



# MSO – Manufacturing and Services Operations

Master in Industrial Management, Operations and Sustainability

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

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## 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](mailto: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.

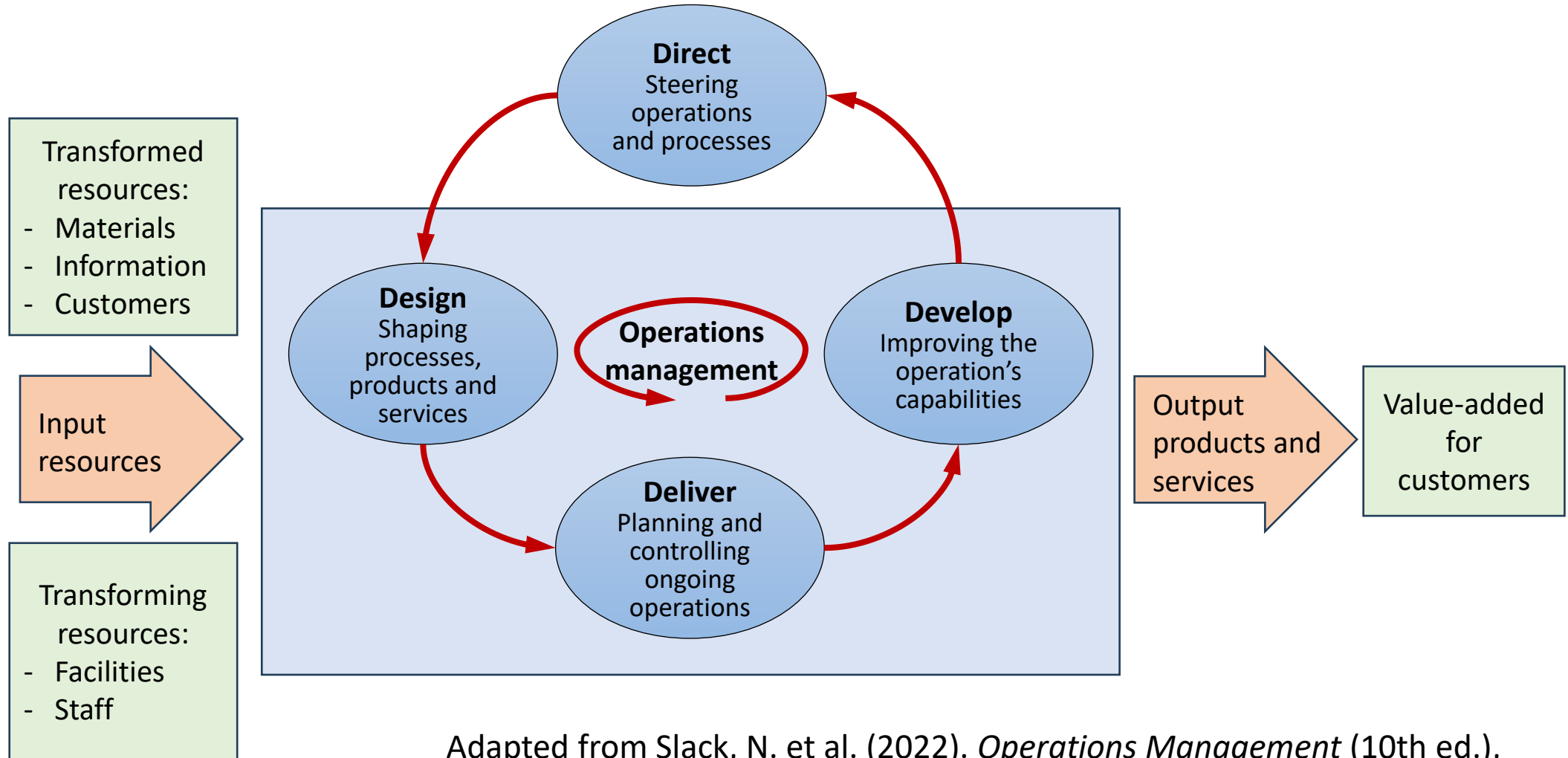
# 1. Introduction to Manufacturing and Service Operations

# Agenda

- Operations management
- Operations performance
- Operations strategy

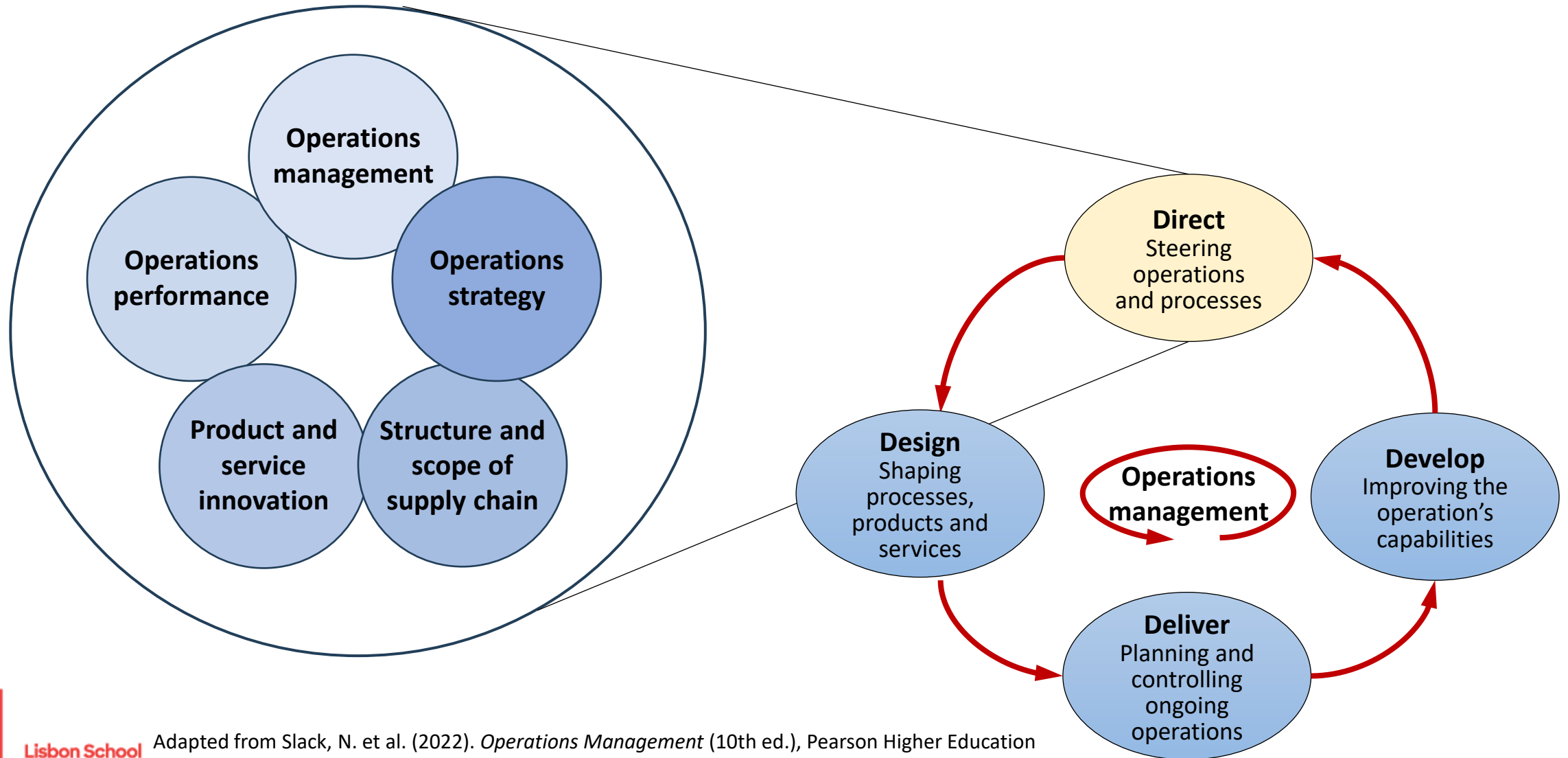


# Operations management lifecycle (4D's model)



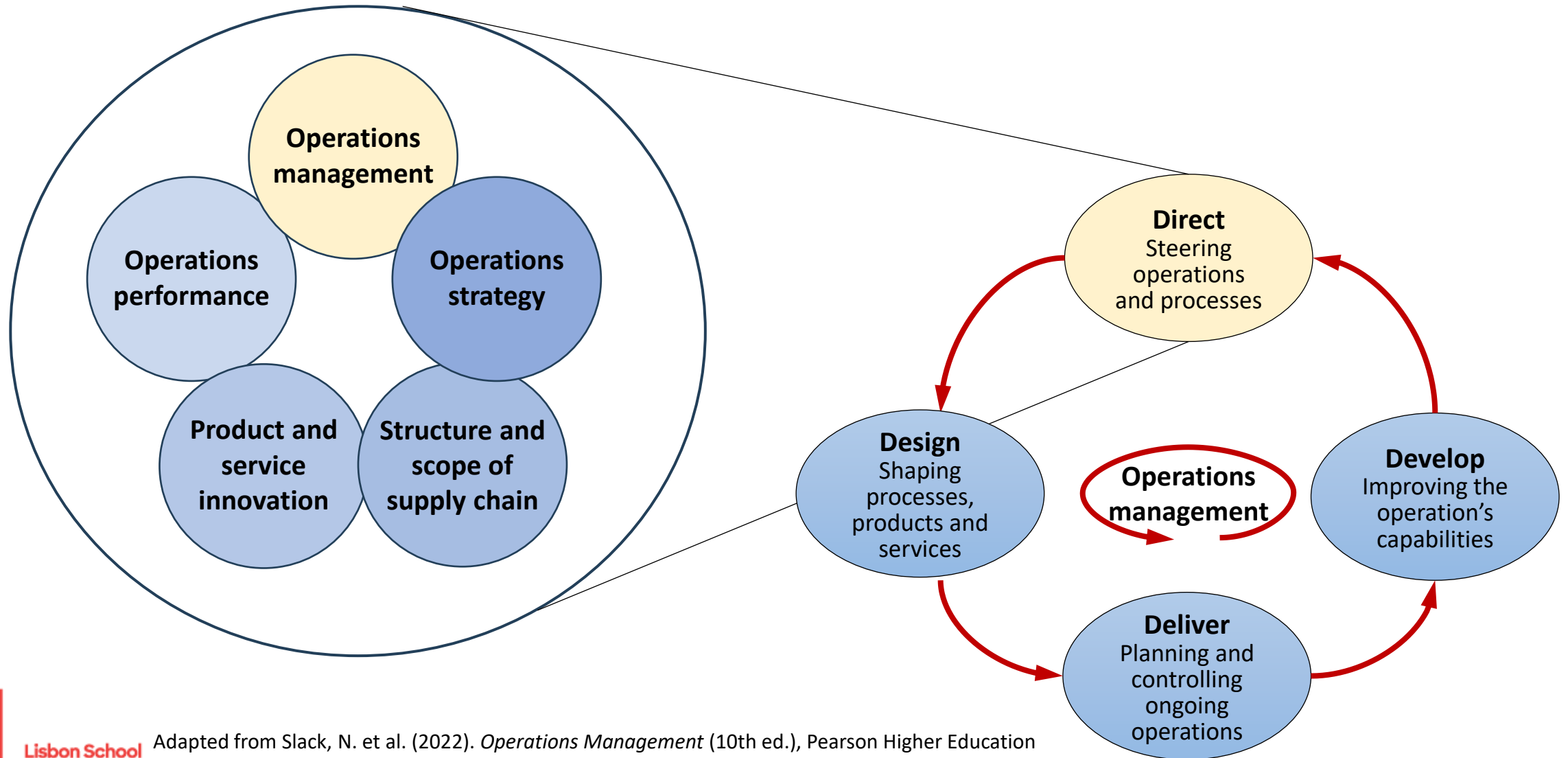
Adapted from Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

