



Course II

Start-up creation, Market opportunities & Circular economy

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A. Determining
Readiness and
Market Fit

B. Financing
your venture

C: From Zero to
Hero

D: Case study:
Solmeya

E. Circular
Economy: How
can I identify
new market
opportunities
using Circularity
concepts?



A. DETERMINING READINESS AND MARKET FIT

Why is innovation so hard

- Innovation is about ***meeting unmet needs with compelling science and technology seeds.***
- Accelerated innovation: make innovation processes **more streamlined, more balanced, just more sensible**

What are the reasons most innovation projects and ventures have not succeeded or do not meet the expectations?

Why is innovation so hard

- Innovation is about effecting change (products, processes and methods)
- Innovation must offer an order of magnitude advantage in terms of
 - Benefits
 - Performance
 - Convenience
 - ease of use, or
 - just a much lower cost.
- It can take decades for a technology to mature and turn it into a commercially robust, market-ready system with a variety of applications (e.g. 3D printing).

The cloverleaf framework

A framework for determining whether a technology venture is ready to be taken to market.

TECHNOLOGY READINESS <ul style="list-style-type: none">• Mature• Major breakthrough• Fully functional	MARKET READINESS <ul style="list-style-type: none">• identifiable, quantifiable benefits,• large and growing market
COMMERCIAL READINESS <ul style="list-style-type: none">• Access to a market• Ability to build a business• Freedom to operate• Distribution networks	MANAGEMENT OR TEAM READINESS <ul style="list-style-type: none">• Experience• Expertise• Energy• Excitement• Ability to work with inventors

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The cloverleaf framework

A framework for determining whether a technology venture is ready to be taken to market.

TECHNOLOGY READINESS Level (TRL) <ul style="list-style-type: none">• Mature (Ready and prepared)• Major breakthrough• Fully functional (easily producible)	MARKET READINESS <ul style="list-style-type: none">• identifiable, quantifiable benefits,• large and growing market
COMMERCIAL READINESS <ul style="list-style-type: none">• Access to a market &• Ability to build a business• Freedom to operate• Distribution networks	MANAGEMENT OR TEAM READINESS <ul style="list-style-type: none">• Experience• Expertise• Energy• Excitement• Ability to work with inventors

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TECHNOLOGY READINESS LEVELS (TRL)

a framework originally developed by NASA to understand the maturity level of different technologies in their portfolio

LEVELS 1-2: LAB DISCOVERIES

- Level 1: Embryotic stage (basic principles and characteristics observed in lab)
- Level 2: Theoretically viable (**validated** in lab – some **peer credibility**)

LEVEL 3: PROOF OF CONCEPT (POC)

LEVELS 4-5: PROTOTYPE Development and Test

- Level 4: Prototype (lab testing)
- Level 5: Prototype (tested in real field conditions)

LEVELS 6-7: FULL SYSTEM TESTING

- Level 6: Full System Pilot Simulated Environment
- Level 7: Full System Pilot Actual Environment

LEVELS 8-9: PRODUCTION SYSTEMS

- Level 8: Production System Test Simulated Environment
- Level 9: Production System Test Actual Environment



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MARKET READINESS- Competitive Analysis

- Competitors' Overview at the local/regional/global level
- Market Research (market shares)
- SWOT Analysis
- Competitive Profile Matrix

Competitor Analysis and Market Research

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- Identify Product/Services Attributes - Identify and Map Customers and Potential Customers
- Assess competing Products/Services in terms of **Quality, Price & Potential**
- Analysis of Competitors' Strategies in Commercializing the Innovations (Product/Service)
- Market Research – Analyze Market Characteristics at different Scales/Levels
 - Micro Level: Market Shares & Market Concentration
 - Macro Level: Income & growth, Employment, Export Potential
 - Structural Level: Sectoral distribution of firms & employment patterns
 - Non-Market Aspects: Behaviors and Attitudes towards Innovation

SWOT Analysis

- **Strengths, Weaknesses, Opportunities, Threats**
 - Advanced SWOT Analysis following MAF+ framework developed by BRIGRID CONNECT
(Anzaldua, McDonald and Duin, 2020)
- Framework to Assess and improve product competitiveness
- **Heat Map** Framework to visualize SWOT strengths and weaknesses vis-à-vis
your competitors

