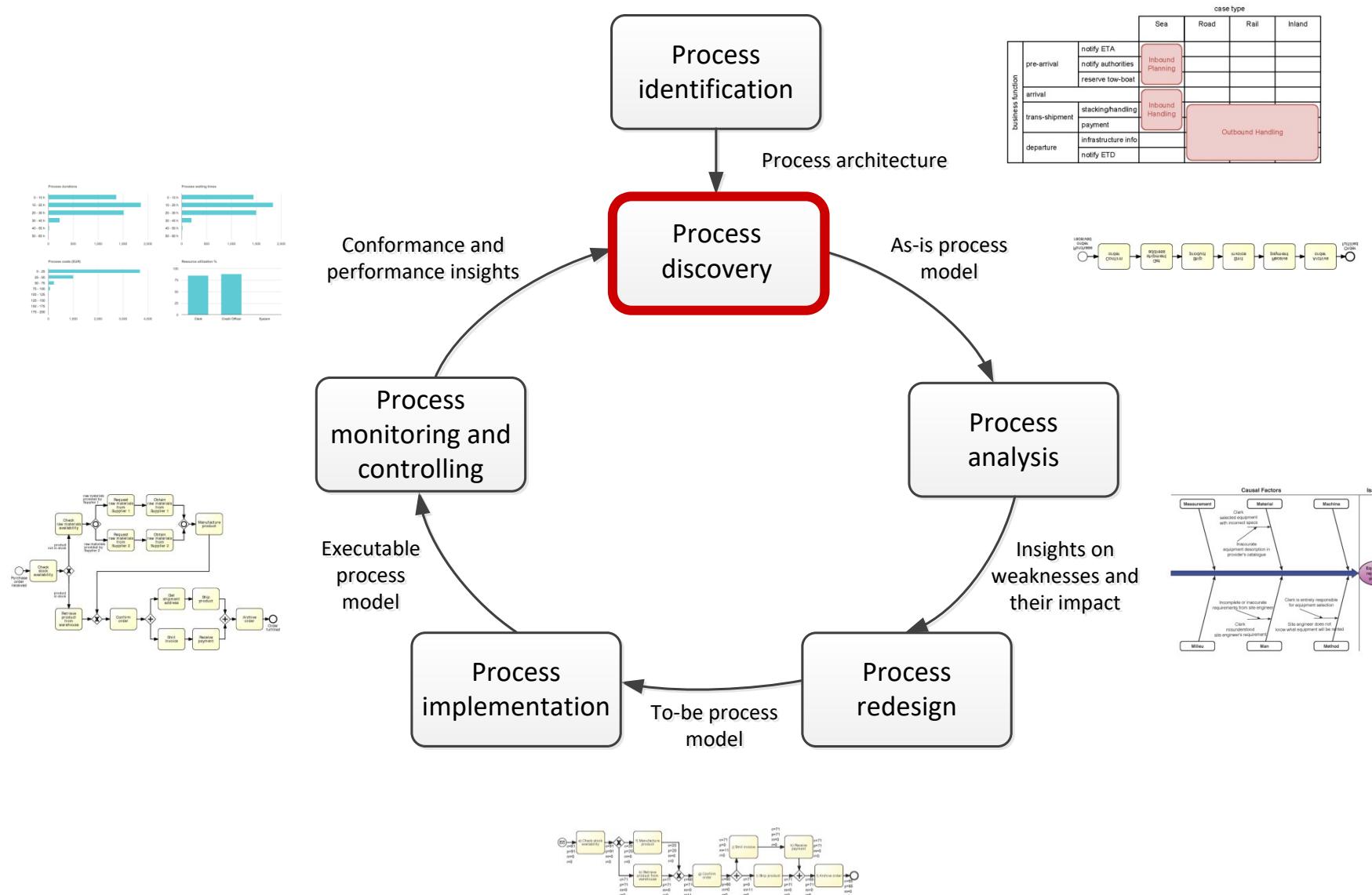
Prioritized process portfolio

Example: prioritized process portfolio

Financial institution

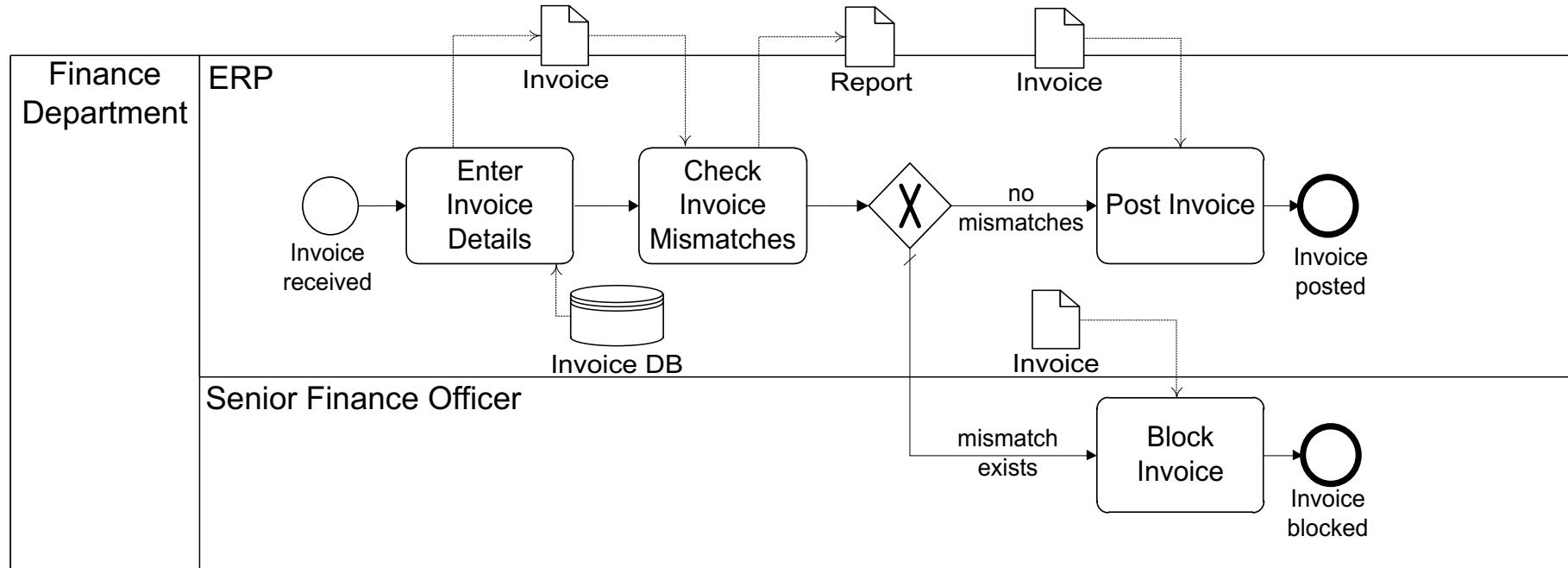


The BPM lifecycle

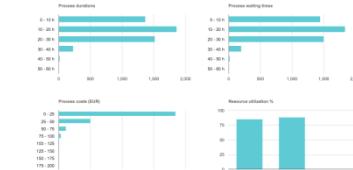


Business process model

Invoice handling example

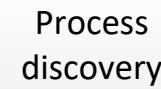


The BPM lifecycle

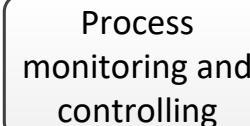


Process architecture

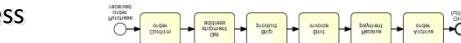
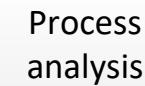
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business function	pre-arrival	notify ETA	Inbound Planning		
	arrival	notify authorities	Inbound Handling		
	trans-shipment	stacking/handling			
	departure	payment			
		infrastructure info			
		notify ETD			



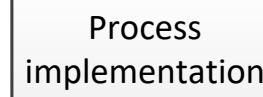
As-is process model



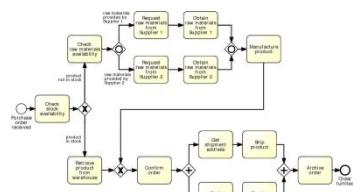
Conformance and performance insights



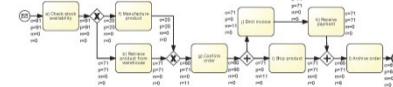
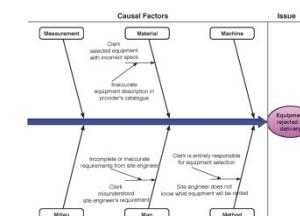
Insights on weaknesses and their impact



To-be process model

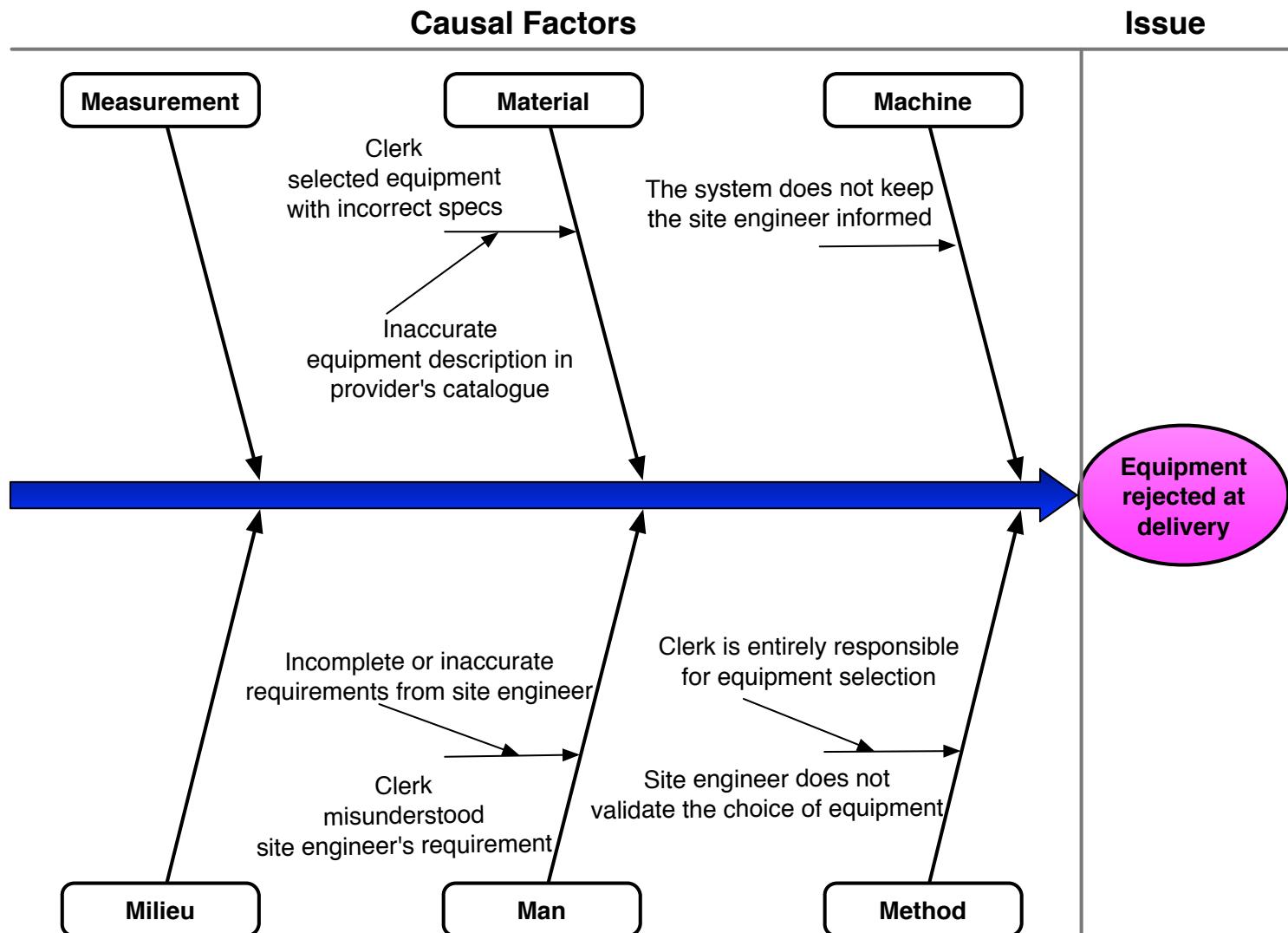


Executable process model



Qualitative process analysis

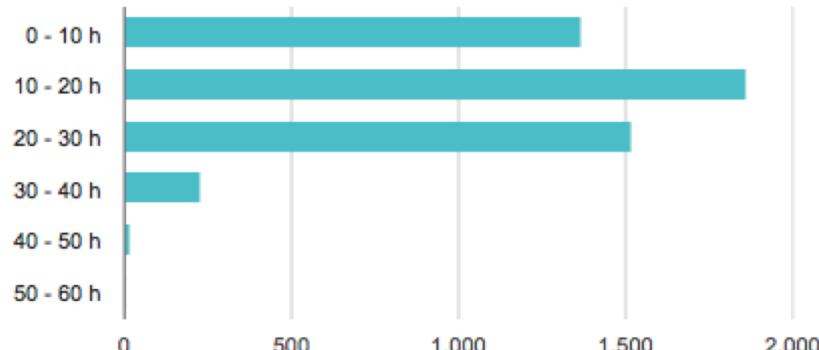
Root-cause analysis example



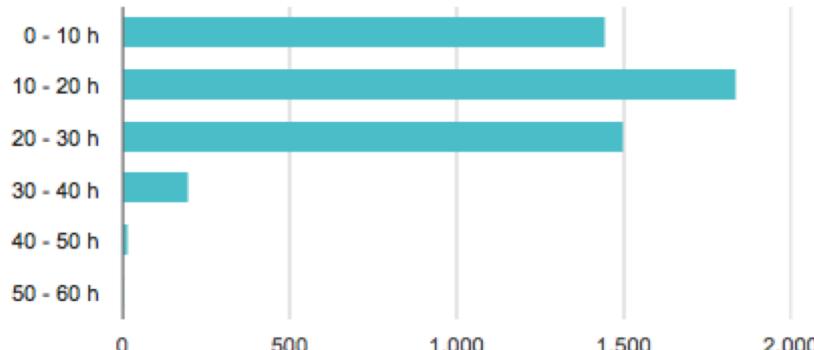
Quantitative process analysis

Process simulation example

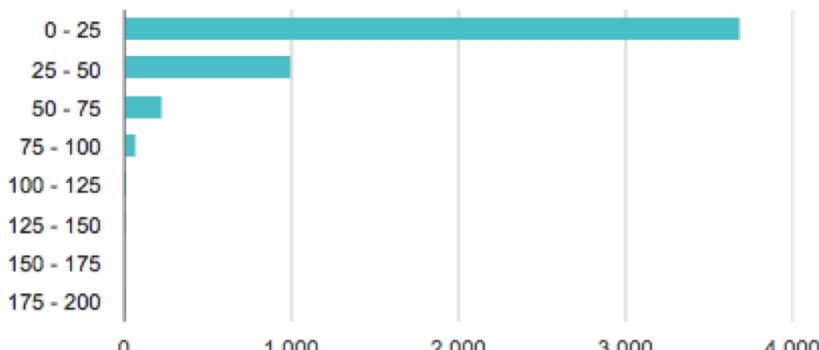
Process durations



Process waiting times



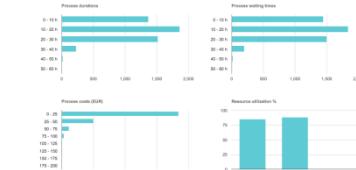
Process costs (EUR)