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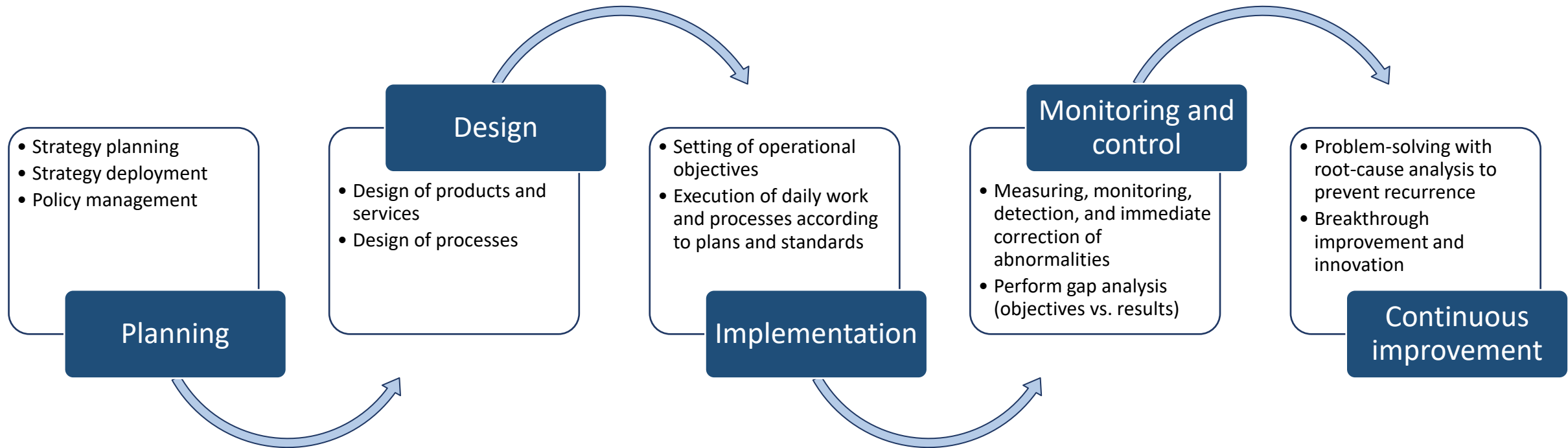
# What is “Operations Management”?

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

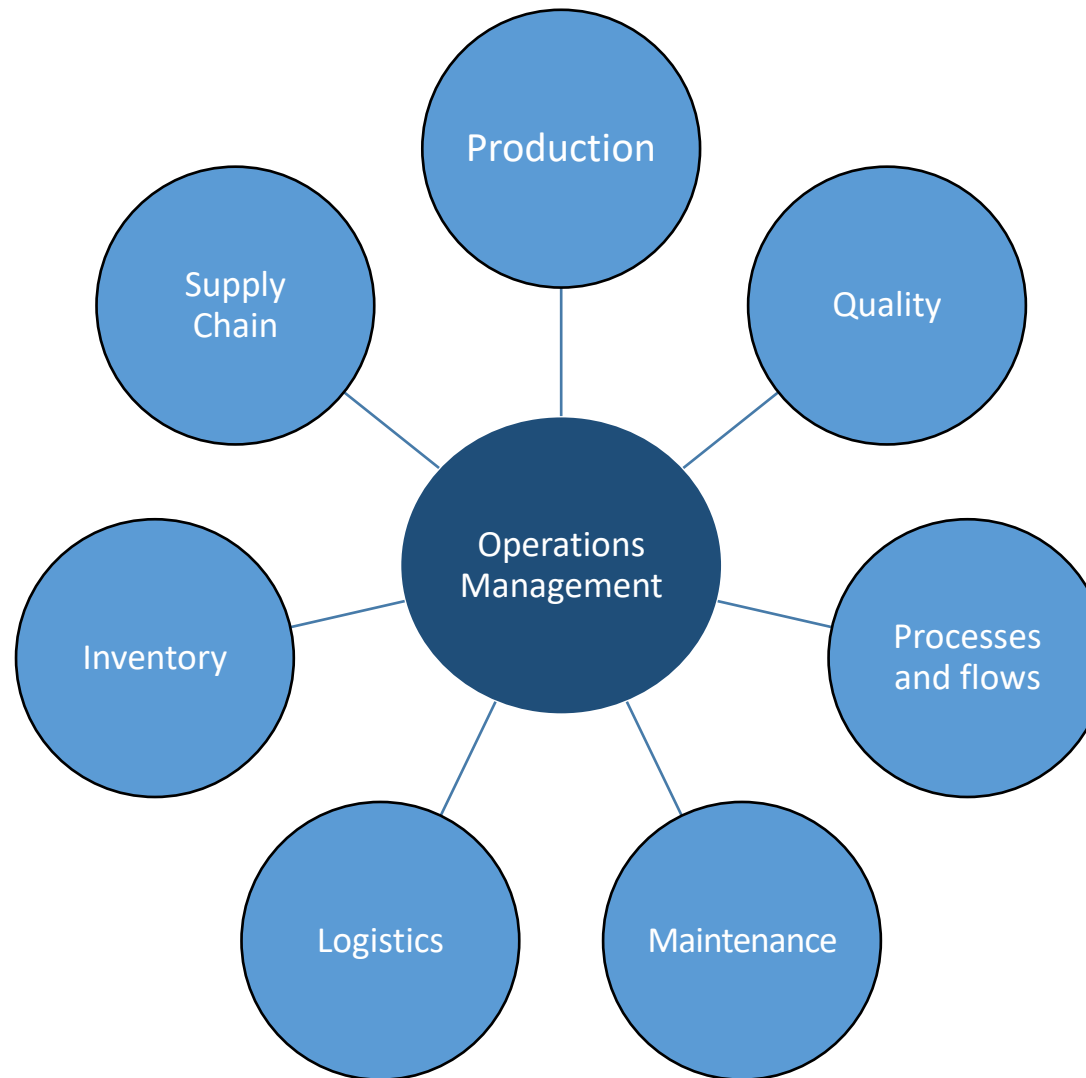
*All organizations possess an **operations function** since they all produce some form of service or product.*



