



MSO – Manufacturing and Services Operations

Master in Industrial Management, Operations and Sustainability

ISEG, Lisbon School of Economics and Management,
Universidade de Lisboa

pamarques@iseg.ulisboa.pt

Course content:

1. Introduction to Manufacturing and Service Operations
2. Design of products, services and processes
3. Managing capacity and demand in manufacturing and services
4. Manufacturing and service inventory management
5. Managing supply chain relationships
6. Continuous improvement of services, products and processes
7. Technology in services and manufacturing

Teacher: Pedro Alexandre De Albuquerque Marques
(pamarques@iseg.ulisboa.pt)

Office hours: Thursday from 5h30 p.m to 6h30 (by appointment)

Course assesement

The evaluation of the curricular unit QM consists of a final exam and a group work:

A) Final exam

The final exam covers all the topics and a minimum grade **of 8.5 out of 20 values** is required.

Continuous evaluation:

B) Group work (**mandatory**): Presentation of a scientific article

The final grade is given by:

$$\text{Final grade} = 0.6 \cdot A + 0.4 \cdot B$$

In the case of the special exam and grade improvements the final grade will be equal to that of the final exam.

Important dates

September 25 – Each group must send by e-mail a word document including the name, student number, e-mail, and Photo.

October 9 – Each group must send by e-mail the reference of the scientific article

November 17 – Each group must send by e-mail the work group presentation.

Weeks (November 20, and November 27) – Presentation of the group work (15-20 minutes).

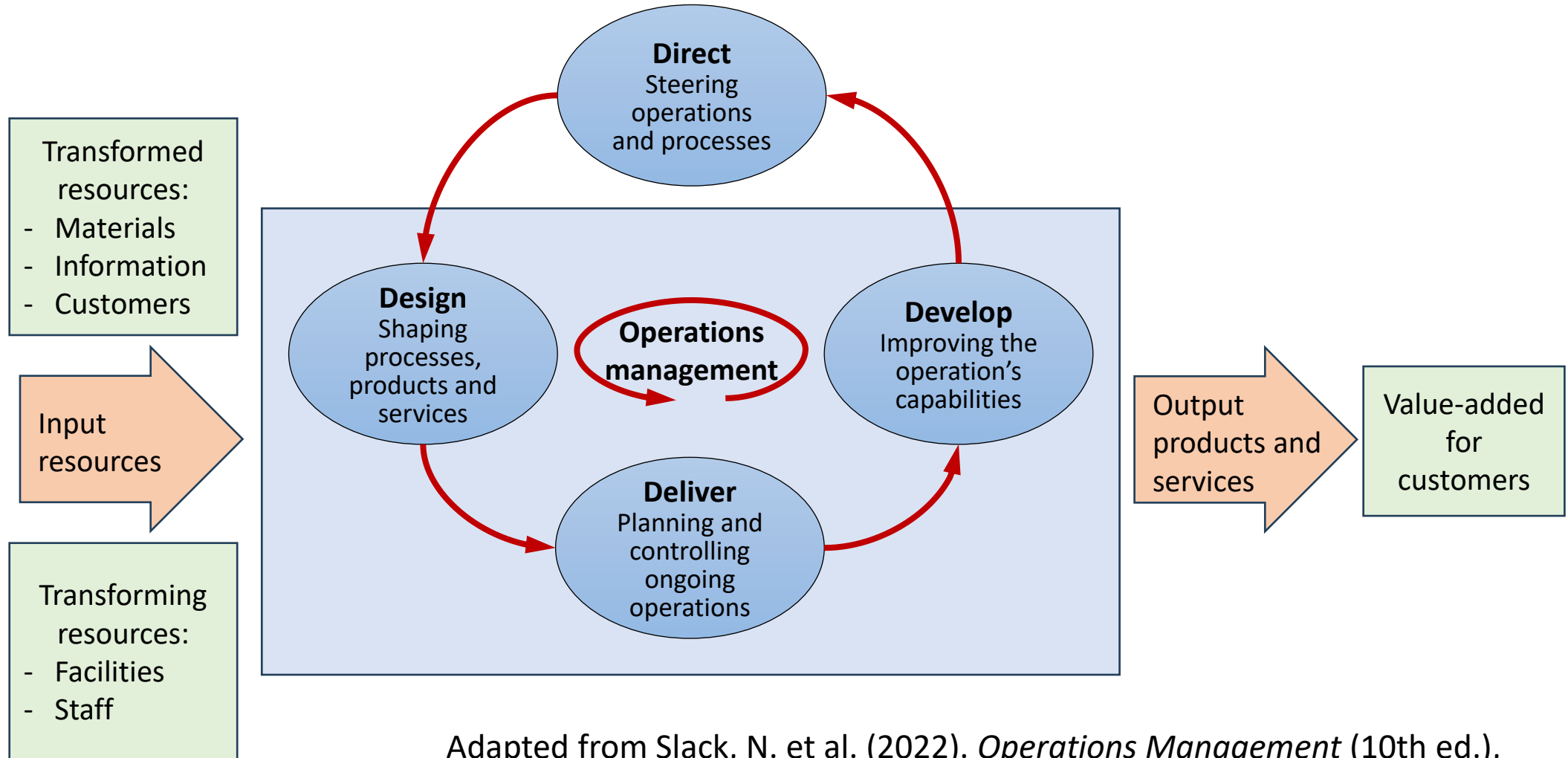
This course provides students with theoretical and practical knowledge regarding operations management as it applies to a **variety of businesses and organizations**. It comprises a set of topics covering the use of principles and tools to perform **operations strategy, design, planning, control, and improvement** related activities. The course is practice-oriented and requires active student's involvement in class activities such as resolution of case studies problem sets and preparation of a work group.

1. Introduction to Manufacturing and Service Operations

Agenda

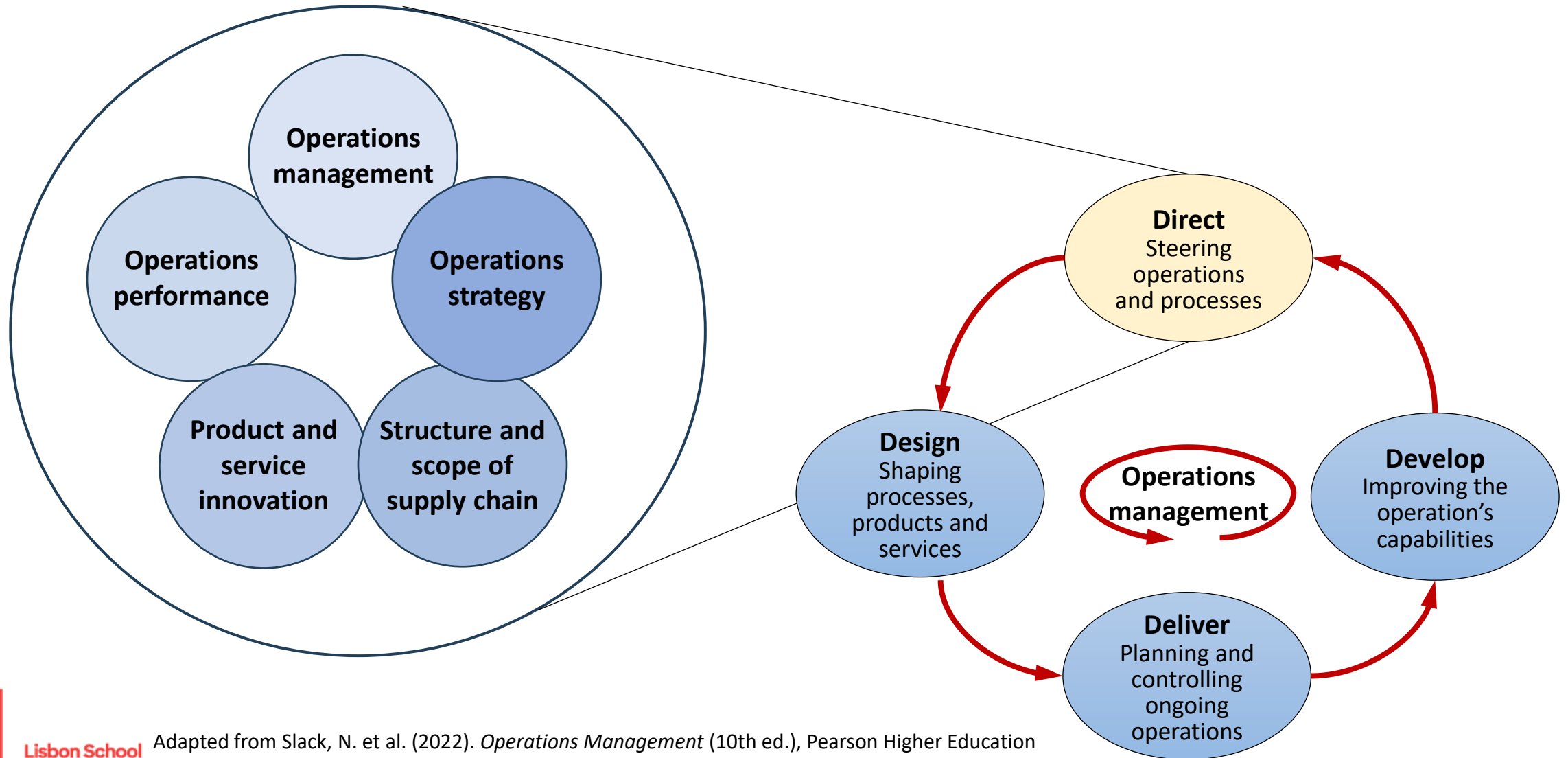
- Operations management
- Operations performance
- Operations strategy

Operations management lifecycle (4D's model)



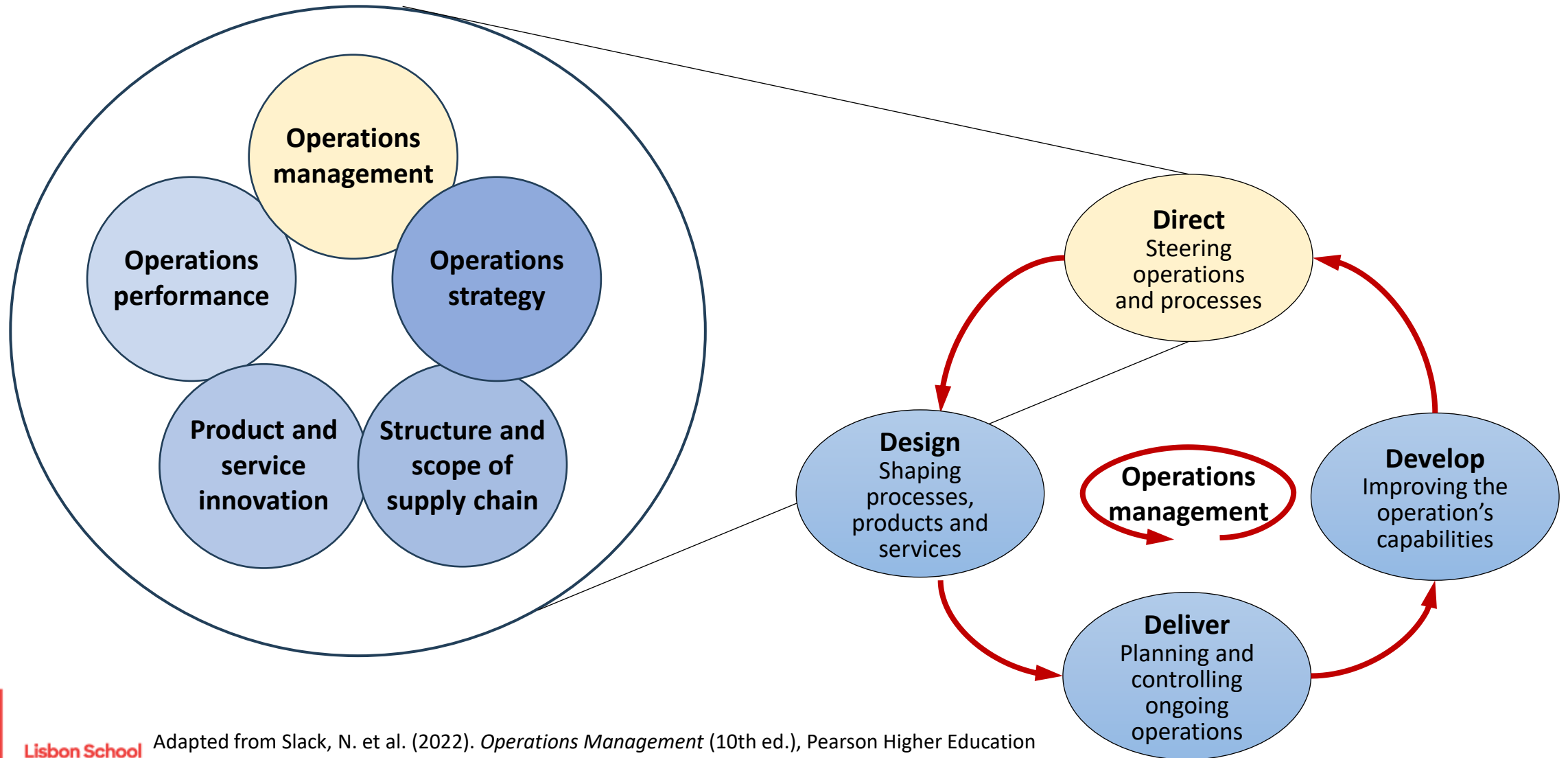
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

Operations management lifecycle (4D's model)



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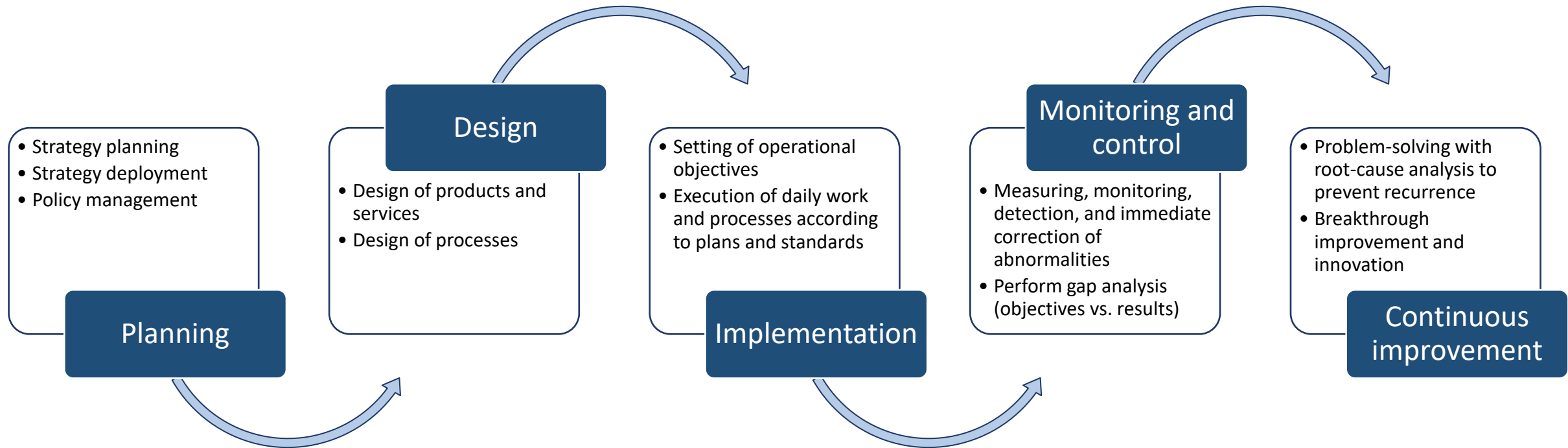
What is “Operations Management”?

*Operations management involves **overseeing the resources used to produce and provide goods and services.***

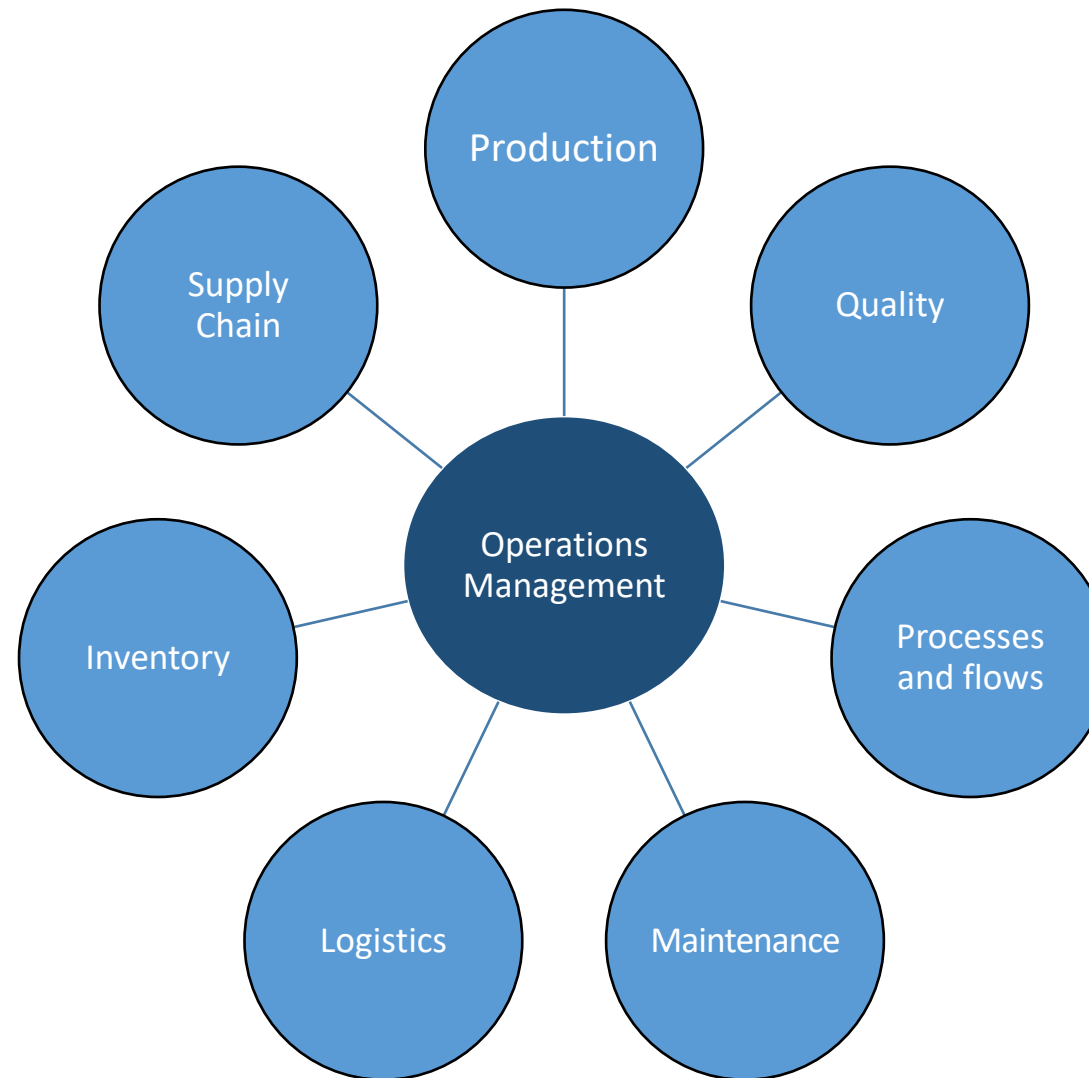
*All organizations possess an **operations function** since they all produce some form of service or product.*



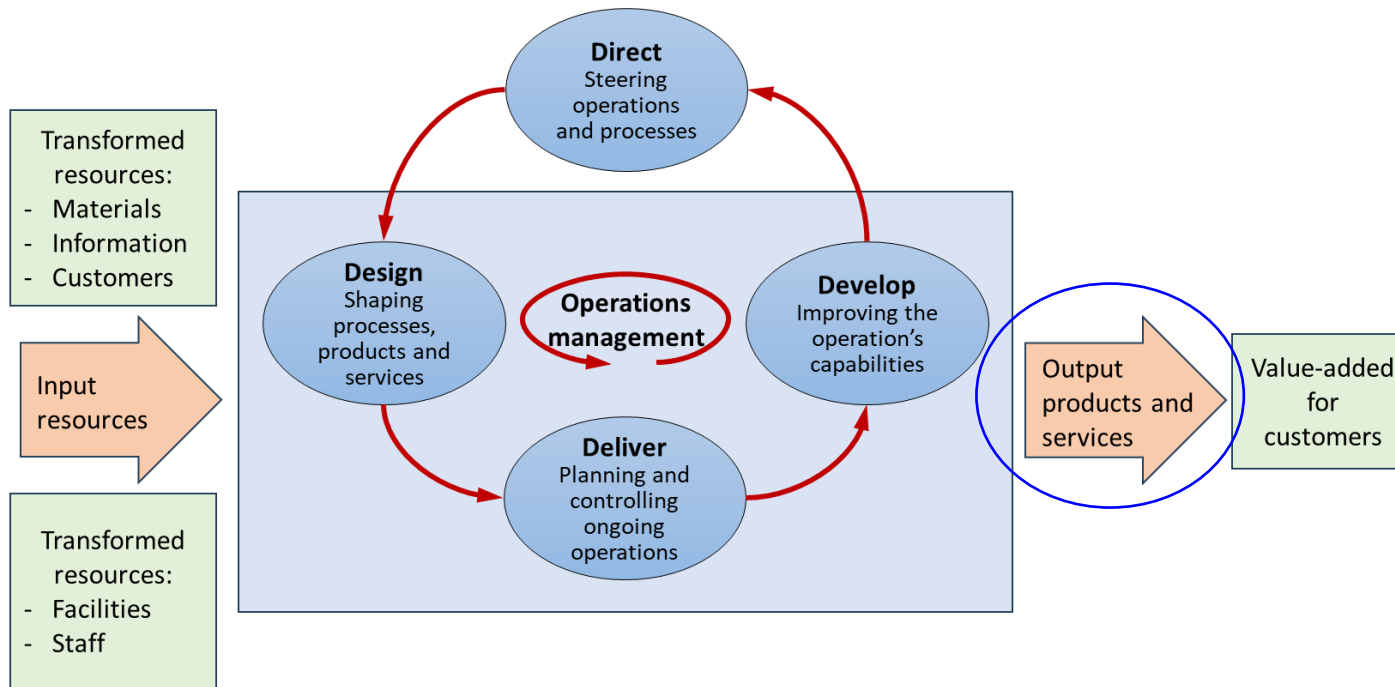
Operations Management process



Operations Management elements



Products and services



According to the International Organization for Standardization (ISO):

Product is an output that is the result of a process that does not include activities that are performed at the interface between the supplier (provider) and the customer.

