Business criterias for selection of 3D-printed components

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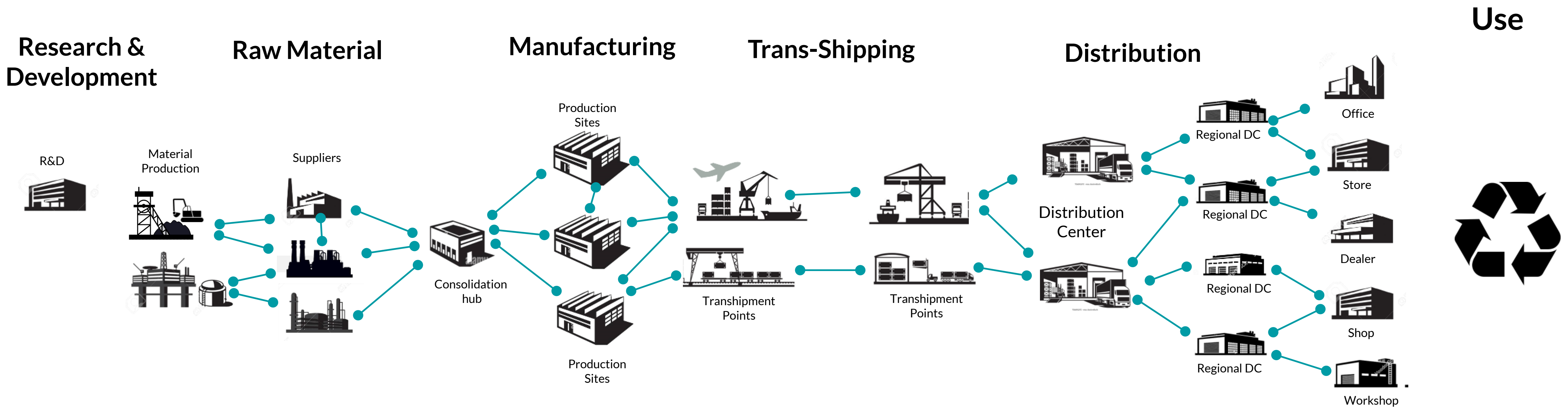
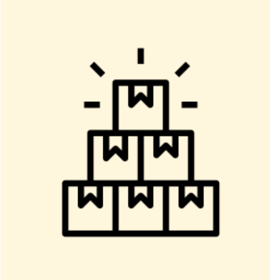
The global supply chain