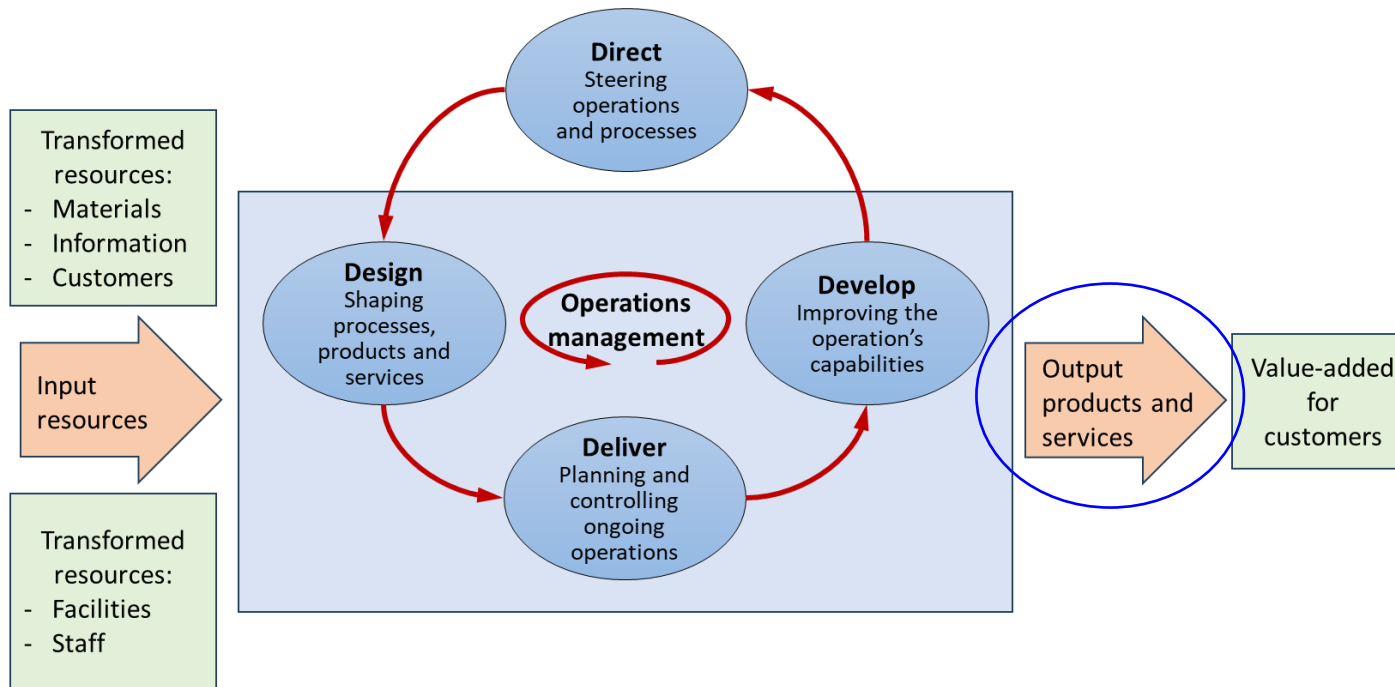
# Operations Management process



# 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..

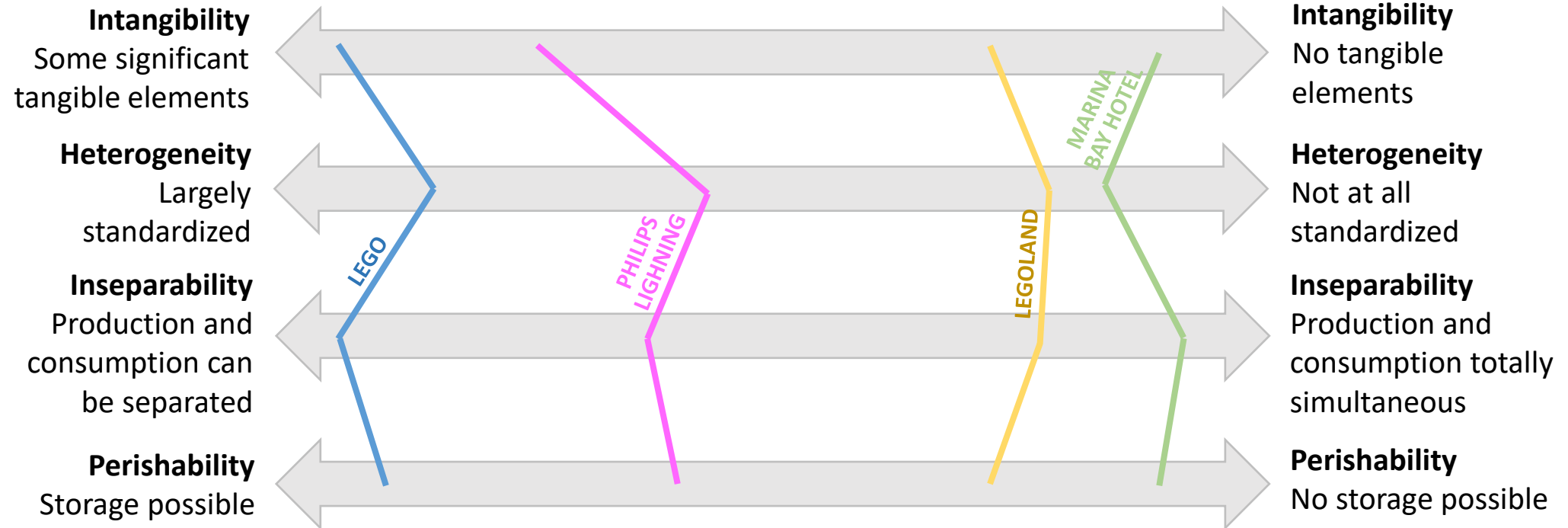


# Products and services



Pure products

Pure services

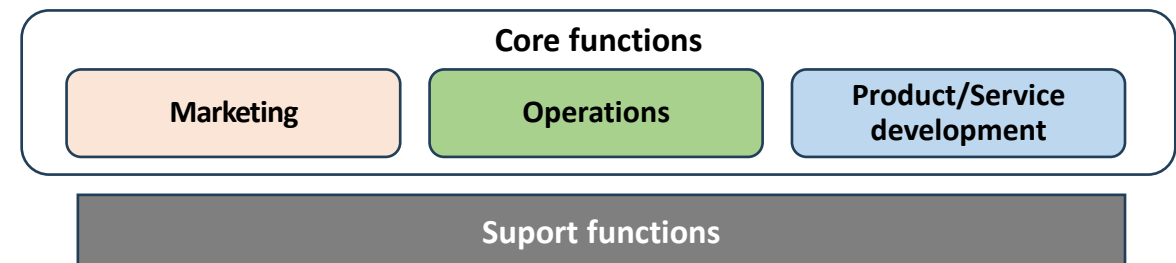
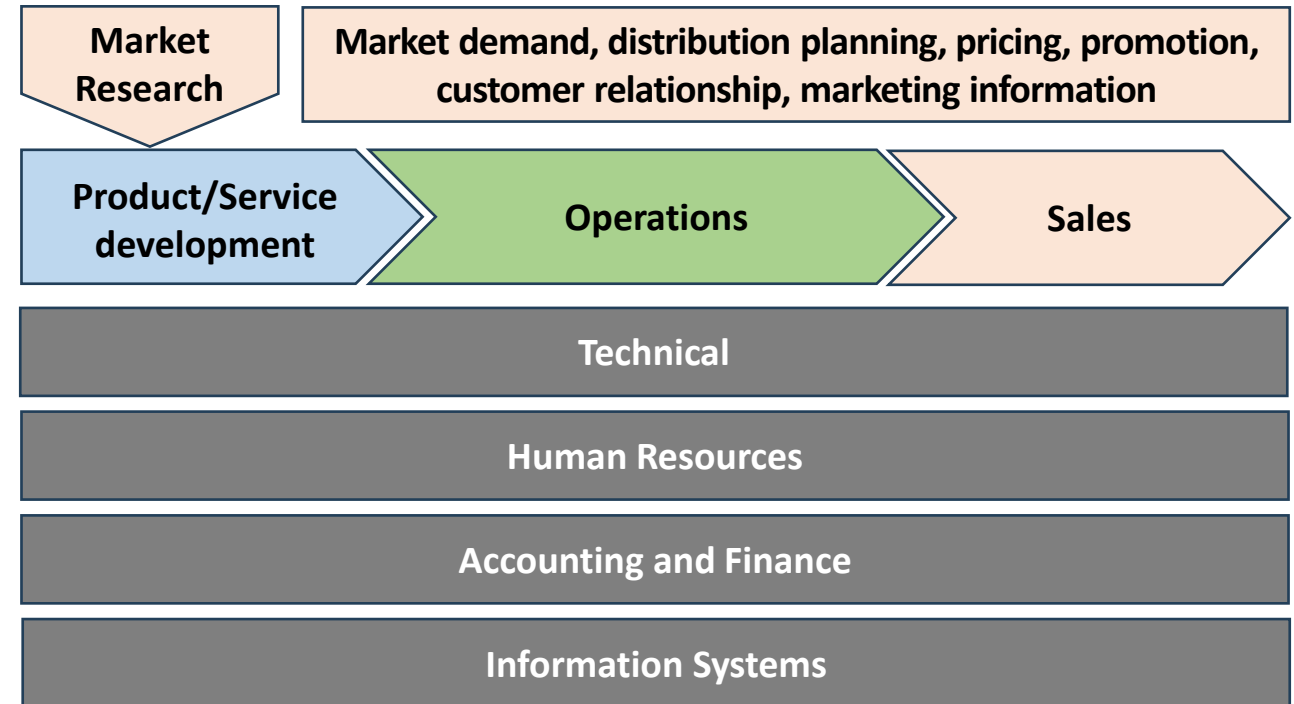




# Operations Management function

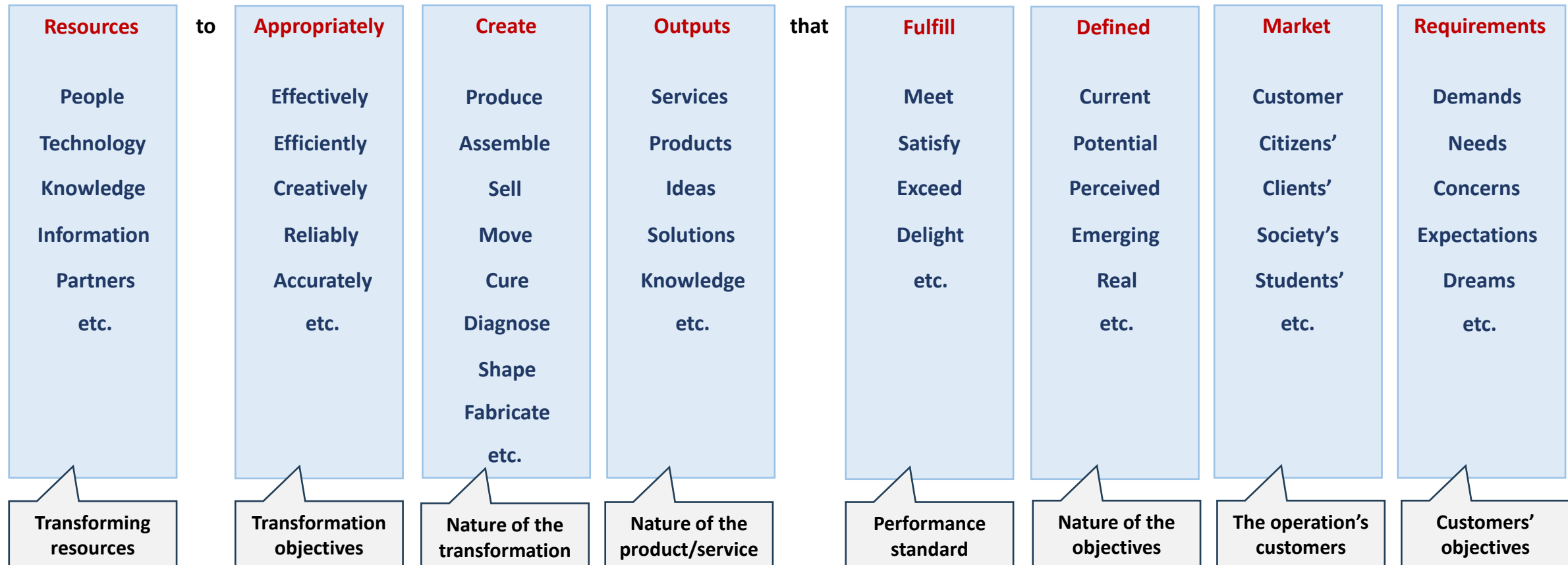
The **operations function** is **central** to the organization because **it creates and delivers services and products**, which is its reason for existing.