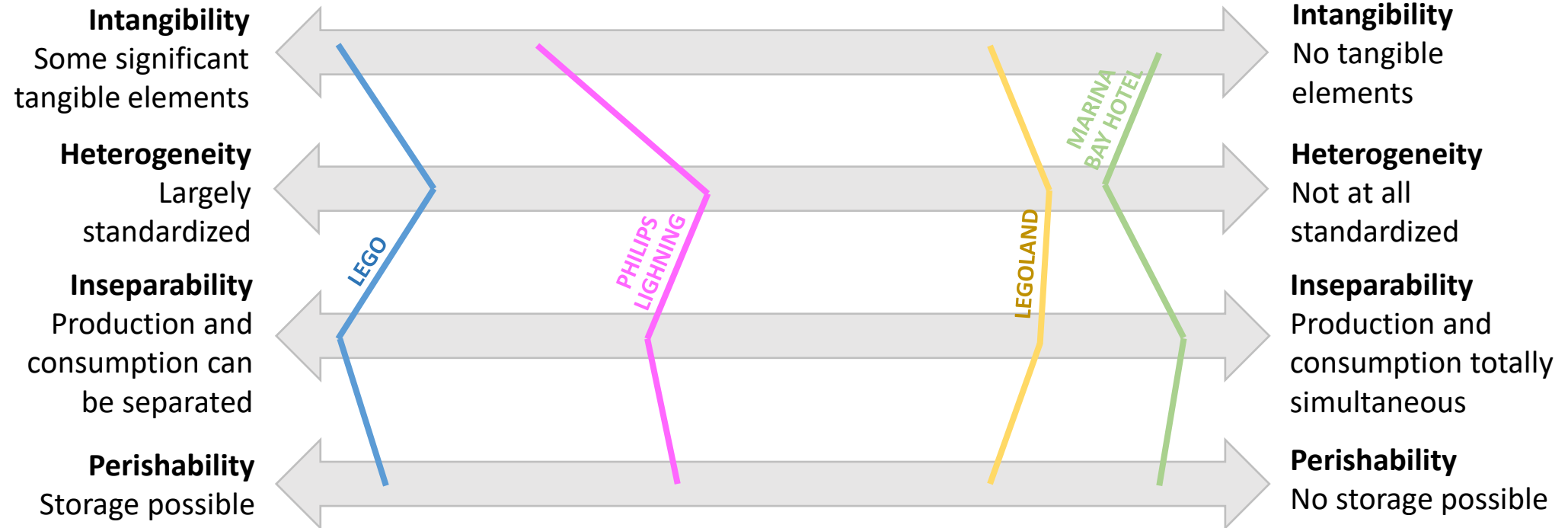
Service is the result of a process that includes at least one activity that is carried out at the interface between the supplier (provider) and the customer..

Products and services



Pure products

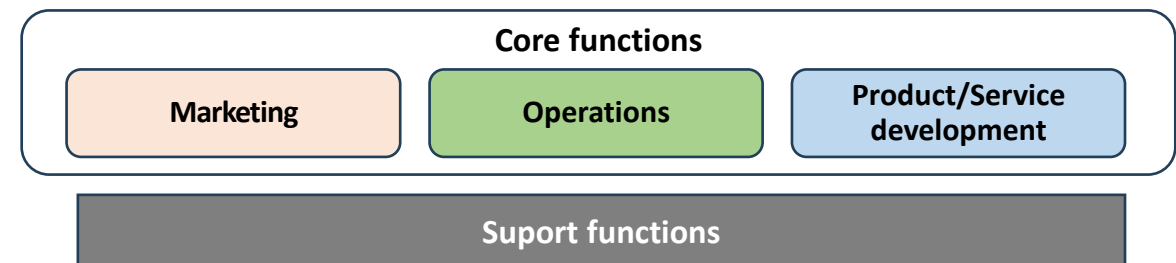
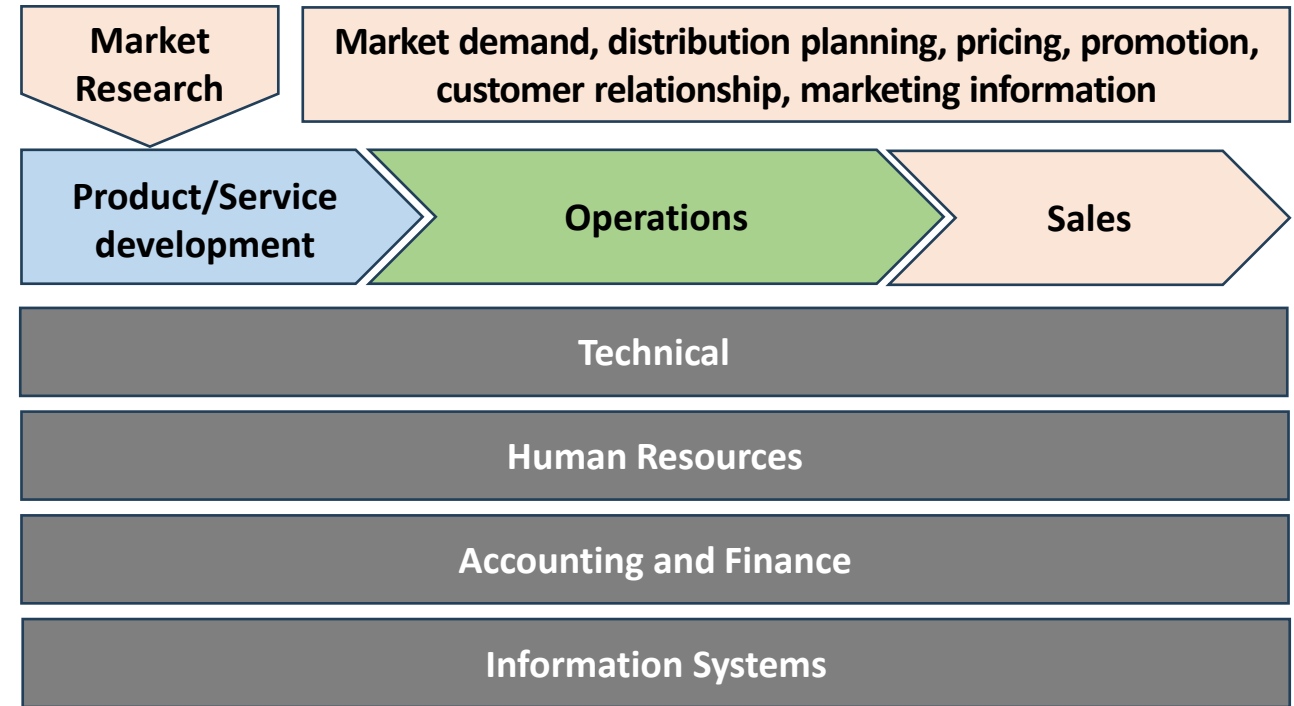
Pure services



Operations Management function

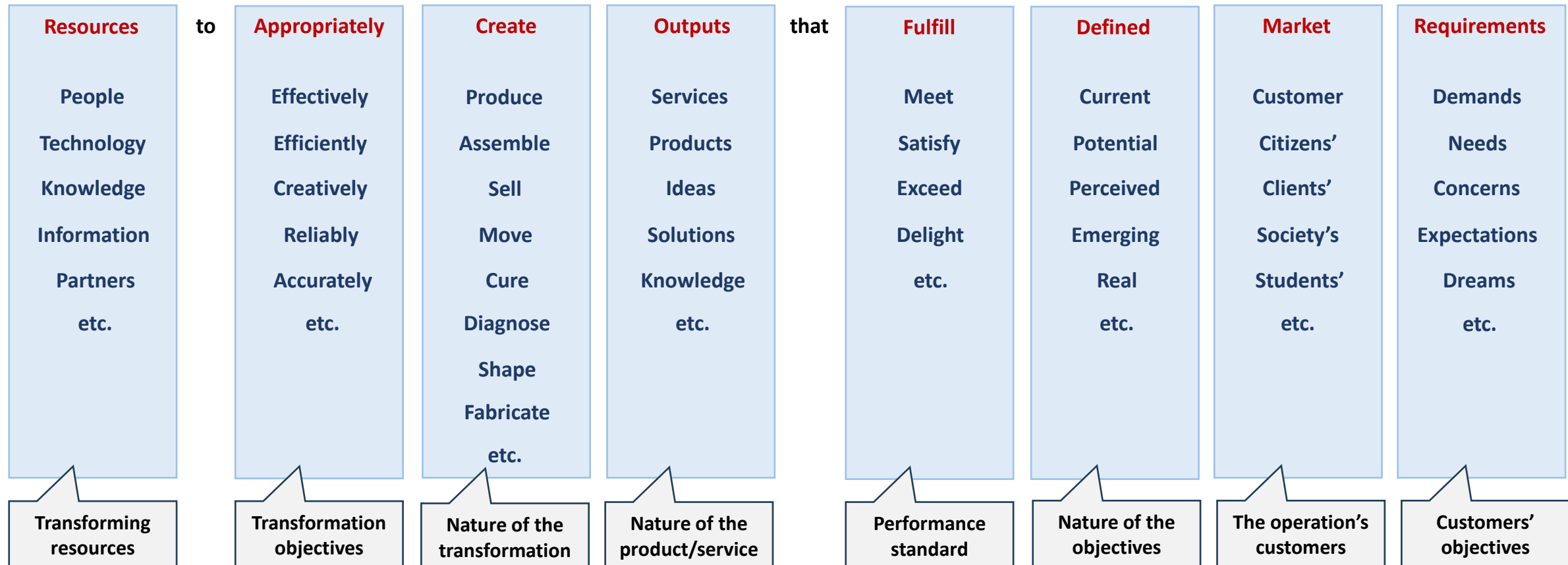
The **operations function** is **central** to the organization because **it creates and delivers services and products**, which is its reason for existing.

Regardless of scale, every organization must **manage operations efficiently and effectively** to ensure successful delivery of products and services.



Operations Management function

Operations management uses...



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Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

RANKINGS



MEMBER

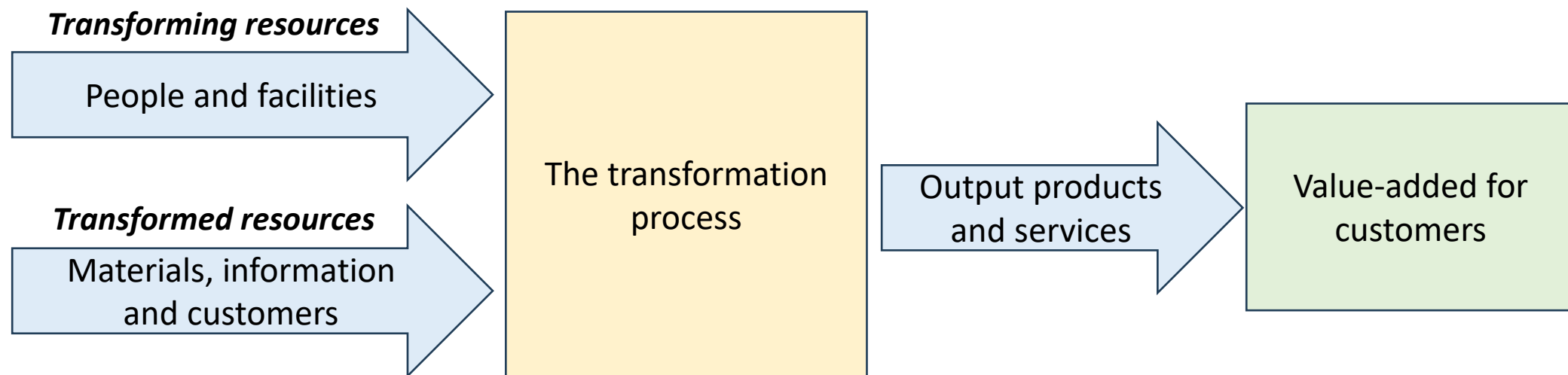


ACCREDITATIONS AND PARTNERSHIPS

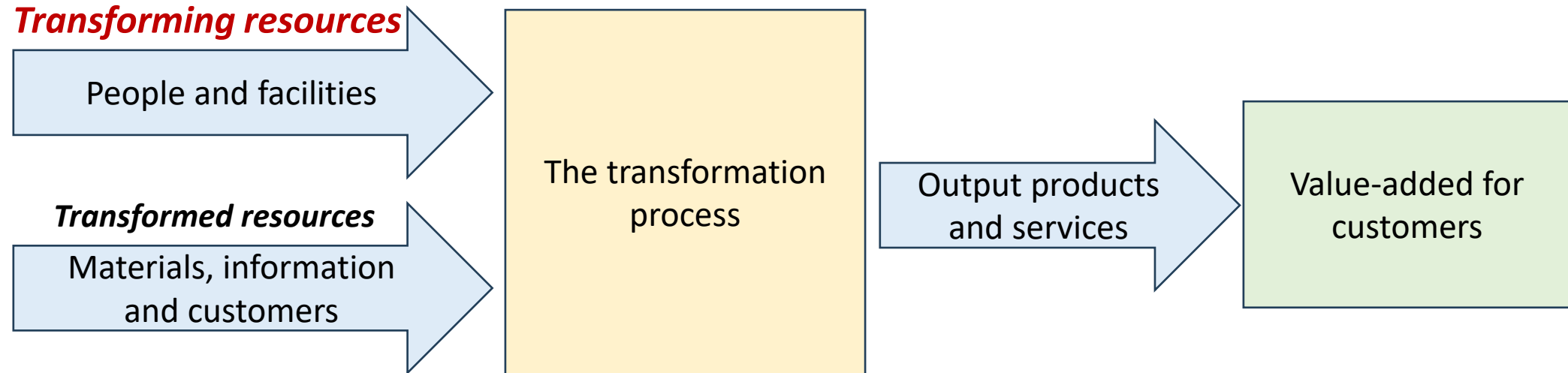


The input–transformation–output process

All operations create and deliver services and products by changing inputs into outputs using an ‘input–transformation–output’ process.

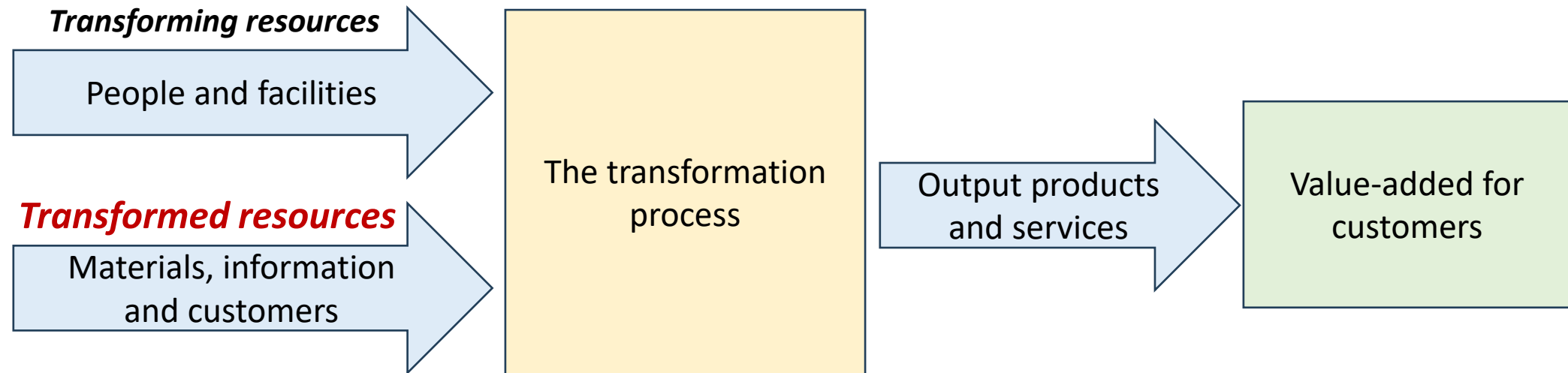


The input–transformation–output process



Transforming resources are those that act upon the transformed resources. It includes facilities (buildings, equipment, plant and process technology) and staff (people who operate, maintain, plan and manage the operation).

The input–transformation–output process



Transformed resources are those that are treated, transformed or converted in the process. It includes materials, information or customers.

The input–transformation–output process

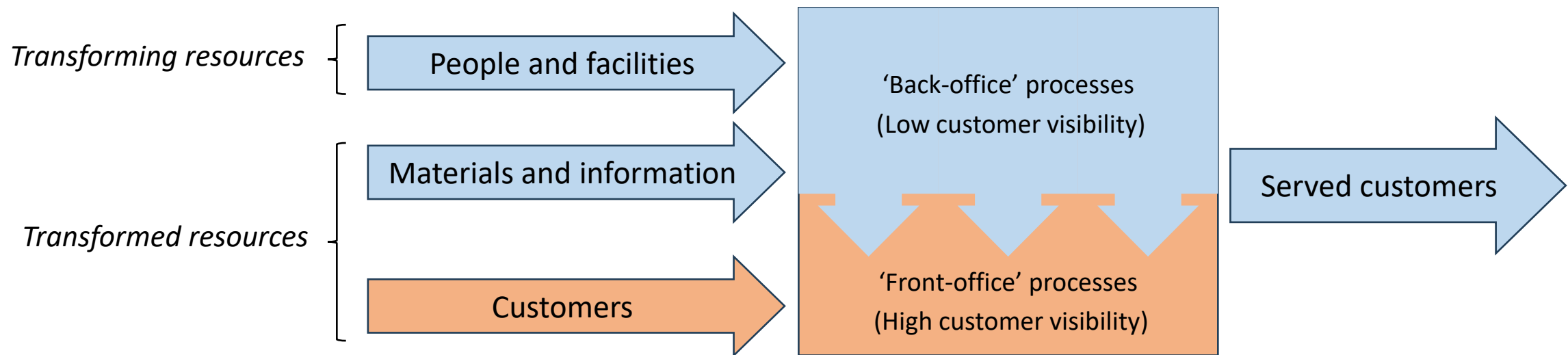
Transformed resources

Predominantly processing inputs of materials	Predominantly processing inputs of information	Predominantly processing inputs of customer
<ul style="list-style-type: none"> ▶ All manufacturing operations ▶ Mining companies ▶ Retail operations ▶ Warehouses ▶ Postal services ▶ Container shipping lines ▶ Trucking companies 	<ul style="list-style-type: none"> ▶ Accountants ▶ Bank headquarters ▶ Market research company ▶ Financial analysts ▶ News service ▶ University research unit ▶ Telecoms company 	<ul style="list-style-type: none"> ▶ Hairdressers ▶ Hotels ▶ Hospitals ▶ Mass rapid transports ▶ Theatres ▶ Theme parks ▶ Dentists

The input–transformation–output process

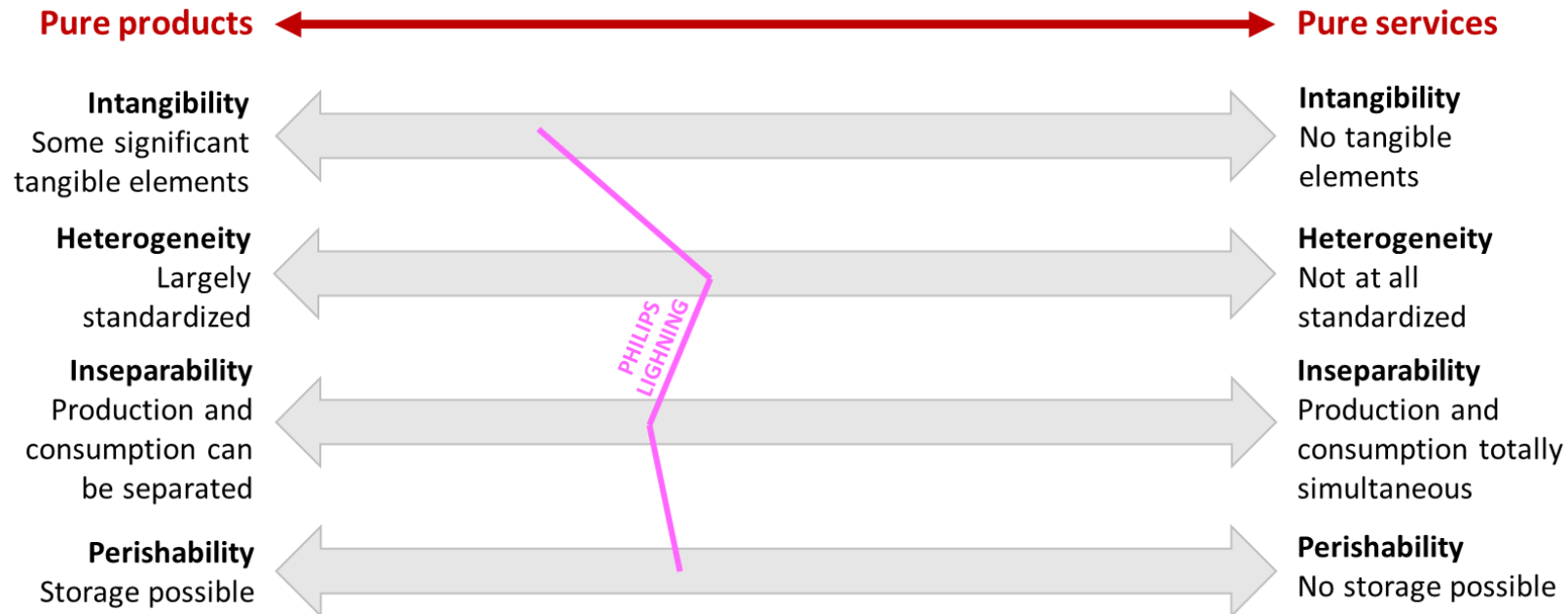
When transformed resources are customers

When the main transformed resource is the customers themselves, it is useful to distinguish between ‘front-office’ processes that act on customers directly and ‘back-office’ processes that provide indirect services.



Servitization

Lighting as-a-service' (LaaSS), where it takes care of its customers' lighting needs from the initial design and installation of the lighting, to the operation and maintenance.