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SWOT Example

(Ganzaldua et al., 2020)

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none">▶ What does your organisation do better than others?▶ What are your unique selling points?▶ What is your organisation's competitive edge? ▶ What do competitors and customers in your market perceive as your added value?	<ul style="list-style-type: none">▶ What do other organisations do better than you?▶ What elements of your business add little or no value?▶ What do competitors and customers in your market perceive as your shortcomings? ▶ What could you improve?
OPPORTUNITIES	THREATS
<ul style="list-style-type: none">▶ What political, economic, social, technological, environmental, or legal changes are happening that could be favourable to you?▶ Where are there currently gaps in the market or unfulfilled demand?▶ What new innovation could your organisation bring to the market?▶ What social and environmental impacts could your product have?	<ul style="list-style-type: none">▶ What political, economic, social, technological, environmental, or legal changes are happening that could be unfavourable to you?▶ What restraints do you face?▶ What is your competition doing that could negatively impact you?

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Strengths: A strength is any factor that provides you with a **competitive advantage**, such as superior quality in your products or exclusive access to certain resources.

Weaknesses: A weakness is an area of underperformance, where improvement is necessary if you want to grow. As the inverse of strengths, this category might address flaws in your products or resources you lack.

Opportunities: An opportunity is a favourable circumstance that you could potentially leverage into a strength. If new market segments or unique selling points are available to you, that could qualify as an opportunity.

Threads: Some common threads are:

Social perception

Natural Disasters

Technological changes

Legislation

- Define Strategies to effectively Mitigate threads



ATHENA Research & Innovation
Information Technologies



Heat Map Example

(Ganzaldua et al., 2020)

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Heat Map: <i>Solutions to contain forest fires</i>		Company X	Company Y	Company Z	My Company
		Product X	Product Y	Product Z	My Product
Key for success	Feature: Effectiveness in putting out forest fires	2	3	3	3
	Feature: Mobility/ease of deployment	1	3	1	3
	Asset: Closeness to the current government	1	3	2	2
Secondary Importance	Feature: Price	3	1	2	3
	Competence: Knowledge/experience on previous cases of fire	1	2	1	1
	Competence: Maintenance skills	2	3	1	3

Key (3 point scale):

	3 = Above Average
	2 = Average
	1 = Below Average

Competitive Profile Matrix

- Compare **Strengths, Weaknesses** and **Potential** against Competitors
- Identify and assign *Weights* to **Critical Success Factors**
 - e.g., product originality, TRL, scalability
- Assign **Scores** (1-4 scale) for each Factor
 - Major Weakness, Minor Weakness, Minor Strength, Major Strength

• *Weight * Score*



Success Factor Assessment

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Competitive Profile Matrix Example

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		Krispy Kreme		Dunkin		Tim Hortons		Starbucks	
Critical Success Factors	Weight	Rating	Score	Rating	Score	Rating	Score	Rating	Score
Advertising	.12	2	.24	3	.36	2	.24	2	.24
Product Quality	.15	4	.6	3	.45	3	.45	3	.45
Product Diversity	.09	2	.18	2	.18	3	.27	3	.27
Price Competitiveness	.10	3	.30	3	.30	3	.30	2	.20
Management	.11	2	.22	3	.33	3	.33	3	.33
Financial Position	.12	4	.48	4	.48	4	.48	4	.48
Customer Loyalty	.08	3	.24	3	.24	3	.24	3	.24
Global Expansion	.13	4	.52	4	.52	2	.26	3	.39
Market Share	.10	3	.30	4	.40	3	.30	4	.40
Total	1.00		3.08		3.26		2.87		3.00

Commercial READINESS

- List Barriers to Entry the Market and actions to Mitigate them.
- List Possible Risks (Technical, Financial, Commercial, and Regulatory risks) together with their Likelihood and its Impact. Provide Risk Mitigation Strategies.