Resource utilization %

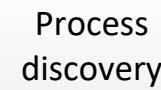


The BPM lifecycle

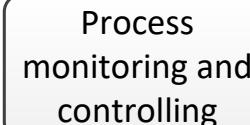


Process architecture

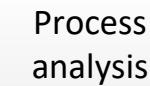
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	departure	payment			
		infrastructure info			
		notify ETD			



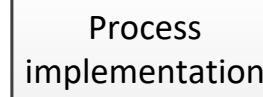
As-is process model



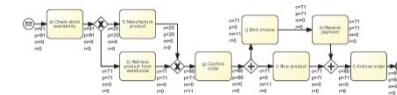
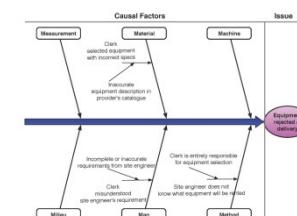
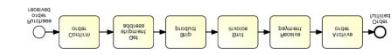
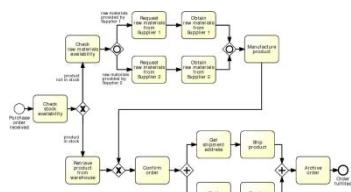
Conformance and performance insights



Insights on weaknesses and their impact

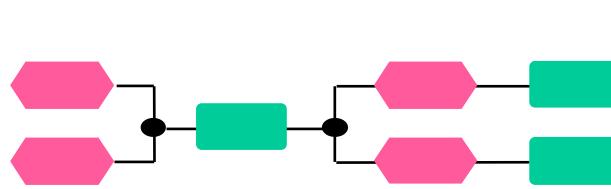


To-be process model

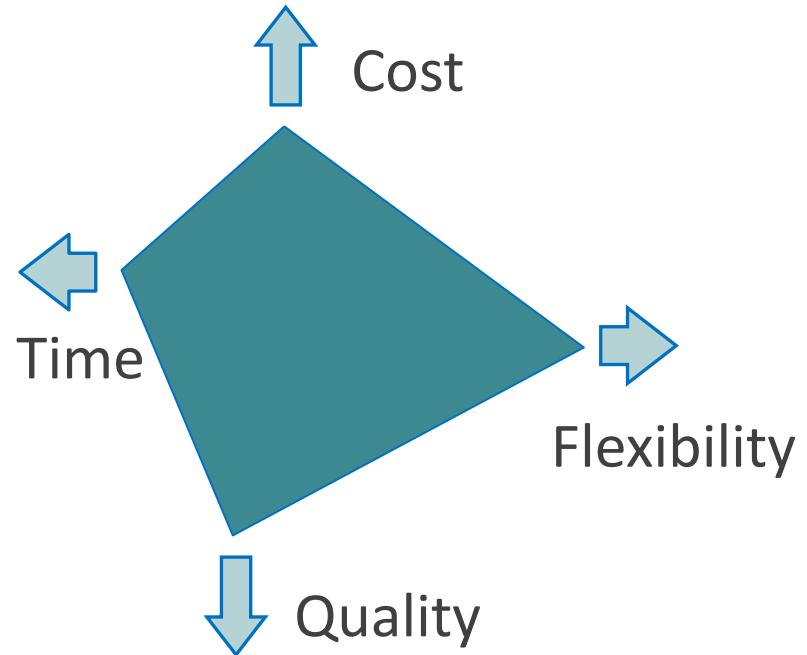
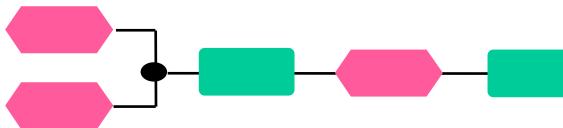


Process redesign

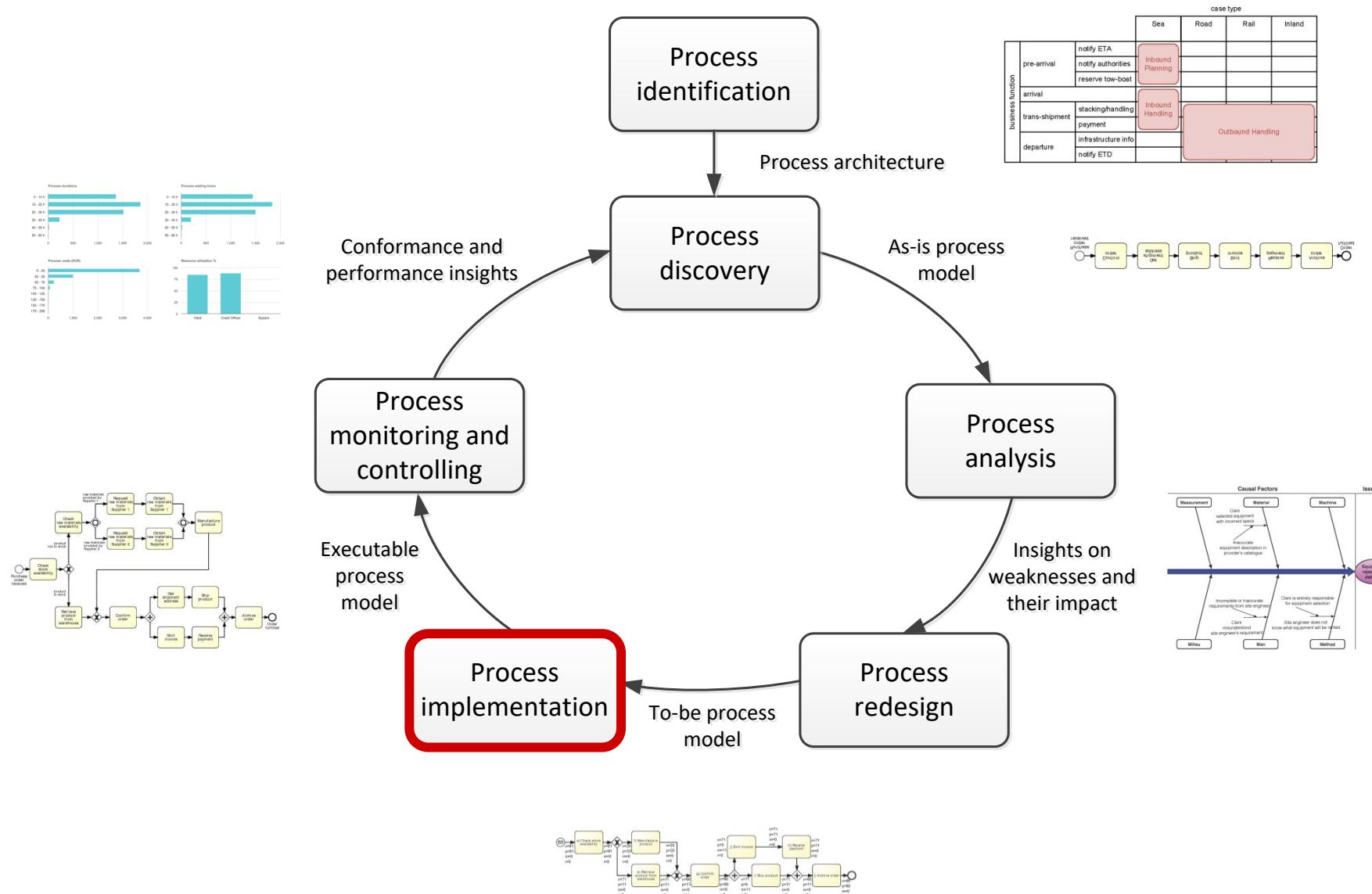
AS-IS process model



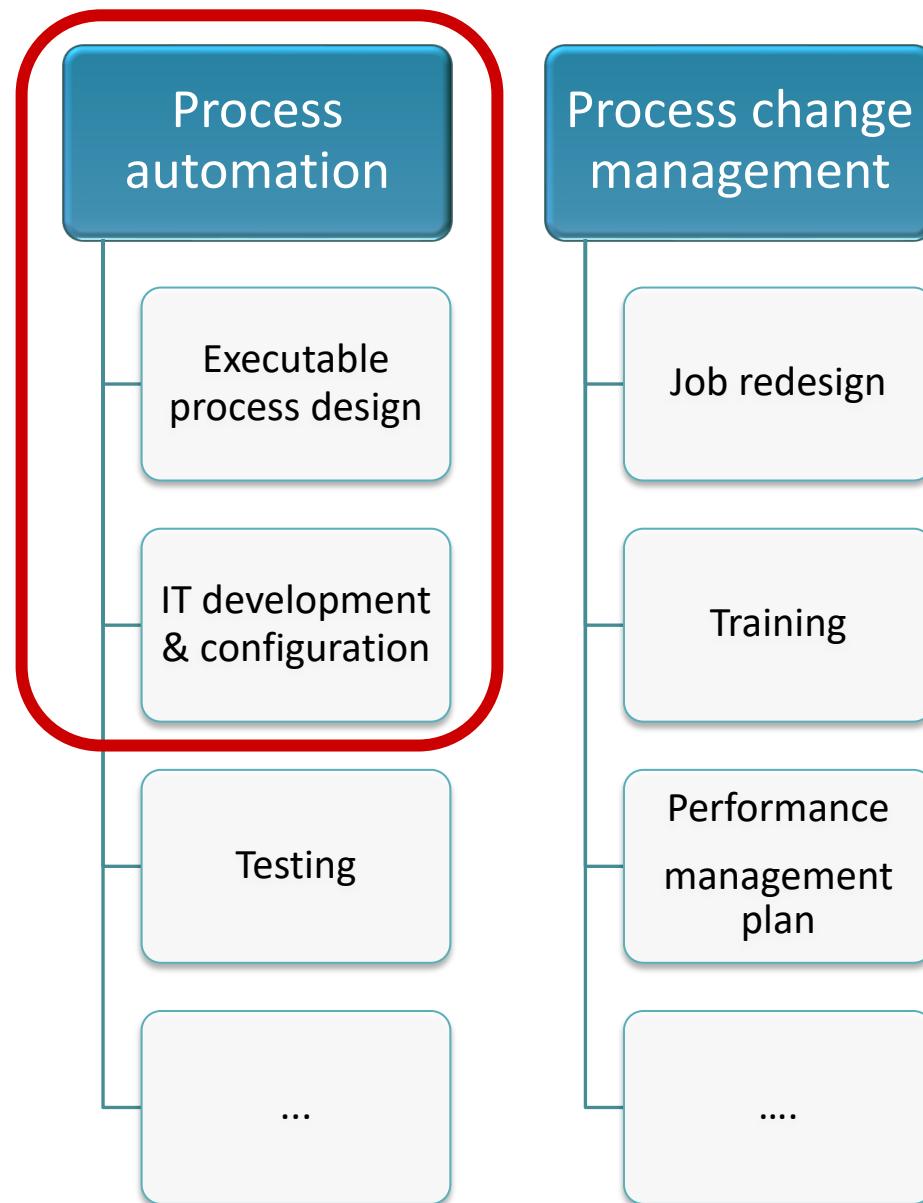
TO-BE process model



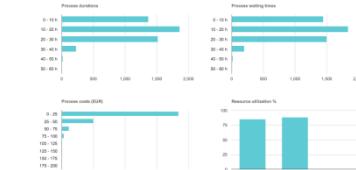
The BPM lifecycle



Process implementation

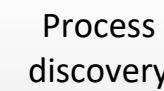


The BPM lifecycle



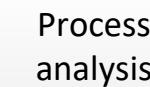
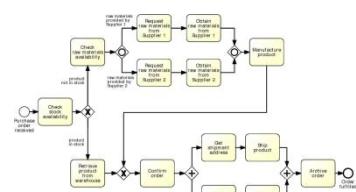
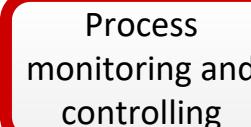
Process architecture

	case type	Sea	Road	Rail	Inland
business function	pre-arrival	notify ETA			
	arrival	notify authorities	Inbound Planning		
	trans-shipment	stacking/handling	Inbound Handling		
	departure	payment		Outbound Handling	
	infrastructure info				
	notify ETD				