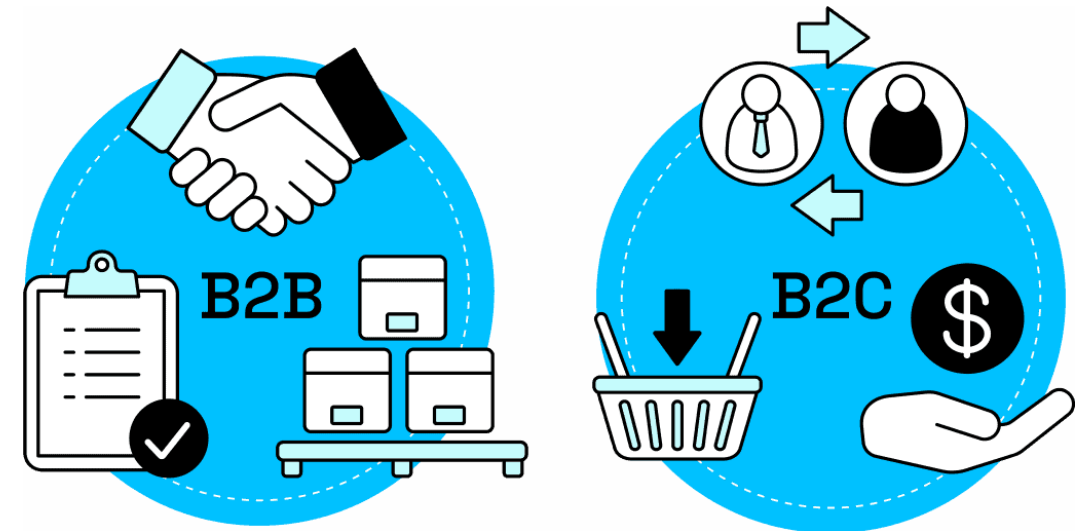


It involves (often manufacturing) firms developing the capabilities they need to provide services and solutions that supplement their traditional product offerings (e.g. customer support, maintenance, training, online services, after sales, ...).

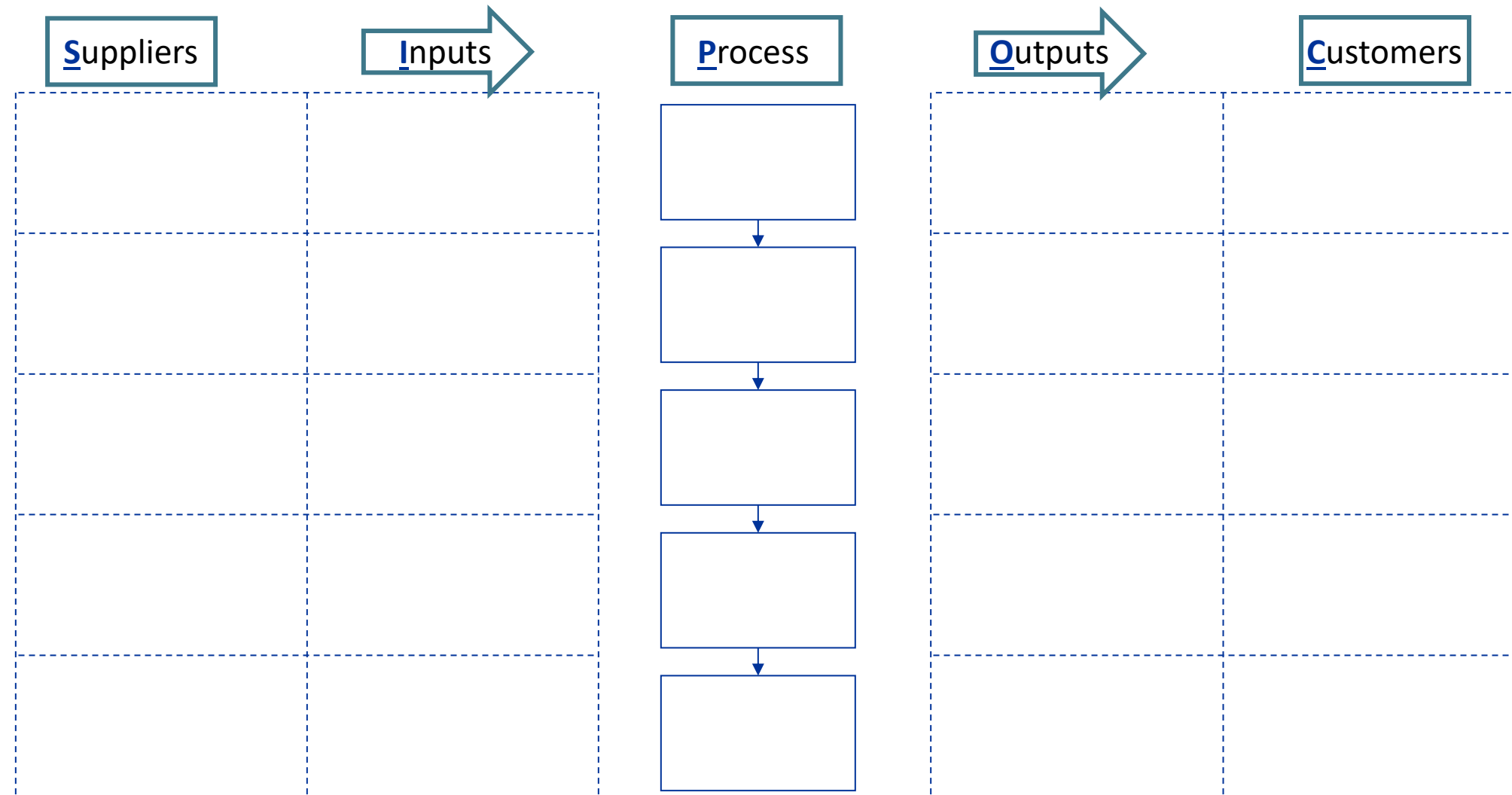
B2B and B2C operations

B2B (Business-to-Business) operations are those that provide their products or services **to other businesses**.

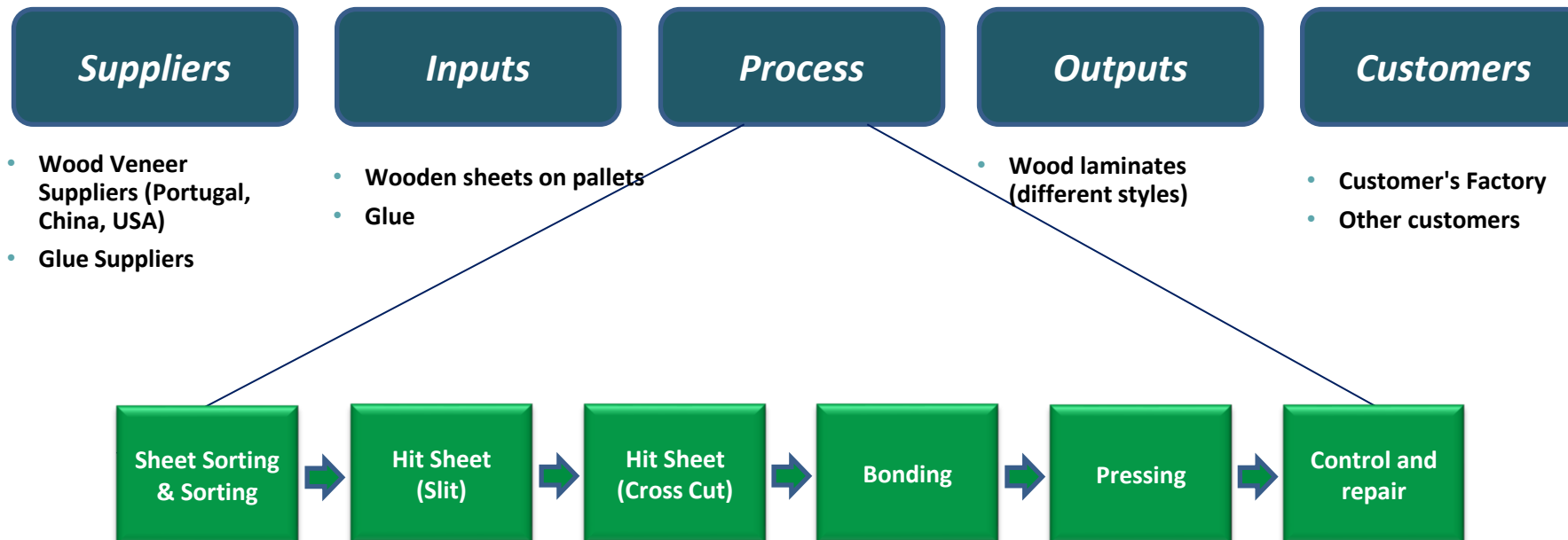
B2C (Business-to-Consumer) operations are those that provide their products or services **direct to the consumers** who (generally) are the ultimate users of the outputs from the operation.



SIPOC analysis

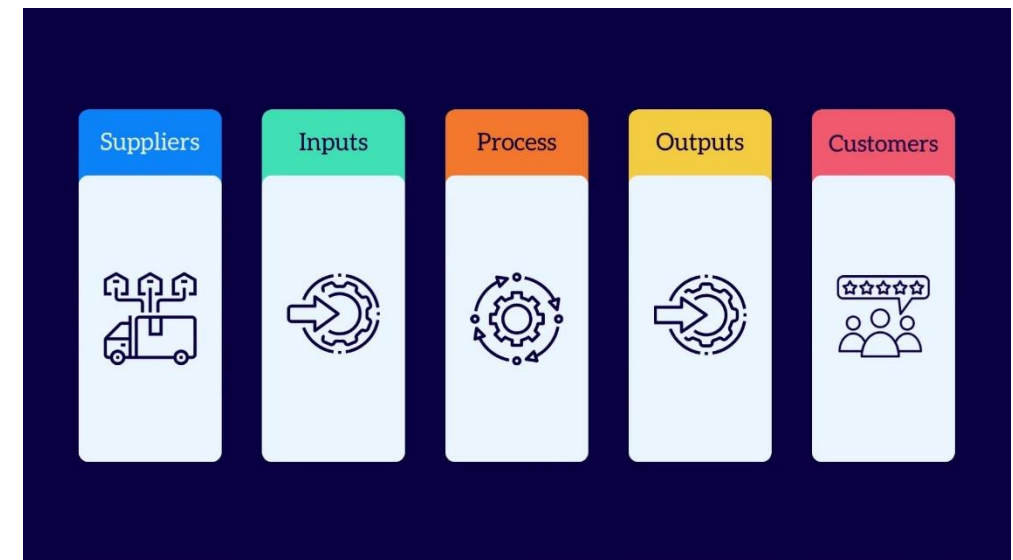


SIPOC analysis

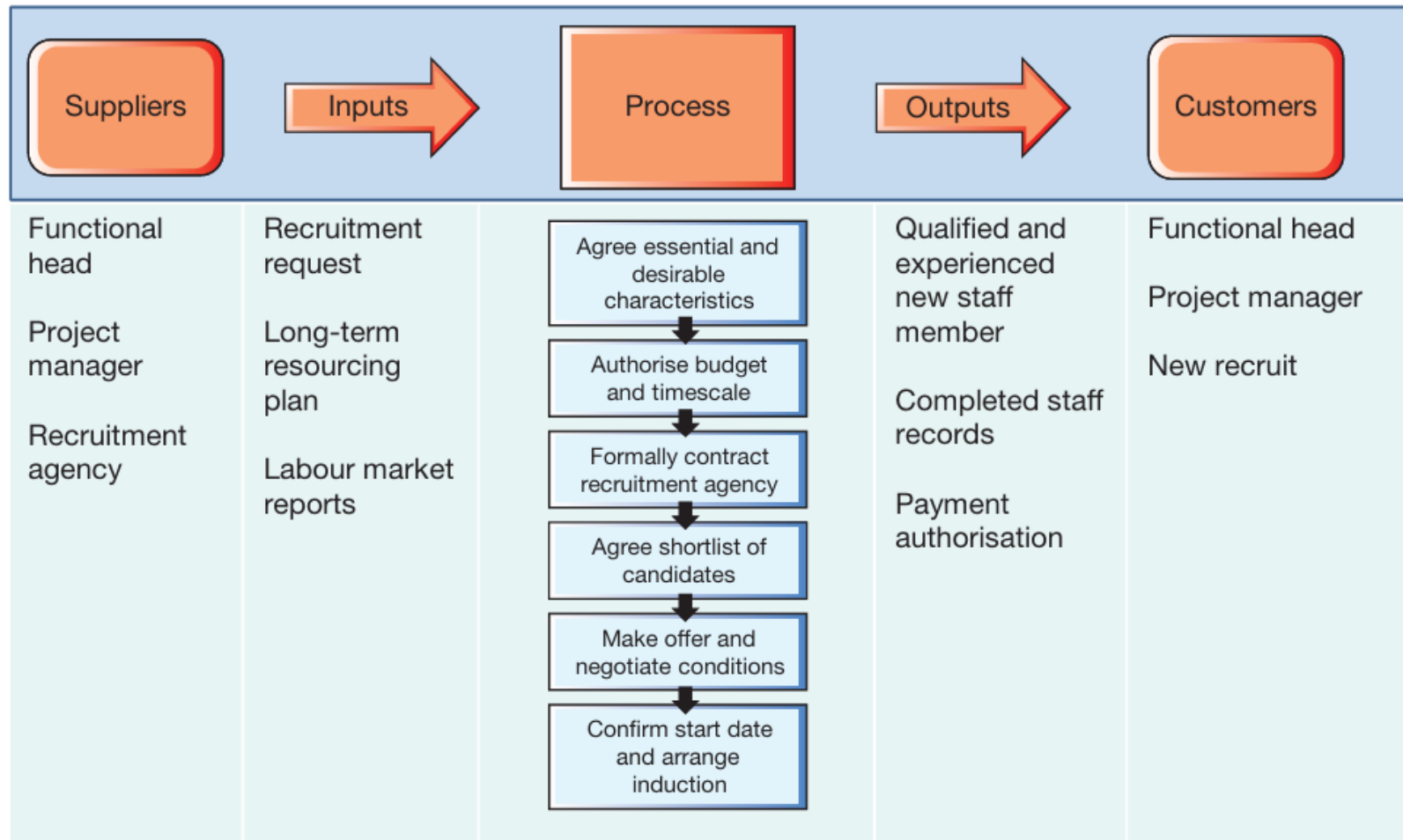


SIPOC analysis

*It is a method of **formalizing a process at a relatively general** rather than a detailed level. The advantage of such an analysis is that it helps all those involved in the process to understand and agree what it involves and where it fits within the business.*