The Challenges of Logistics

Right product



Right quantity

Right place

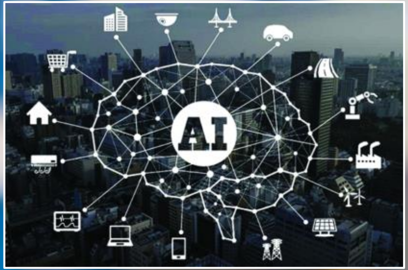
Right time

Digitalisation of Transportation

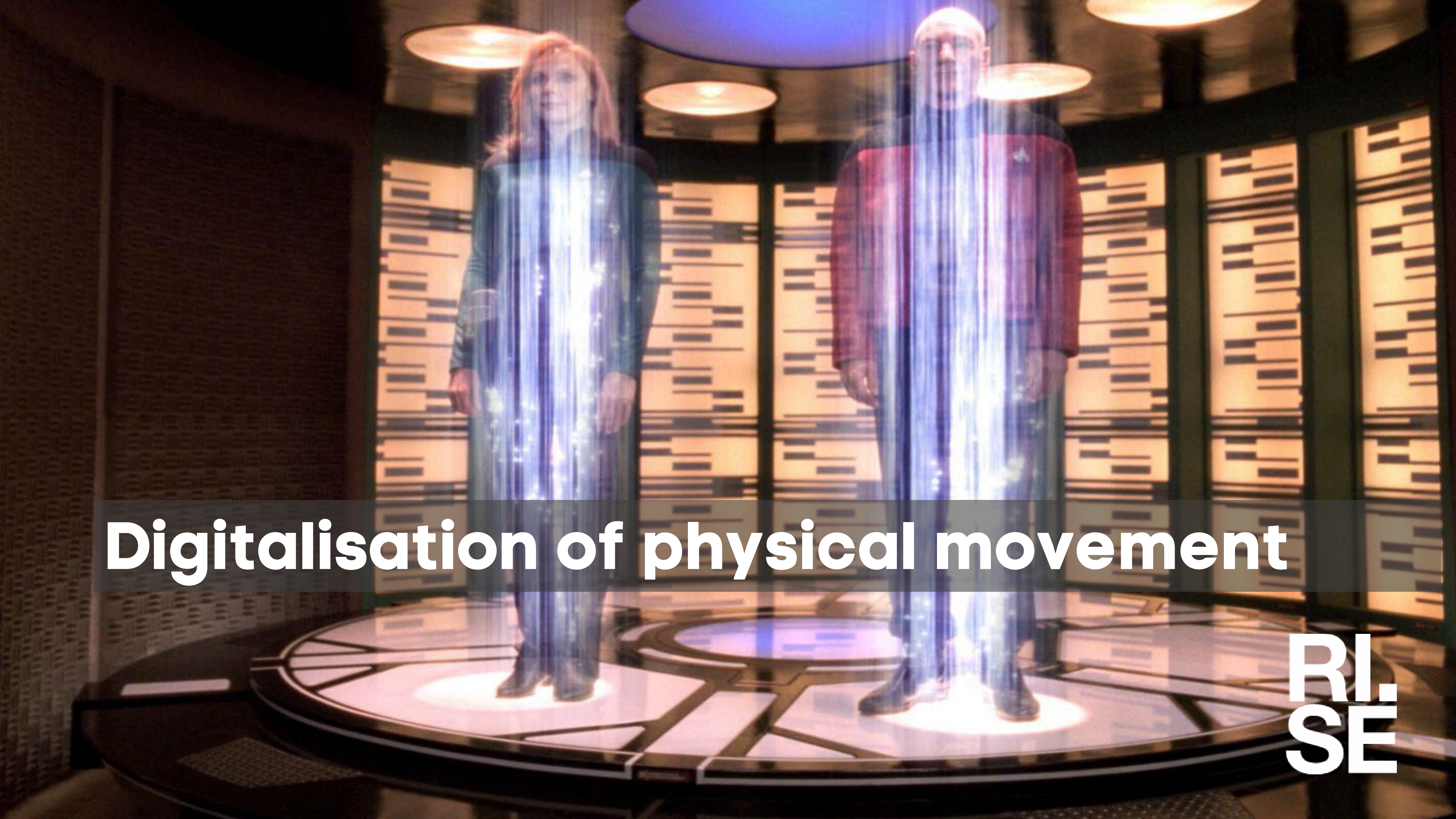
Control Towers

Connectivity

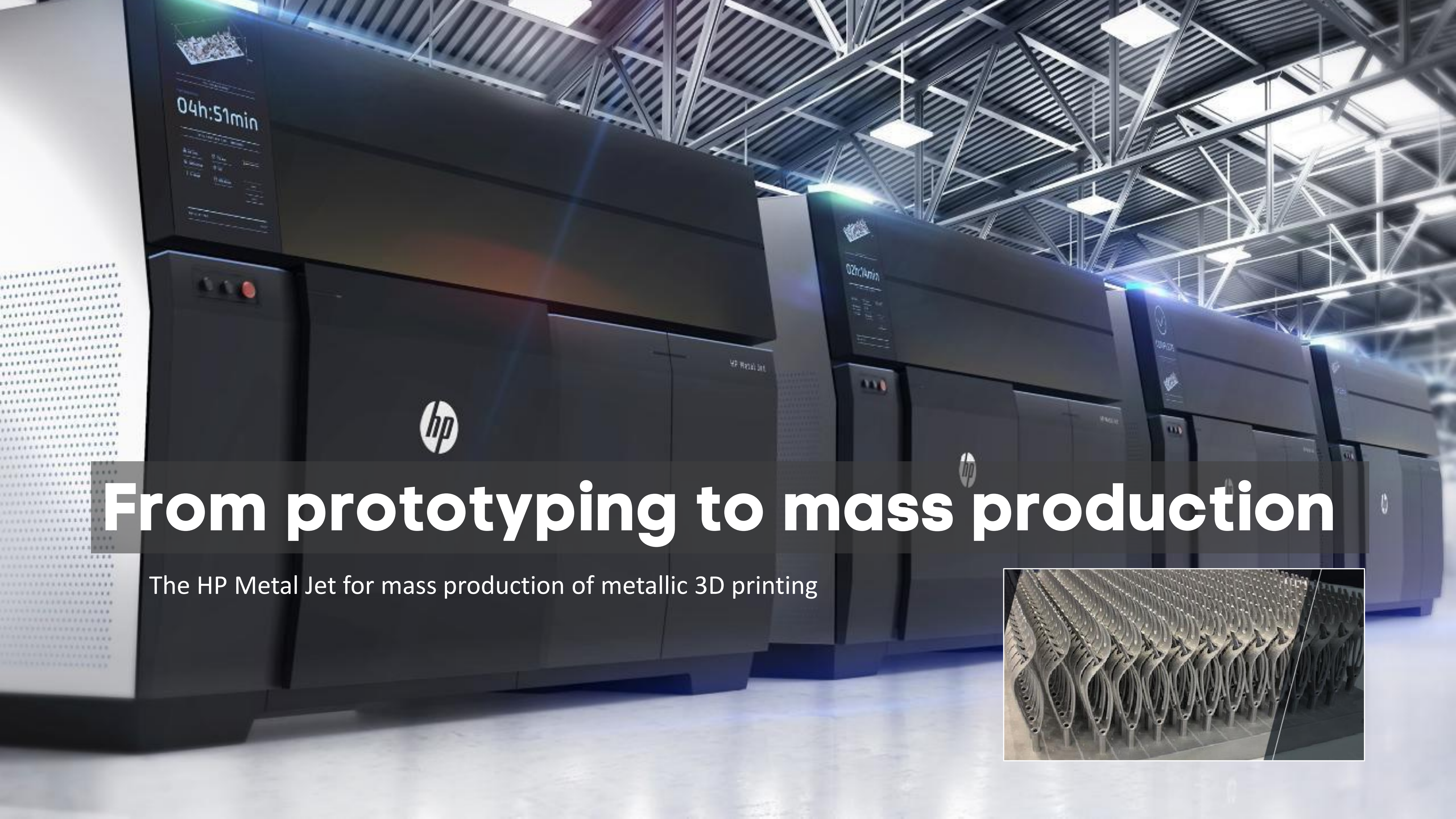
Artificial Intelligence



Autonomous


Digitalisation of physical movement

Postal logistics digital transformation

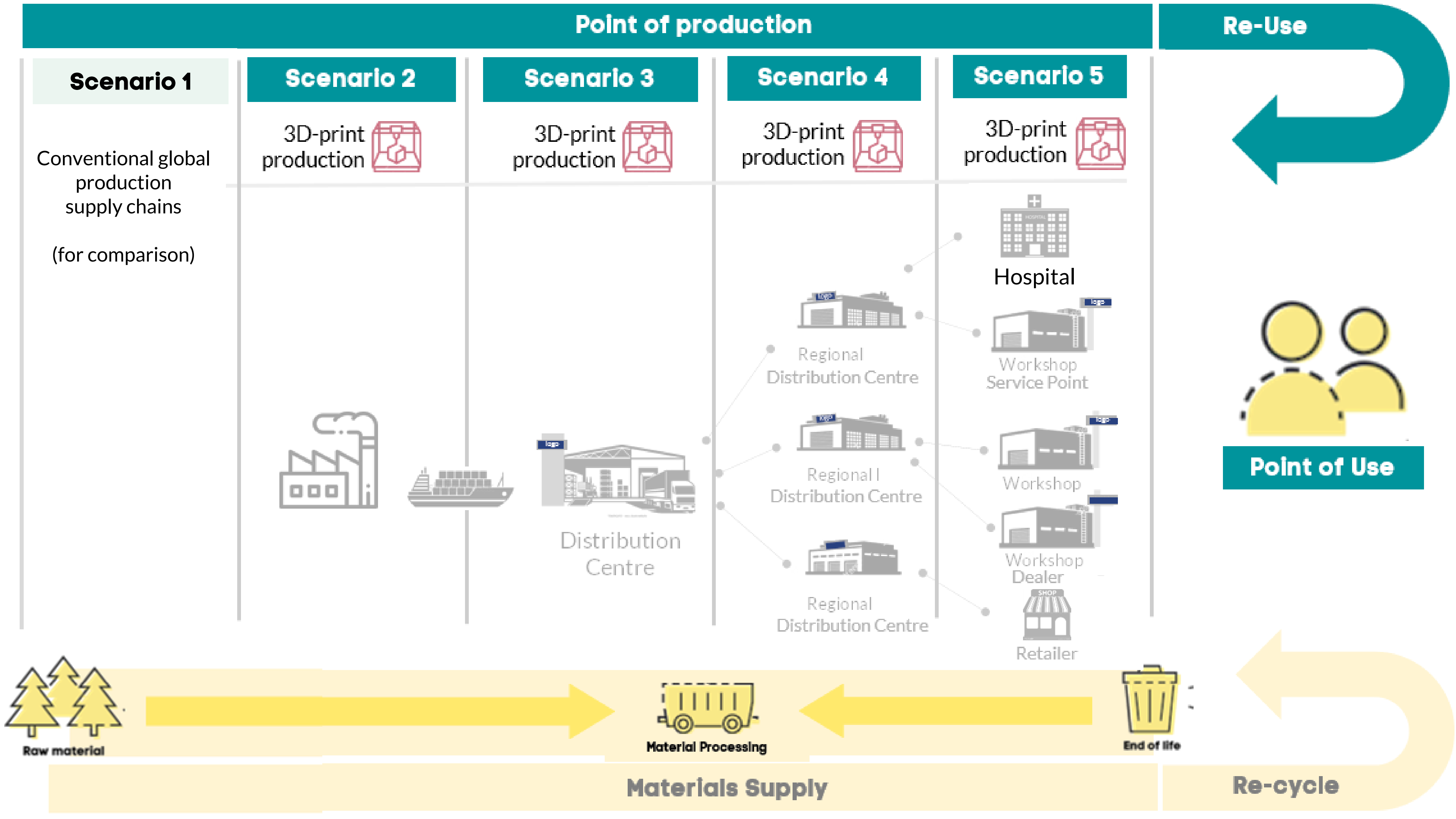


From prototyping to mass production

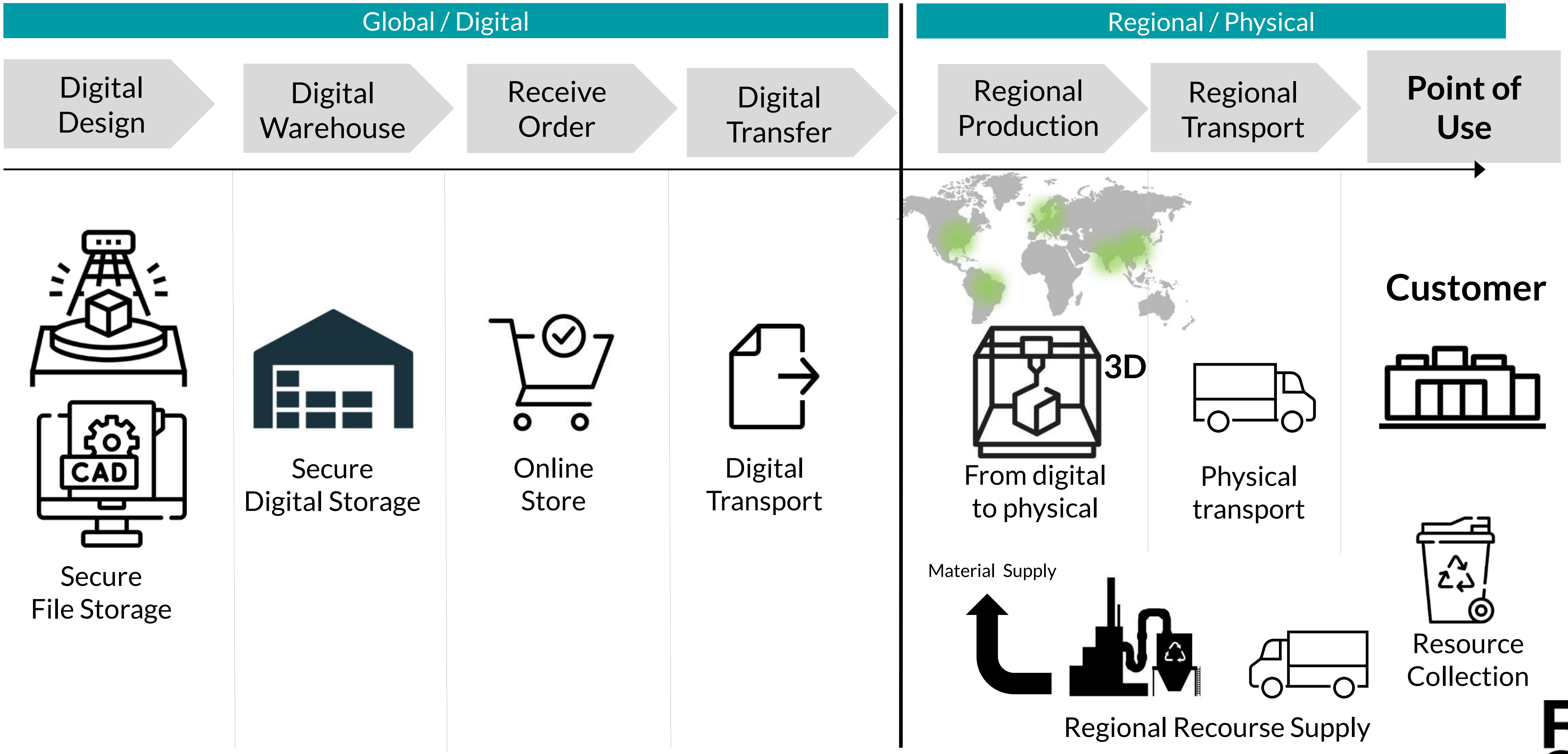
The HP Metal Jet for mass production of metallic 3D printing