- Failure to achieve a higher level TRL (T)
- Failure to secure funding (F)
- Underperformance (C)
- Changes in Regulations

Id.	Type	Description	Likelihood	Effect	Mitigation Action
T1	Technological	The value of our Biodiversity Index must be certified and trusted by our customers, as well as our approach to its continuous monitoring. Demonstrating to the international community the reliability of our outputs is crucial and challenging, also taking into consideration that our approach, i.e. the monitoring of flora and fauna through our artificial intelligence algorithms for defining biodiversity, is brand new and never proposed in the market before.	Medium	High	We will involve eminent certification companies (such as RIINA), no-profit organisations leaders in the biodiversity sector (Regenerative Society Foundation) and Universities in our testing campaigns to collect independent evaluations (refer to WP4 description). RIINA will be our third-party certicator of our Biodiversity Index quantification.
T2	Technological	Our mathematical models are driven by data from different sources (Hive-Tech, Spectrum, Sentinel 1 and 2). Achieving an accurate, effective and reliable calculation is risky, as we must make these data homogeneous and use them all together to feed our artificial intelligence algorithms, capable of determining the Biodiversity Index not only in the analysed area, but also in the surrounding regions (scalability concept).	Low	Medium	We have many years of experience in managing, correlating and interpreting data and are confident that we will overcome technological bottlenecks in our development phase.

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B. FINANCING YOUR VENTURE



Pursuing a Path to Market

- How are you going to finance your venture itself?
- You may choose to raise money with:
 - Venture capitalist
 - Seed fund
 - Angel investor
 - Bootstrapping (No external Capital)
 - Crowdfunding (run a Kickstarter or an Indiegogo campaign)

"ENTREPRENEURSHIP IS REALLY THIS ENGINE OF BOTH TECHNOLOGICAL CHANGE AND GROWTH. BUT AT THE SAME TIME, ONE OF THE KEY BARRIERS TO ENTREPRENEURSHIP IS RAISING CAPITAL."

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The Engine of a Firm: Cash, Assets, and Cash



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The Engine of a Firm: Cash, Assets, and Credit



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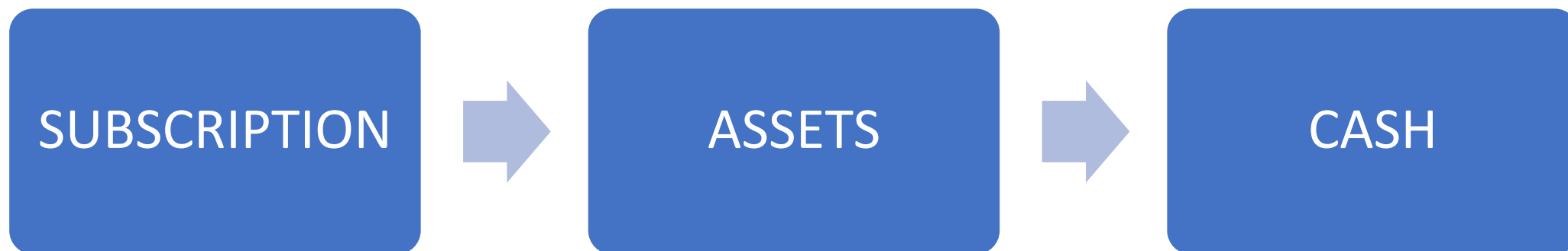
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The Engine of a Firm: SUBSCRIPTION, Assets, and Cash



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HOW MUCH CAPITAL DO I NEED

- Not every business can be cash flow positive from the start.
- get to cash flow positive as quickly and with as little external finance as possible
- Scale up once positive
- Estimate the consumers willingness to pay

BUSINESS TO BUSINESS (B2B)

- A term used to describe companies whose primary customers are other companies

BUSINESS TO CONSUMER (B2C)

- A term used to describe companies whose primary customers are mass consumers or the general public

Types of capital

DILUTIVE CAPITAL

- Any capital infusion in your startup that requires you (the founders) to give up a share of your equity or ownership in your company
- E.g. Venture Capitals

NON-DILUTIVE CAPITAL

- Any funding that does not require a company's owners to dilute, i.e., sell or reduce their stake of ownership in the company
- E.g. Debts or grants