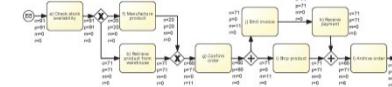
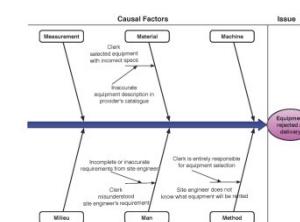
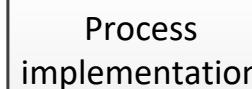
As-is process model

Conformance and performance insights



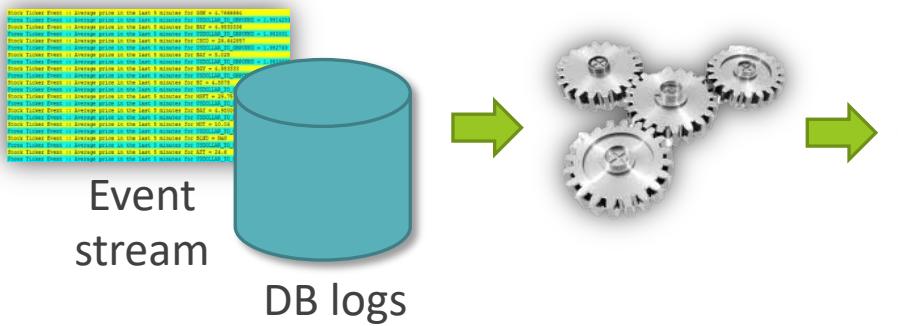
Insights on weaknesses and their impact

To-be process model

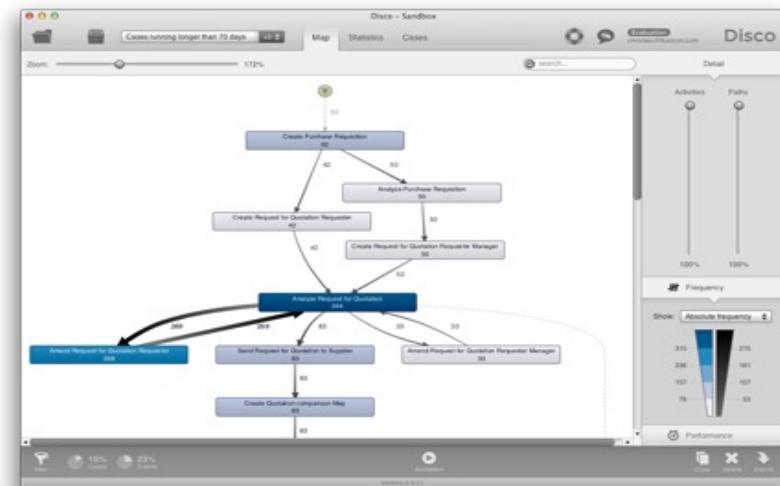


Process monitoring

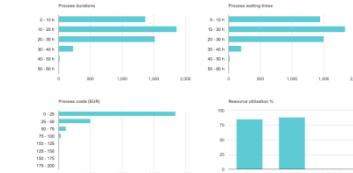
Dashboards, alerts & reports



Model-based analytics (p. mining)

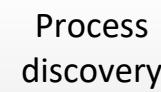


The BPM lifecycle

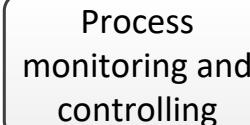


Process architecture

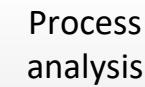
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As-is process model



Conformance and performance insights

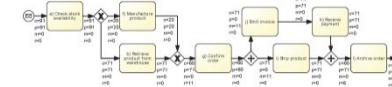
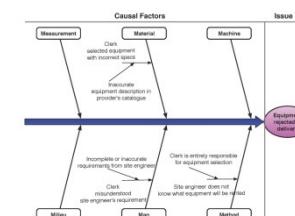
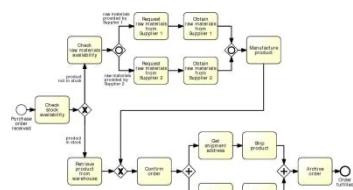


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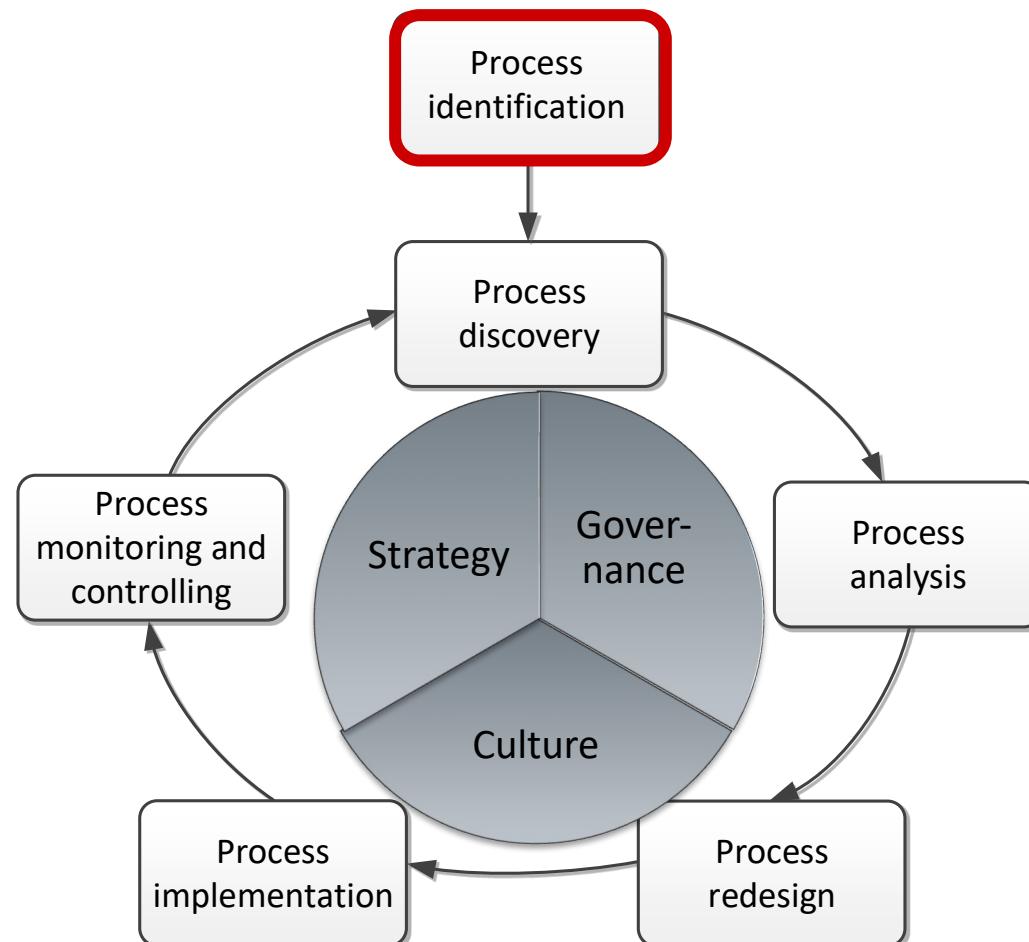
Executable process model



To-be process model



The BPM lifecycle



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

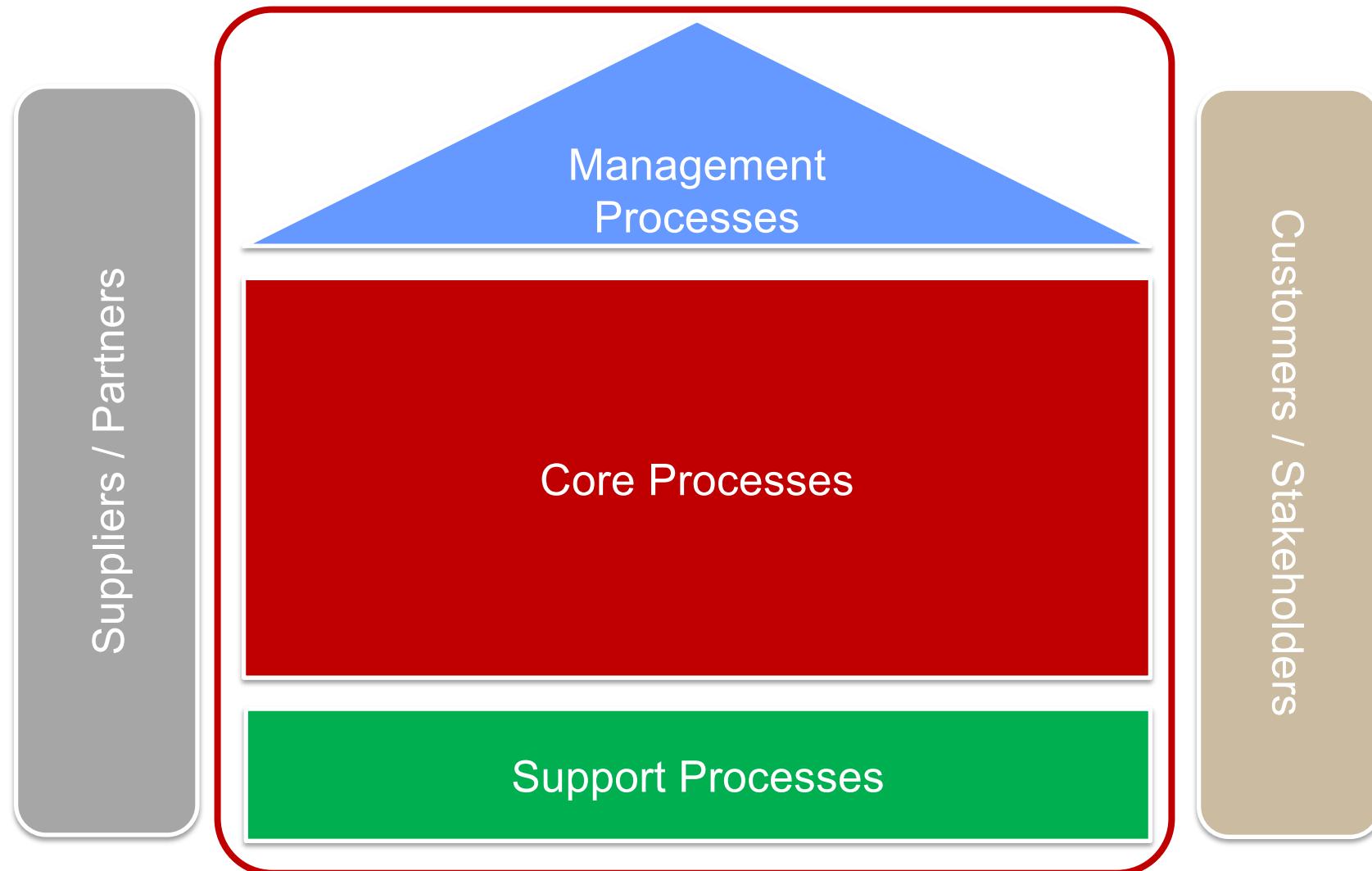
Process Enumeration

“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



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)
- ...