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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RANKINGS



MEMBER

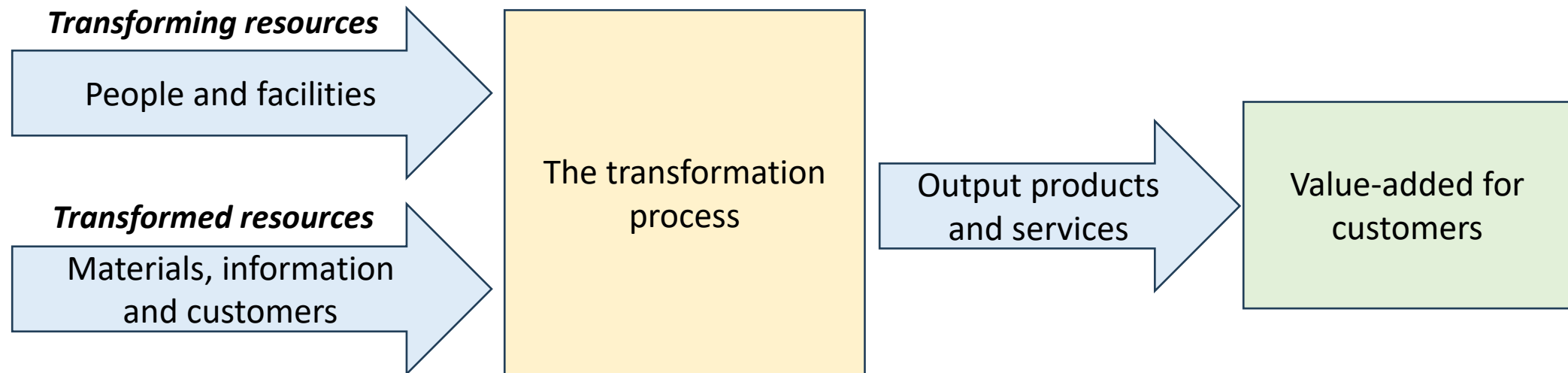


ACCREDITATIONS AND PARTNERSHIPS

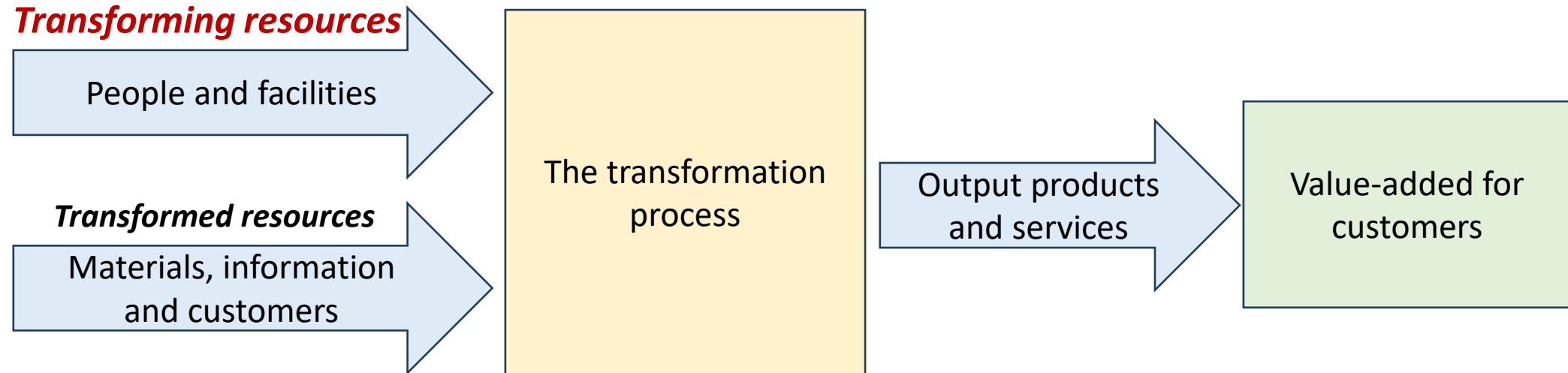


# The input–transformation–output process

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

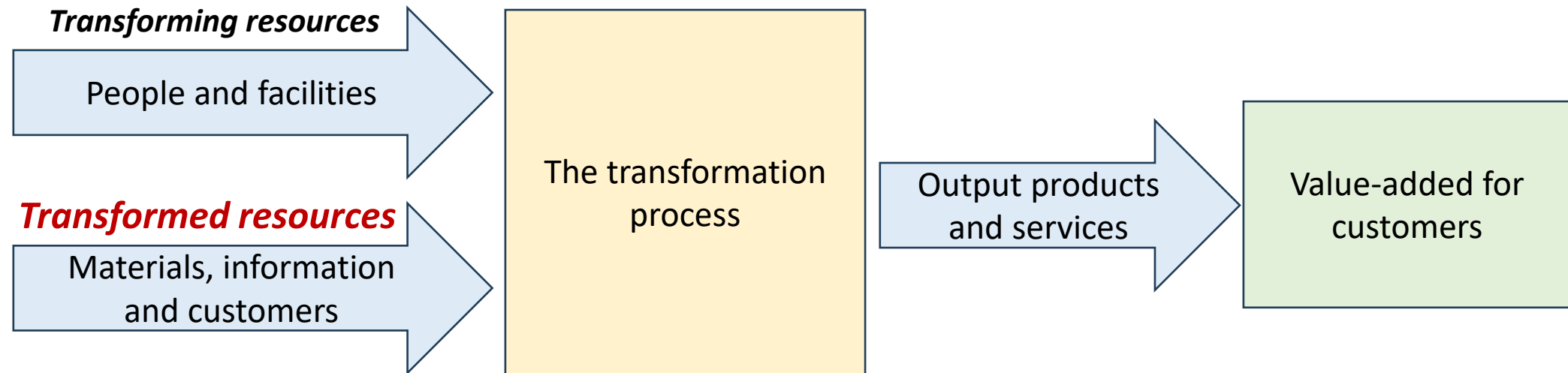


# The input–transformation–output process



***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

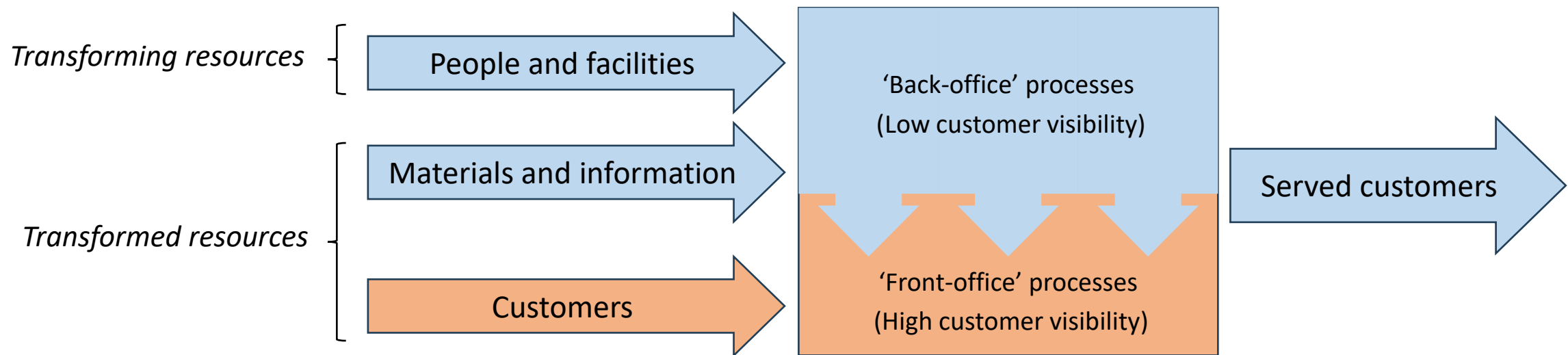
## *Transformed resources*

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

# The input–transformation–output process

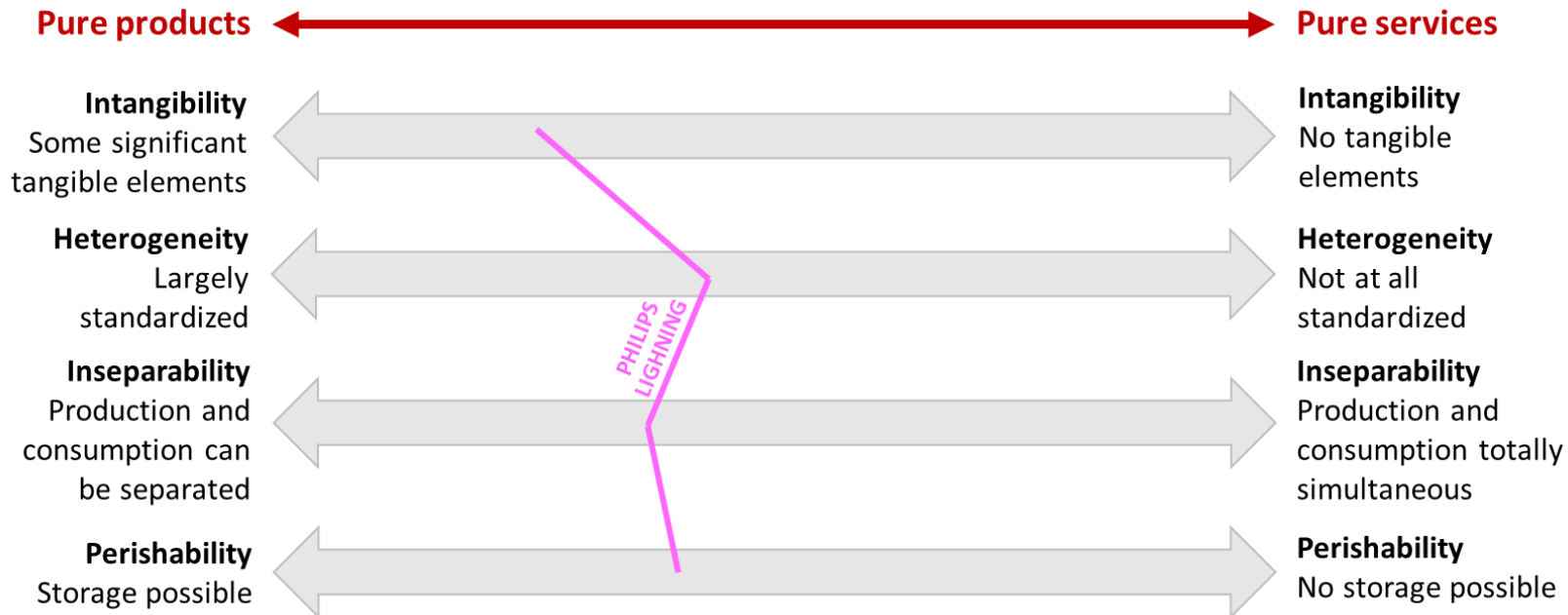
## *When transformed resources are customers*

*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.