How will AM (3D-print) change business?

5 Supply Chain Scenarios



Example of Digital Supply Chain Scenario



Supply Chain Values

Reduce transportation	Reduce Production Cost	Reduce Warehouse costs	Reduce Inventory Costs	Optimize Demand management
Reduce air Transports Reduce road transports Reduce logistics risks e.g. delays Reduce transportation Lead Time	Small scale production to reduce product cost for small volumes.	Optimise space usage Reduce heating Reduce inventory Material handling	Reduce dead stock Obsolesce Reduce depreciation volumes Fulfil All-Time Requirement)	Just-In-Demand production From Forecast to demand driven Avoid Out-of -Stock

Business Opportunities

Sustainability	Increase Uptime	Increase Parts Availability	Deliver on Customer Promise	Extend over the product lifecycle
Sustainability savings + image Lifecycle perspective Produce component Transport Warehousing Space + energy Scrapping	Decrease leadtime of parts delivery Right product at the right	0,5% increase in availability increases sales with 1%	Deliver on contracted part availability +15 Parts Availability End-of-production	By possible availability of old parts we can get.

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RISE – Research Institutes of Sweden

SPARSAM

Sustainability Parameters for Parts Analyses and Selection for Additive Manufacturing

PRODUKTION2030

COORDINATOR: Teknikföretagen

FOUNDERS: Swedish Production Academy, RISE, KTH, Chalmers

WITH SUPPORT FROM: Vinnova, Energimyndigheten, Formas, Strategic innovation programmes

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SPARSAM Summary of Results

1 Which Components shall be 3D printed?

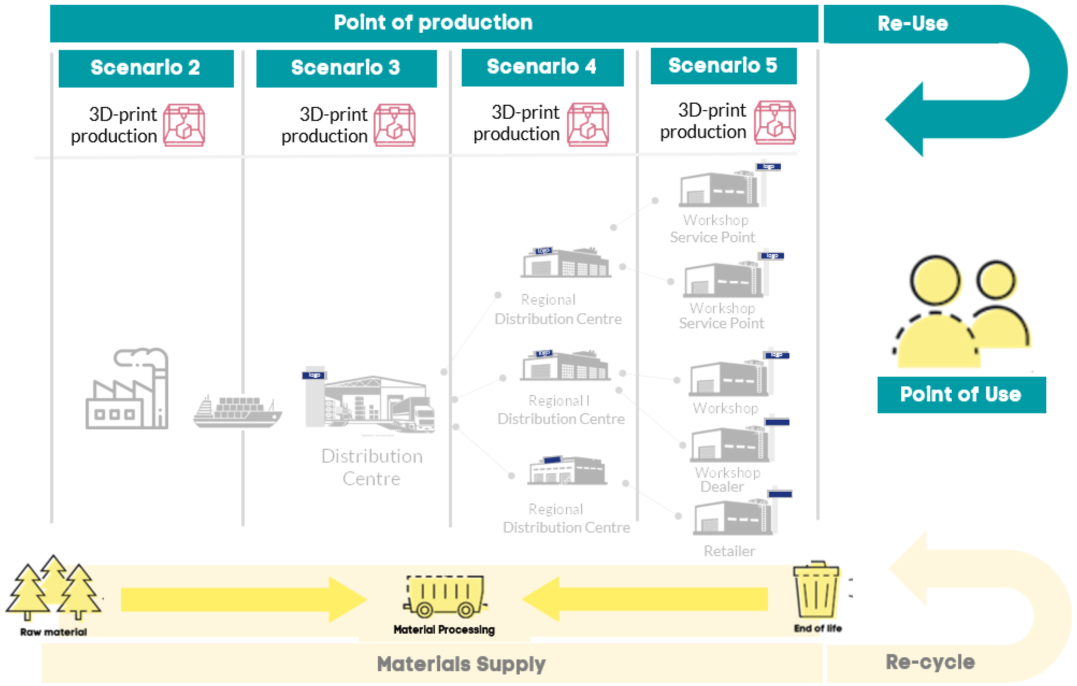
Technical Selection Criteria's
- Complex shape
- Expensive material
- Low weight is essential
- Technical properties can be improved
- Individual variations (tailored)
- Potential to parts consolidation
- A need to reduce assembly time
- Smaller series

Business Selection Criteria's
- Reduced Warehouse cost
- Reduced Inventory Costs
- Increased Part Availability
- Lead time
- Optimized Demand Management
- Reduced Transportation
- Reduced Production Cost
- Increased Uptime

NEW

Sustainability Selection Criteria's
- CO2 Emissions
- Material Consumption
- Energy Usage

2 Where should they be 3D-printed? Scenario 1-5



3 What are the saving and value in each scenario?

COST

TIME

SUSTAINABILITY

NEW

SPARSAM: Extends the technical selection criteria's with business and sustainability selection criteria's

NEW

SPARSAM: Provides a generic model to describe convectional supply chains and production scenarios based on 3D-printing

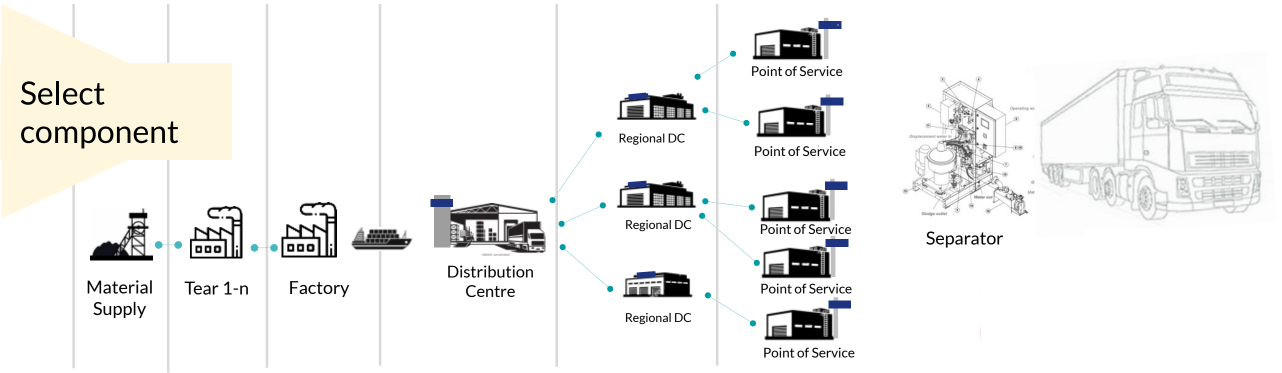
NEW

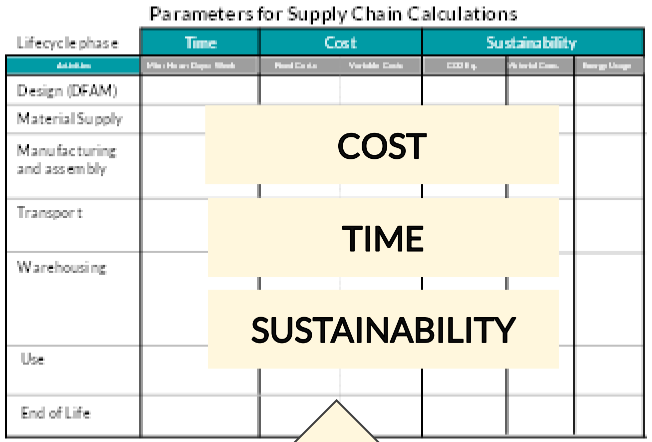
SPARSAM: Provides a model to calculate the value with-3d print compared to conversional methods