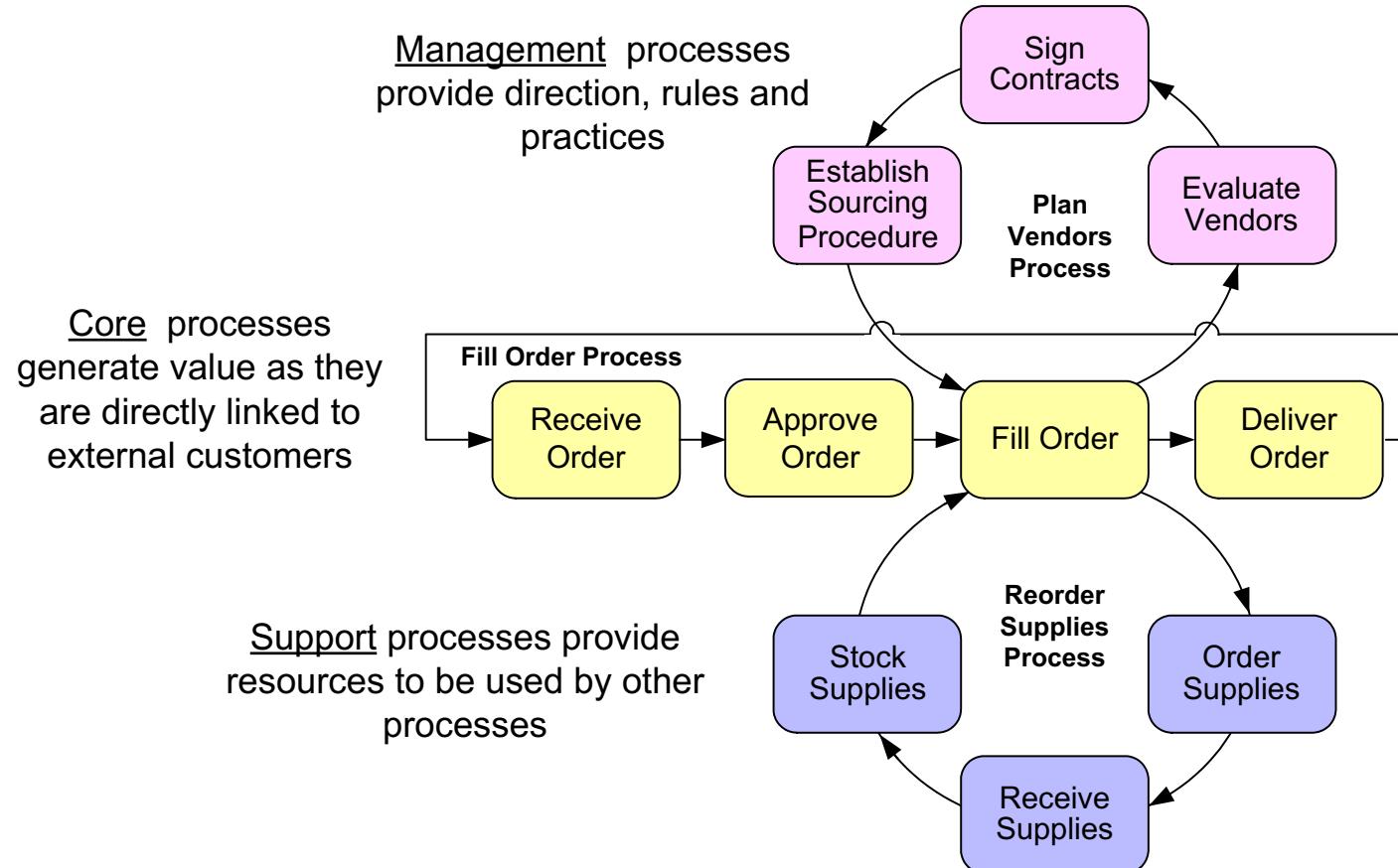
Support processes

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

Management processes

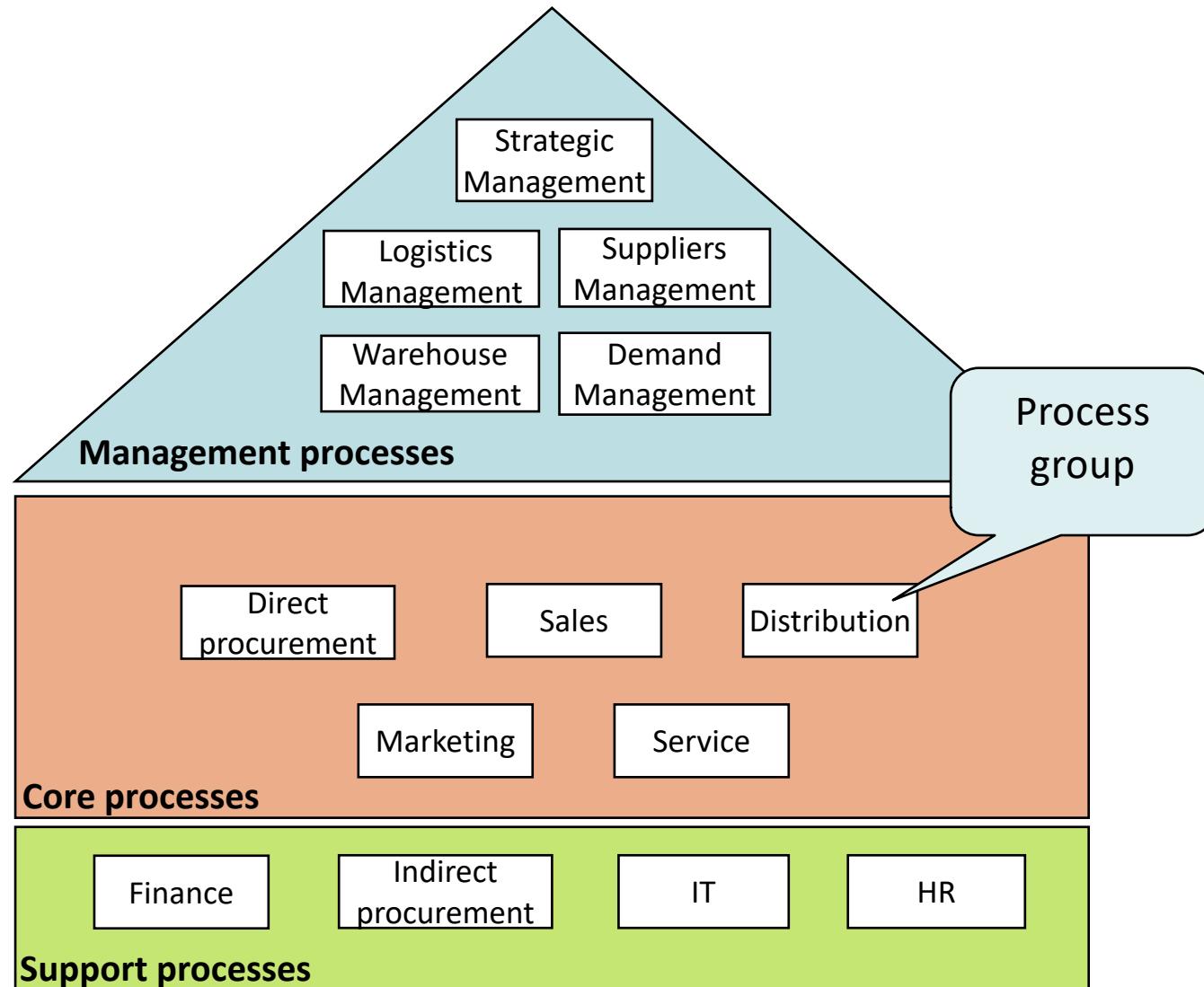
- Suppliers management (suppliers planning, suppliers acquisition...)
- Logistics management (logistics planning, logistics controlling...)
- ...

Relations between core, support, mgt processes



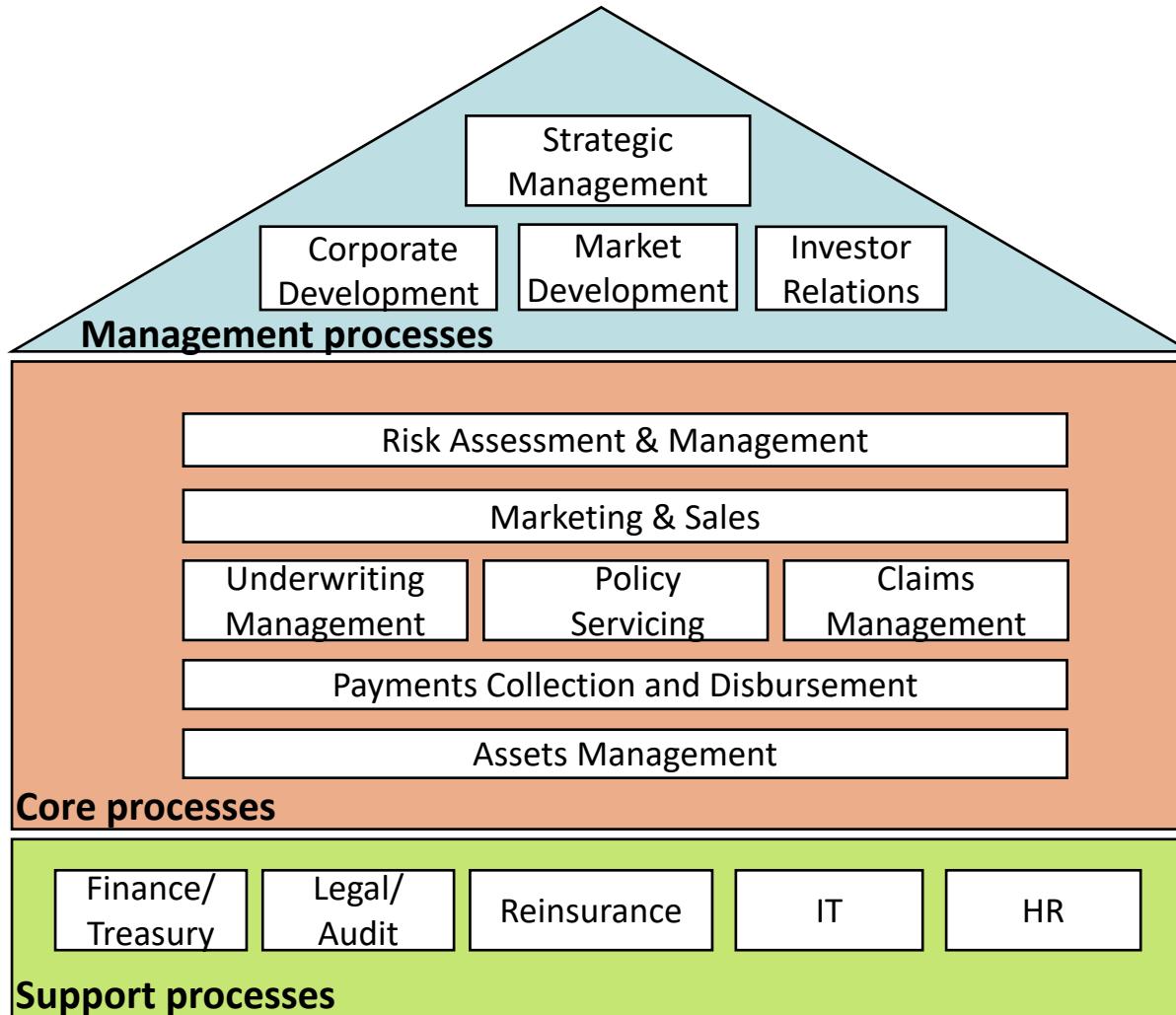
Example: process architecture

Wholesaler



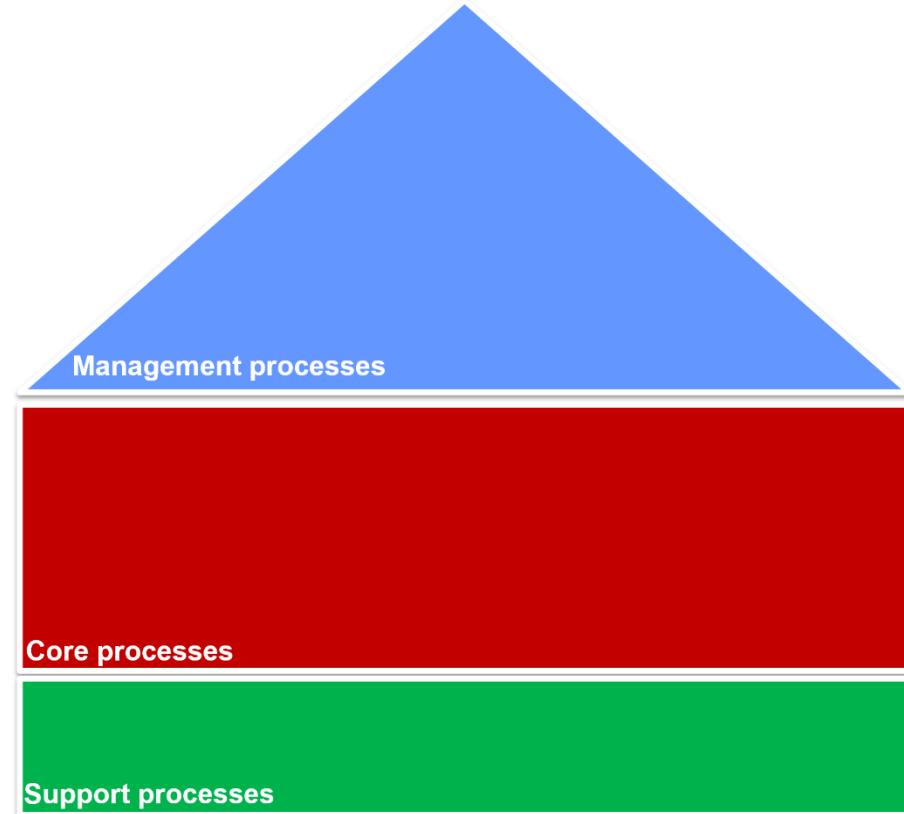
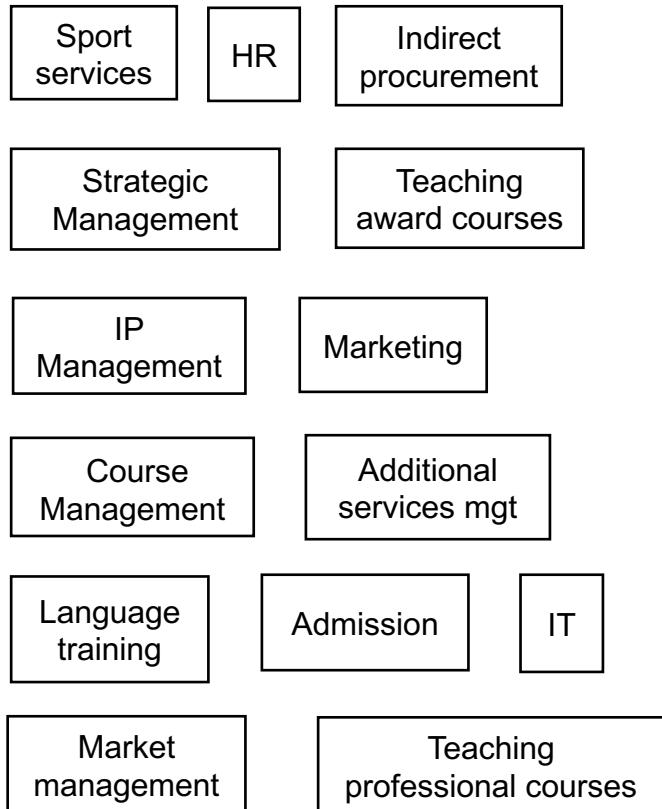
Example: process architecture