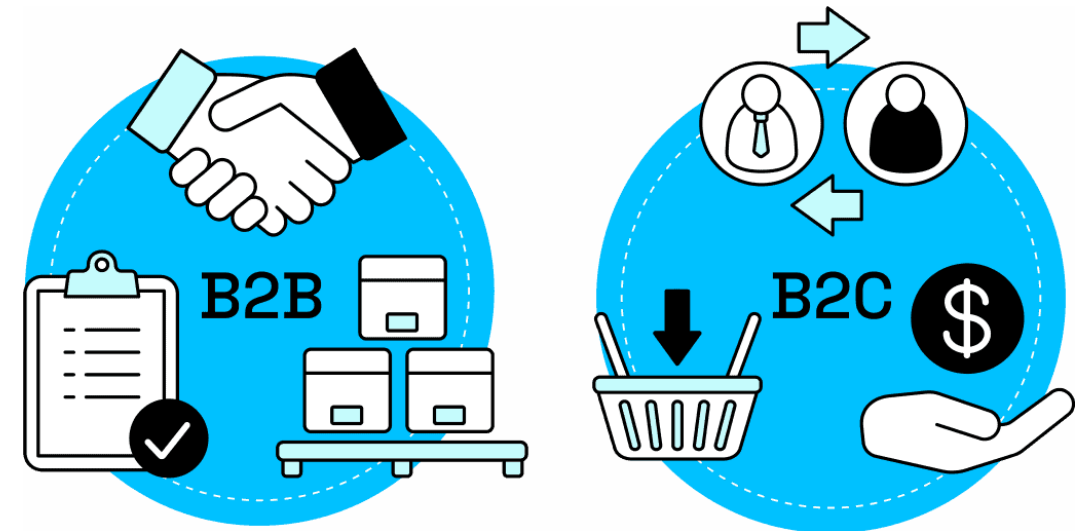
*It involves (often manufacturing) firms developing the capabilities they need to provide services and solutions that supplement their traditional product offerings (e.g. customer support, maintenance, training, online services, after sales, ...).*



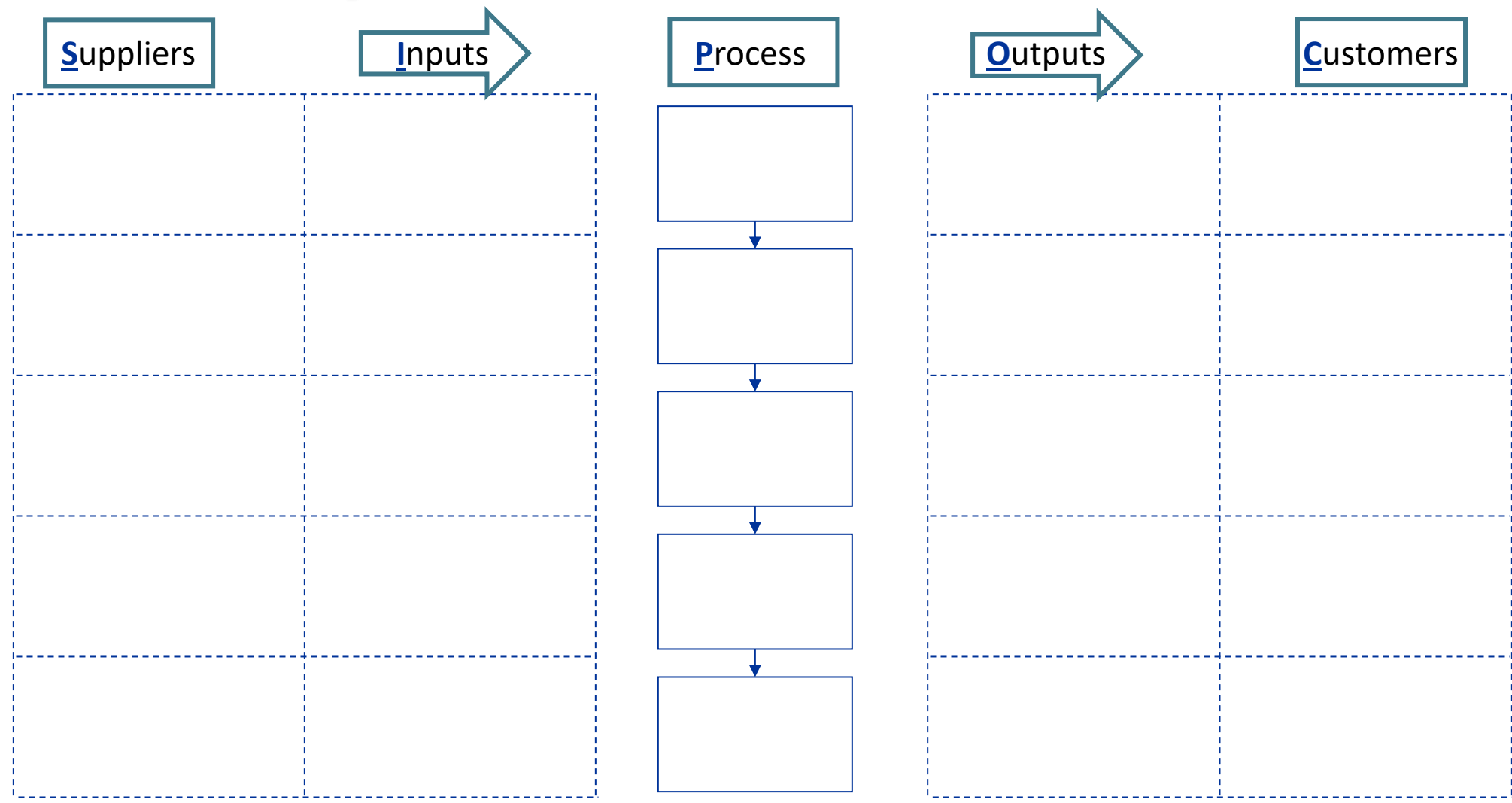
# B2B and B2C operations

**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



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♦ RANKINGS



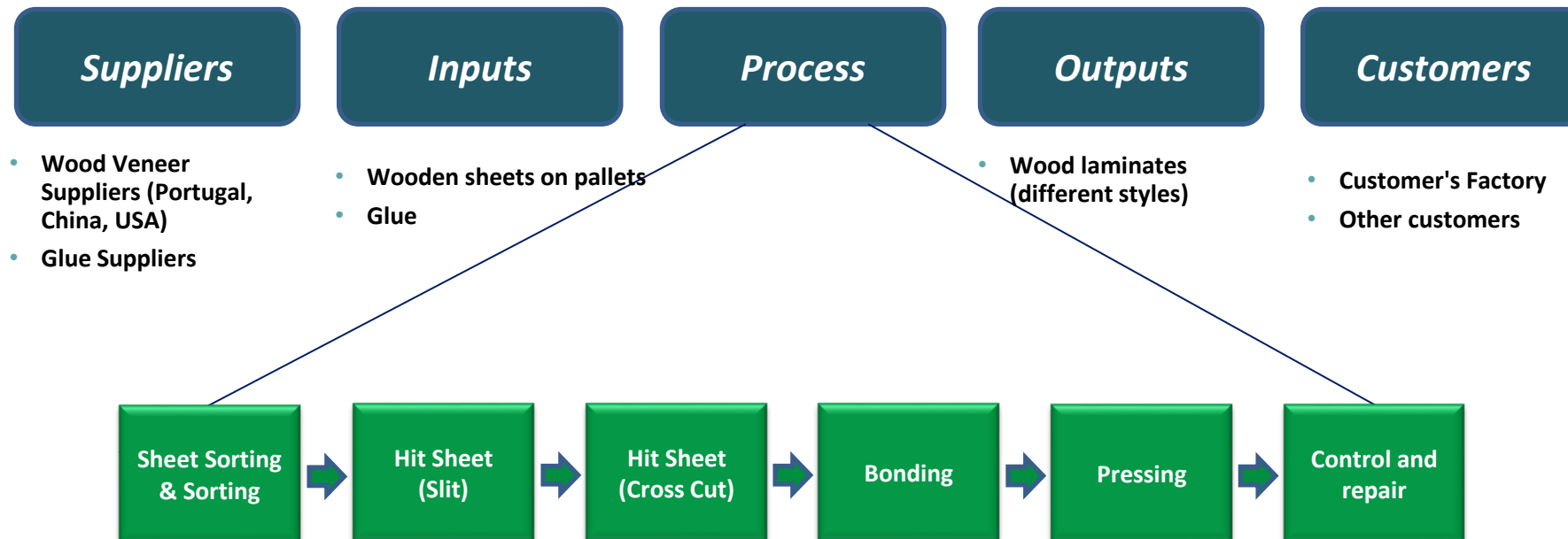
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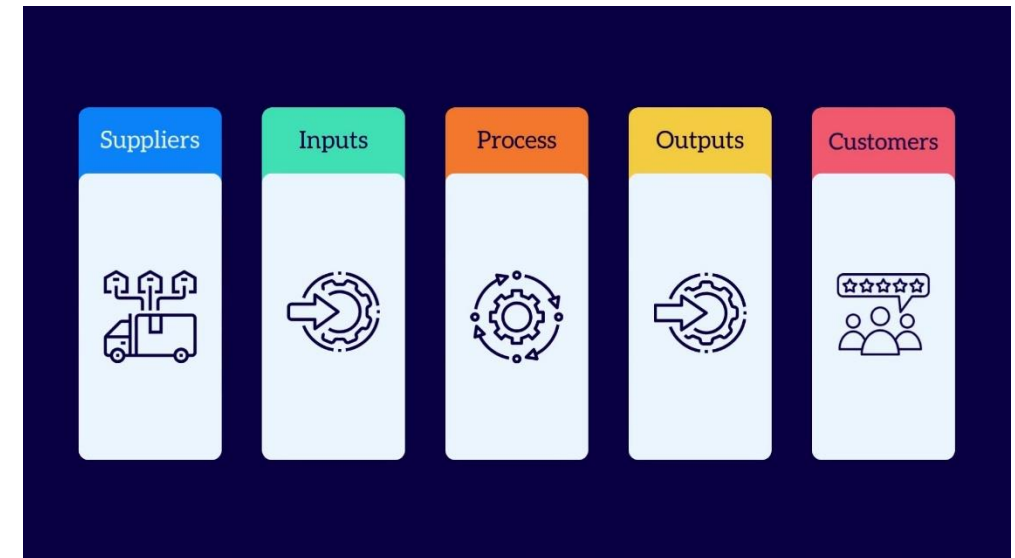