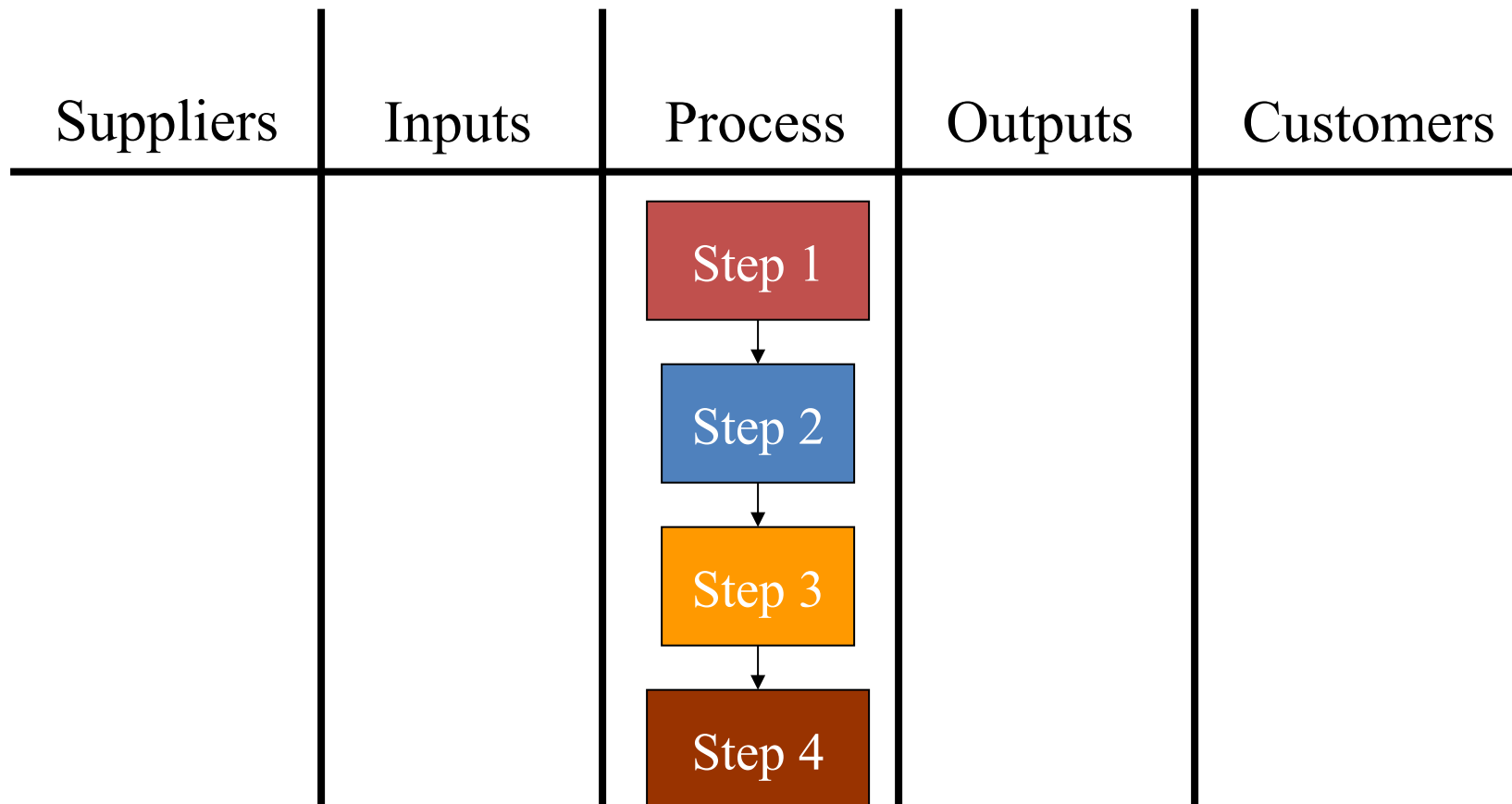


SIPOC analysis

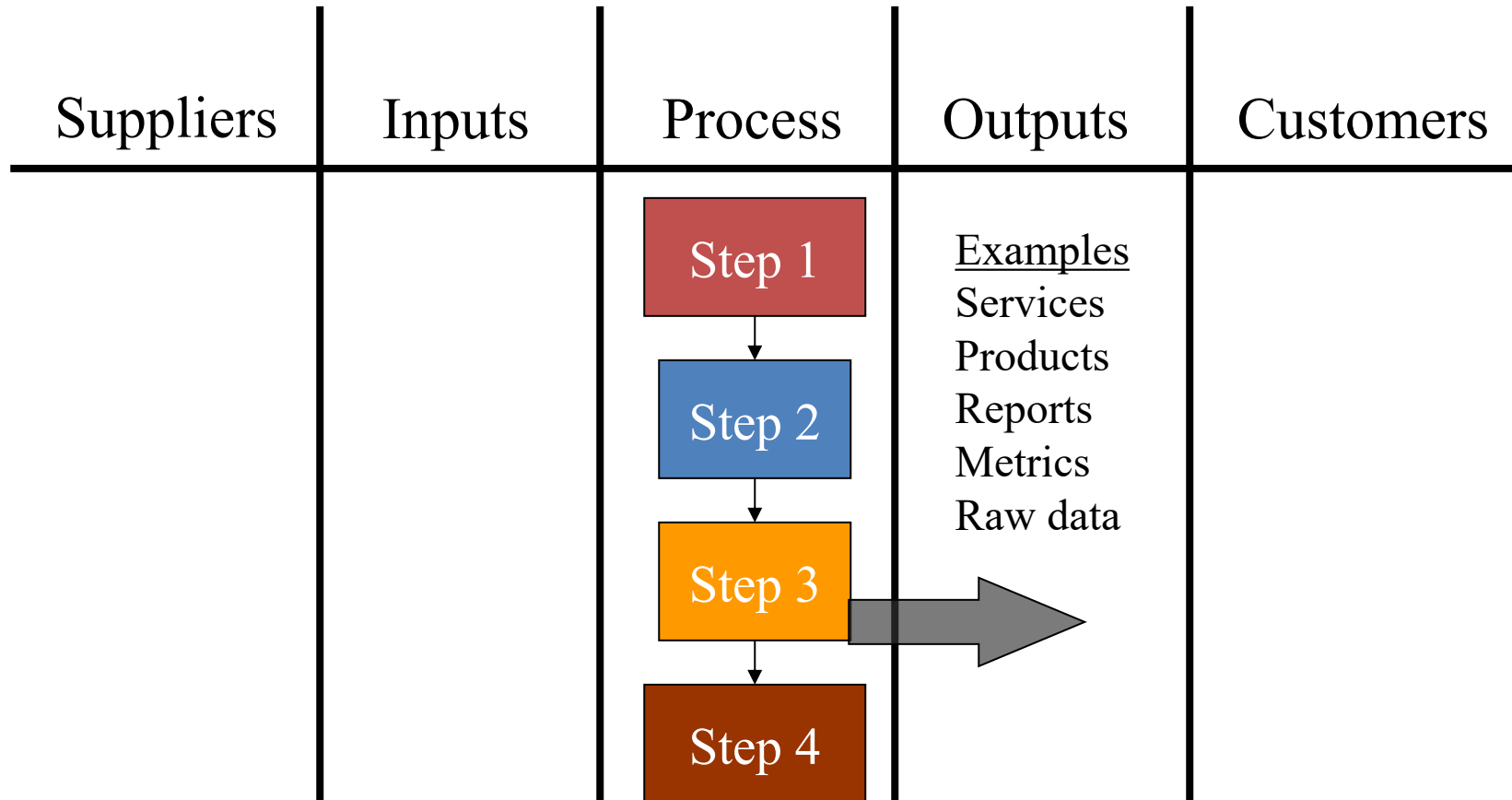


Source: Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

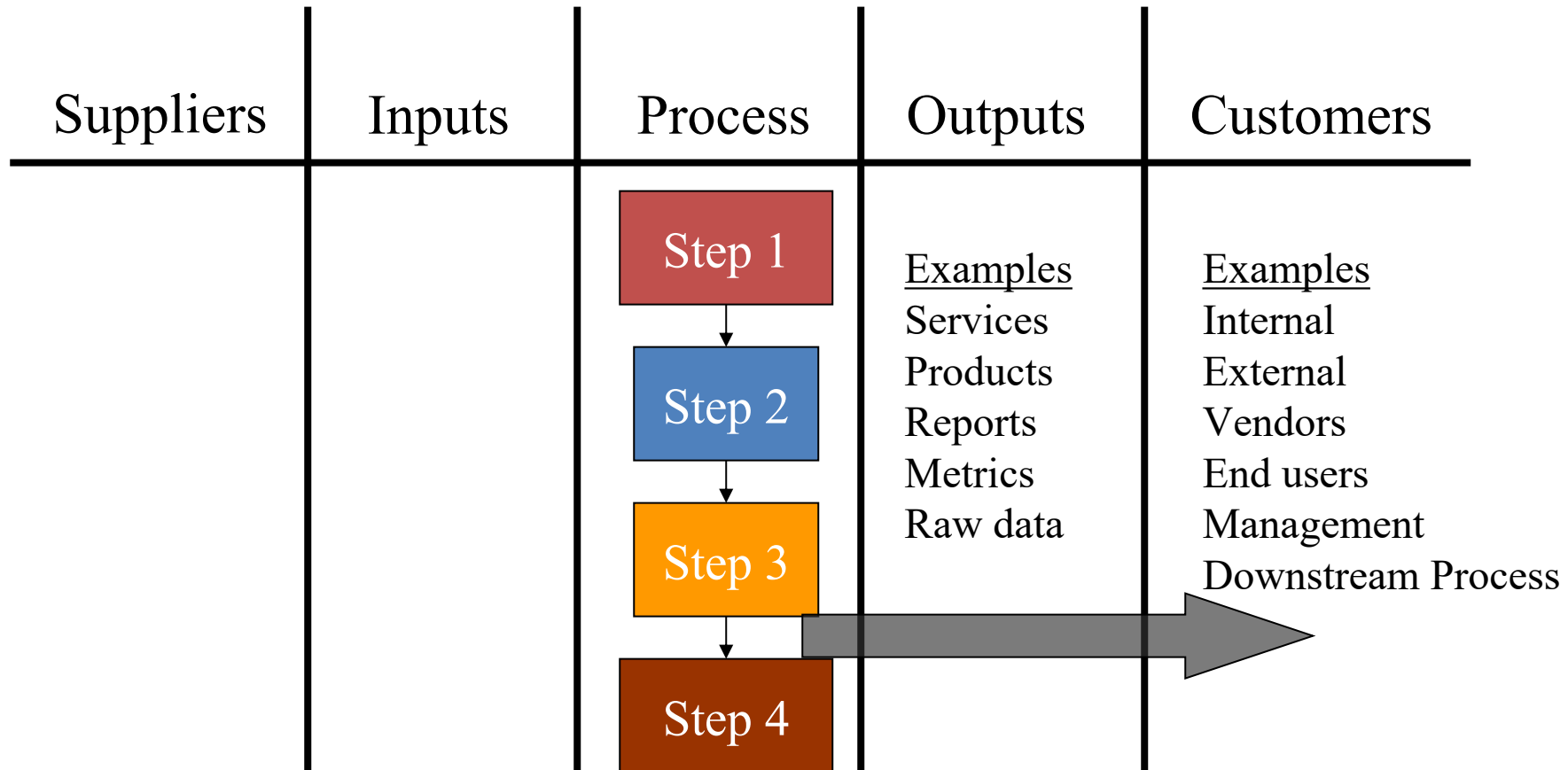
SIPOC analysis



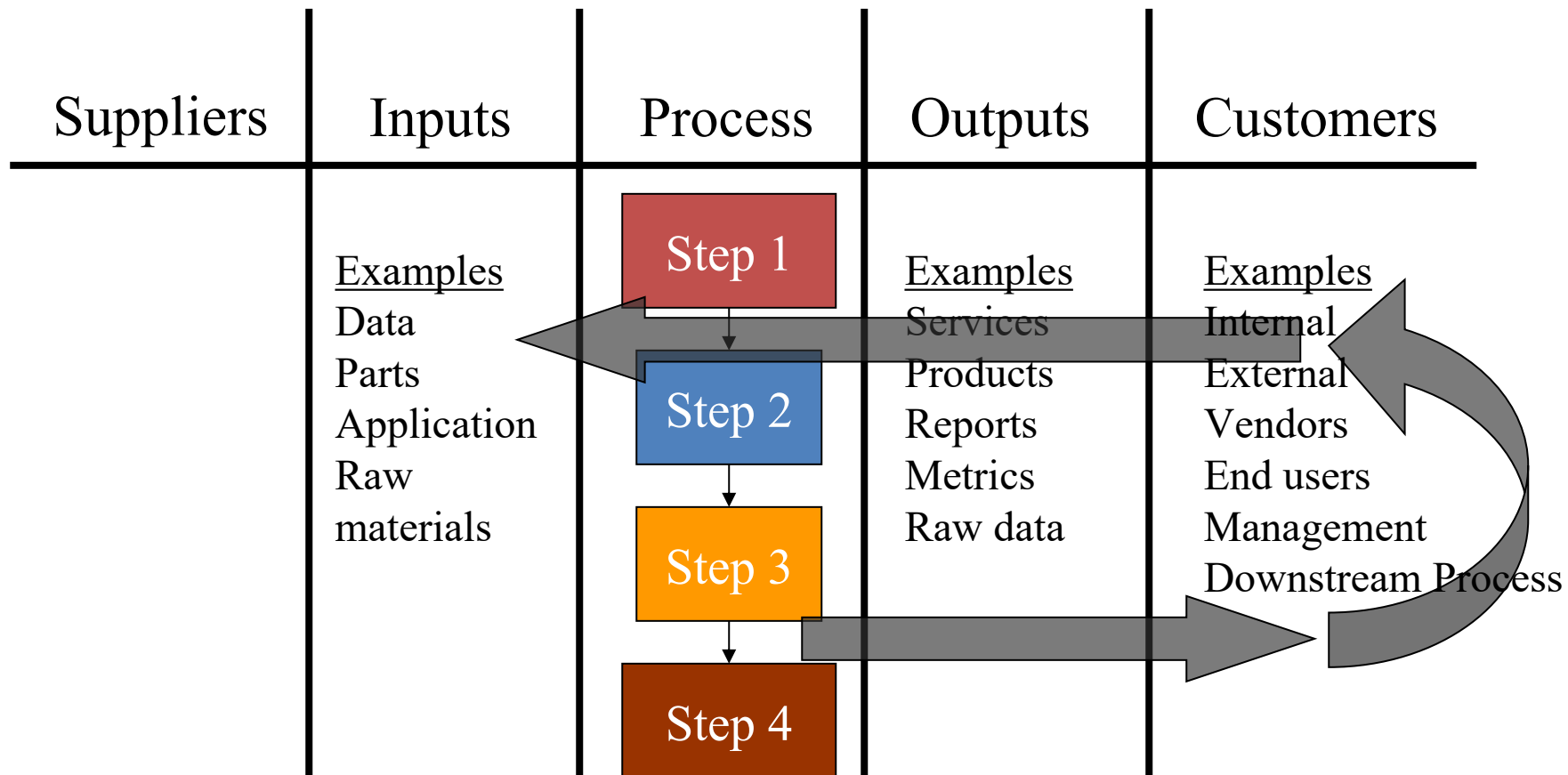
SIPOC analysis



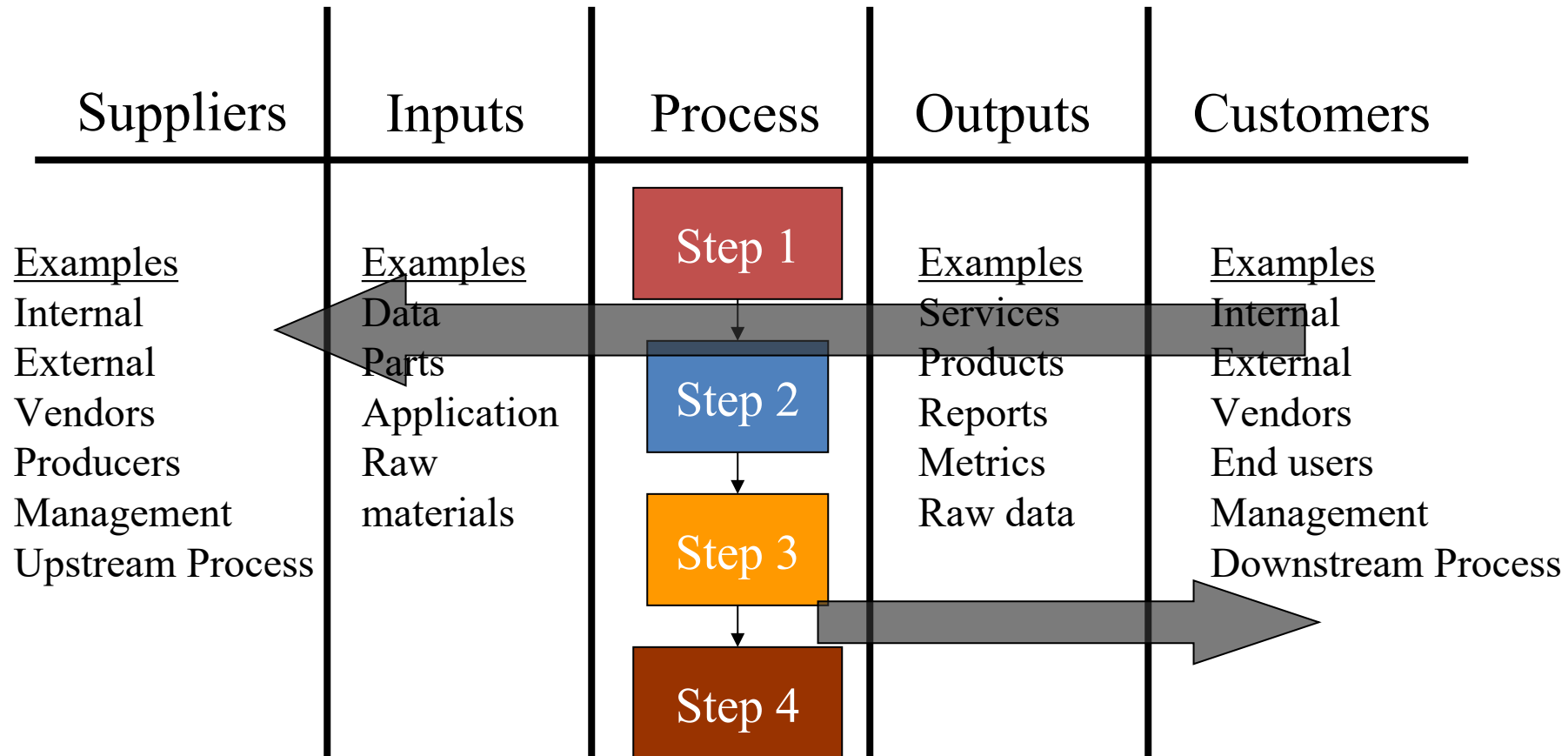
SIPOC analysis



SIPOC analysis



SIPOC analysis



Process hierarchy

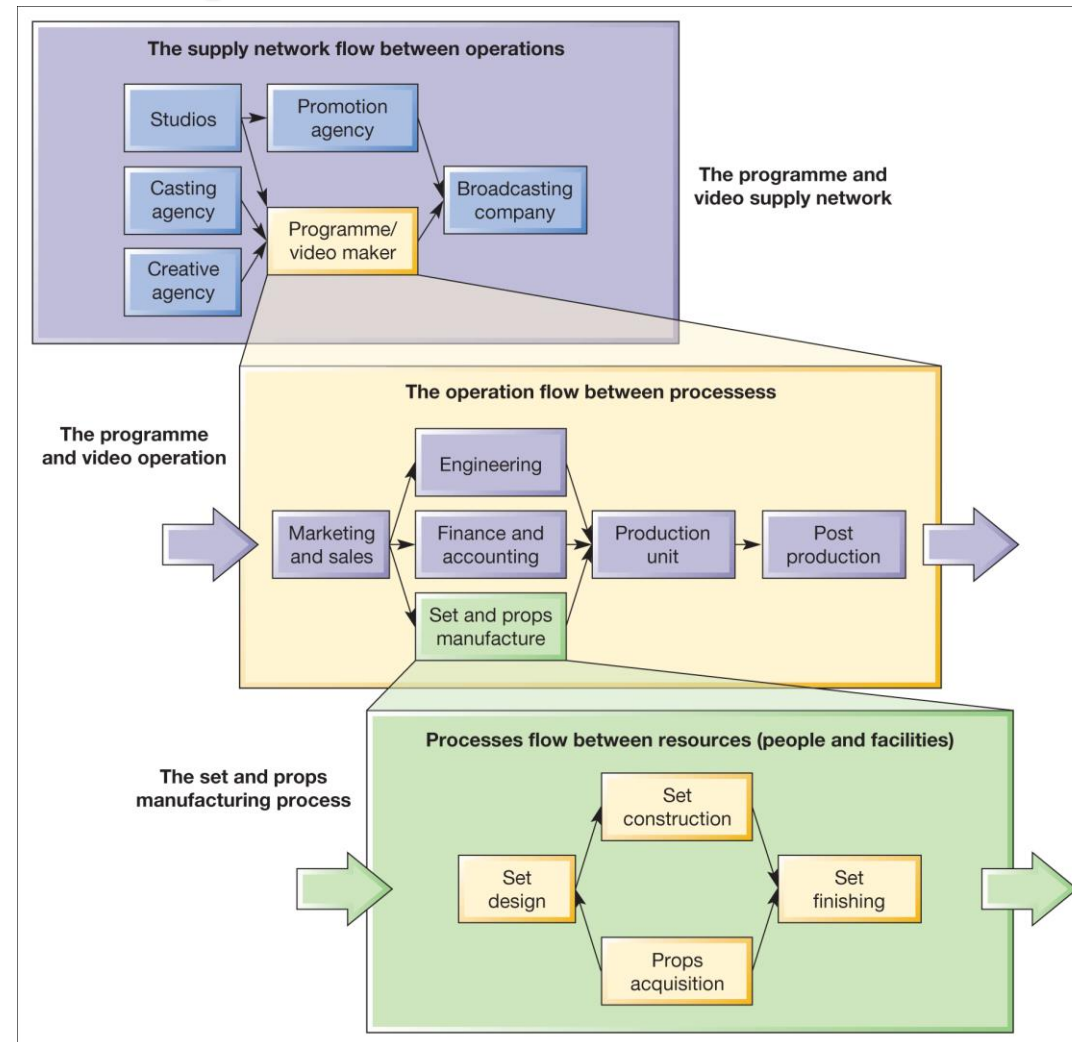
Suppliers	Inputs	Process	Outputs	Customers
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2 - Entrada 3	Actividade 1	- Saída 1	- Cliente 1
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2 - Entrada 3 - Entrada 4	Actividade 2	- Saída 1 - Saída 2	- Cliente 1 - Cliente 2
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2	Actividade 3	- Saída 1	- Cliente 1 - Cliente 2
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2 - Entrada 3	Actividade 4	- Saída 1	- Cliente 1

Suppliers	Inputs	Process	Outputs	Customers
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2 - Entrada 3	Actividade 3.1	- Saída 1	- Cliente 1
- Fornecedor 1	- Entrada 1 - Entrada 2 - Entrada 3 - Entrada 4	Decisão 3.1	- Saída 1 - Saída 2	- Cliente 1 - Cliente 2
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2	Actividade 3.3	- Saída 1	- Cliente 1 - Cliente 2
- Fornecedor 1	- Entrada 1 - Entrada 2 - Entrada 3	Actividade 3.4	- Saída 1	- Cliente 1
- Fornecedor 1	- Entrada 1 - Entrada 2 - Entrada 3	Actividade 3.5	- Saída 1	- Cliente 1

Suppliers	Inputs	Process	Outputs	Customers
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2 - Entrada 3	Actividade 3.3.1	- Saída 1	- Cliente 1
- Fornecedor 1	- Entrada 1 - Entrada 2 - Entrada 3 - Entrada 4	Actividade 3.3.2	- Saída 1 - Saída 2	- Cliente 1 - Cliente 2
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2	Actividade 3.3.3	- Saída 1	- Cliente 1 - Cliente 2
- Fornecedor 1	- Entrada 1 - Entrada 2 - Entrada 3	Actividade 3.3.4	- Saída 1	- Cliente 1