Insurance company

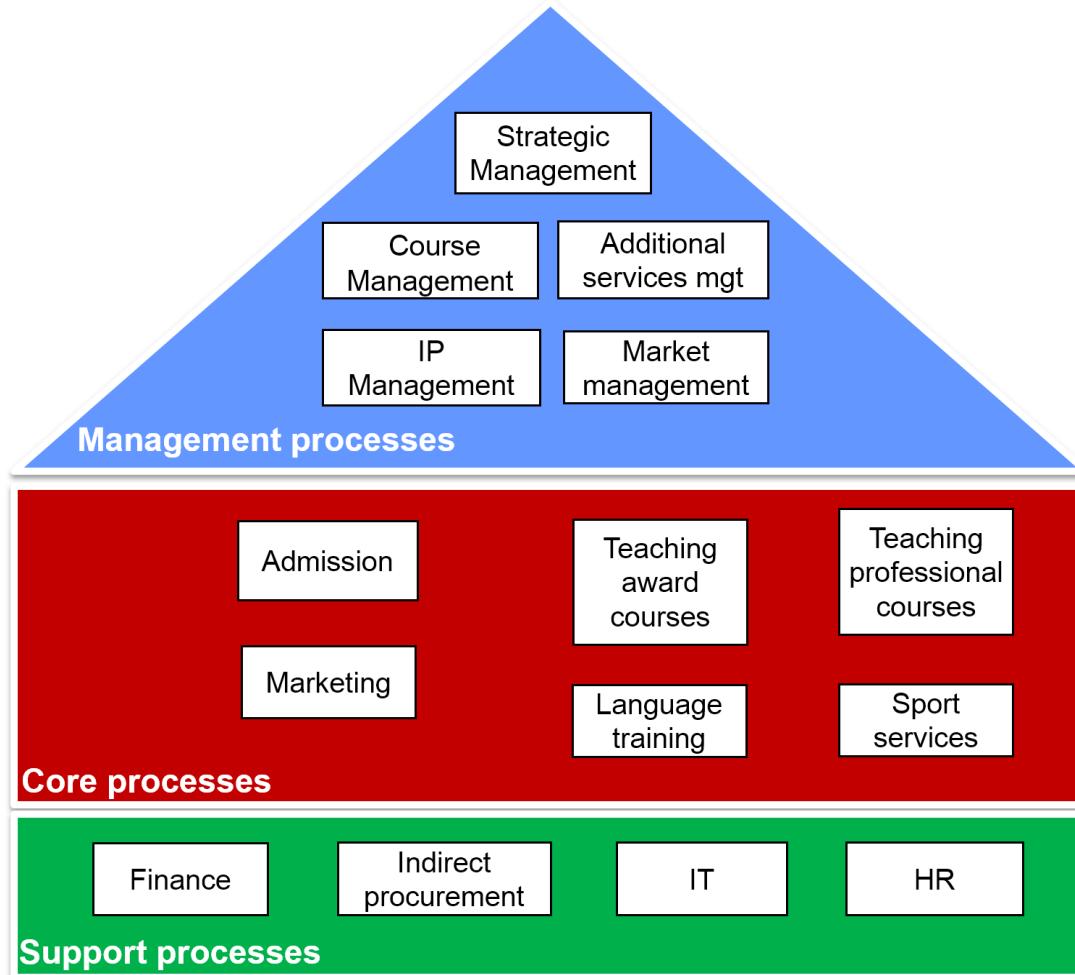


Exercise: classify by process type

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



Solution: identify process types



Process scoping

Processes are interdependent → insights into interrelations required

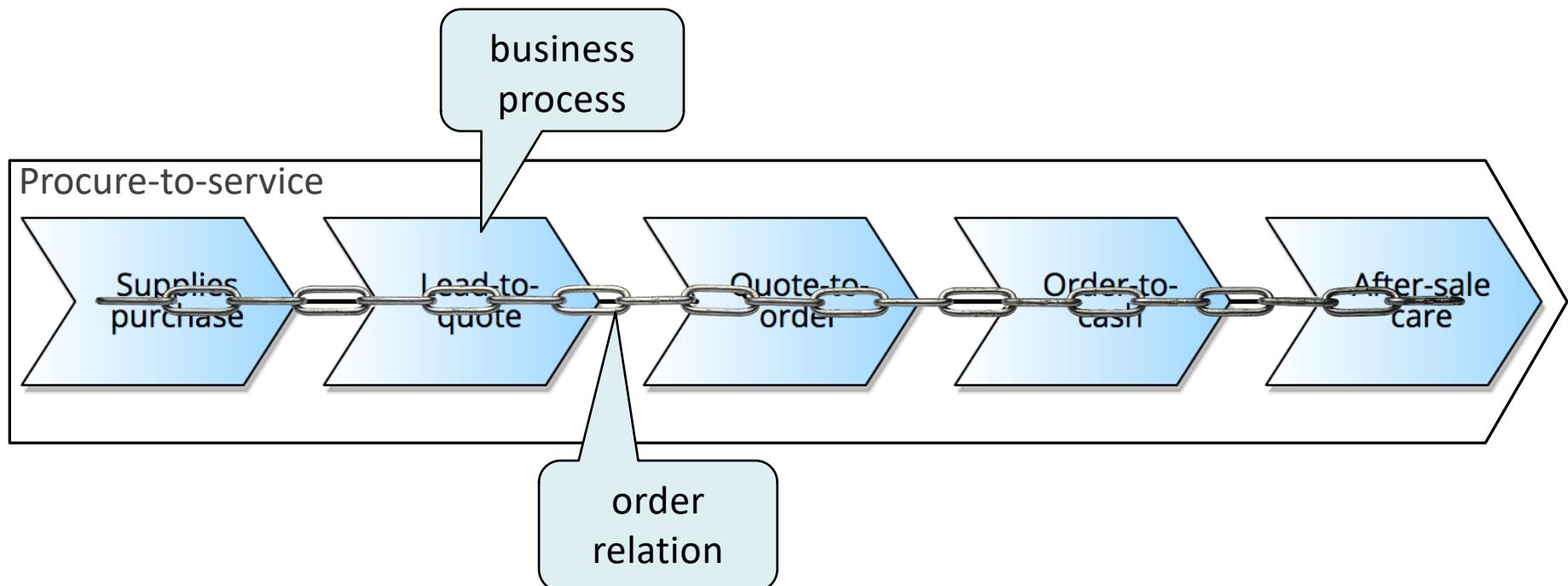
- Specialization: general – special product/service
- Horizontal: upstream – downstream processes and their value chains
- Vertical: main processes – sub-processes



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

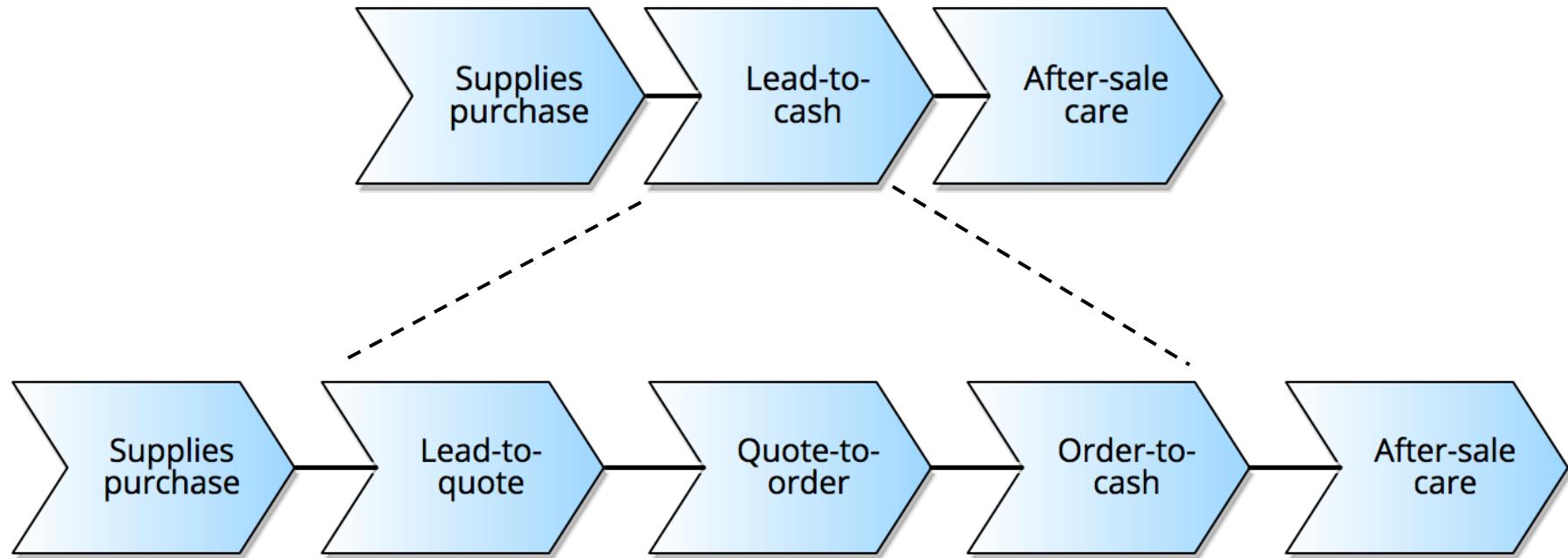
1. Change of key business object in the process
2. Change of granularity of main business object
3. Change in frequency/time
4. Change in intermediate outcome/resolution/objective