# SIPOC analysis

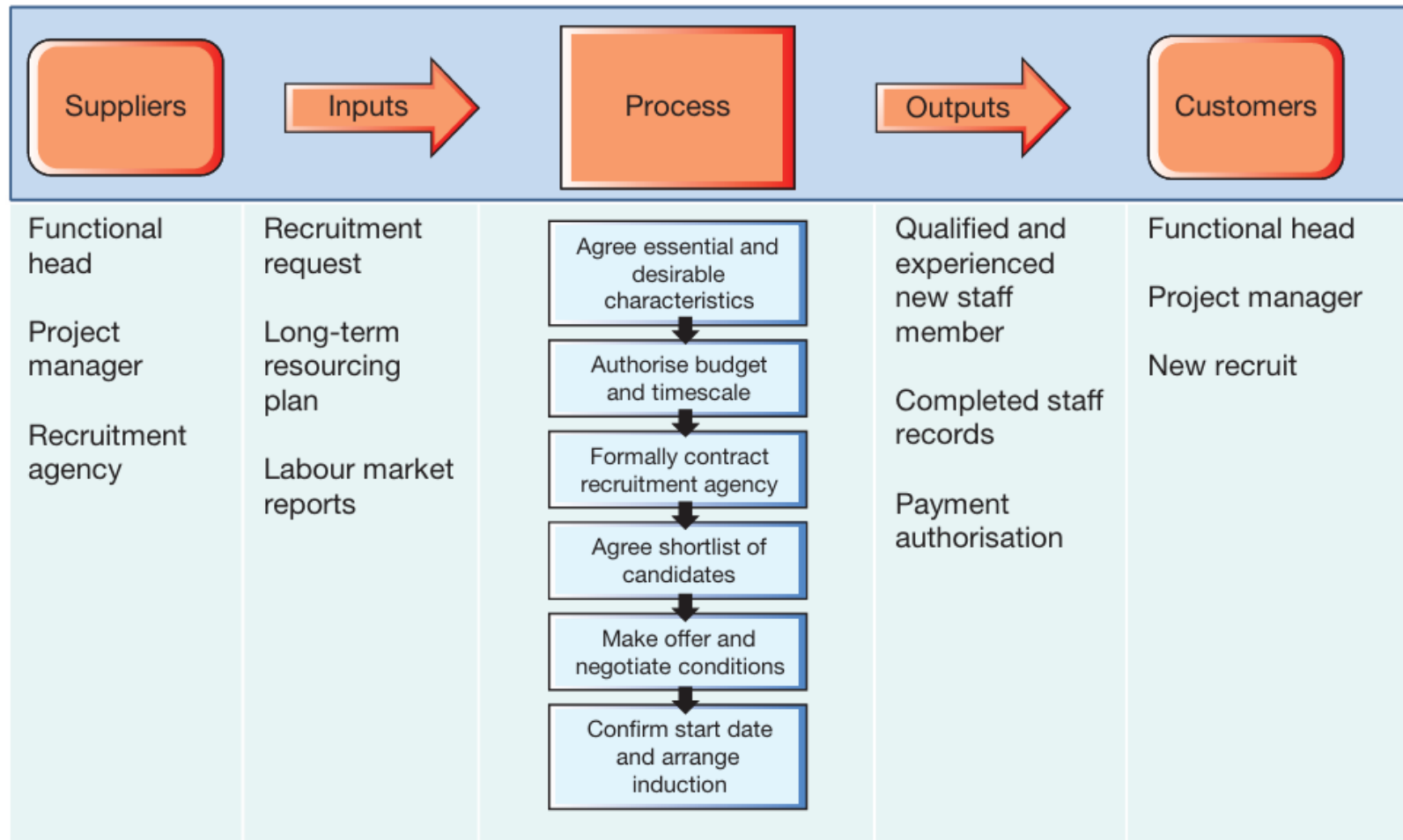


# SIPOC analysis

*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.*

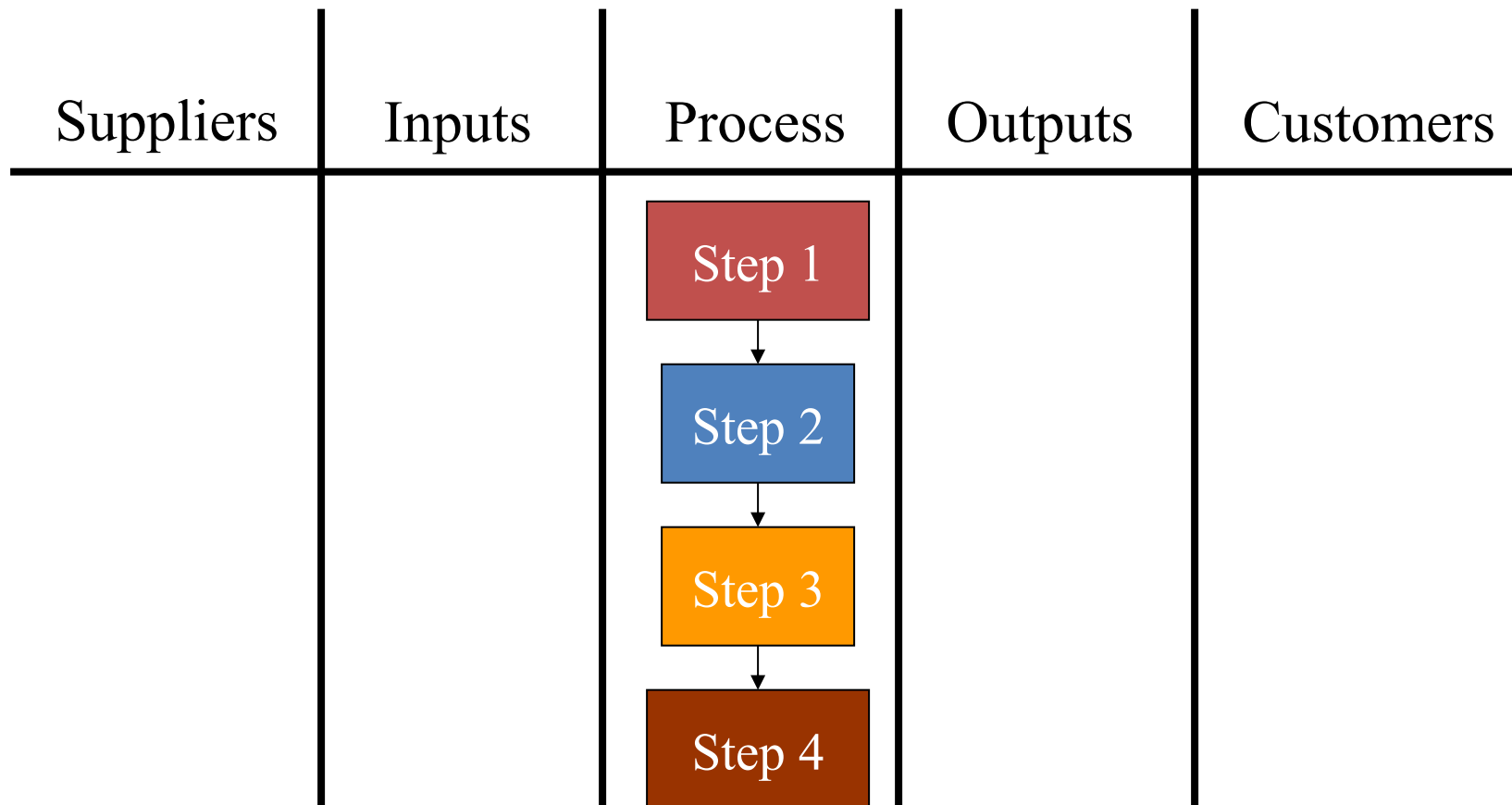


# SIPOC analysis

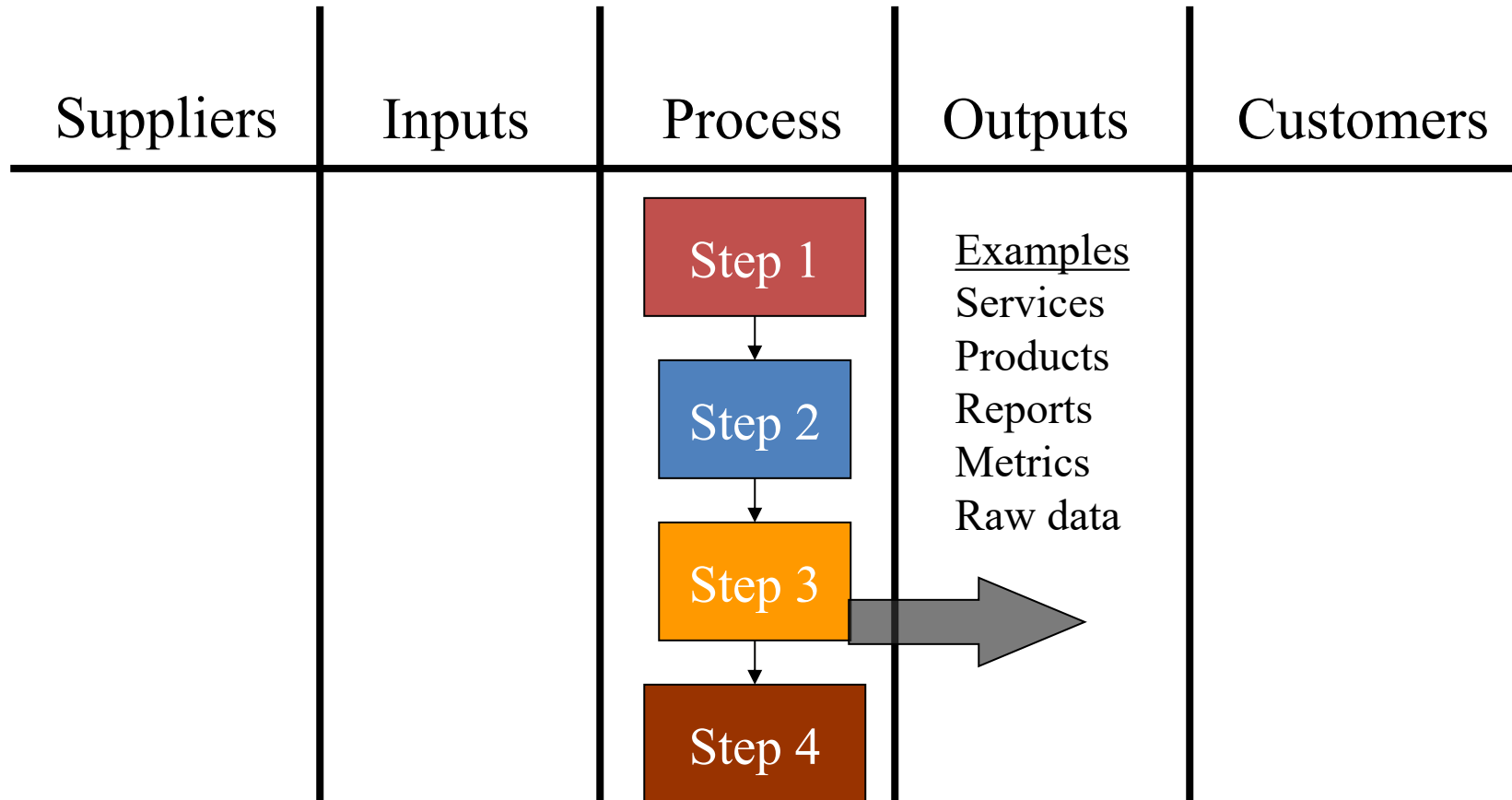


Source: Slack, N. et al. (2022). *Operations Management* (10th ed.), Pearson Higher Education