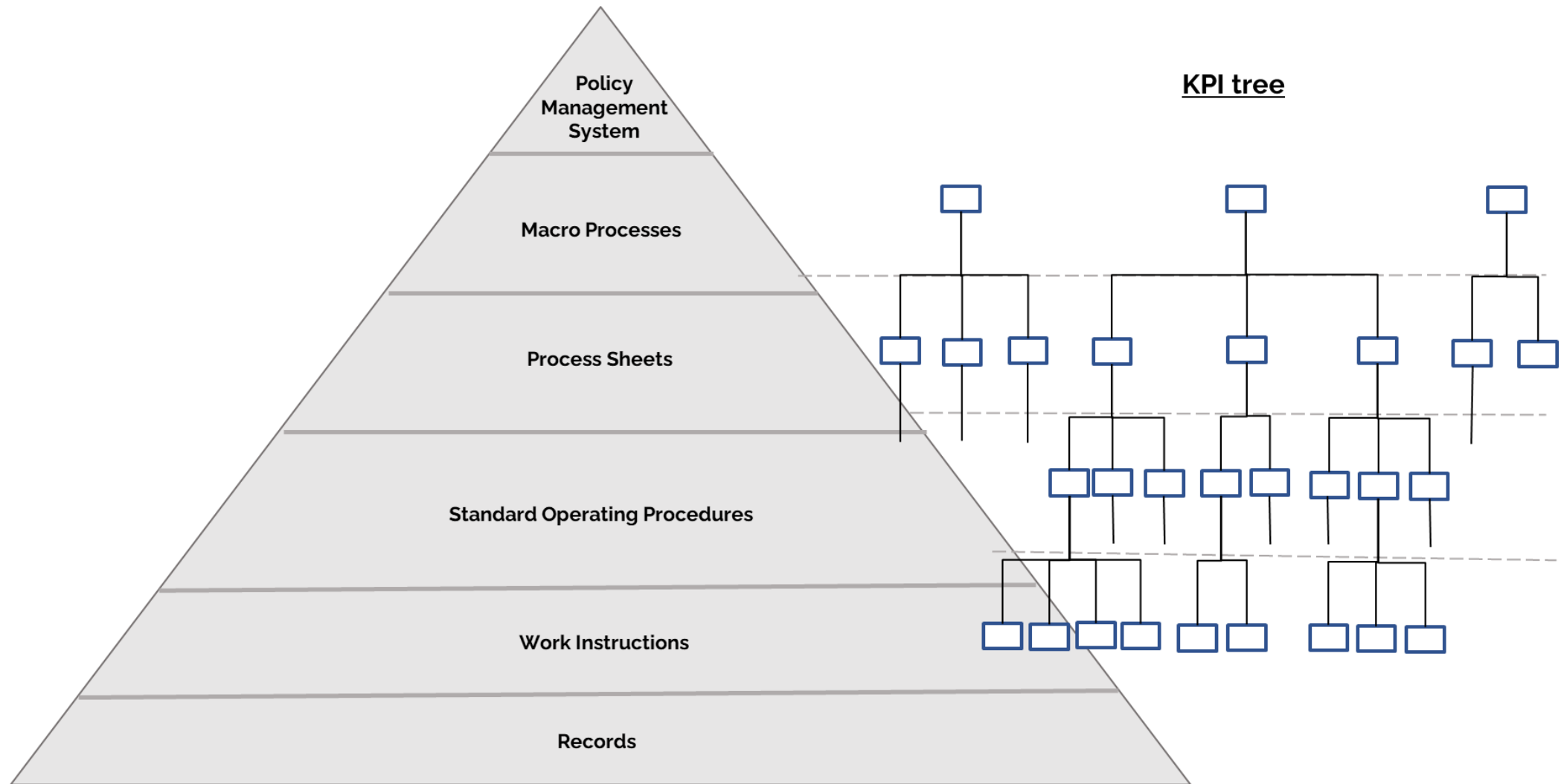
Increasingly level of detail

Process hierarchy

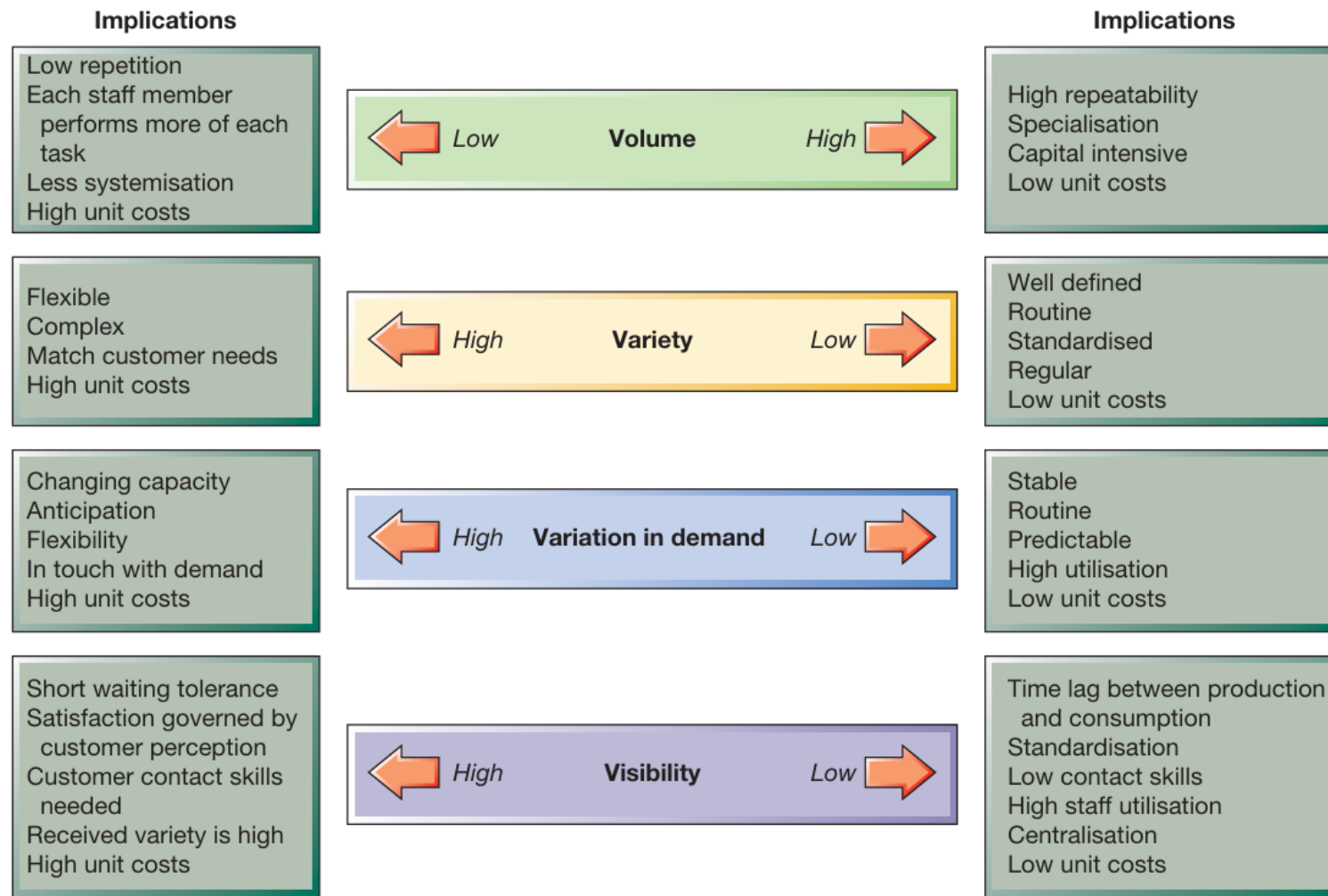


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Process hierarchy



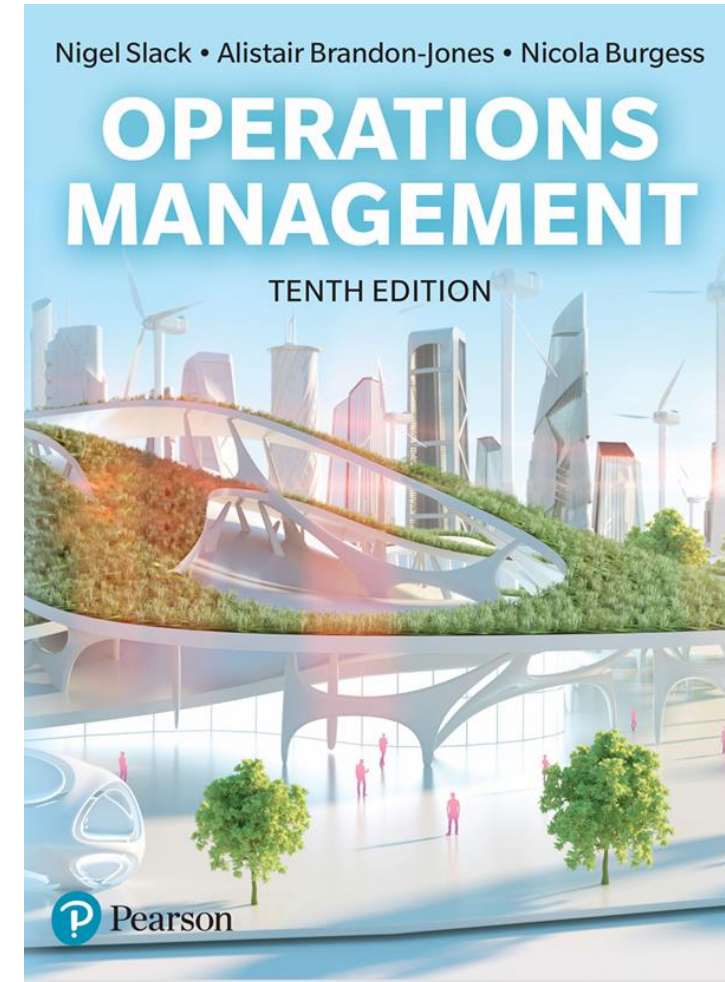
The four Vs of operations



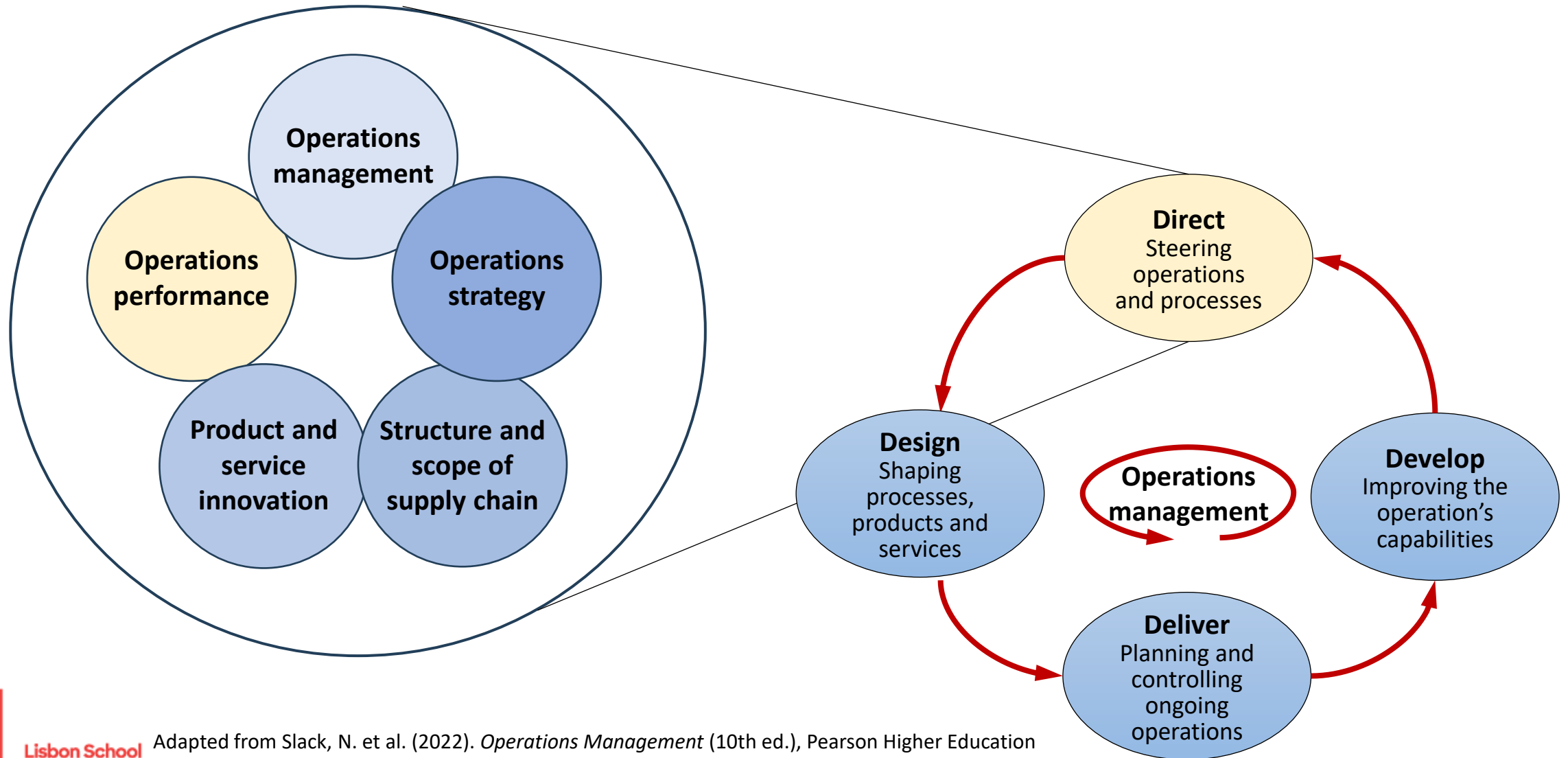
Source: Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

References:

- Slack, N. et al. (2022). Operations Management (10th ed.), Pearson Higher Education

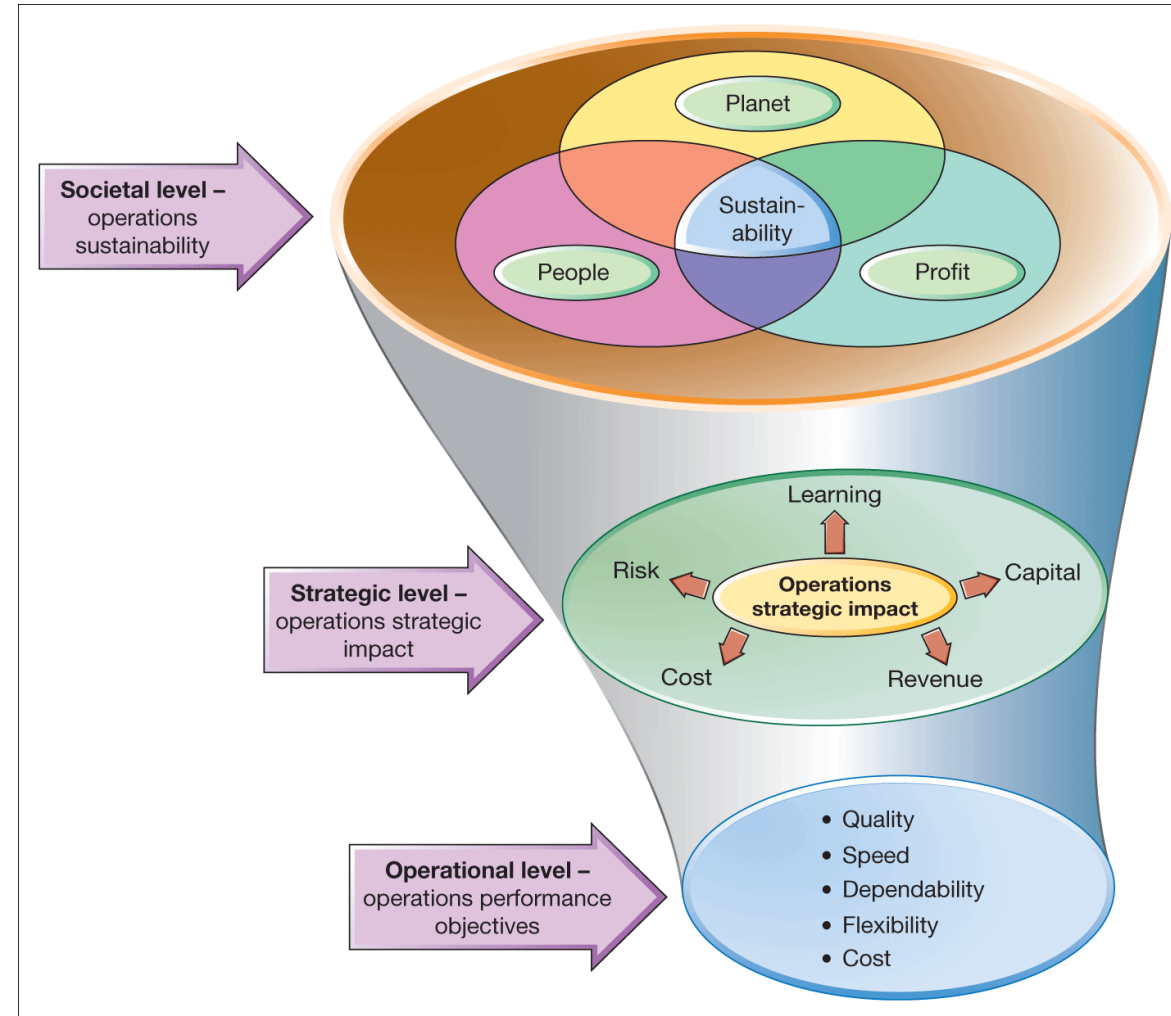


Operations management lifecycle (4D's model)



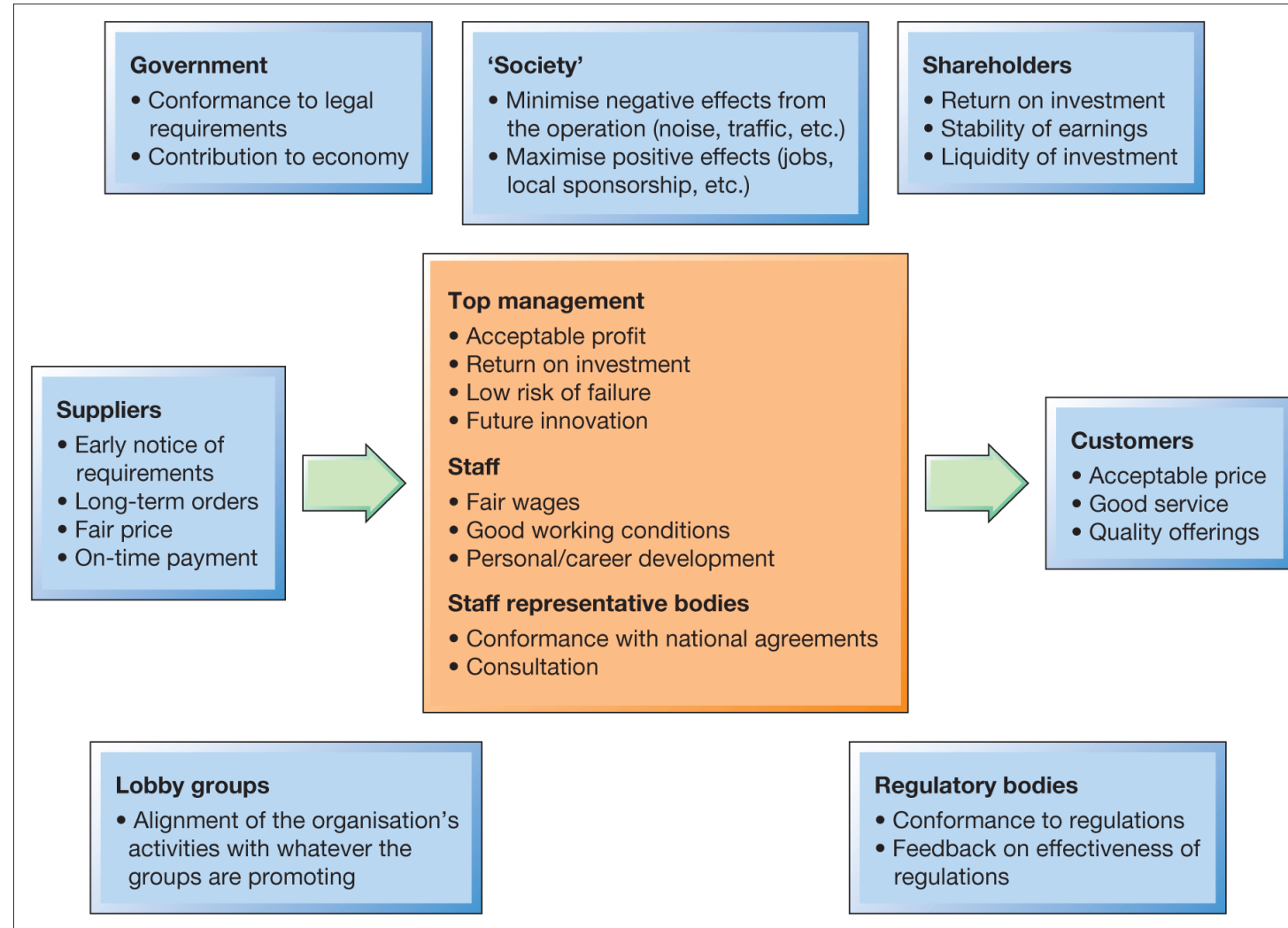
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Three levels of operations performance



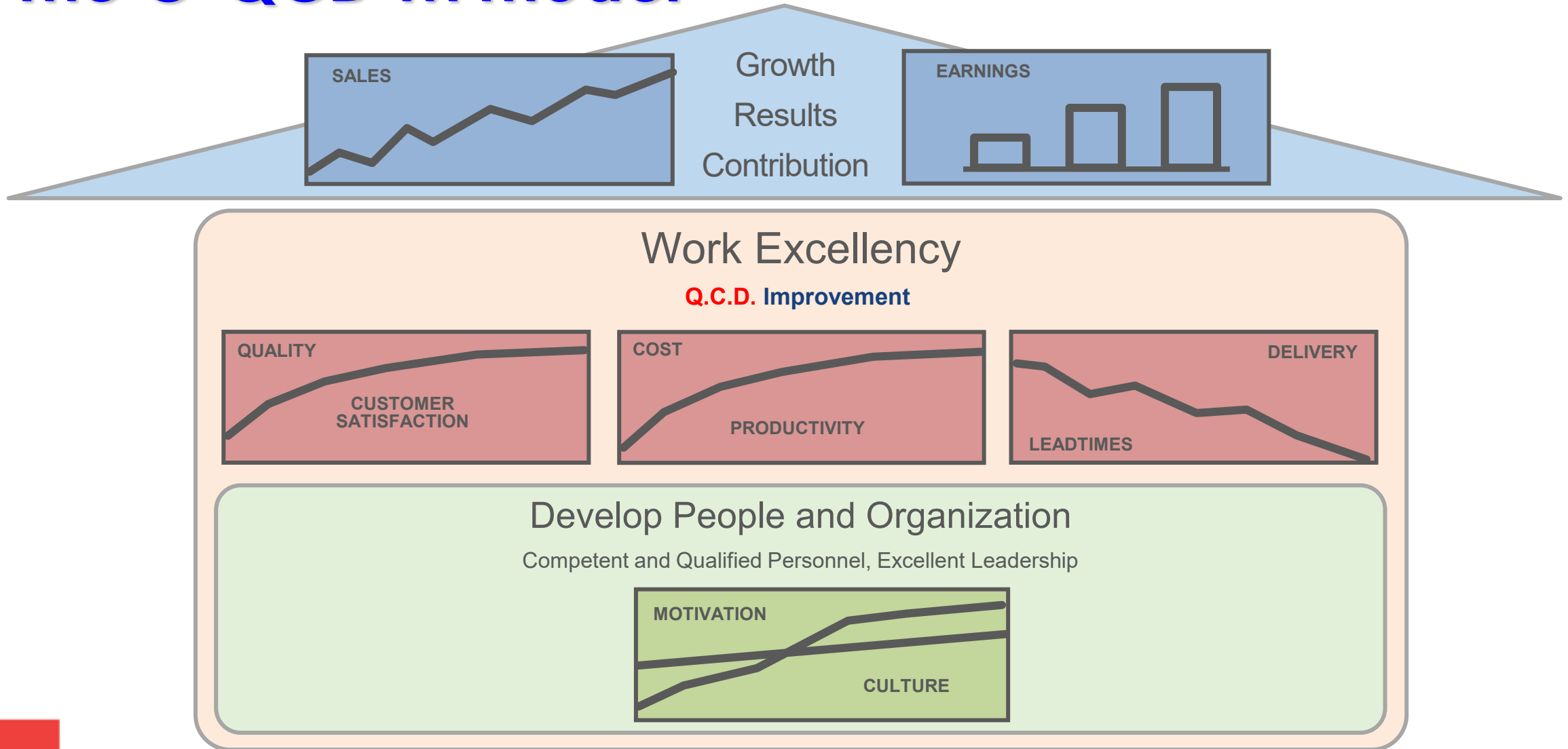
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

Customers and Stakeholders



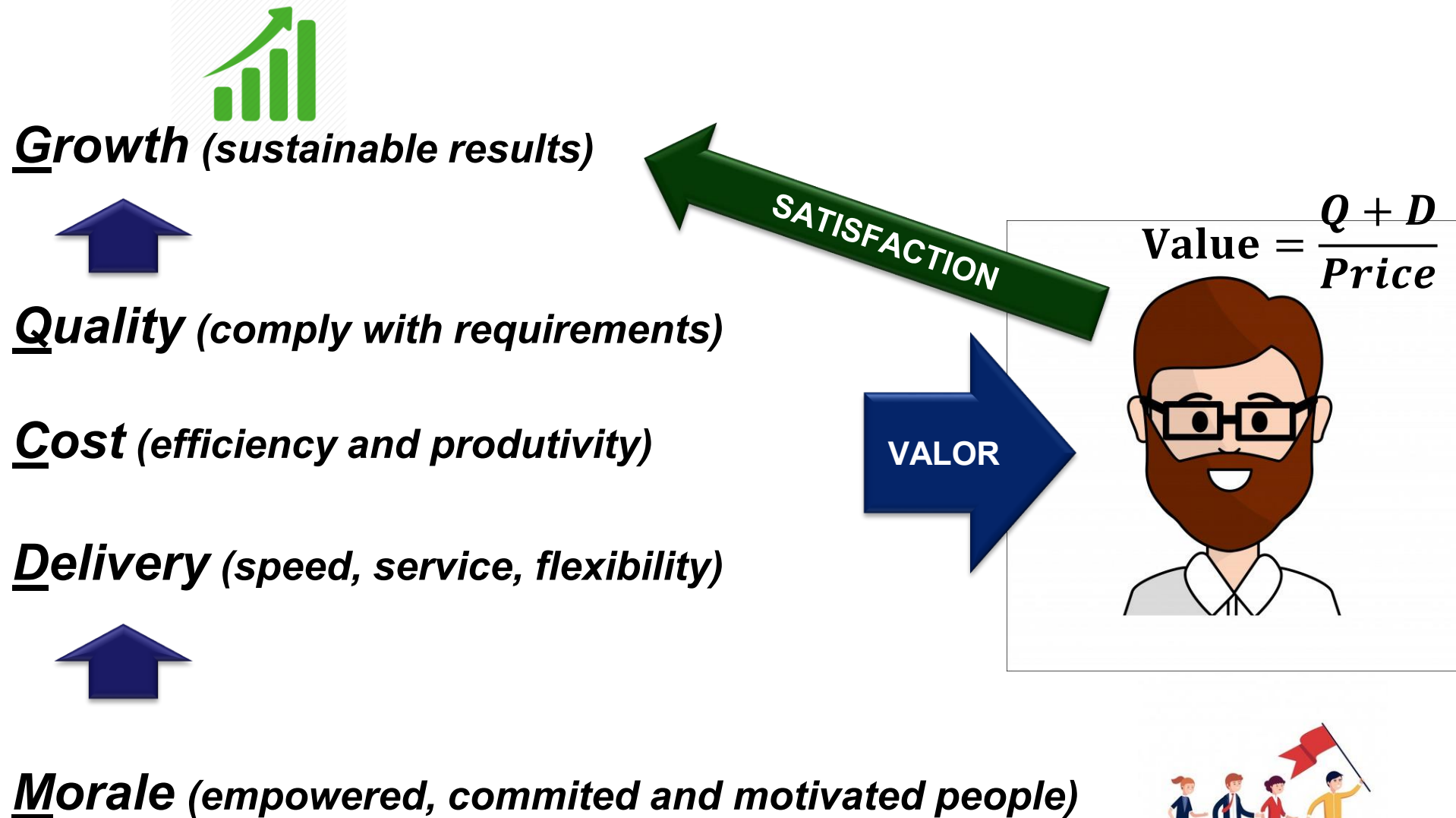
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