Example: value chain

Wholesaler

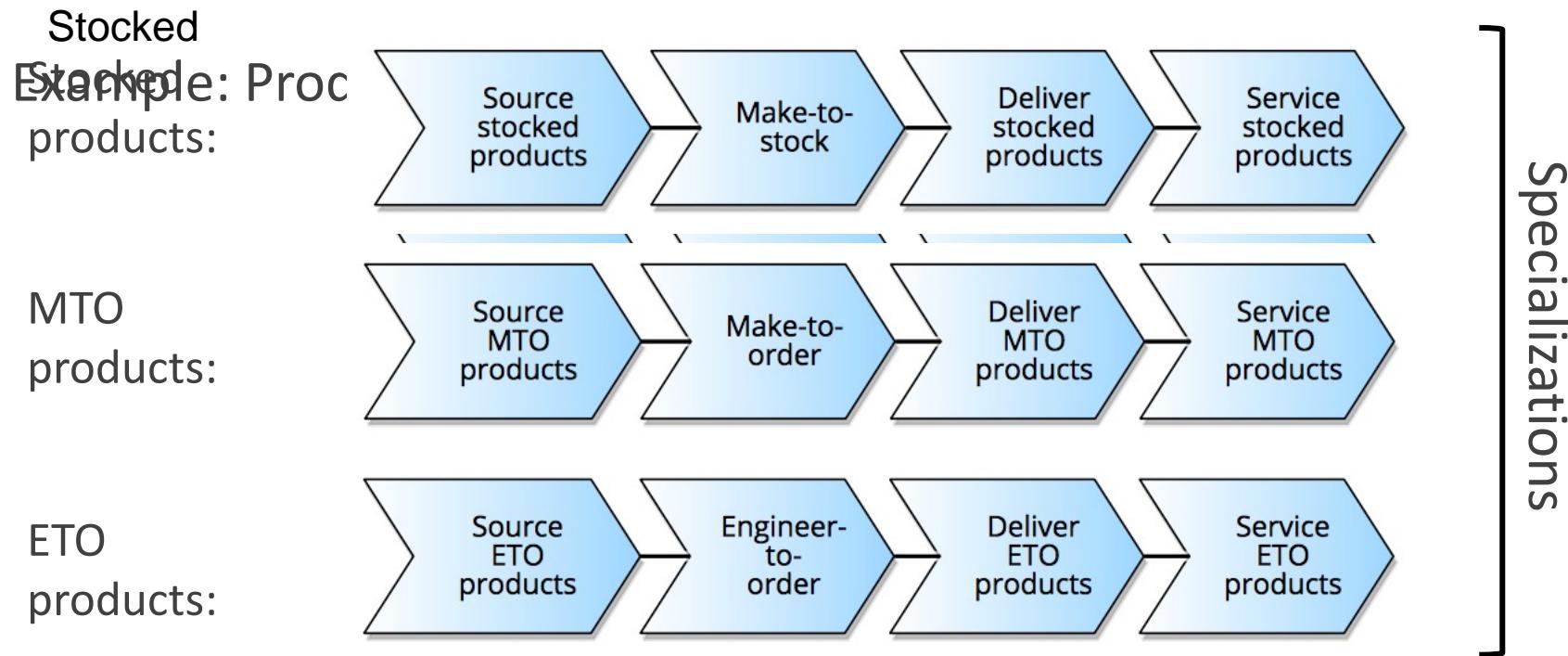
Core processes



Typical value chains for core processes

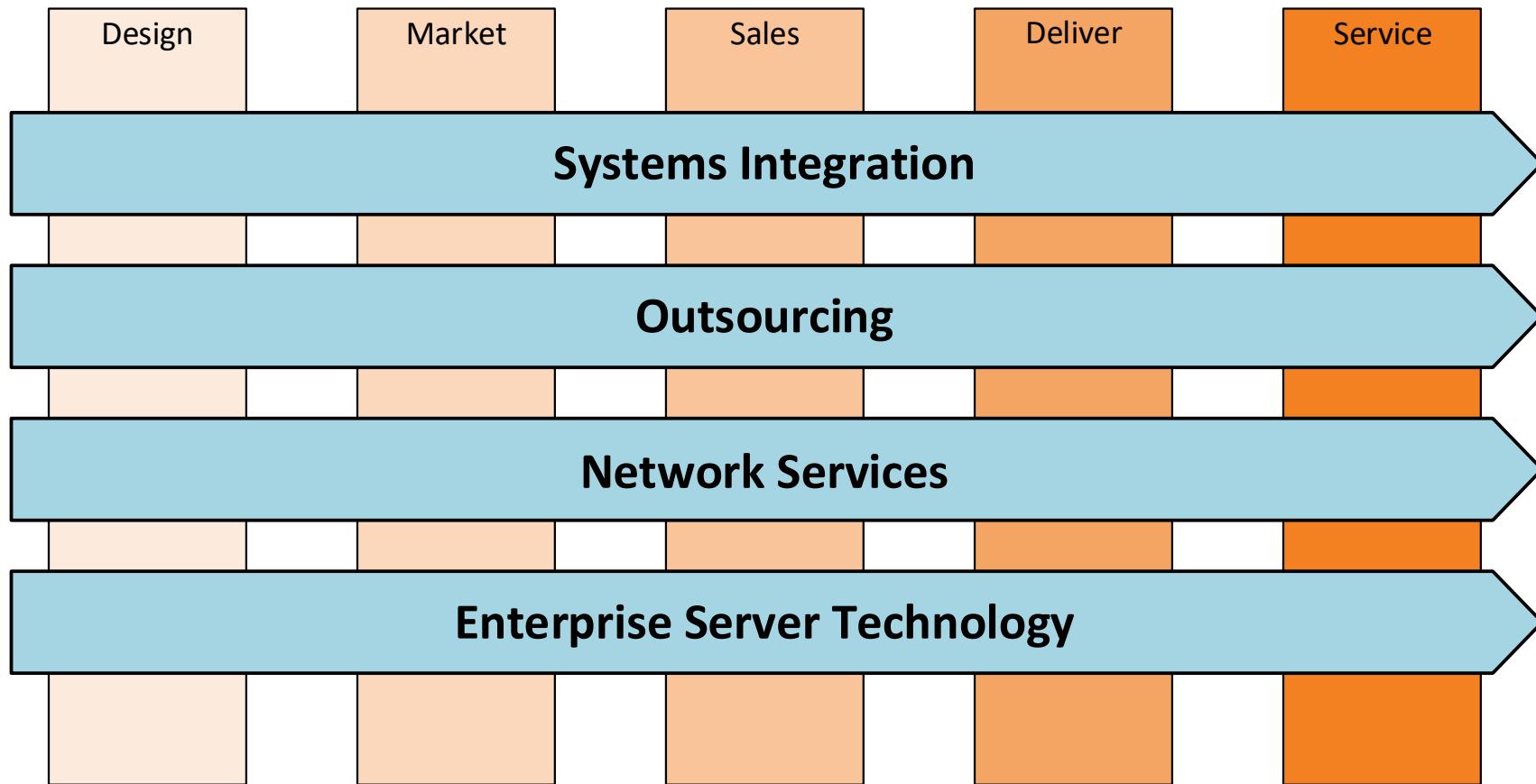
Think around three main steps:

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



Example: value chains for service provider

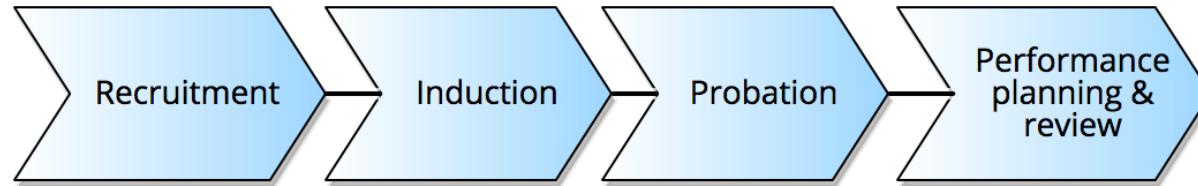
IT service provider



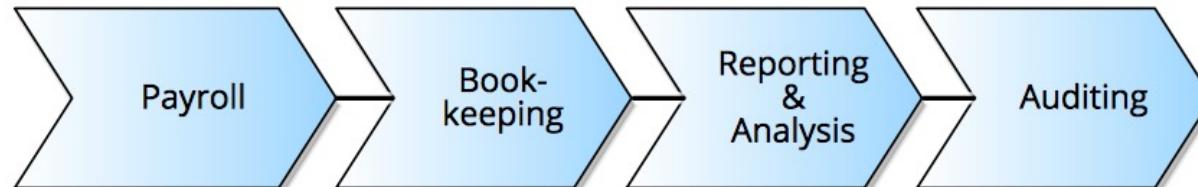
Example: value chain of non-core processes

Support processes

HR:

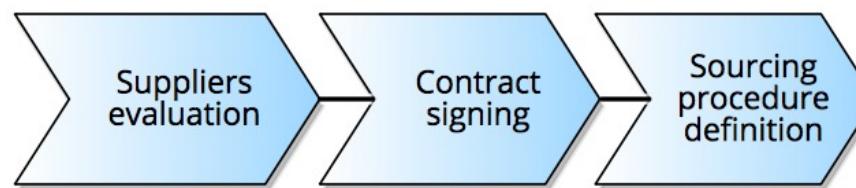


Accounting:



Management processes

Suppliers management:

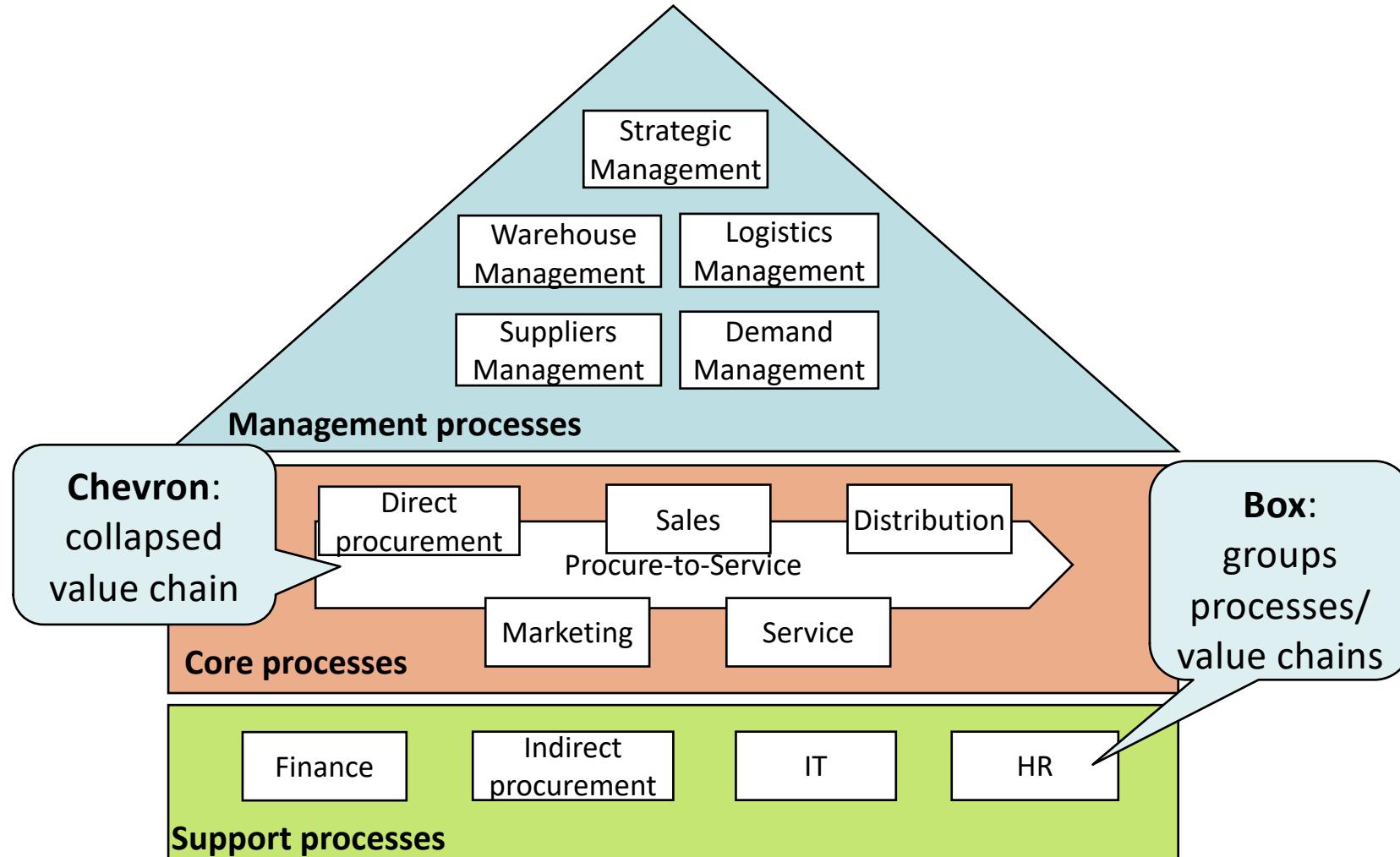


Risk management:



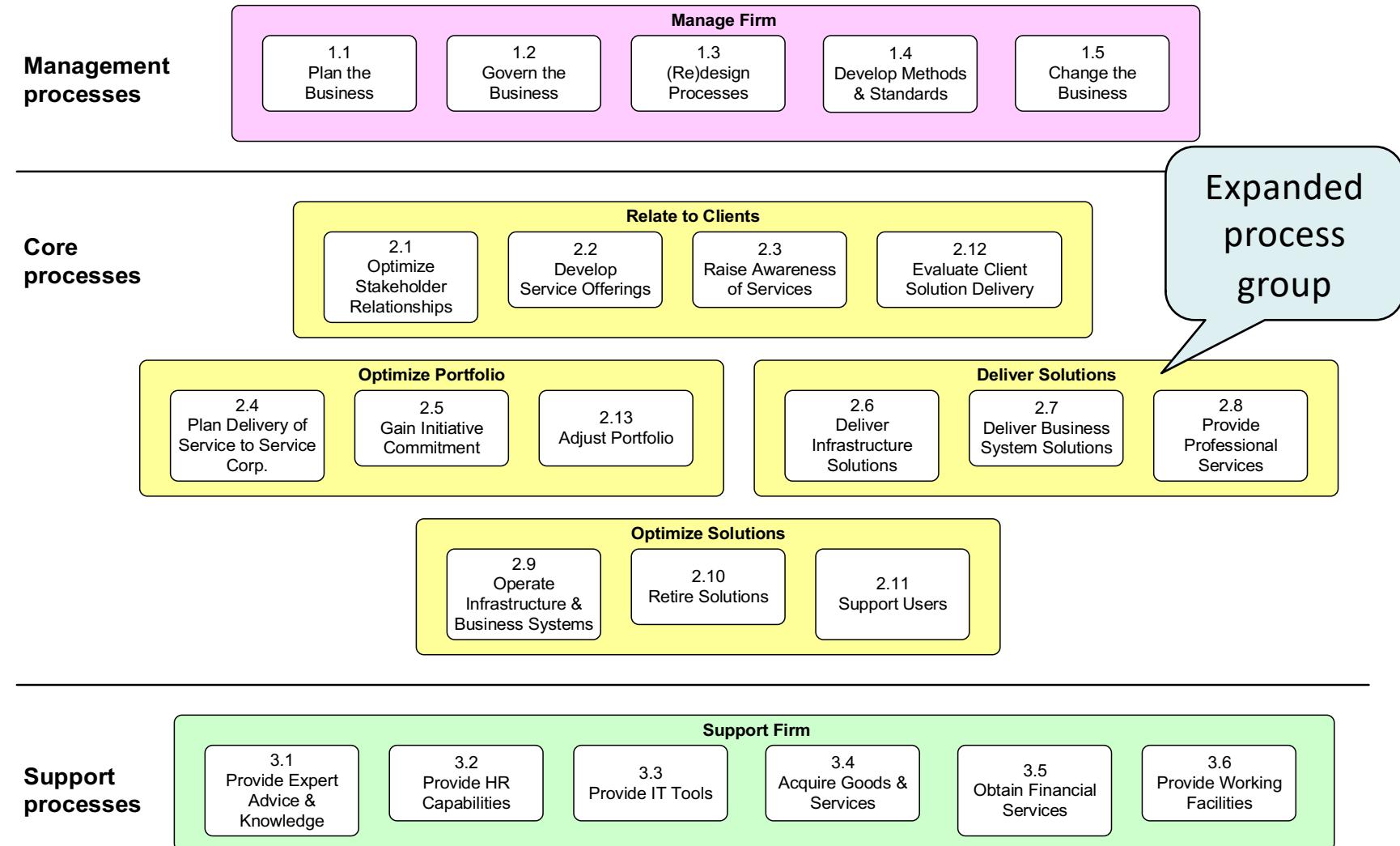
Example: process architecture & value chains