Example of use

Verify and develop the model to quantify Time, Cost, Sustainability Gains

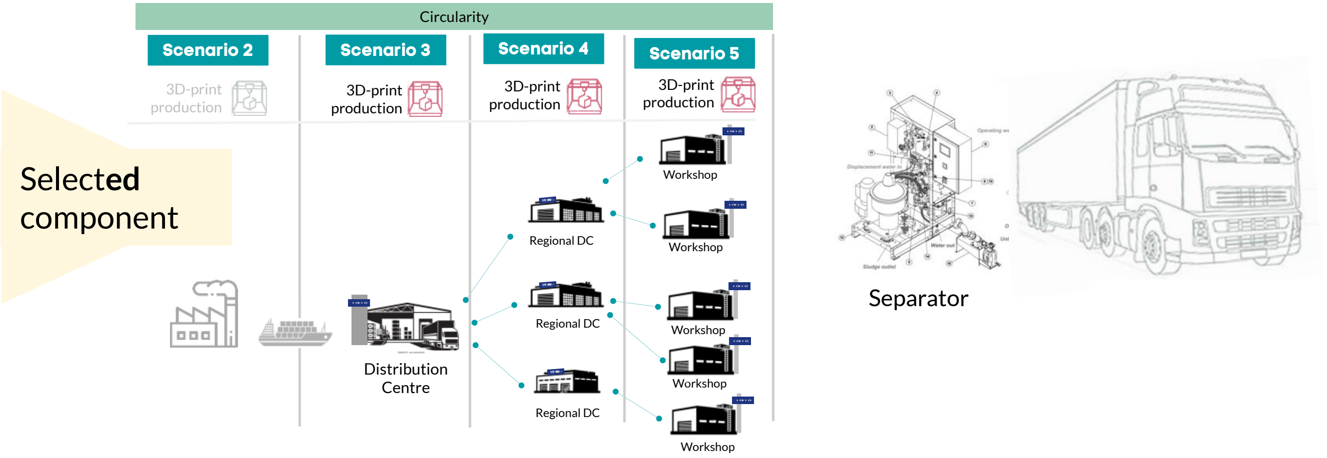
1. Current Supply Chain as Baseline

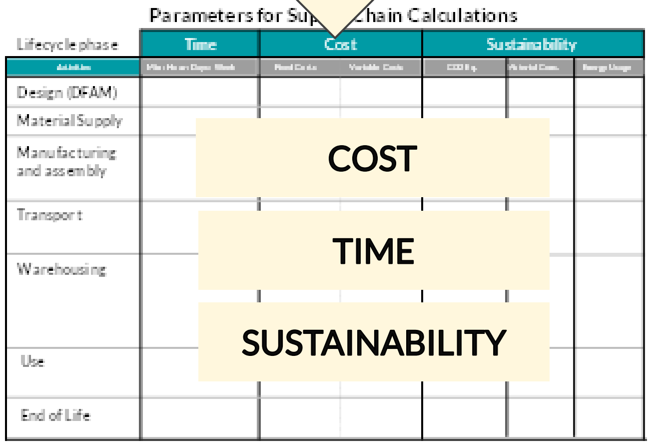




Compare

2. Design new Supply Chain based on scenario 2, 3, 4 or 5





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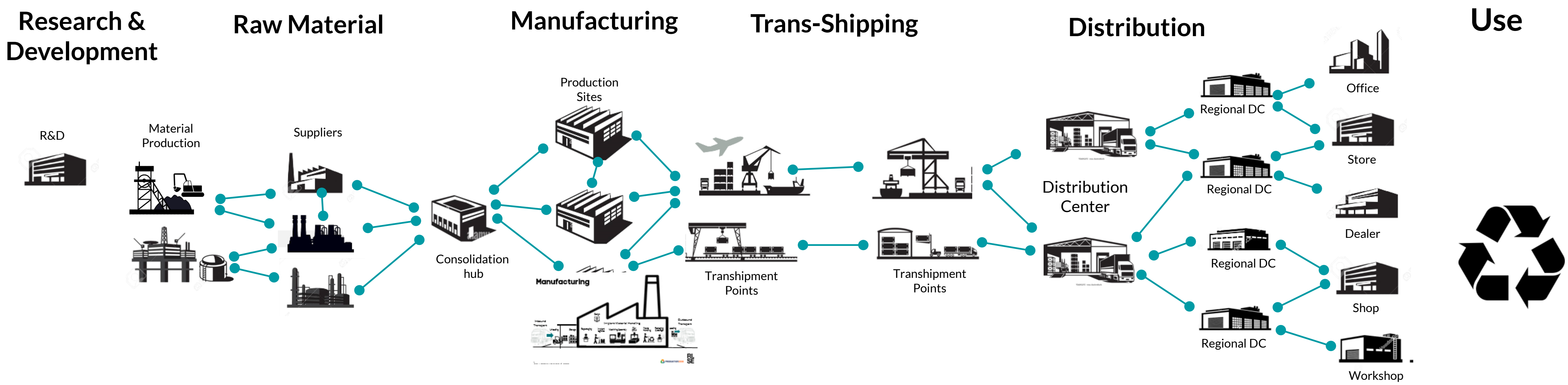
The Principle