The G-QCD-M model



Adapted from: Kaizen Institute, 2017

The G-QCD-M model



The G-QCD-M model | example

Current Situation/Reasons for Action	Objectives G: Growth
Reduction in sales/m ² (Slump in Sales) Change in Consumption channels (online sales) Increase in knowledge of clients (Internet) Increase in product technological dynamics (Progress) Need to motivate employees	Increase Sales Improve Margin Increase Productivity
Field/Level of Management	Q.C.D.M. Objectives
Store Operations	Q: Improve Quality Expectation (Complaint Rate) Q: Improve After-Sales Service and the Client Experience in General
	A: Increase Productivity A: Increase Sales Efficiency
	D: Reduce Lead Time D: Increase % of Clients Expected within the Level of Service
	M: Increase Motivation M: Improve the Incentive System



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Adapted from: Kaizen Institute, 2017

♦ RANKINGS



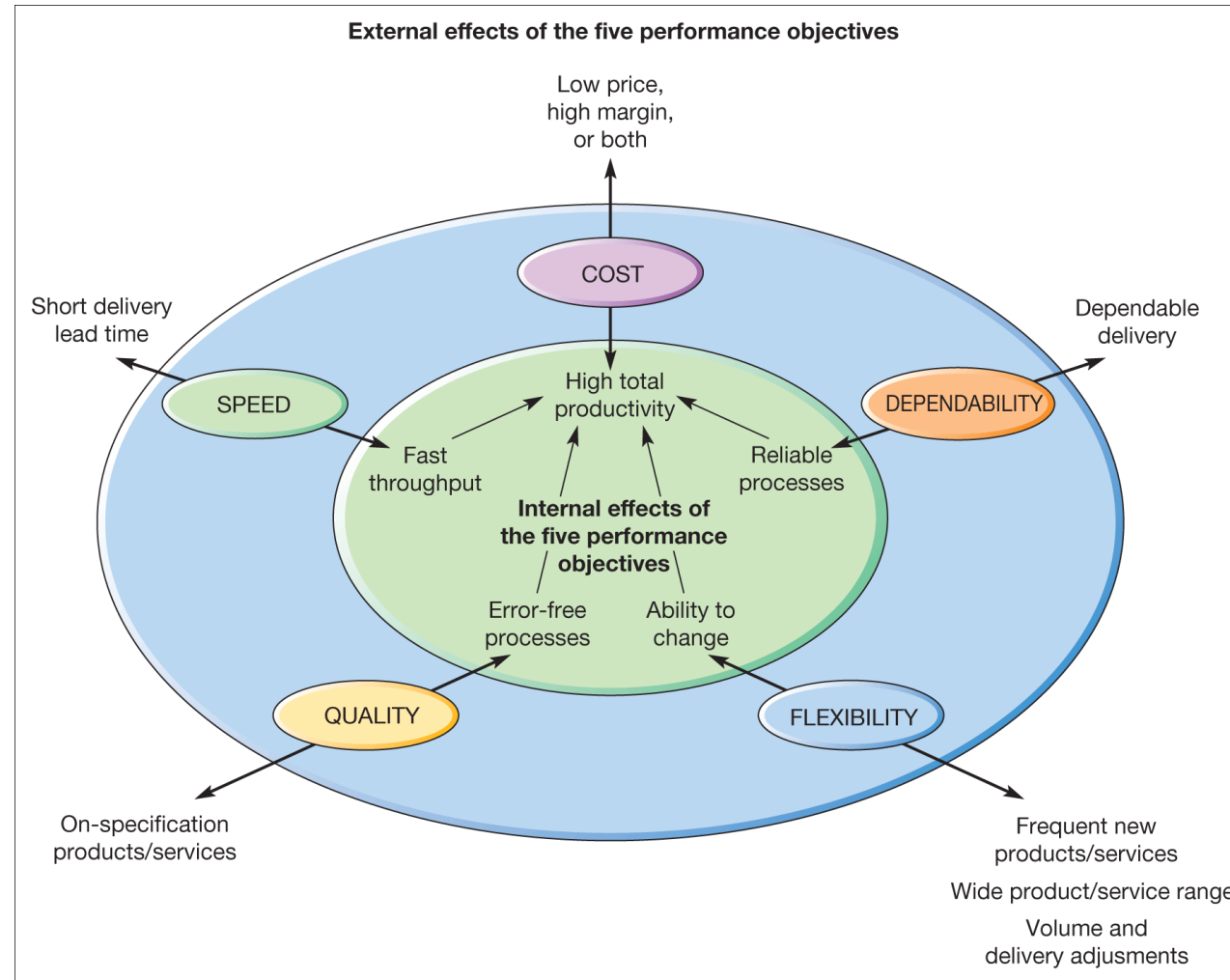
Master in Finance
Ranking 2020



♦ MEMBER

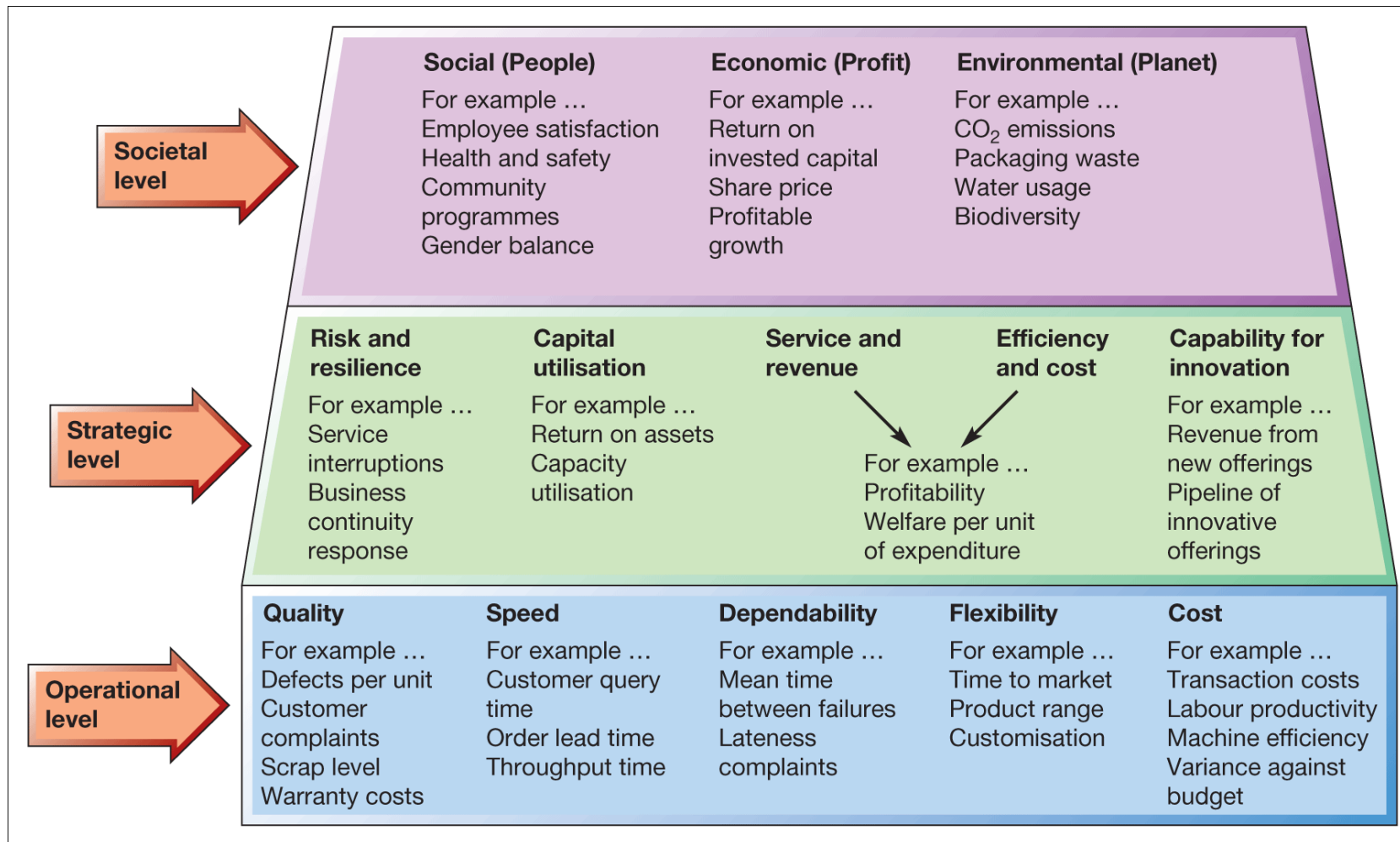


Five performance objectives



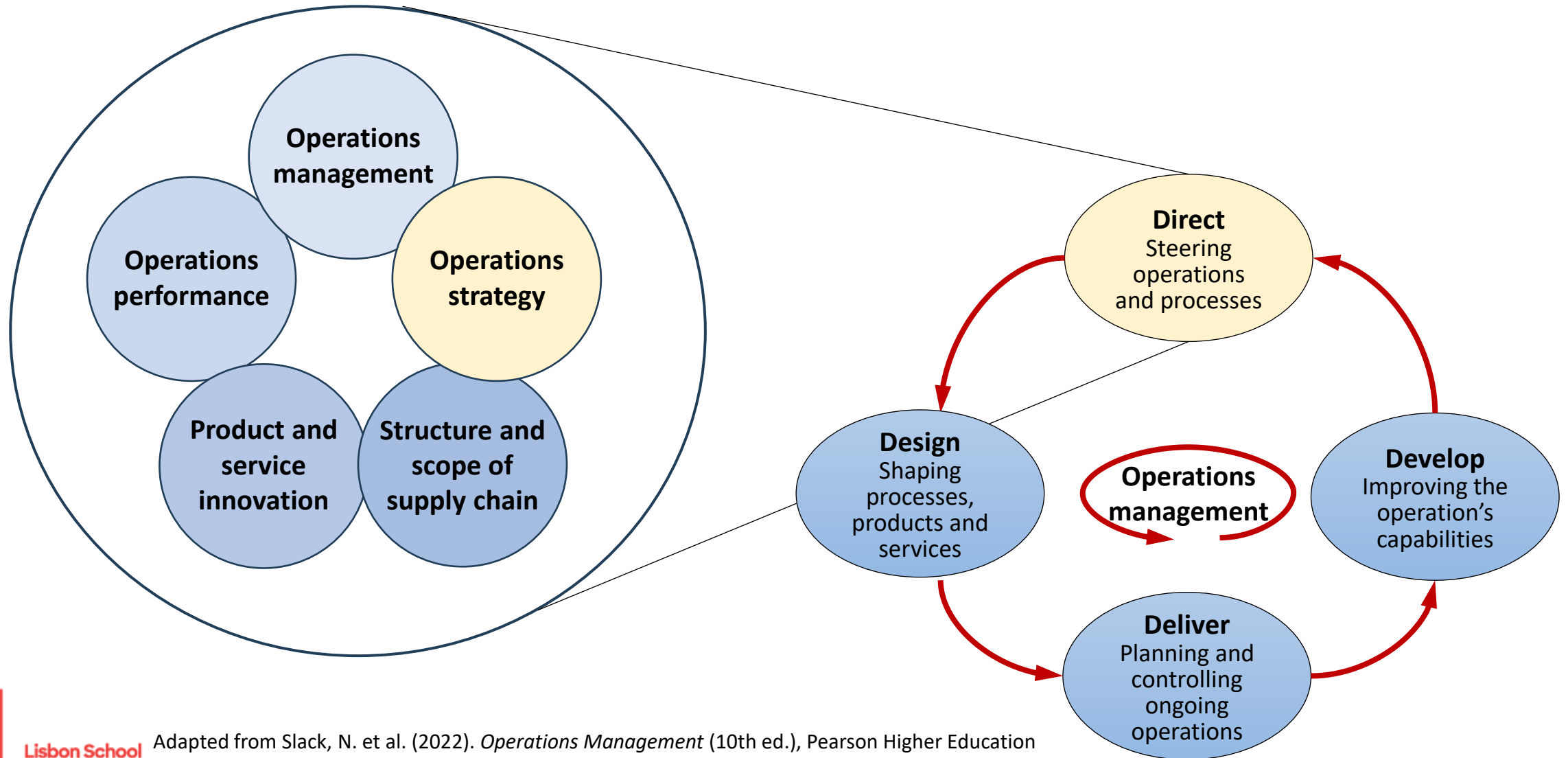
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

Performance measures at the three levels



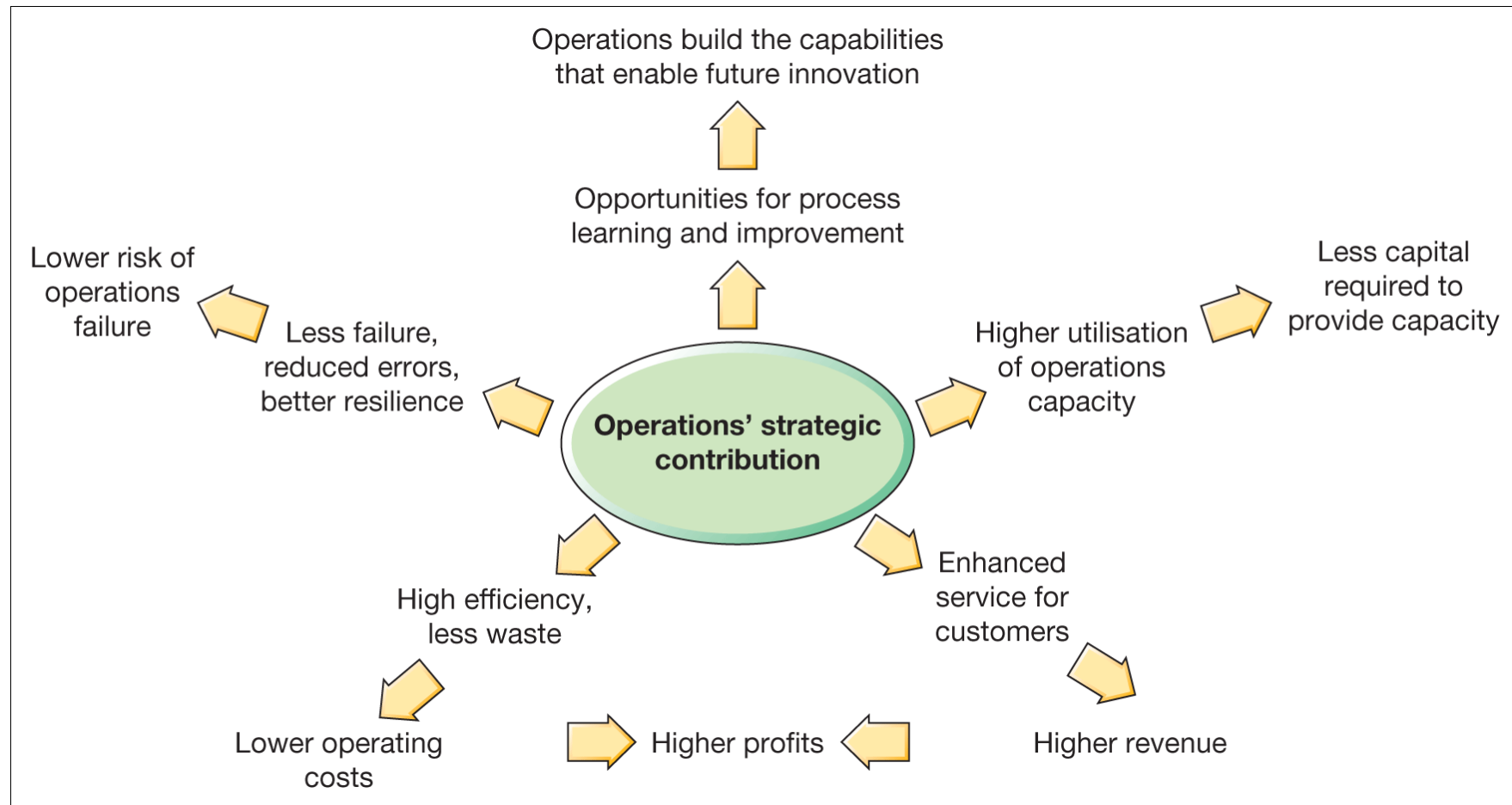
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Operations management lifecycle (4D's model)



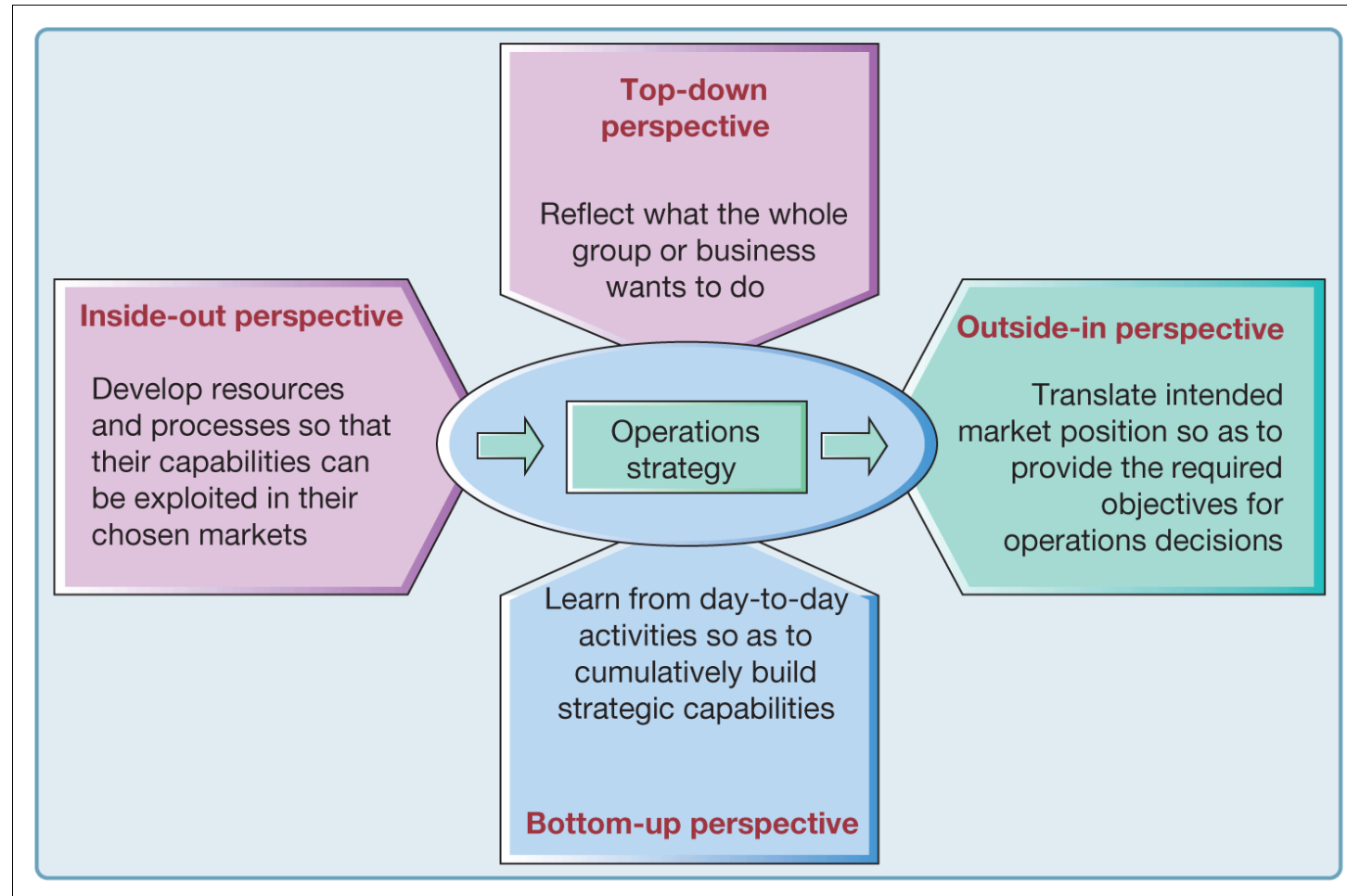
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Strategic contribution of operations



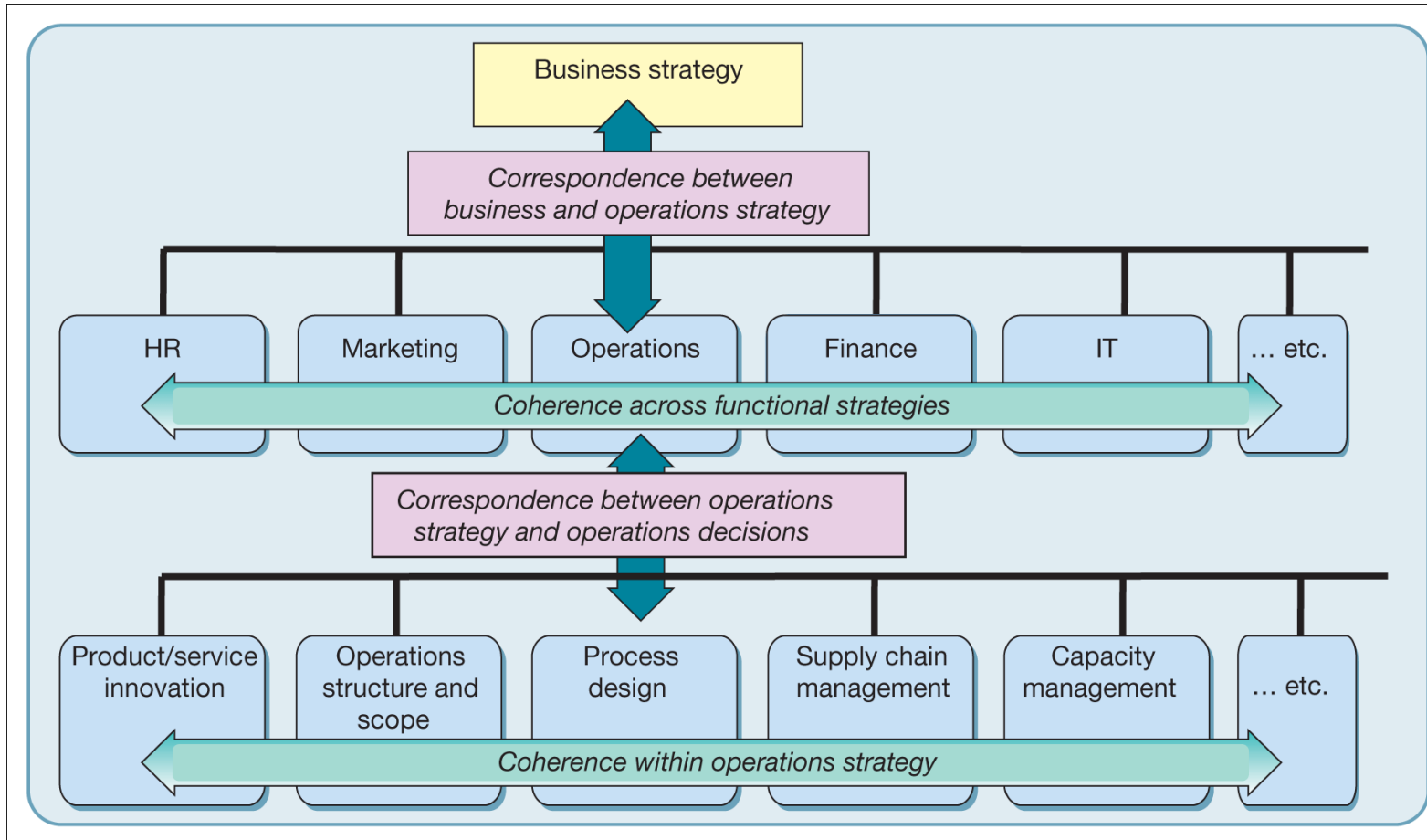
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