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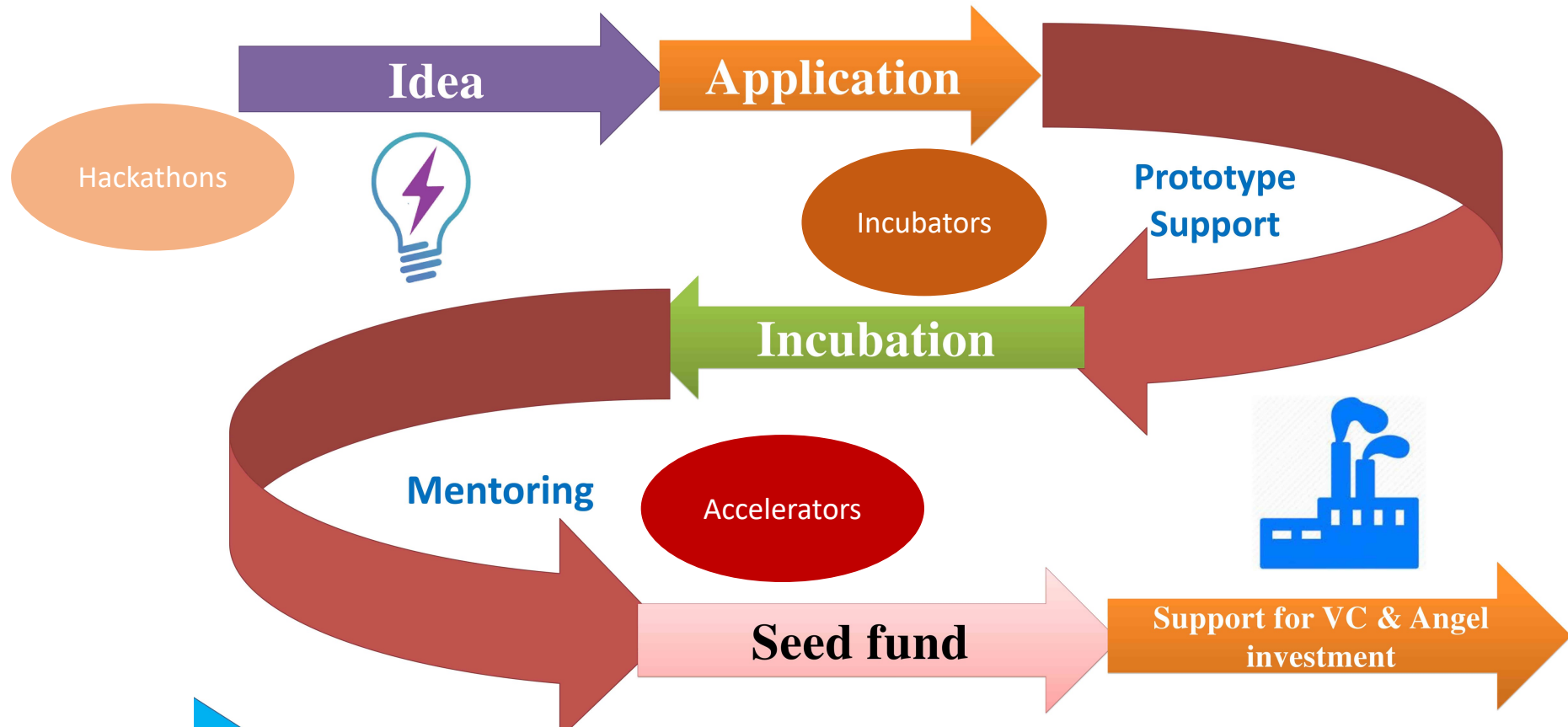
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C. FROM ZERO TO HERO

INCUBATION PROCESS



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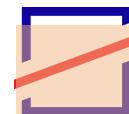
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What is a Hackathon

In the spirit of citizens joining forces to work on climate challenges, Climathon, orchestrated by [EIT Climate-KIC](#), is a global movement of local and self-organized events focused on changing cities and/or regions for the better.

Citizens and city officials collaborate **to raise awareness and provide climate-relevant learnings, strengthen local ecosystems, and inspire further climate action** through local projects and initiatives.