For calculating cost, time & sustainability savings for 3D-printed parts

Scenario 1 - The traditional supply chain



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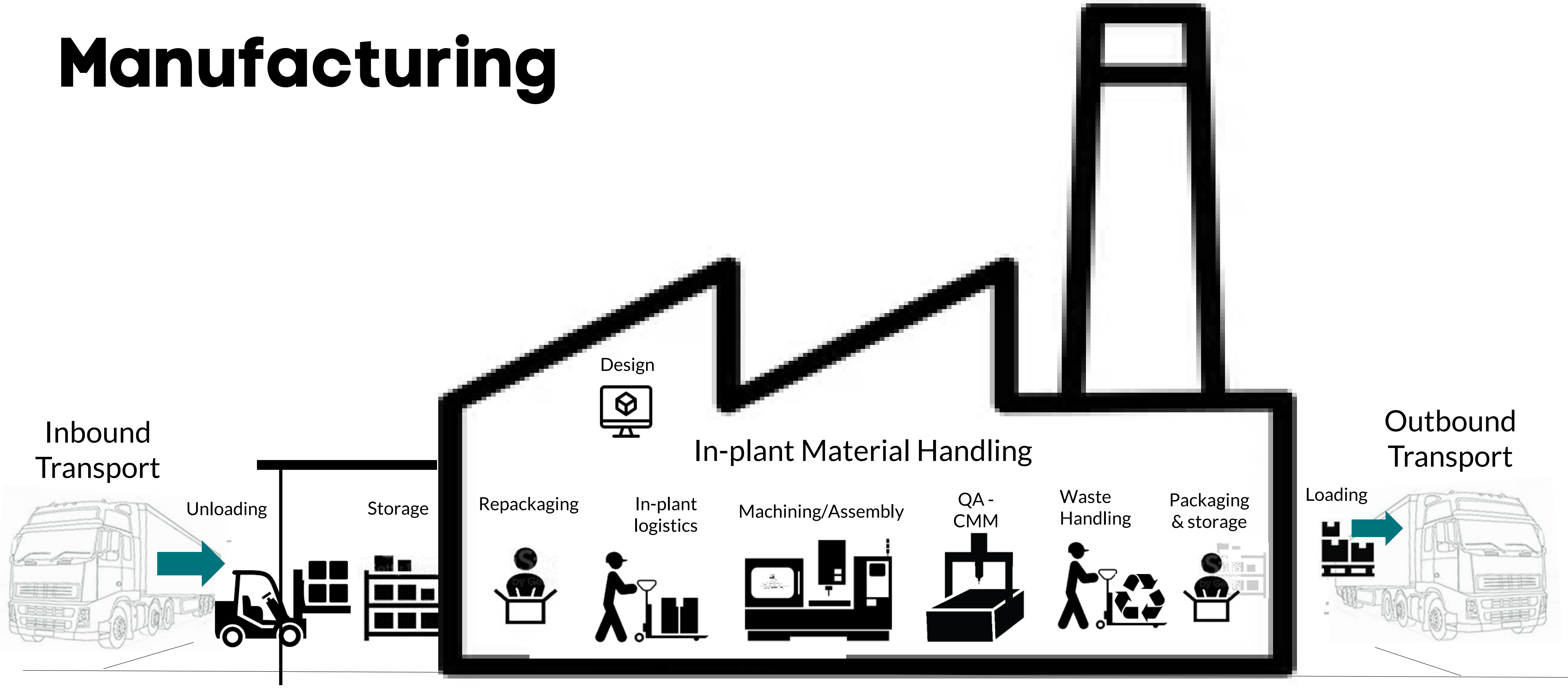
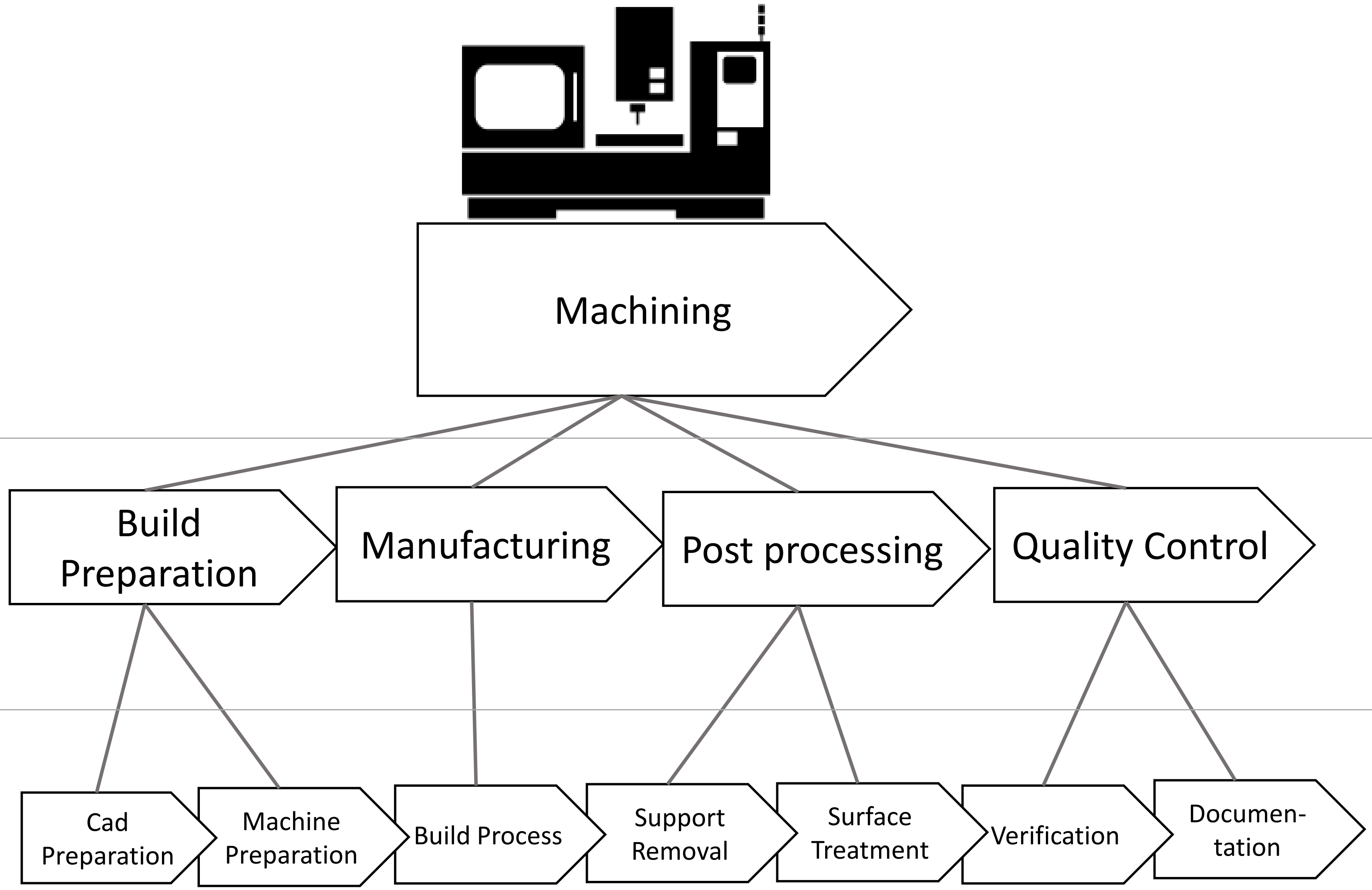
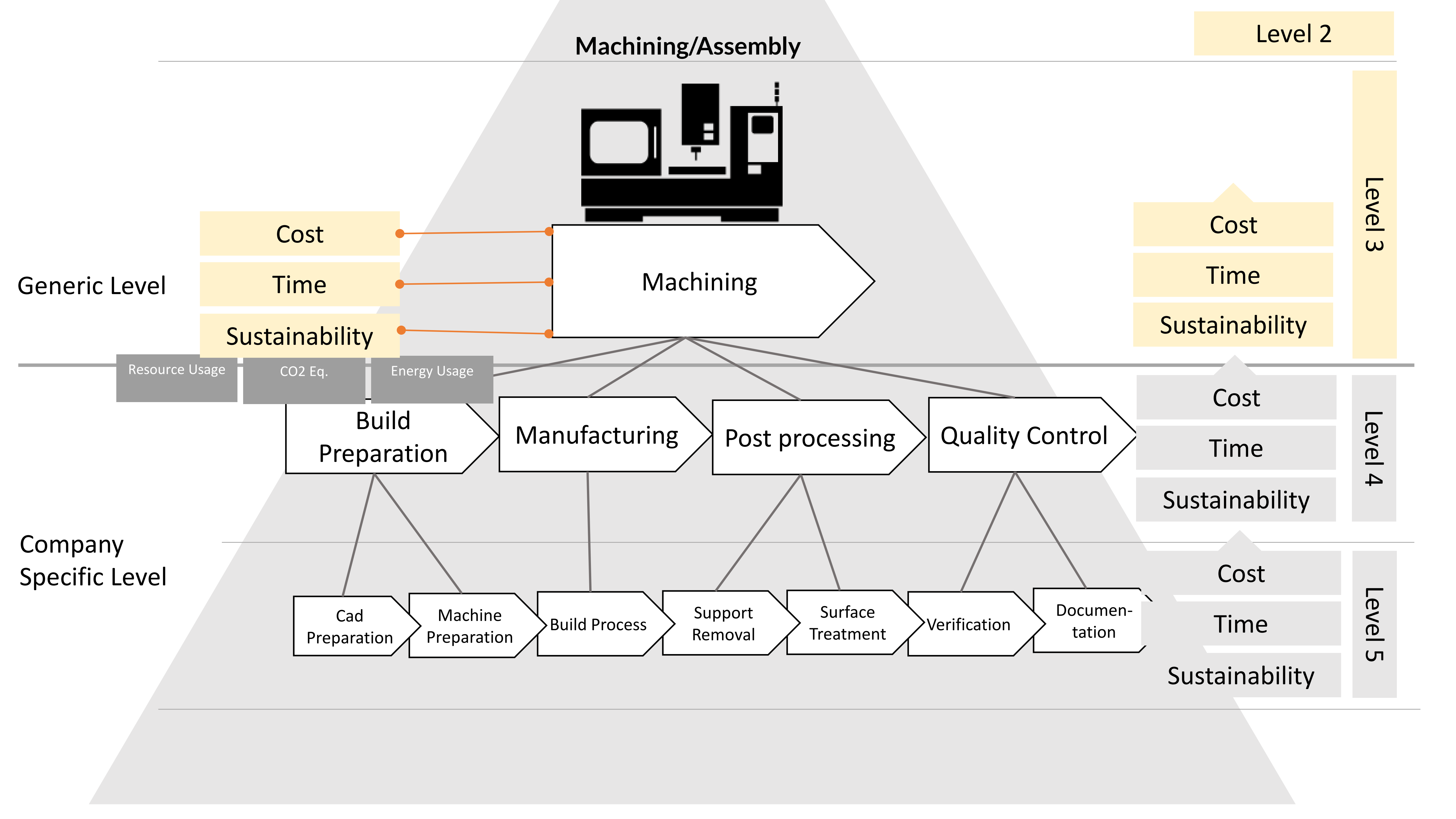
Manufacturing