The four perspectives on operations strategy



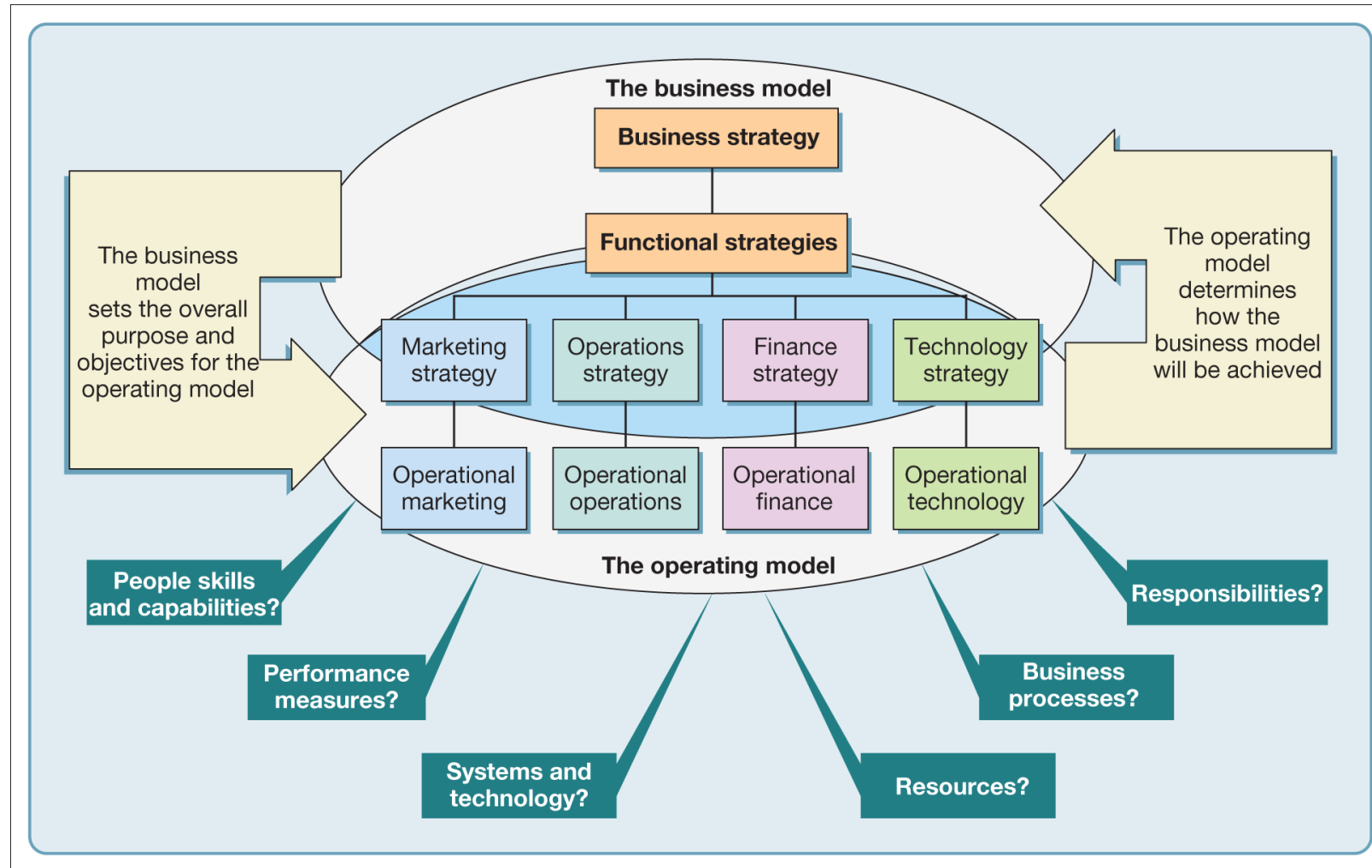
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

Alignment of operations strategy with business strategy ('top-down')



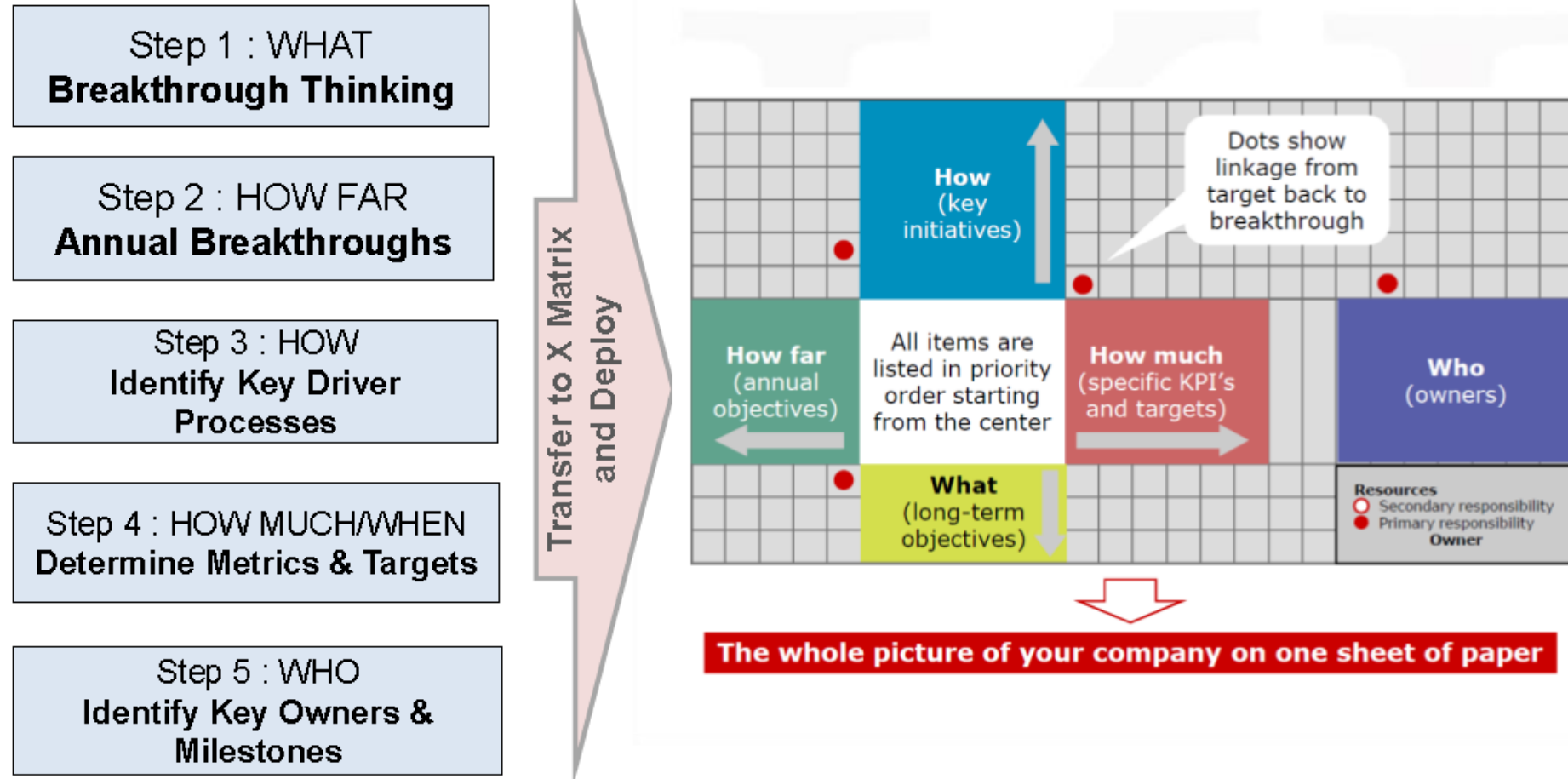
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

The business model and the operating model



Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

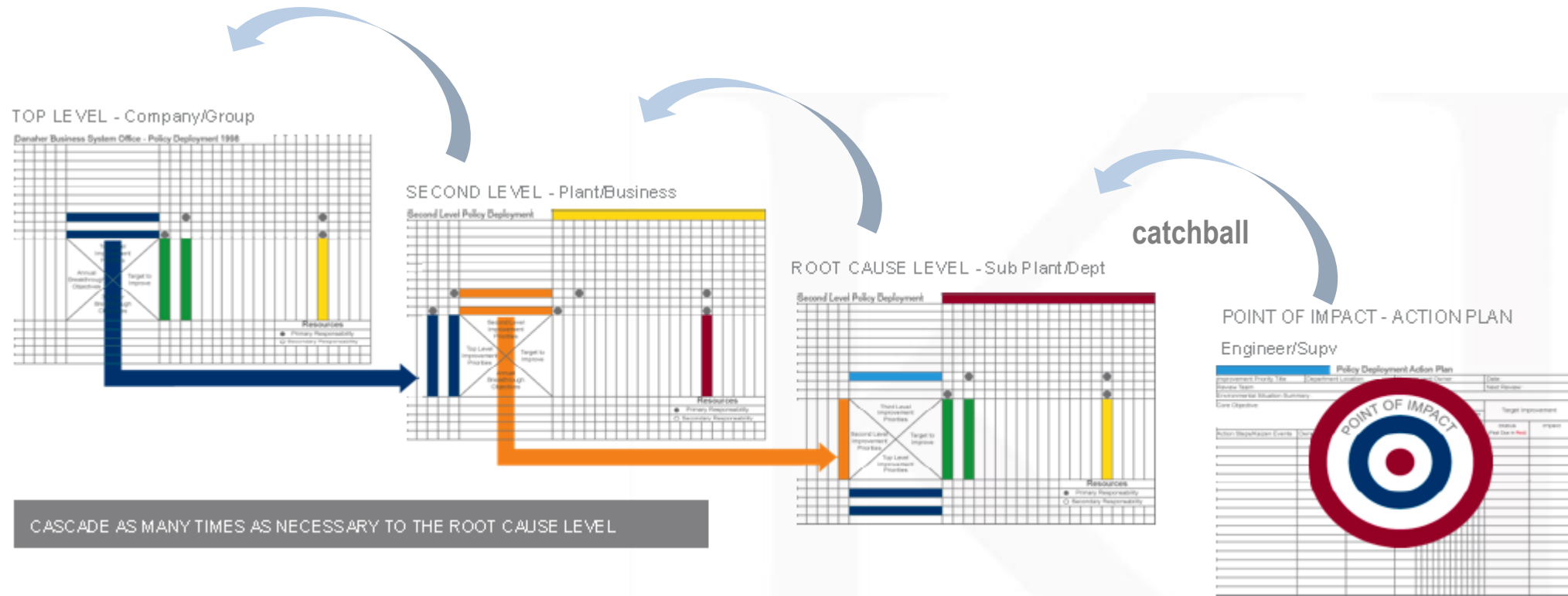
Strategy deployment | X-Matrix of Hoshin Kanri



Adapted from Kaizen Institute, 2017

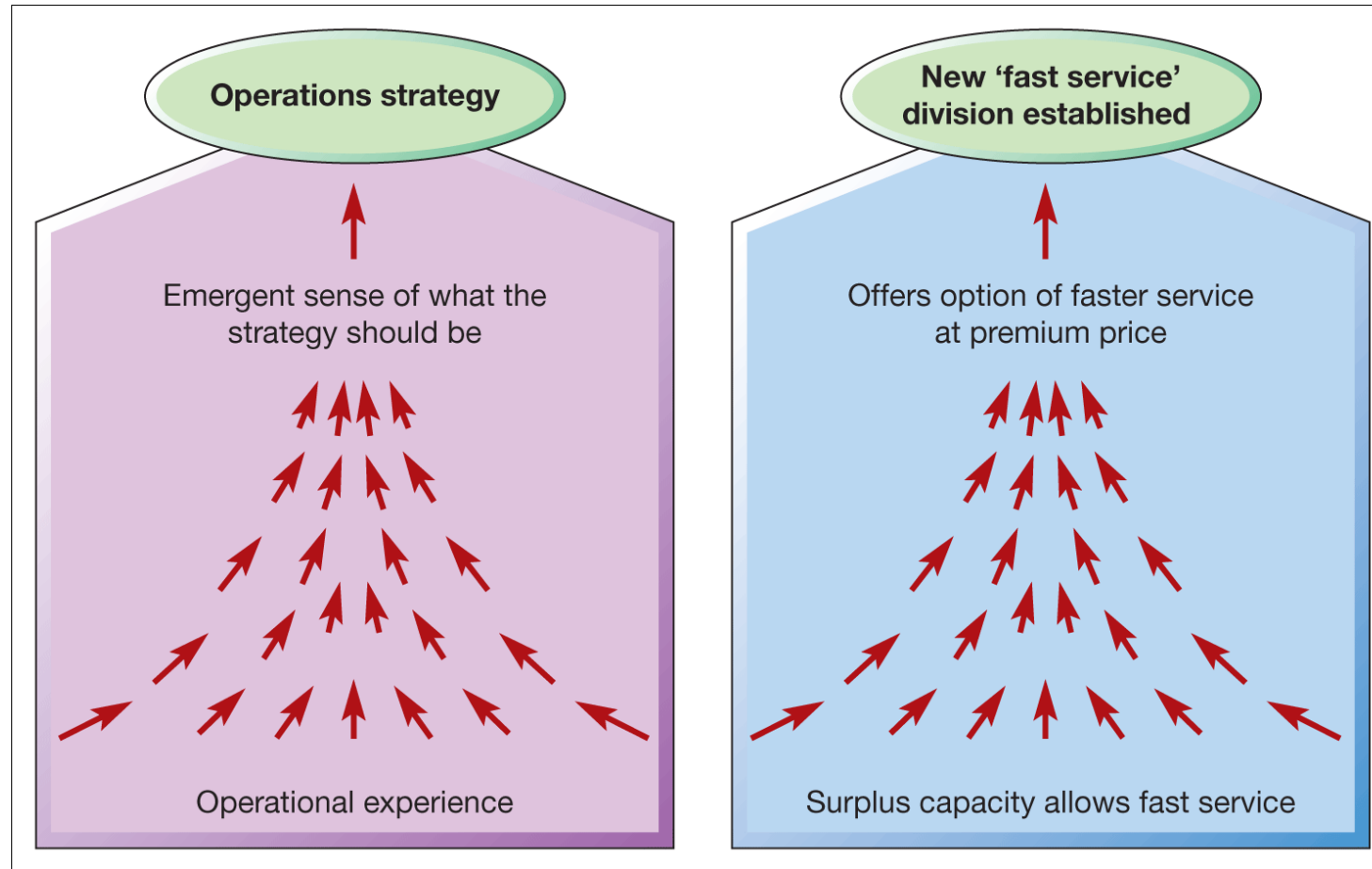
Source: <https://tcmuklimited.co.uk/strategy-deployment-example/>

Strategy deployment | X-Matrix of Hoshin Kanri



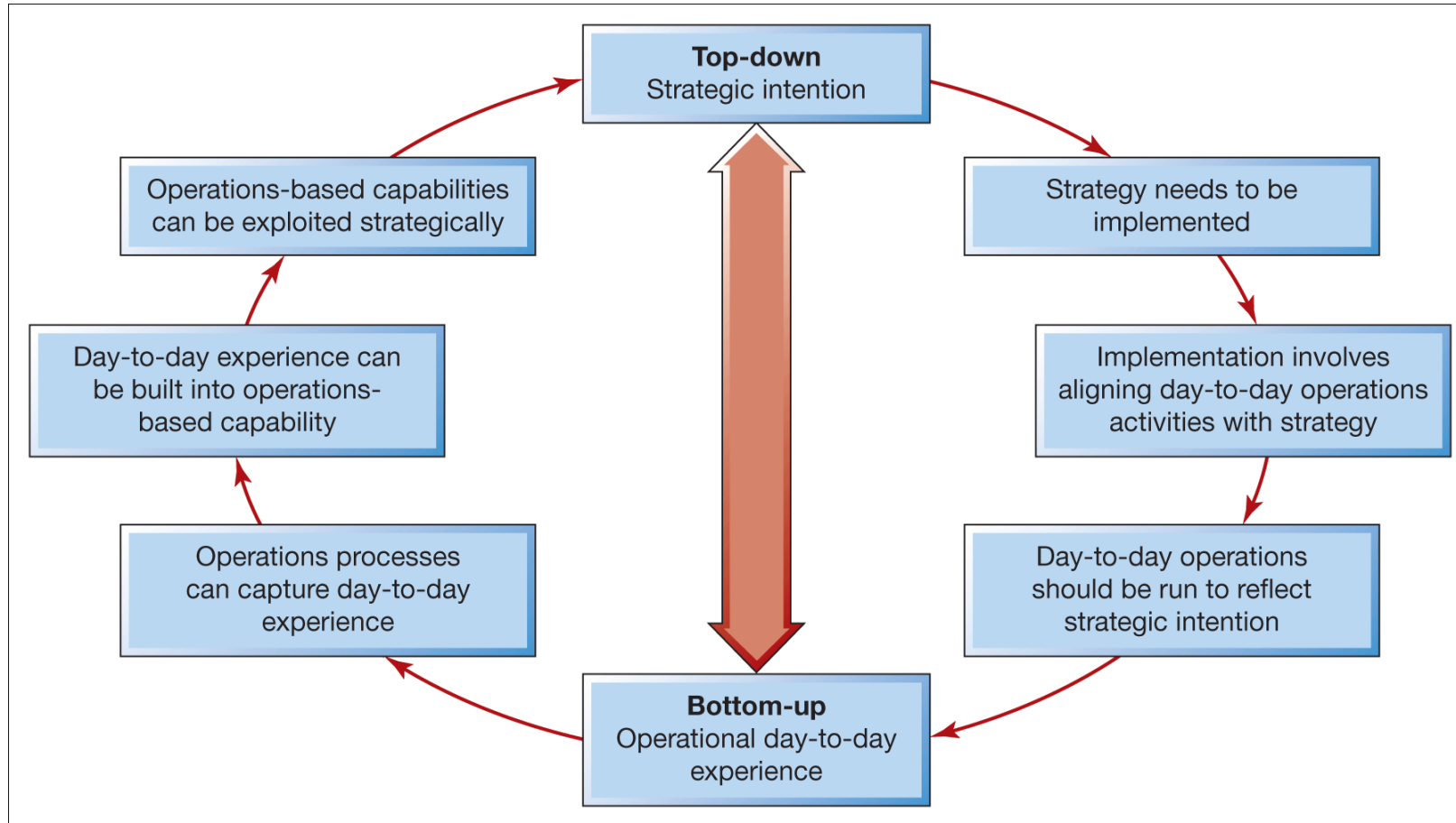
Adapted from Kaizen Institute, 2017

The 'bottom-up' perspective of operations strategy



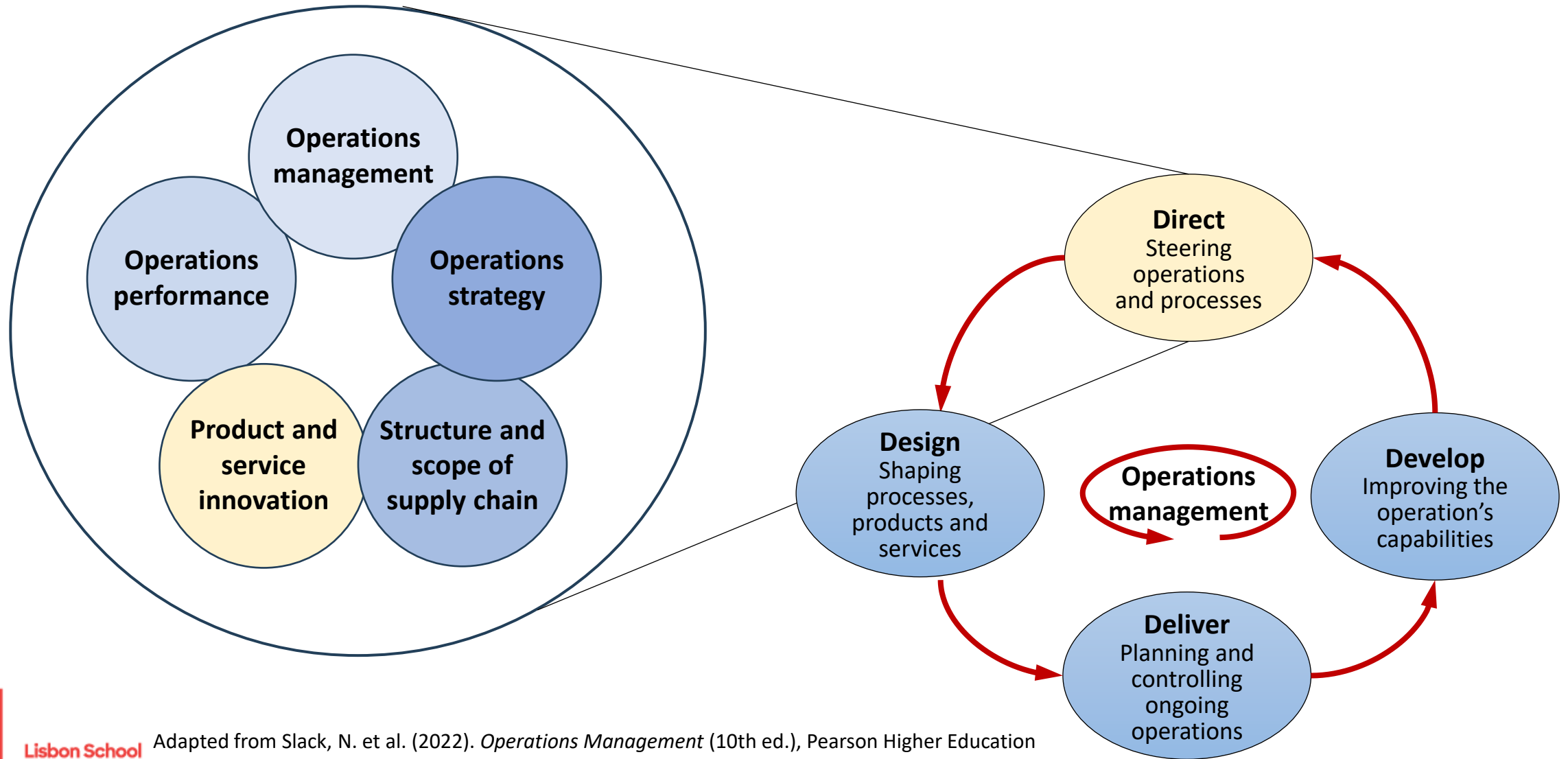
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