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*

Subprocesses

Typical focus of Process enumeration

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

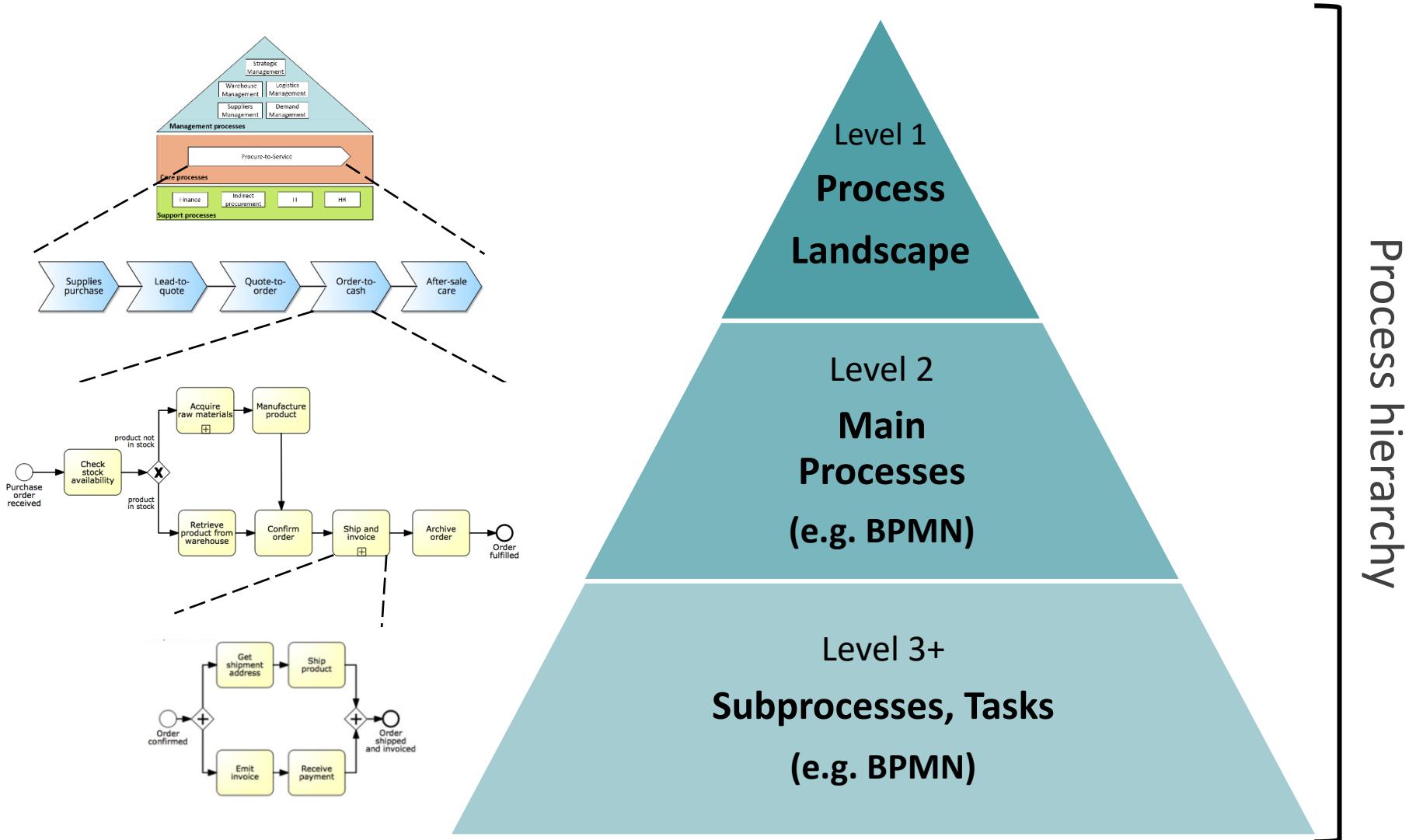
- *Order shipment, invoicing*

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

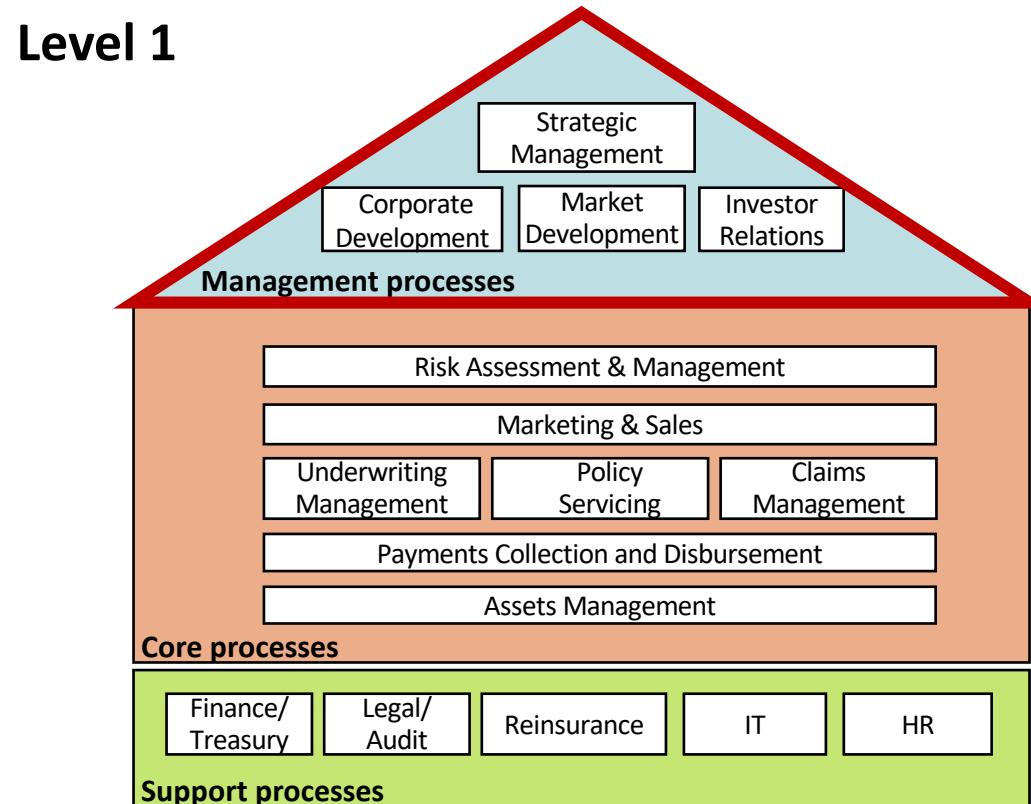


How many levels in the process architecture?