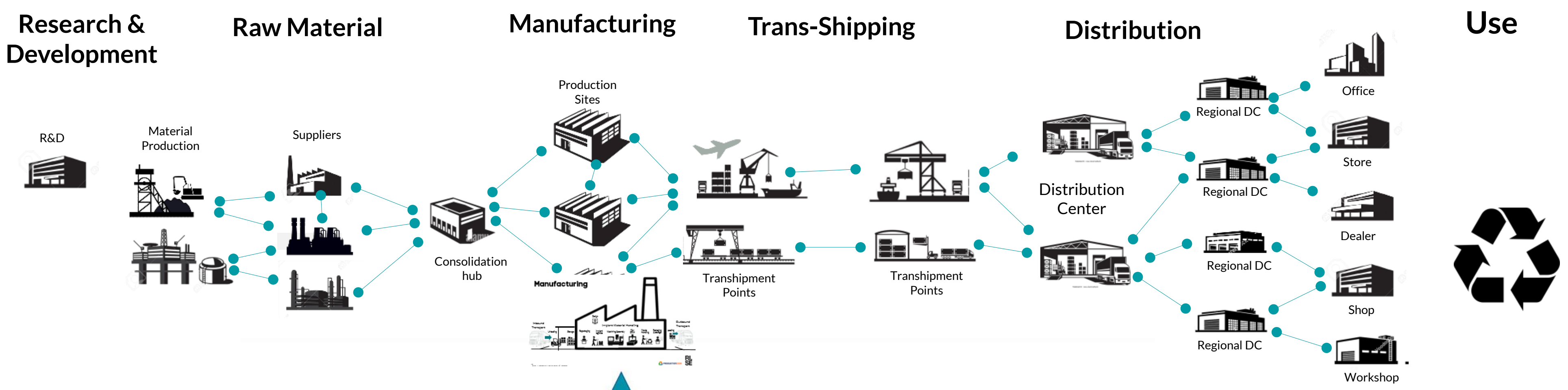


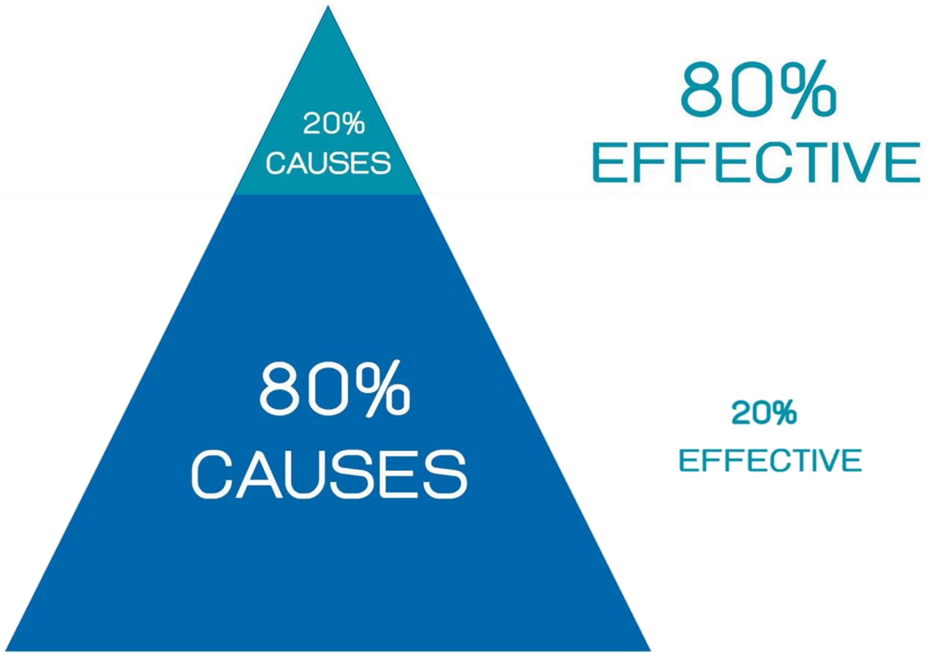
Machining/Assembly




Machining/Assembly
Level 2
Level 3
Level 4
Level 5
Generic Level
Company Specific Level
Cost
Time
Sustainability
Machining
Resource Usage
CO2 Eq.
Energy Usage
Build Preparation
Manufacturing
Post processing
Quality Control
Cad Preparation
Machine Preparation
Build Process
Support Removal
Surface Treatment
Verification
Documen-tation
Cost
Time
Sustainability
Cost
Time
Sustainability
Cost
Time
Sustainability

Pareto Principle





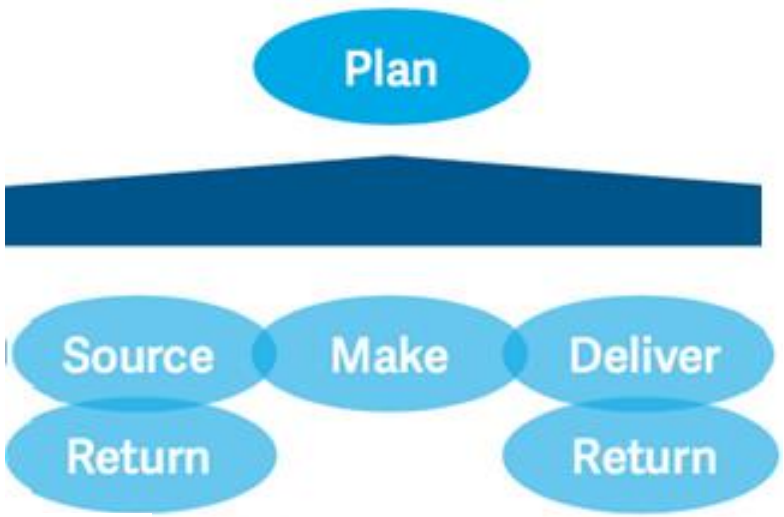
The Method

For calculating cost, time & sustainability savings for 3D-printed parts

SCOR - 5 Key Processes

SUPPLY CHAIN OPERATIONS REFERENCE MODEL

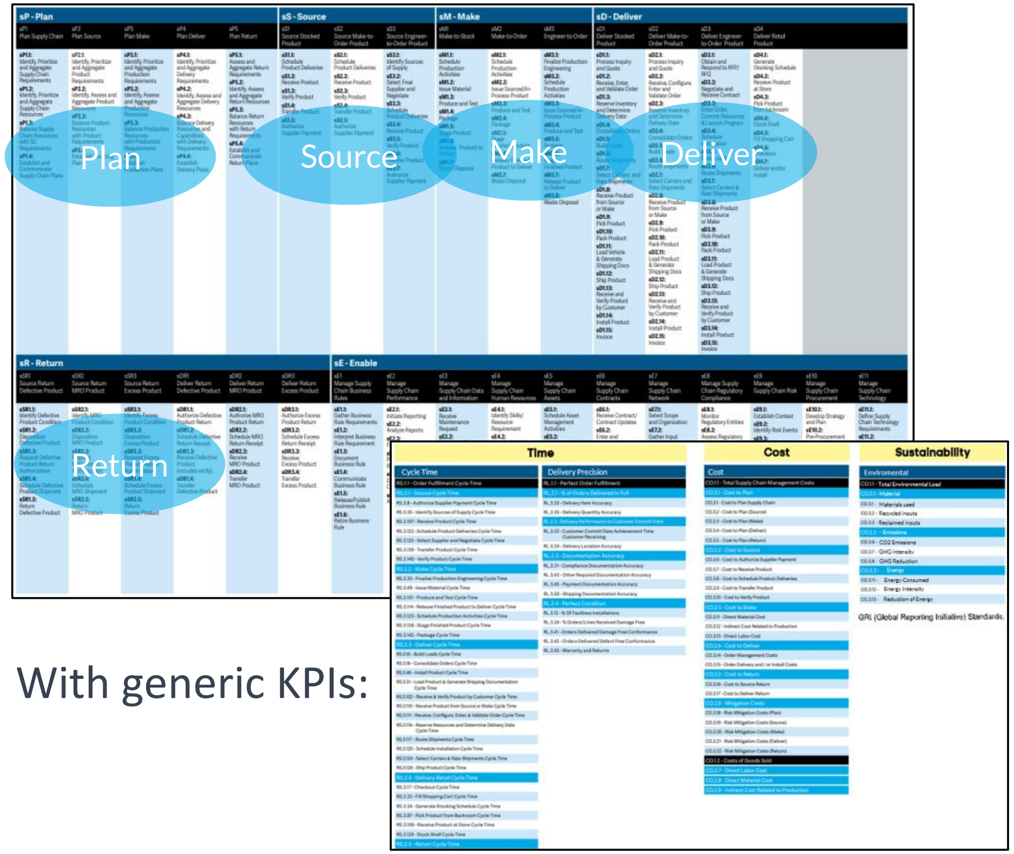
SCOR consists of five key processes:



The SCOR (Supply Chain Operations Reference) model is a widely-used framework for analyzing and optimizing supply chains.