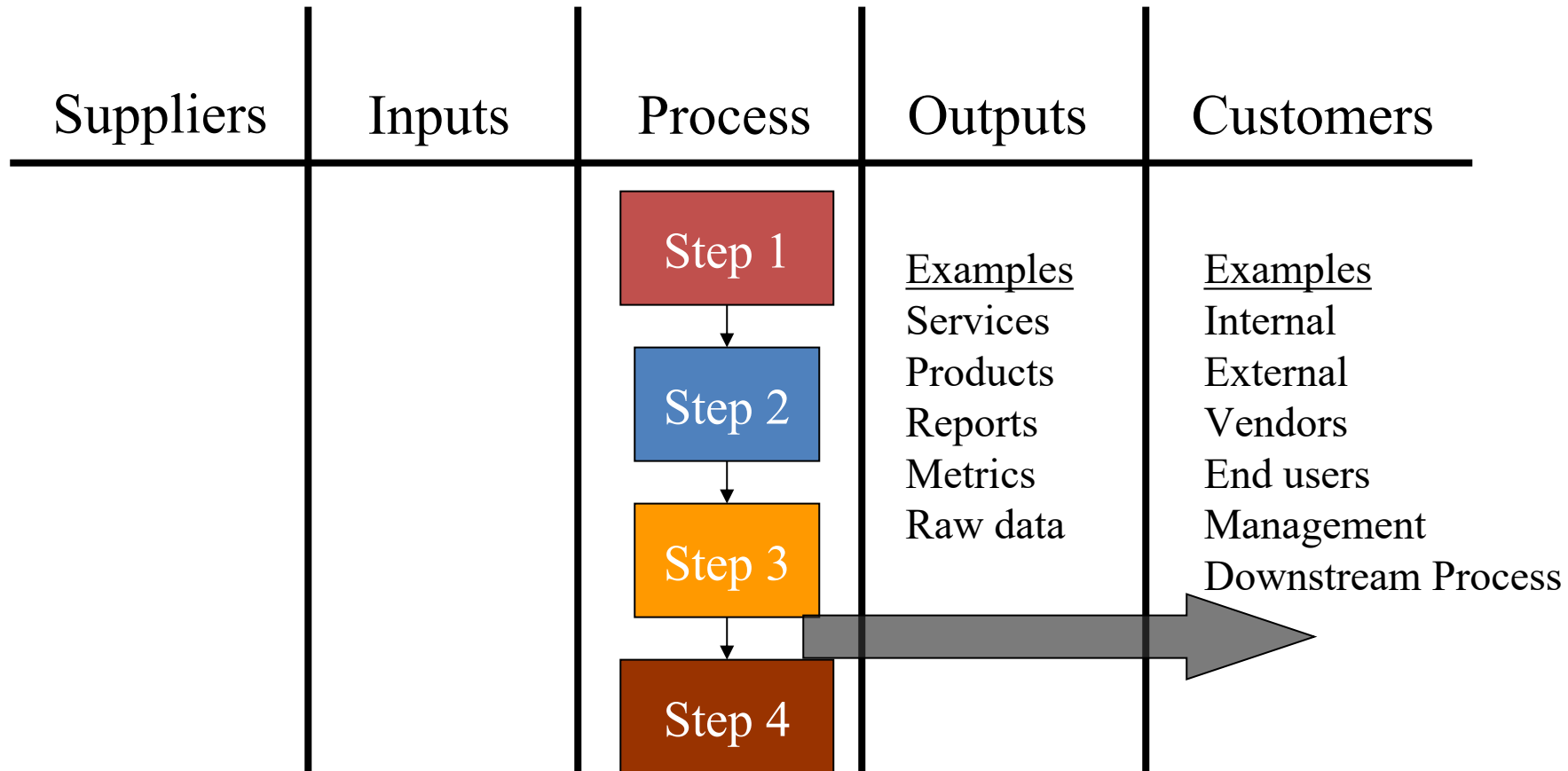
# SIPOC analysis



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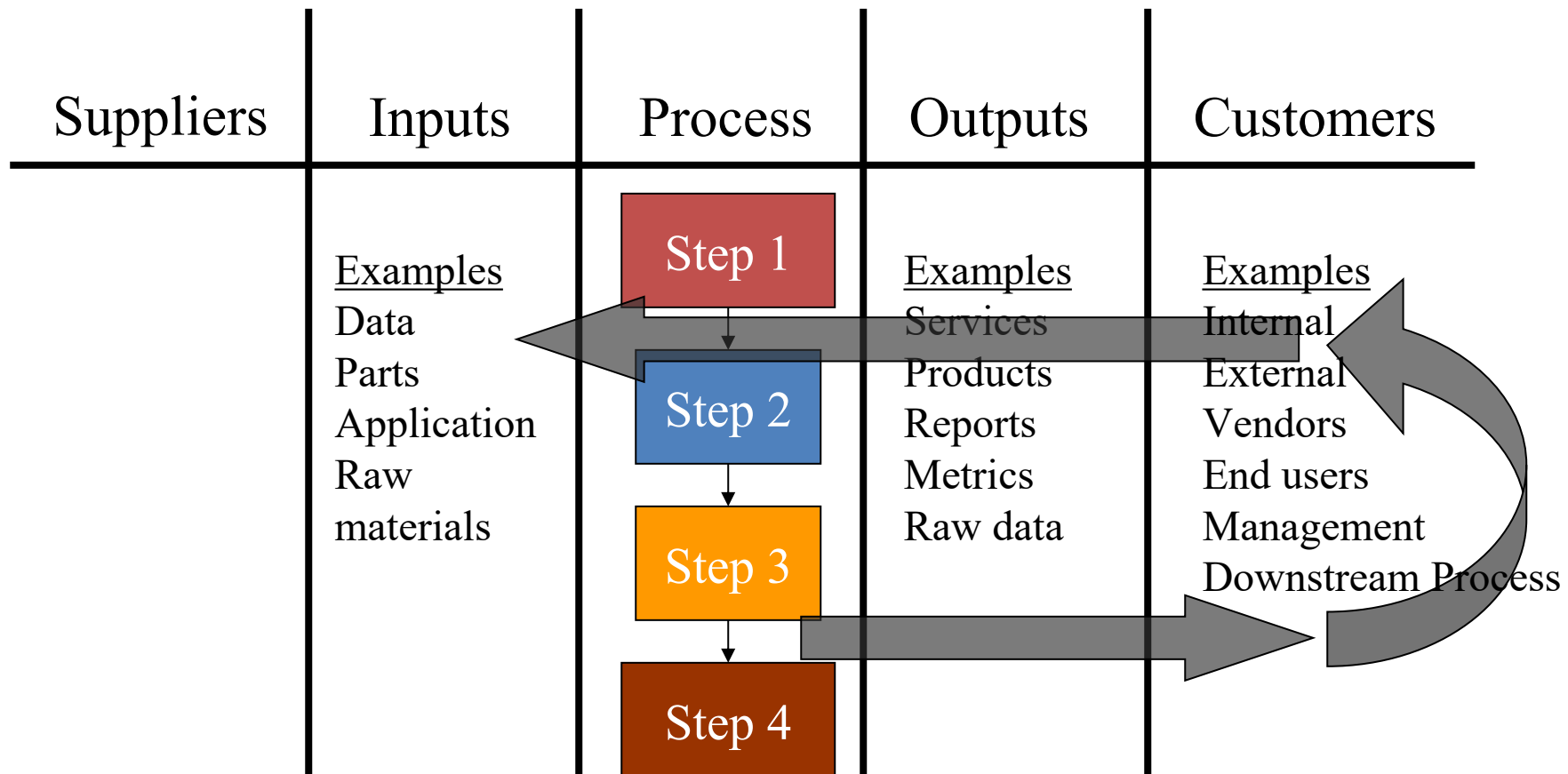