Example: hierarchical process architecture

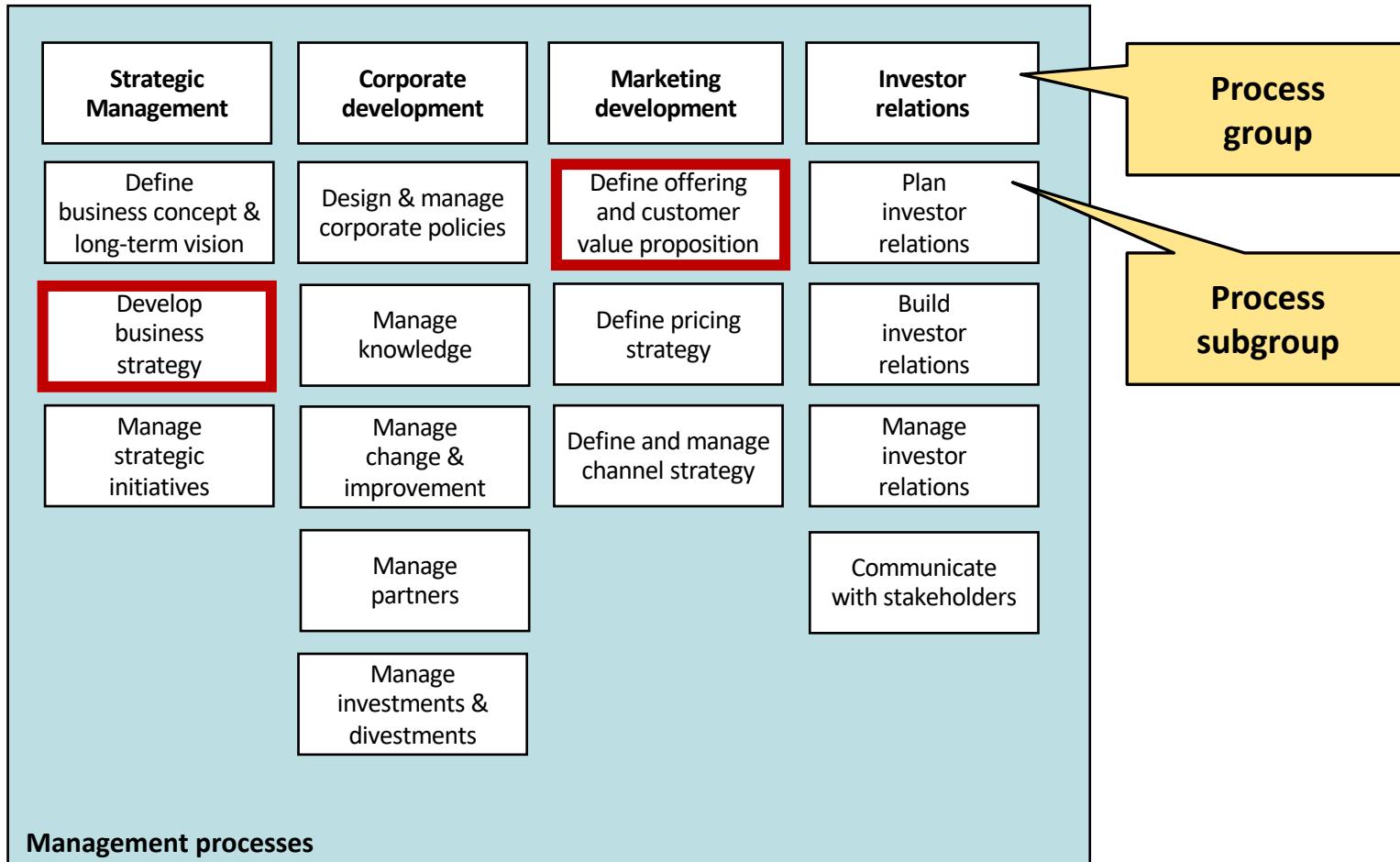
Insurance company



Example: hierarchical process architecture

Insurance company

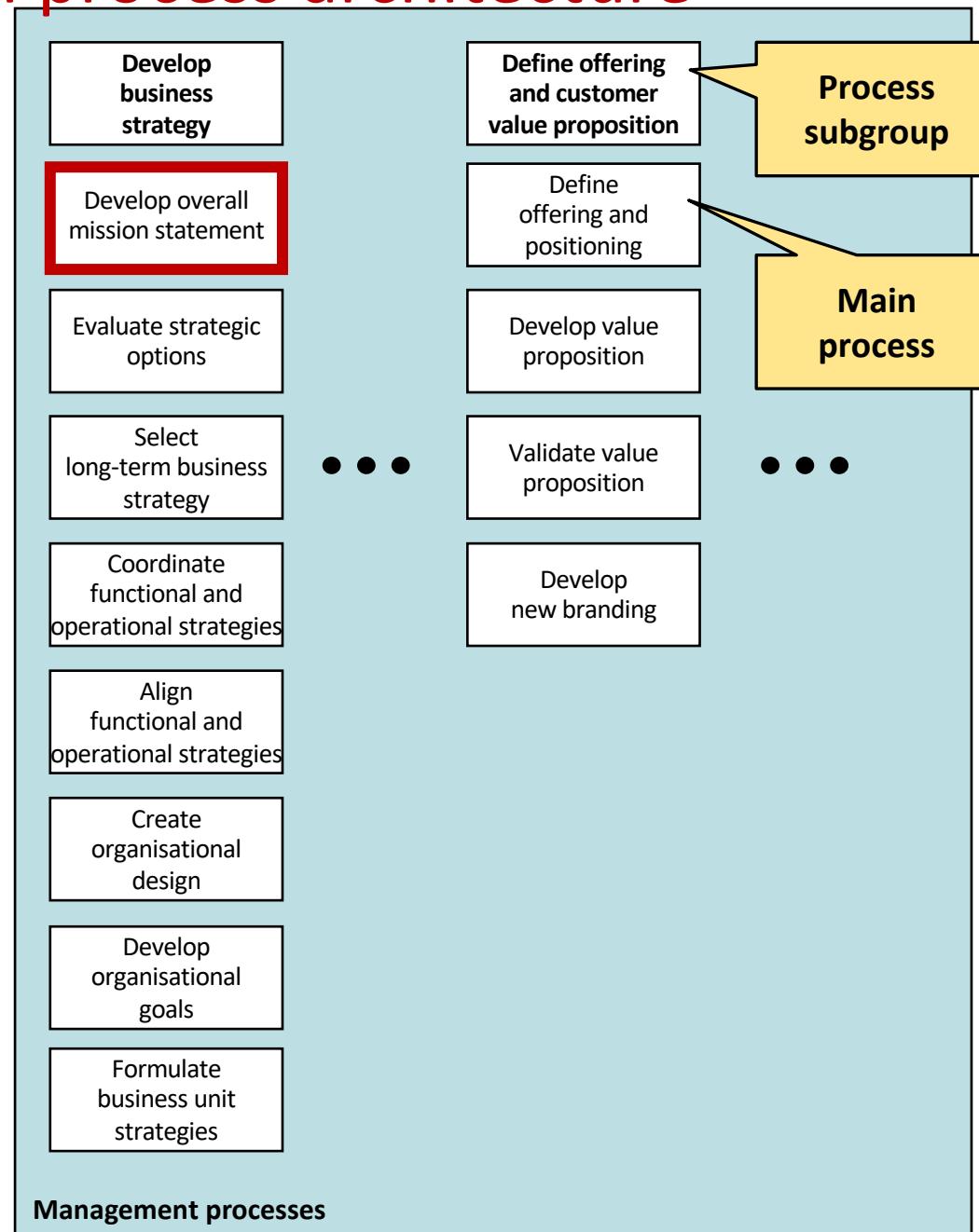
Level 2



Example: hierarchical process architecture

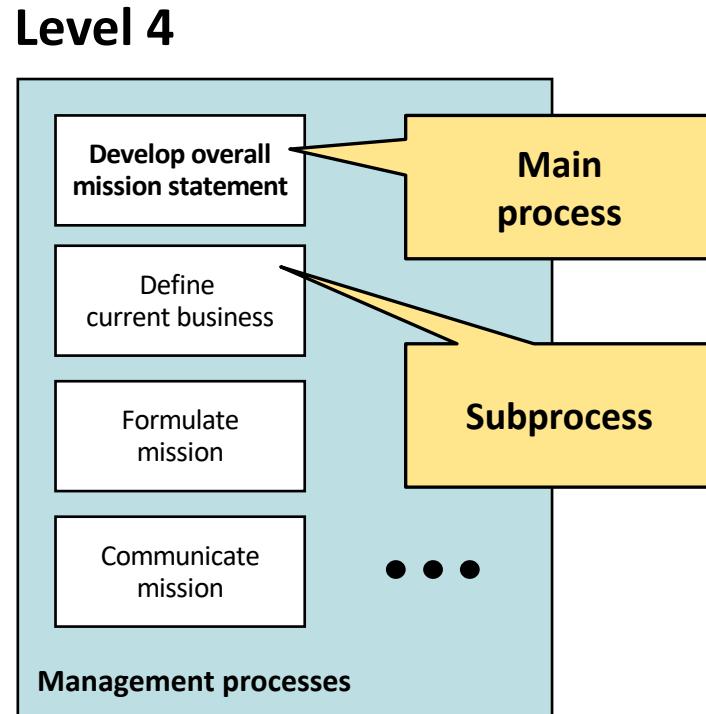
Insurance company

Level 3



Example: hierarchical process architecture

Insurance company



Designation via reference models

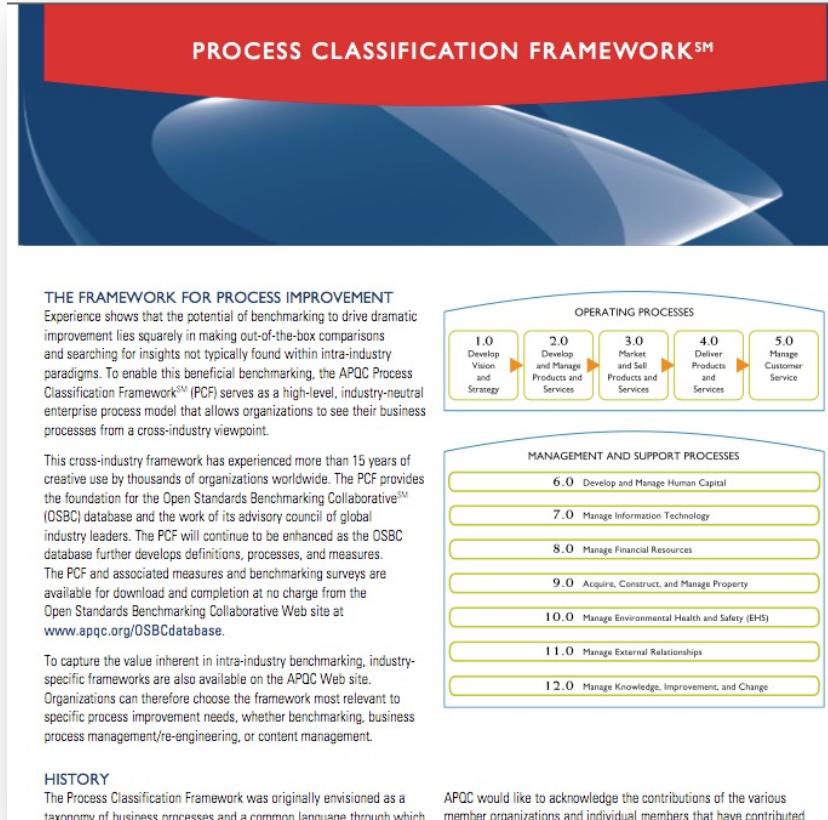
A reference model is used as a template to design the process architecture

Examples:

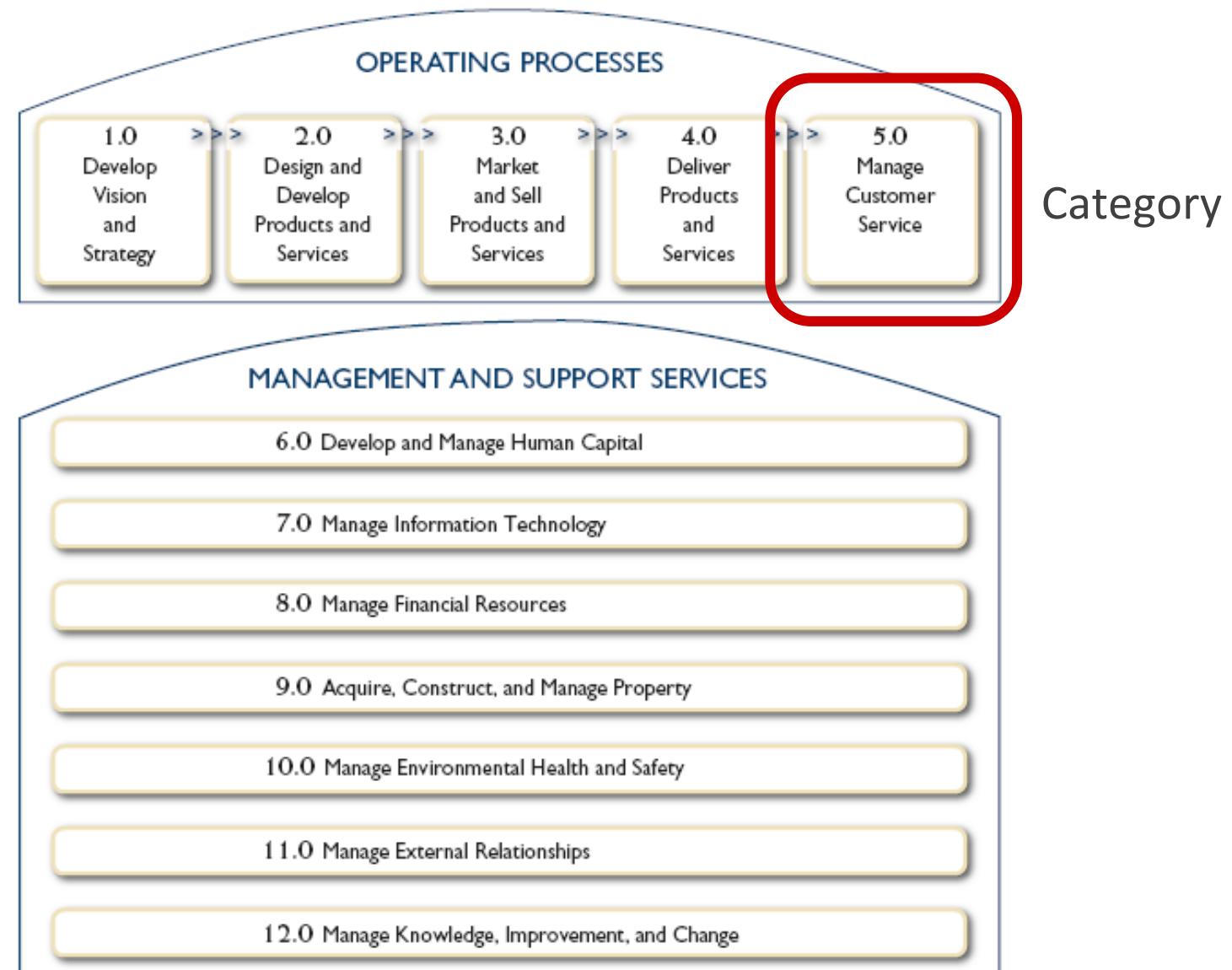
- Information Technology Infrastructure Library (ITIL)
- Supply Chain Operations Reference Model (SCOR)
- Process Classification Framework (PCF)
- Control Objectives for Information Technology (COBIT)
- Value Reference Model (VRM)
- Voluntary Interindustry Commerce Solutions (VICS)
- eTOM Business Process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

Example: APQC Process Classification Framework (PCF)

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



APQC PCF Overview



APQC Classification Framework

	4.1.8.4 Identify performance trends (10273)	4.3.1.4 Release production orders and create lots (10309)
	4.1.8.5 Analyze performance benchmark gaps (10274)	4.3.2 Produce product (10304)
	4.1.8.6 Prepare appropriate reports (10275)	4.3.2.1 Manage raw material inventory (10310)
	4.1.8.7 Develop performance improvement plan (10276)	4.3.2.2 Execute detailed line schedule (10311)
4.1.9	Develop quality standards and procedures (10368)	4.3.2.3 Rerun defective items (10313)
4.1.9.1	Establish quality targets (10371)	4.3.2.4 Assess production performance (10314)
4.1.9.2	Develop standard testing procedures (10372)	4.3.3 Schedule and perform maintenance (10305)
4.1.9.3	Communicate quality specifications (10373)	4.3.3.1 Determine process for preventive (planned) maintenance (Preventive Maintenance Orders) (10315)
4.2	Procure materials and services (10216)	Group
4.2.1	Develop sourcing strategies (10277)	4.3.3.2 Determine process for requested (unplanned) maintenance (Work Order Cycle) (10316)
4.2.1.1	Develop procurement plan (10281)	4.3.3.3 Execute maintenance (10317)
4.2.1.2	Clarify purchasing requirements (10282)	4.3.3.4 Calibrate test equipment (10318)
4.2.1.3	Develop inventory strategy (10283)	4.3.3.5 Report maintenance issues (10319)
Activity	4.2.1.4 Match needs to supply capabilities (10284)	4.3.4 Perform quality testing (10369)
	4.2.1.5 Analyze company's spend profile (10285)	4.3.4.1 Perform testing using the standard testing procedure (10374)
	4.2.1.6 Seek opportunities to improve efficiency and value (10286)	4.3.4.2 Record test results (10375)
	4.2.1.7 Collaborate with suppliers to identify sourcing opportunities (10287)	4.3.5 Maintain production records and manage lot traceability (10370)
	4.2.2 Select suppliers and develop/maintain contracts	4.3.5.1 Determine lot numbering system (10276)
Process		

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

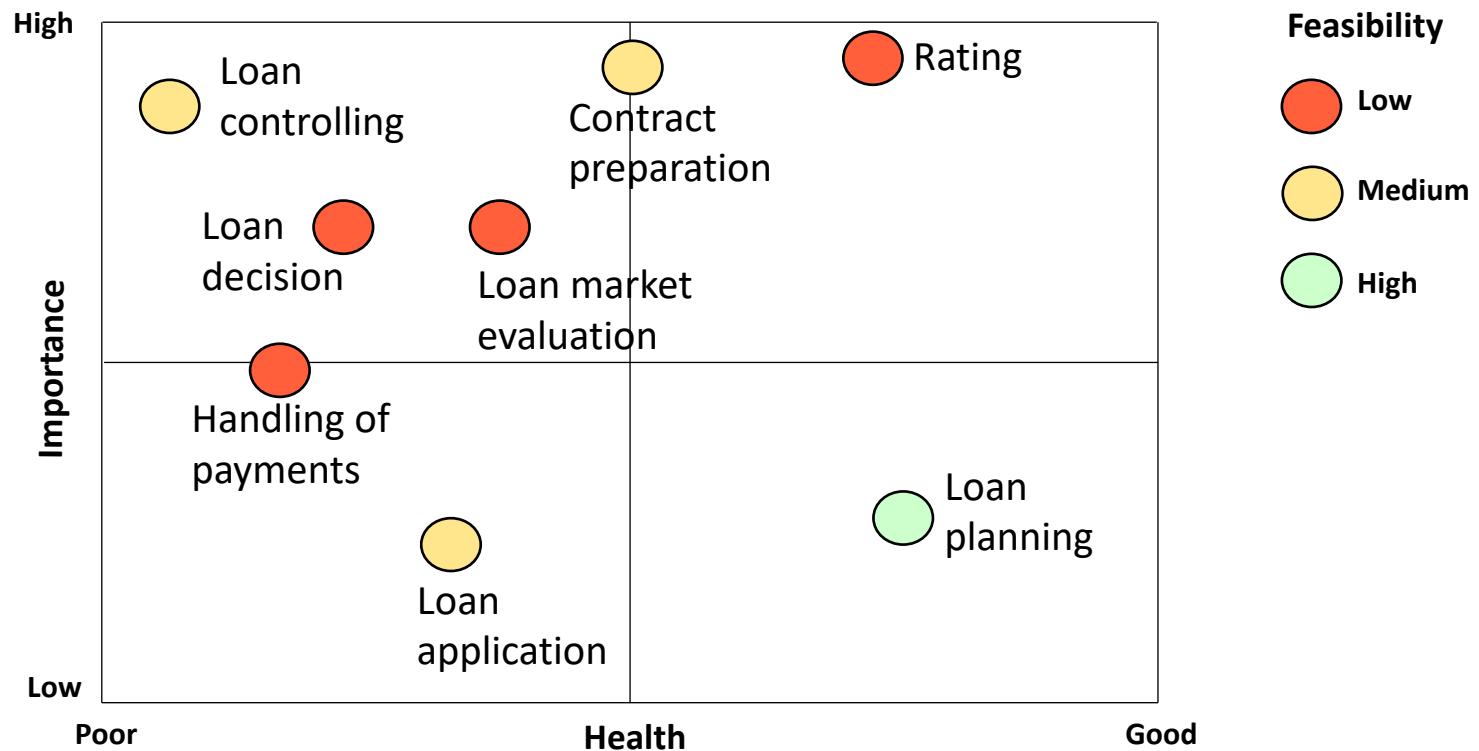
Which processes are most susceptible to successful process management?



Prioritized process portfolio

Example: prioritized process portfolio

Financial institution



Acknowledgements

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