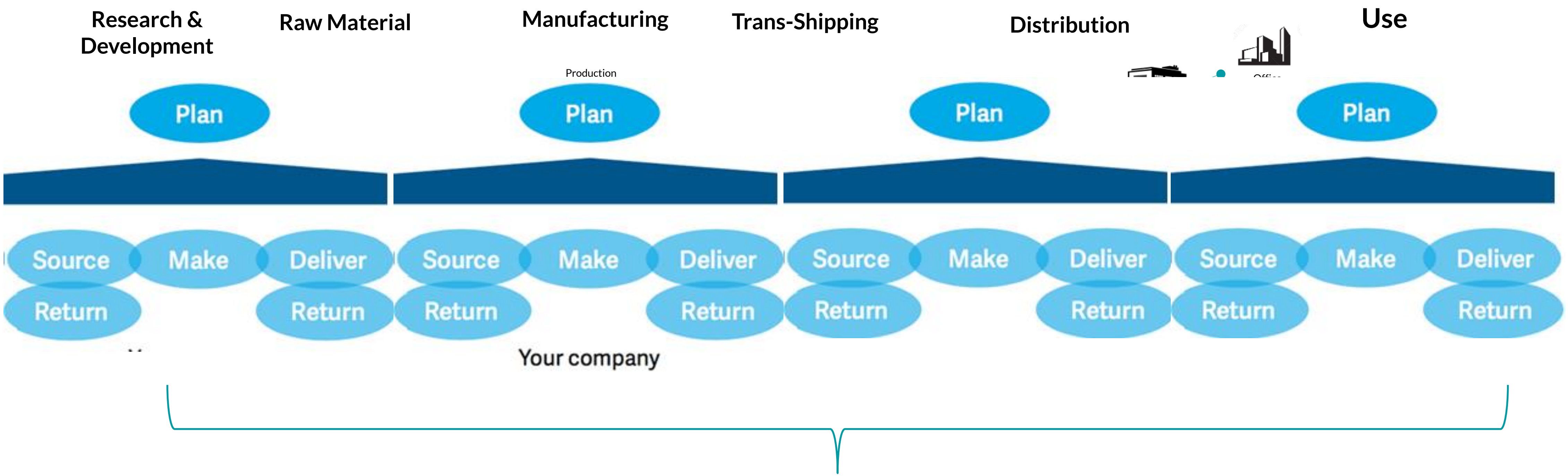
It was developed by the Supply Chain Council, a non-profit organization and is an open access framework.

Each of the 5 process is further broken down into a set of generic sub-processes



With generic KPIs:

SCOR – To model a traditional supply chain

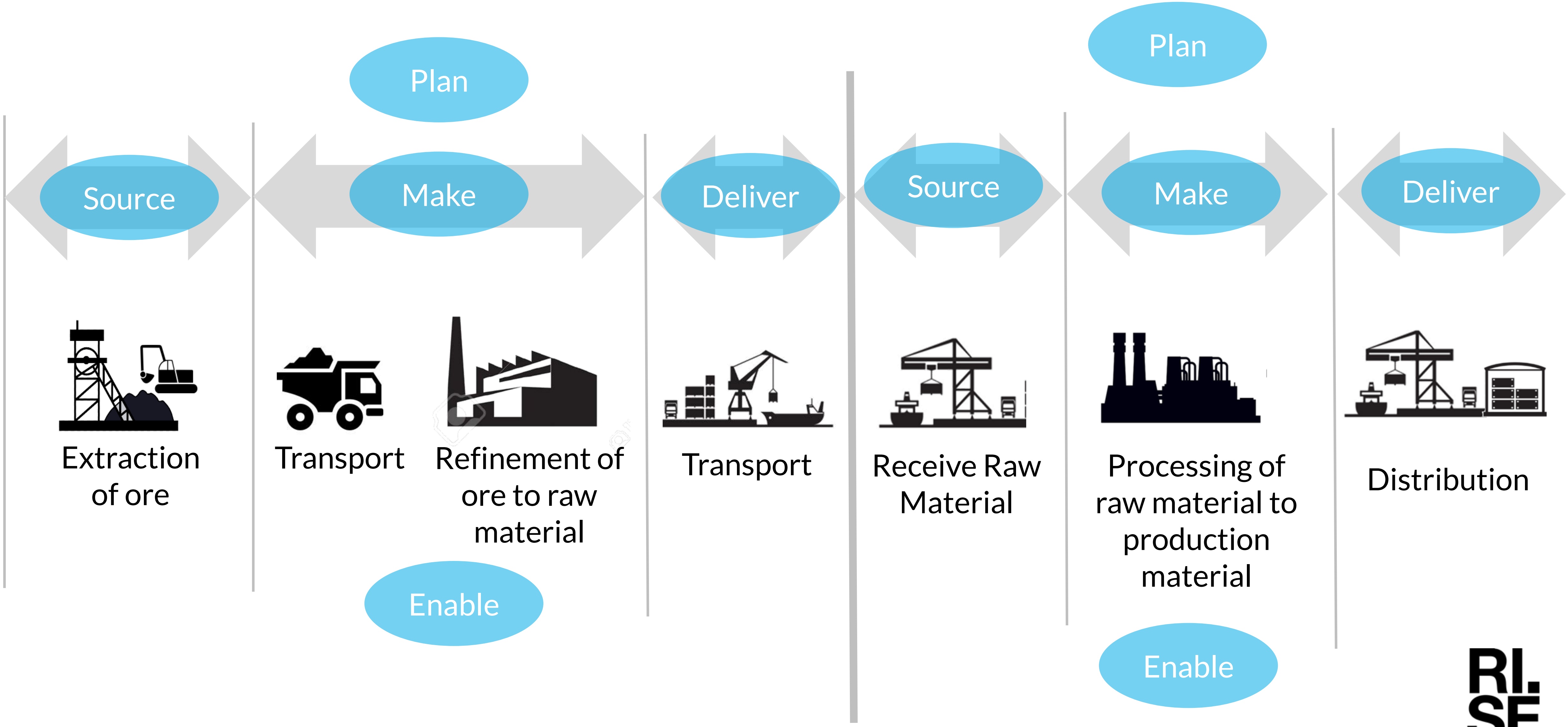


COST

TIME

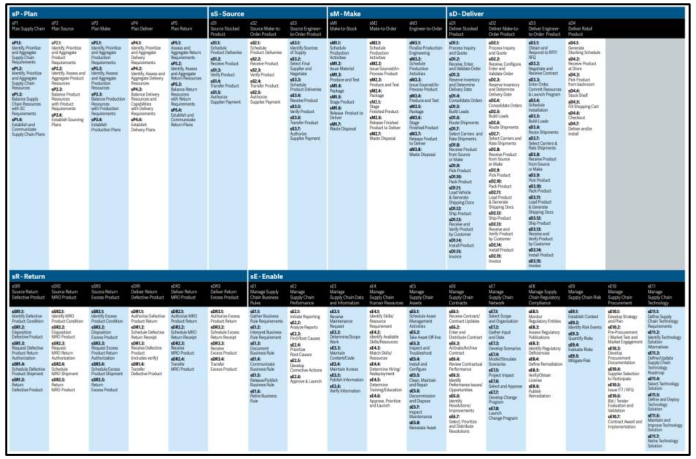
SUSTAINABILITY

Example Raw material supply chain



Build unique supply chains with generic activities

A box of generic activities:



Plan

Source

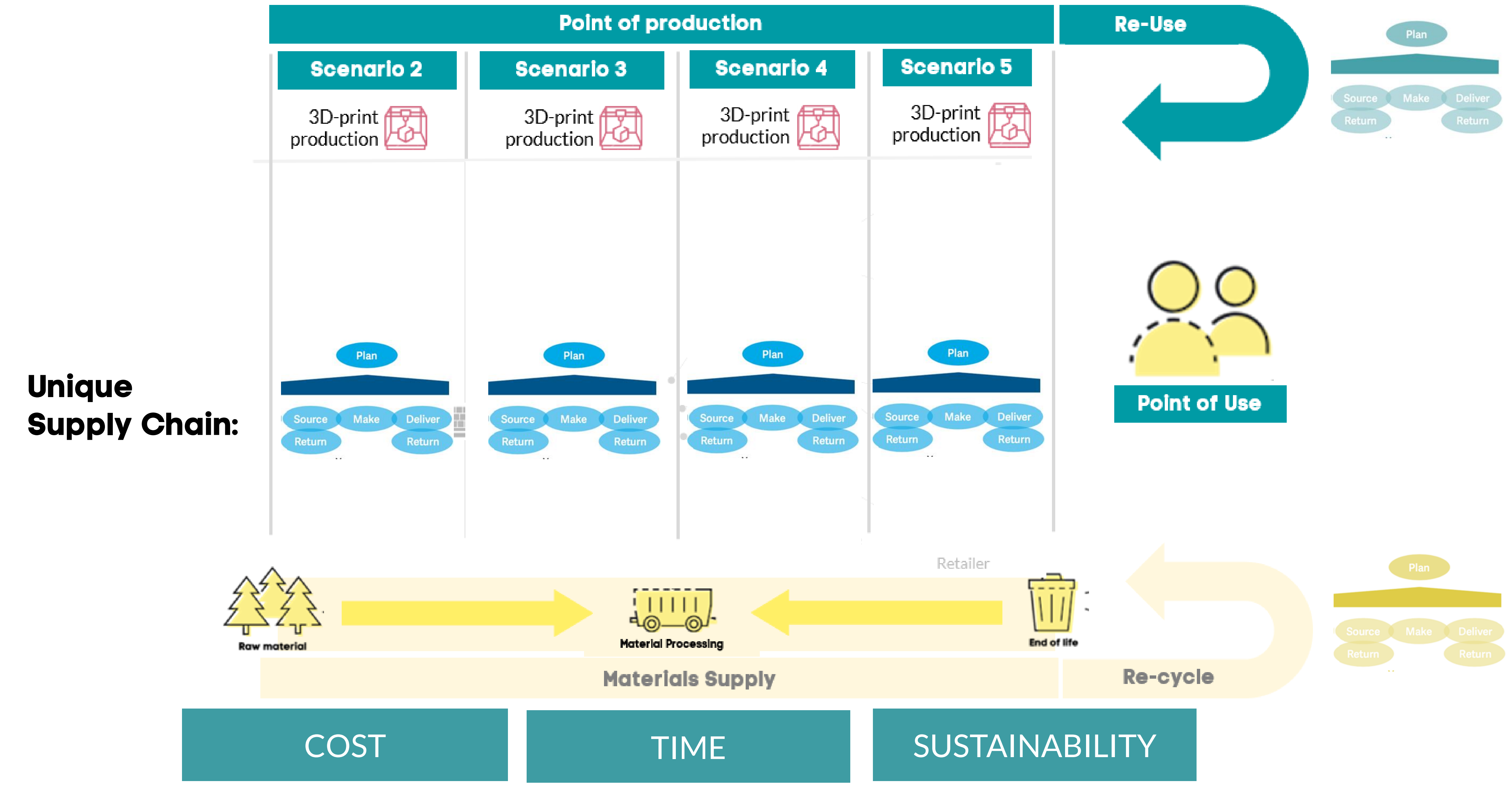
Make

Deliver

Return

Unique Supply Chains

Model supply chains with AM/3D print

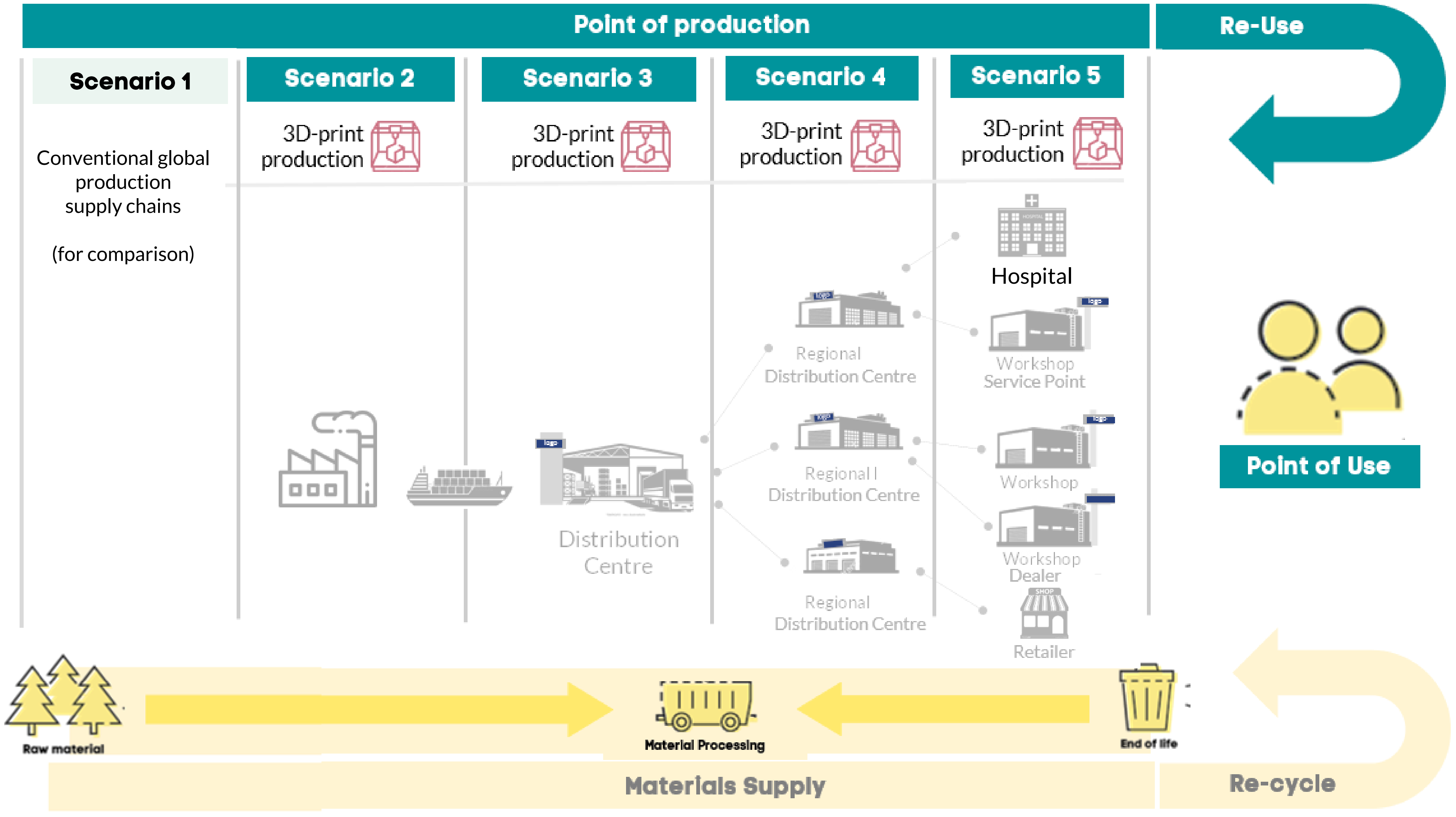


The Results

What are the cost, time & sustainability savings for 3D-printed parts?

Researching…

5 Supply Chain Scenarios



Follow or participate in the research!

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Research: Just-In-Demand
Matching demand with
3D-printed supply

Project: SPARSAM
Quantify Cost, Time & Sustainability
savings with 3D-print

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