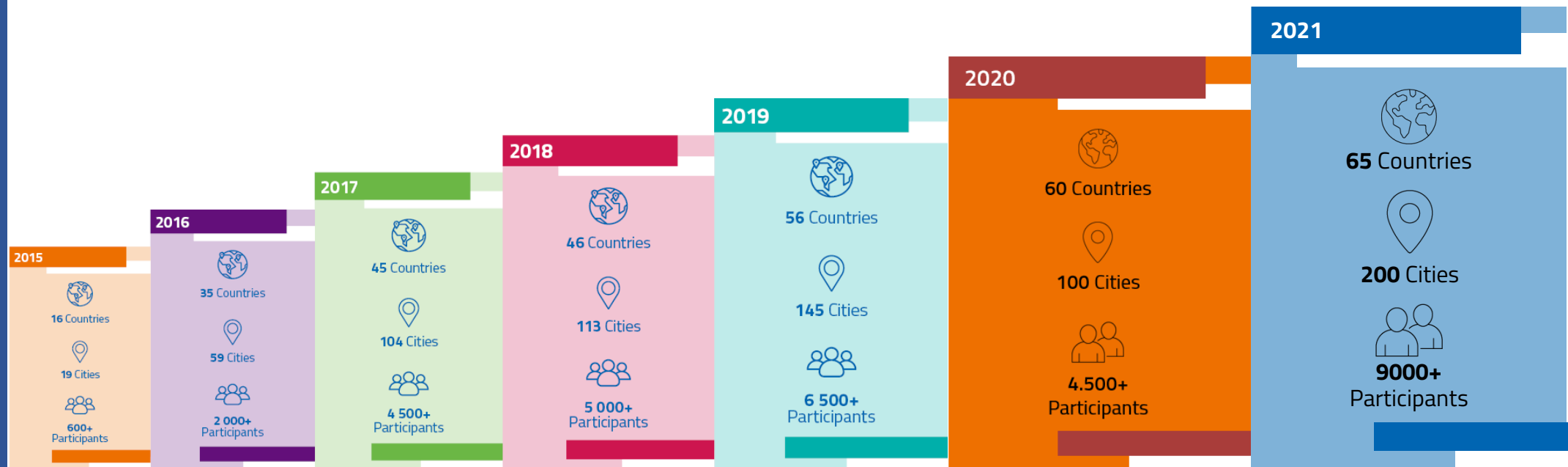
As citizens, what future do we want?



The impact of citizens is growing

Our movement is building!

We can raise climate awareness and increase our impact by bringing communities together to collaborate and create ideas for the cities of tomorrow.



*In 2020 many Climathons were postponed or held online due to COVID-19

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20 Climathons in Greece since 2019

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- ✓ Athens
- ✓ Agia Paraskeui
- ✓ Piraeus
- ✓ Thessaloniki
- ✓ Thiva
- ✓ Larissa
- ✓ Volos
- ✓ Corfu
- ✓ Herakleion
- ✓ Chania
- ✓ Mitilini



<https://climathon.climate-kic.org>



<https://www.instagram.com/climathongreece/>



<https://www.facebook.com/ClimathonGreece>



ATHENA

Research & Innovation
Information Technologies
Sustainable Development Unit



What is an Accelerator, What it offers



The Maritime Industry (Challenge Owners)

1. Problem/Challenge and Solution Identification
2. Specific Calls Launched based on sector's needs
3. Evaluation of TRL of start-up technology
4. Risk Mitigation by sourcing multiple start-ups
5. Investment Opportunities
6. Technological Solutions
7. Increased connectivity to the research & development sector



To the Startups

1. Mentoring and coaching
2. Extensive Training Program
3. Climate Impact Assessment
4. Co-working Spaces
5. Networking Events
6. Connection with Industry
7. Grants/Seed Capital
8. Facilitate Technology Demonstrations in a real-world test bed through leveraging our external partner network
9. Connection with the USA/Israeli innovation ecosystem (through Kinisis Ventures, Earth Fund and theDOCK)

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Bootcamps

1

Online and in-person bootcamps at the beginning of each stage

Workshops

2

Interactive, online training sessions on different topics: marketing, financials, team building, etc.

Peer-to-Peer

3

Online sessions where startups receive feedback from other mentors and startups

Mentoring

4

Experienced mentors support the teams throughout the programme in regular one-on-one sessions

Funding*

8

Stage 1: 5.000 – 10.000€
 Stage 2: 20.000 – 100.000€
 Stage 3: >200.000€

Demo Day

7

Startups pitch in front of investors, challenge owners and other bluetech stakeholders (in person if COVID allows)

Demonstration

6

Access to our large network stakeholders for technical support and the opportunity to demonstrate your technology in a safe environment.

Networking

5

Stage 2 + 3 start-ups will be invited to participate to visits of the USA / Israeli ecosystems through our collaborators Kinisis Ventures and TheDock.