# SIPOC analysis

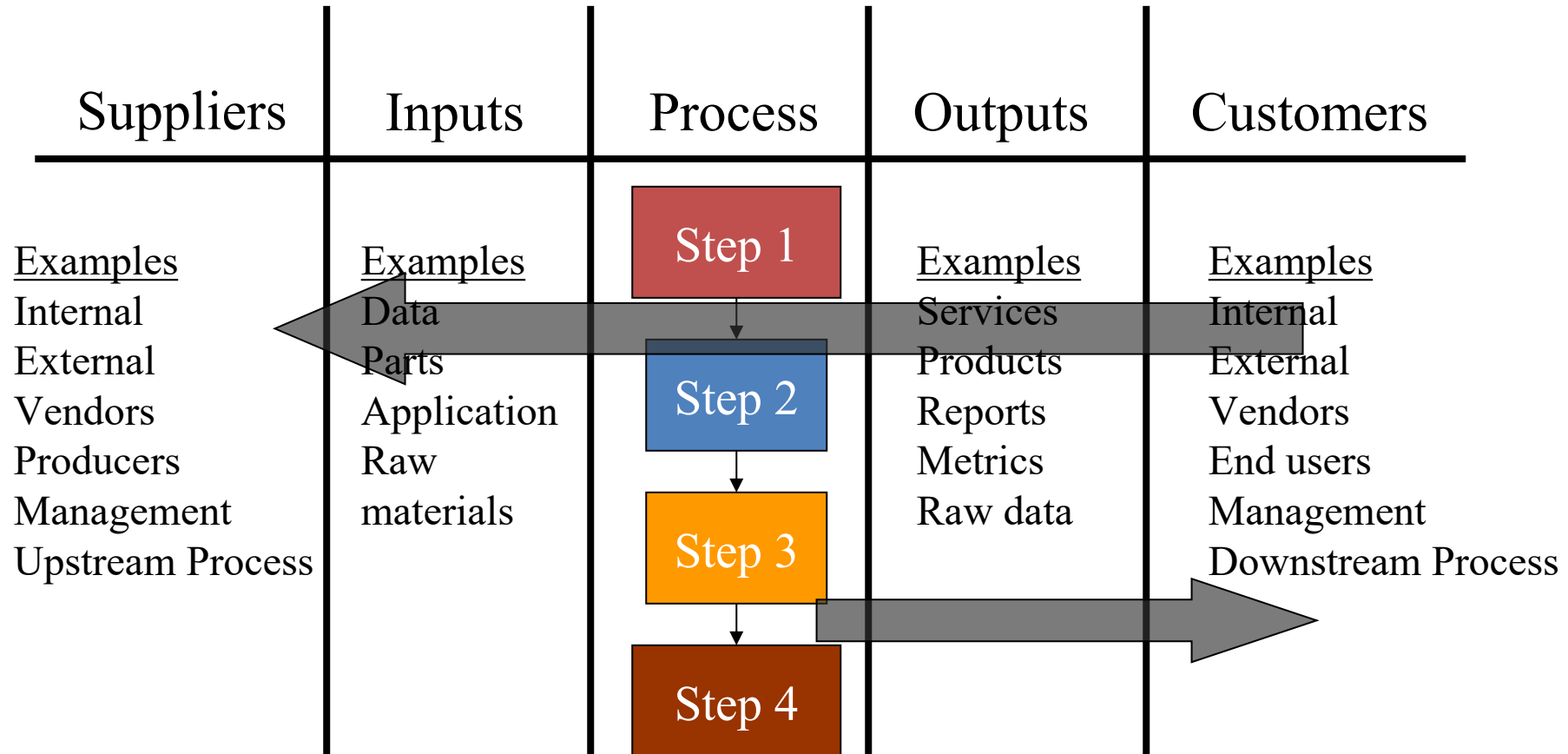




# SIPOC analysis



# SIPOC analysis



# Process hierarchy

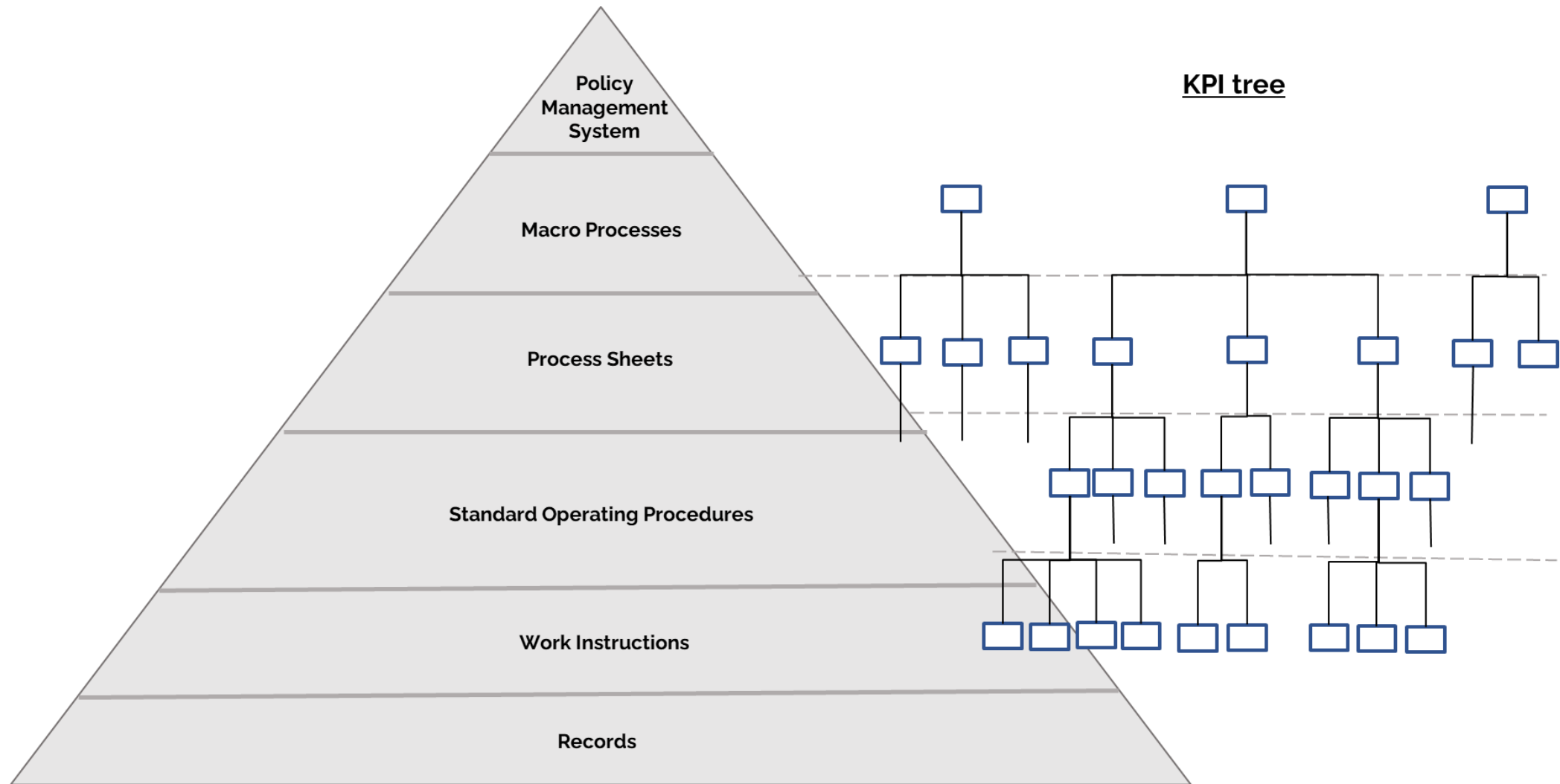
Suppliers	Inputs	Process	Outputs	Customers
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2 - Entrada 3	Actividade 1	- Saída 1	- Cliente 1
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2 - Entrada 3 - Entrada 4	Actividade 2	- Saída 1 - Saída 2	- Cliente 1 - Cliente 2
- Fornecedor 1 - Fornecedor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

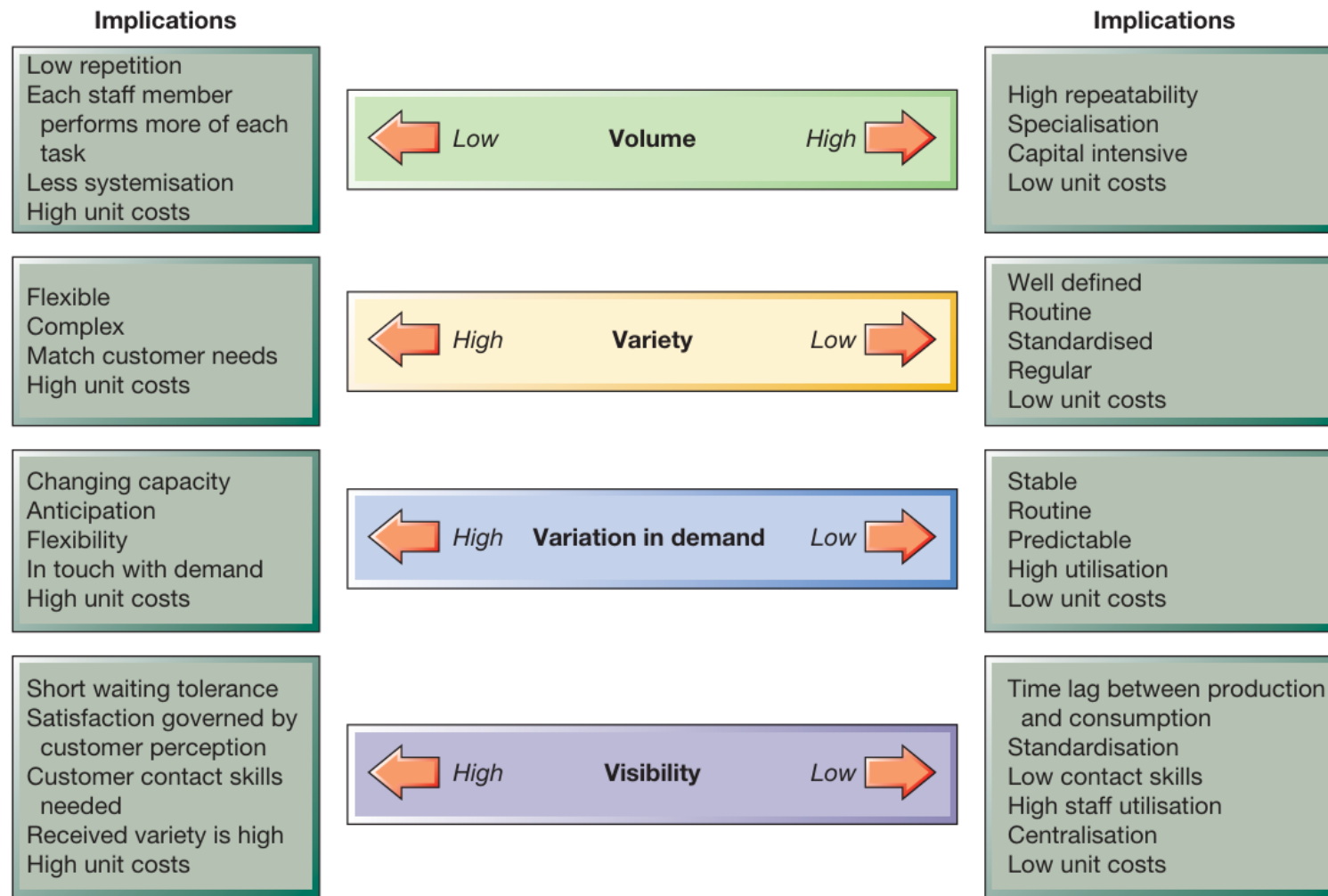
Suppliers	Inputs	Process	Outputs	Customers
- Fornecedor 1 - Fornecedor 2	- Entrada 1 - Entrada 2 - Entrada 3	Actividade 3.3.1	- Saída 1	- Cliente 1
- Fornecedor 1	- Entrada 1 - Entrada 2 - Entrada 3 - Entrada 4	Actividade 3.3.2	- Saída 1 - Saída 2	- Cliente 1 - Cliente 2
- Fornecedor 1 - Fornecedor 2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



# The four Vs of operations



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

# References:

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