The “top-down’ and ‘bottom-up’ perspectives on operations strategy




Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

Operations management lifecycle (4D's model)



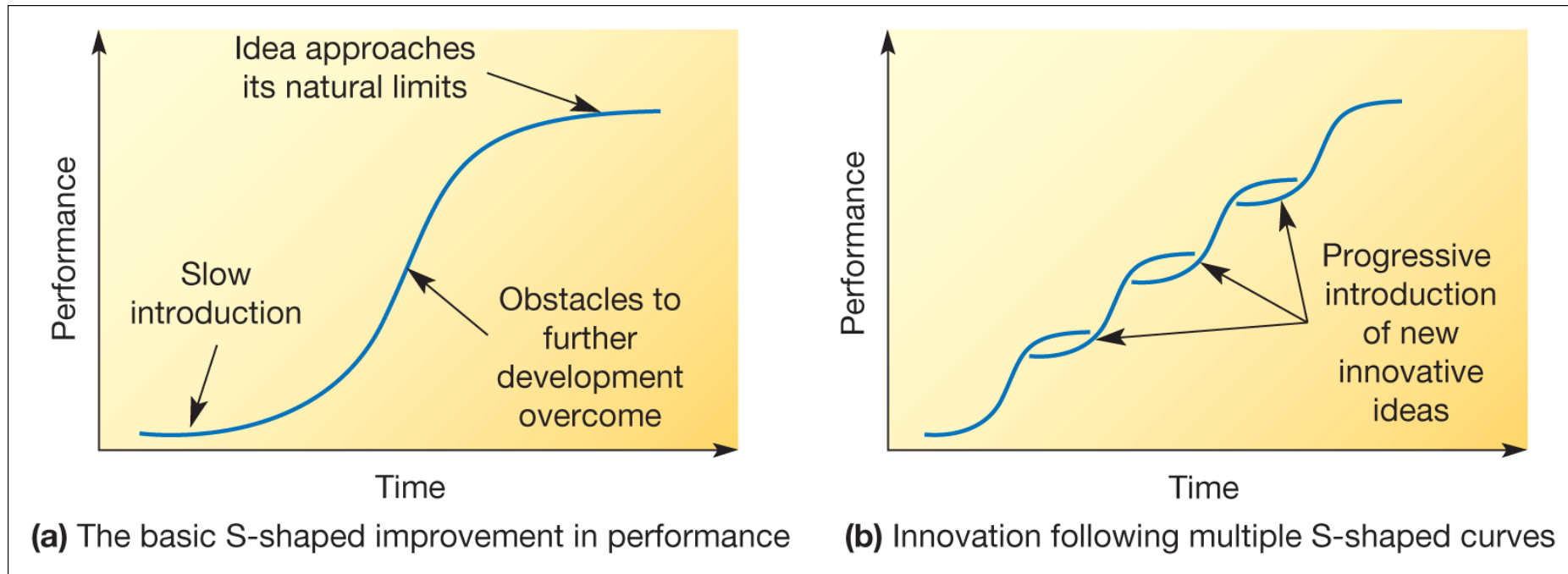
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

Product/service lifecycle

Sales volume				
	Introduction into market	Growth in market acceptance	Maturity of market, sales level off	Decline as market becomes saturated
	Customers	Innovators	Early adopters	Bulk of market
	Competitors	Few/none	Increasing numbers	Stable numbers
	Likely order winners	Product/service specification	Availability	Low price Dependable supply
	Likely qualifiers	Quality Range	Price Range	Range Quality
	Dominant operations performance objectives	Flexibility Quality	Speed Dependability Quality	Cost Dependability

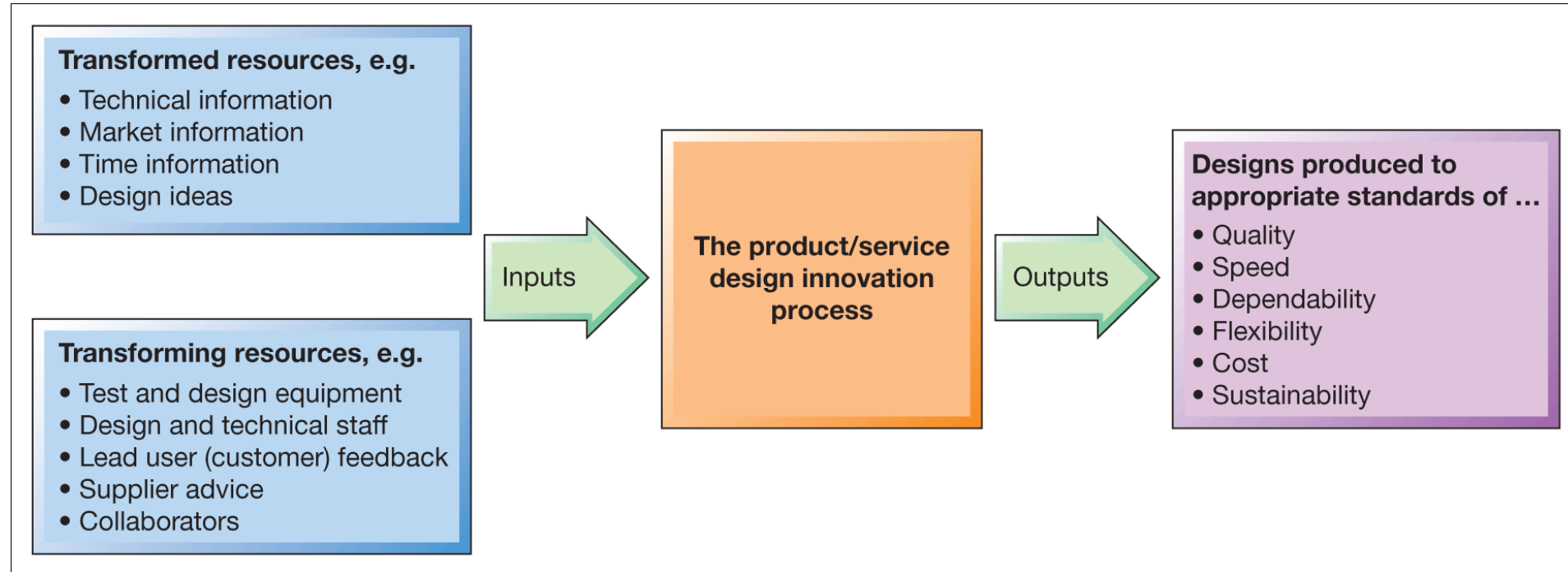
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

The S-shaped curve of innovation

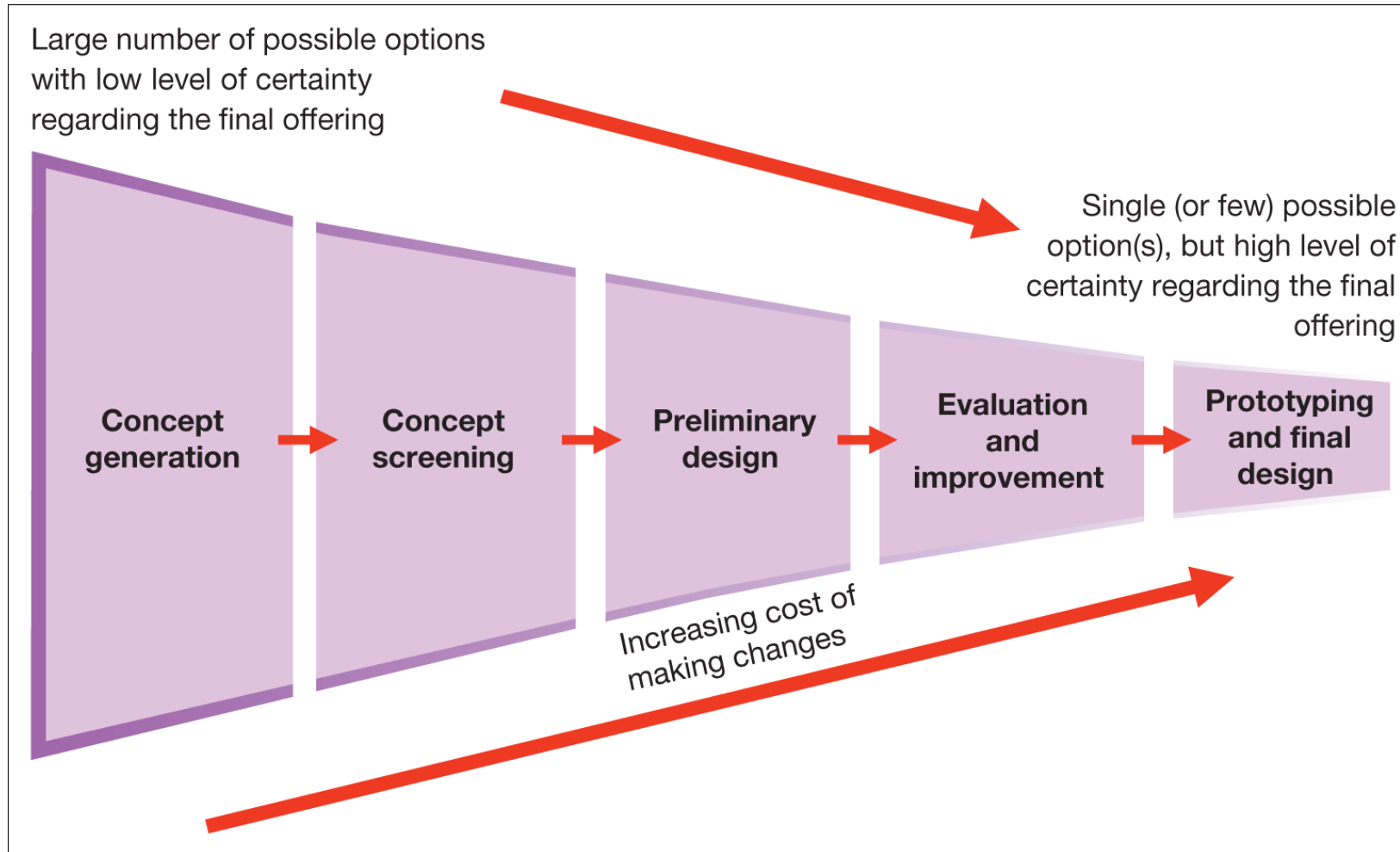


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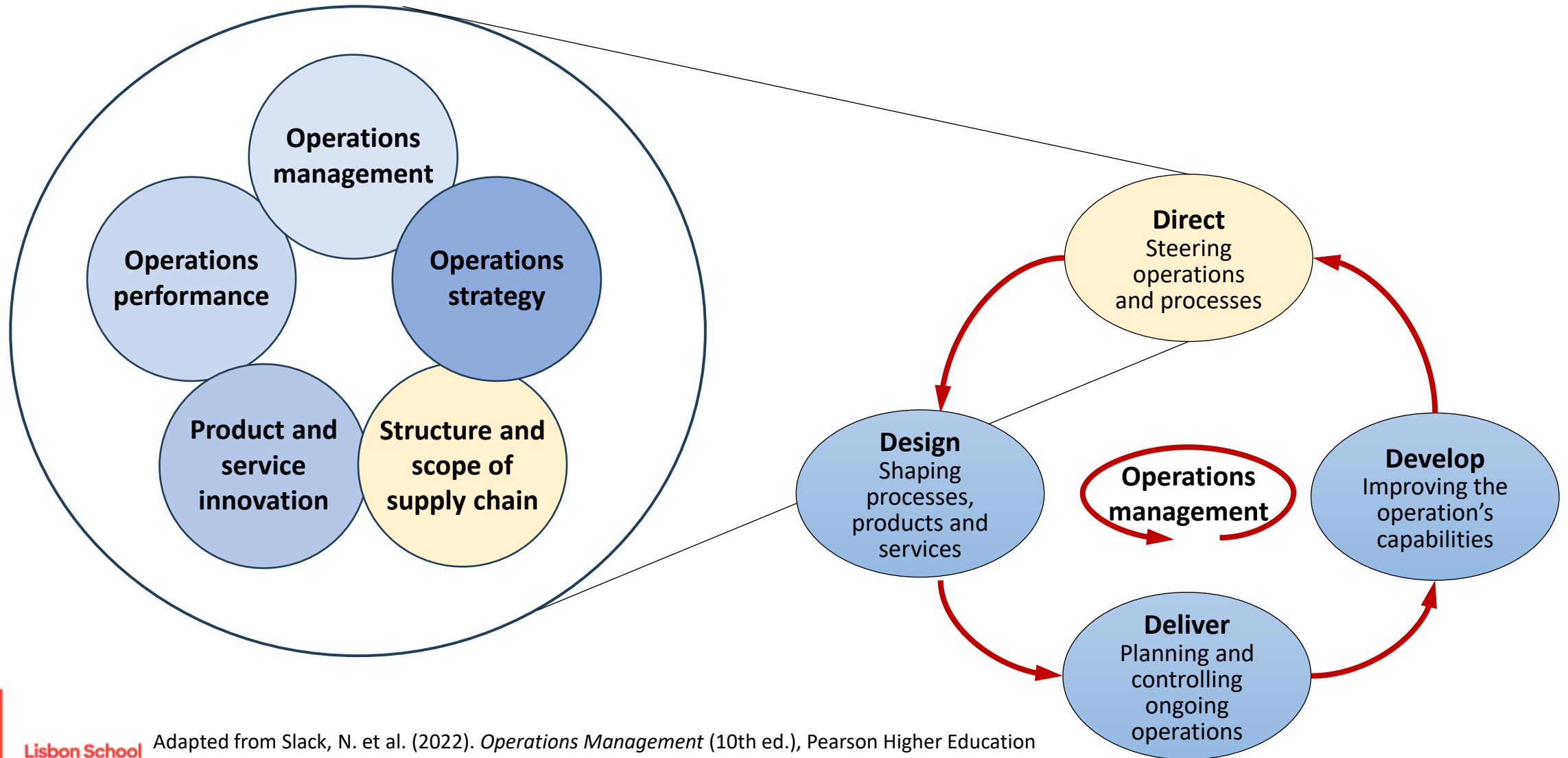
The product and service design innovation activity as a process



The stages of product/service innovation

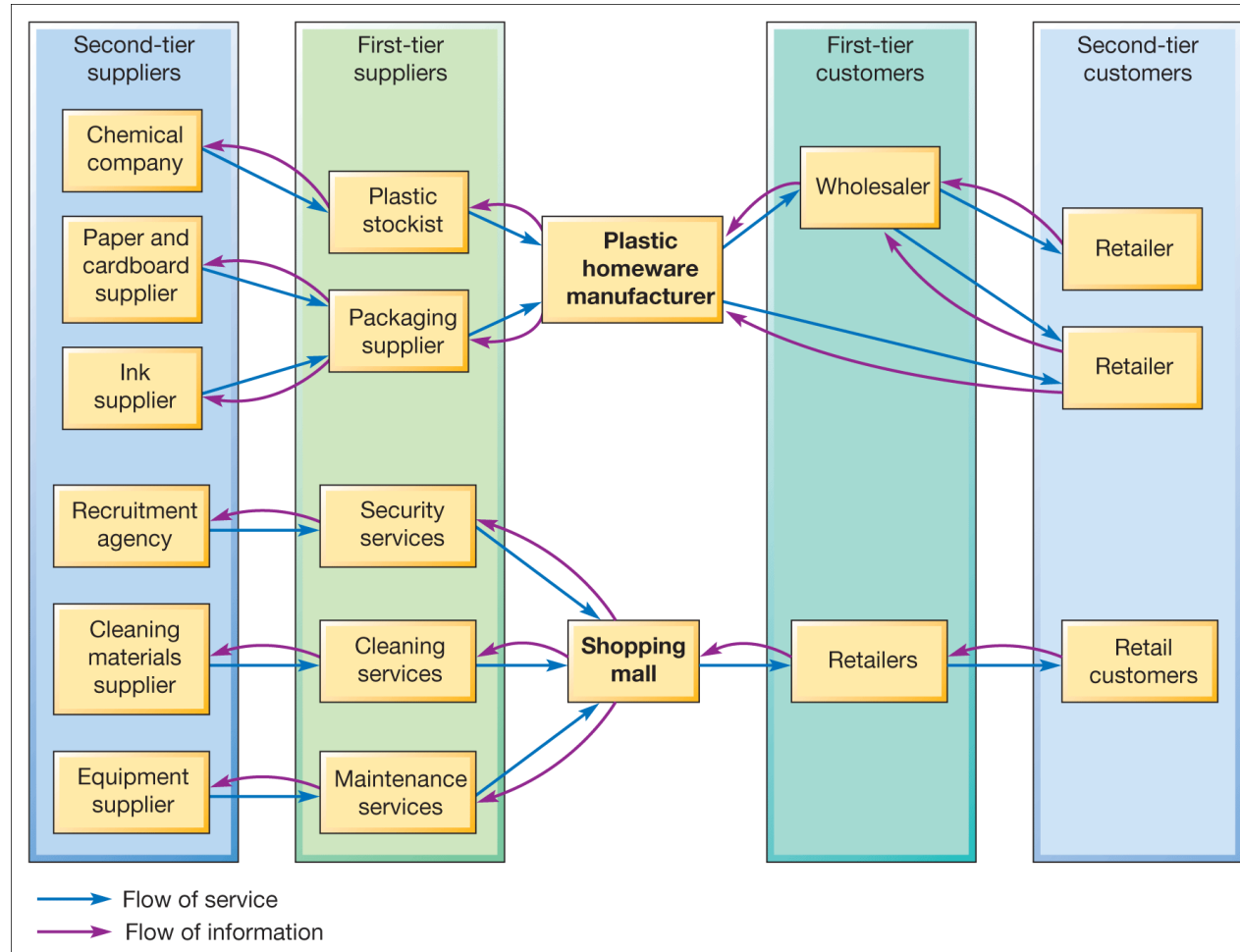


Operations management lifecycle (4D's model)



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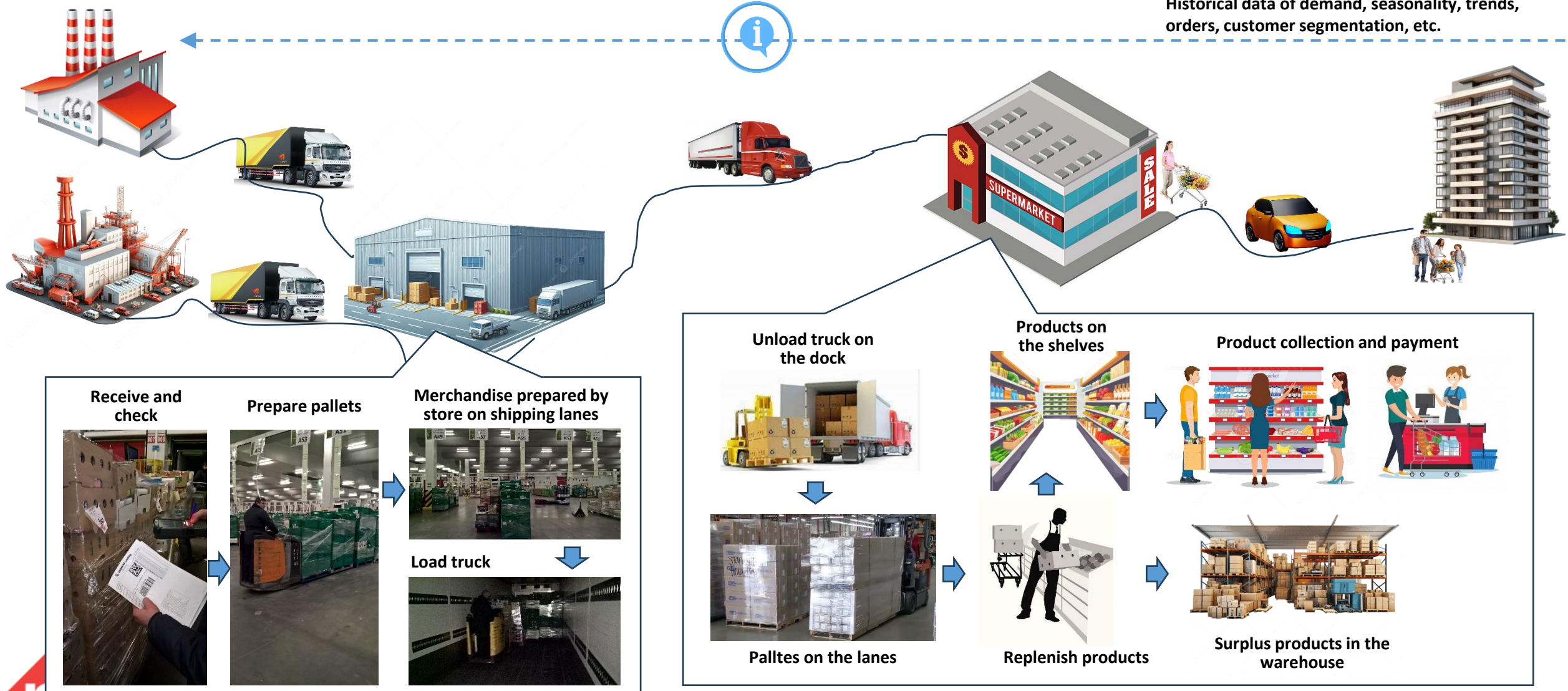
Supply network for a plastic homeware and a shopping mall



Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

Supply chain for a food retail enterprise

Historical data of demand, seasonality, trends, orders, customer segmentation, etc.



What determines the structure and scope of supply?