MENA Maritime Accelerator Selected start-ups 2023

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VESSELJOIN

WHAT WE DO

Learn More

Georgios Fotopoulos
g.fotopoulos@vesseljoin.com
<https://vesseljoin.com/>

“ We are aiming to create a dedicated section for companies in green technologies that will be able to showcase their business and share their news or even network with thousands of seafarers and other companies globally **”**

Vesseljoin provides a paperless while streamlined job application process for both: shipping/maritime companies, manning agents and seafarers. At the same time vesseljoin is a professional social media network for the maritime industry with online courses related to green technologies and environment.

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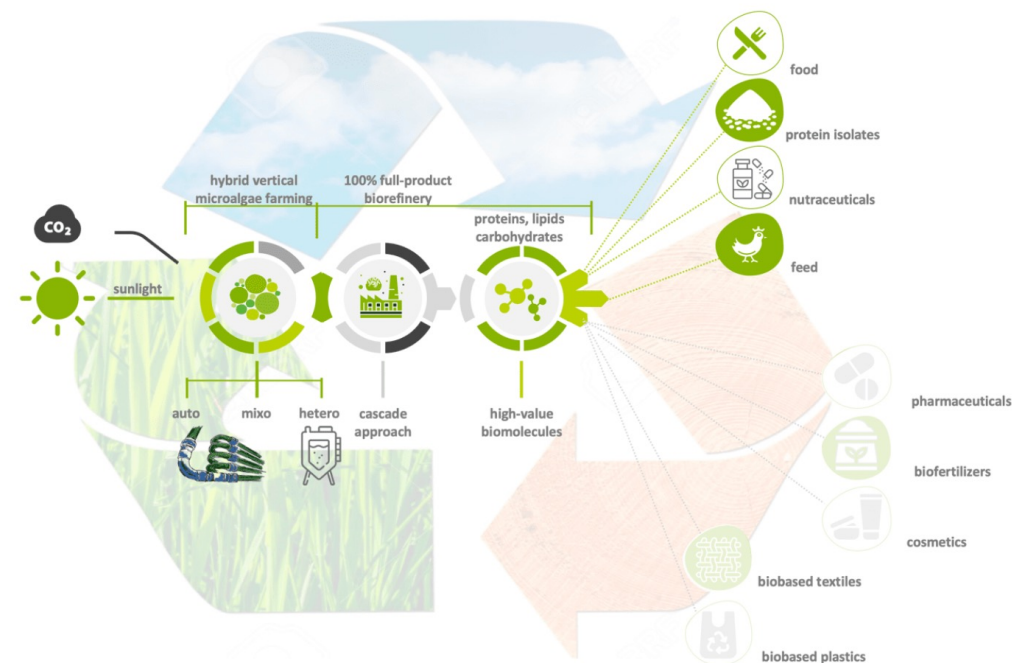
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D. Case study - Solmeyea

- Headquarters: Greece
- Climate-KIC Hub Greece Accelerator 2020 winner
- An AgriBioTech Company
- It aims to help the planet breathe better & eat healthier
- It produces through “hybrid vertical microalgae farming” **functional proteins & high-value biobased products for food, feed & pharma applications.**
- Their technology is based on CO₂ utilization through vertical microalgae cultivation. We do so, in a controlled closed system ensuring optimal sunlight, land and water use.
- They fixate 29x more CO₂ than an equal size forest and simultaneously tackle climate change & humanity’s nutritional needs.



Find more at: www.solmeyea.com



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Circular Economy

A hand is shown from the bottom, holding a glowing wireframe globe. Surrounding the globe are several hexagonal icons: a CO2 molecule, wind turbines, a factory, a globe, a hand holding a plant, a car with a charging cable, and a circular arrow symbol. The background is a dark blue gradient with faint bokeh lights.

How can I identify new market opportunities using Circularity concepts?

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Smarter product use and manufacture	R0	Refuse	Make product redundant by abandoning its function or by offering the same function with a radically different product
	R1	Rethink	Make product use more intensive (e.g. through sharing products or by putting multi-functional products on market).
	R2	Reduce	Increase efficiency in product manufacture or use by consuming fewer natural resources
Extend lifespan of product and its parts	R3	Reuse	Re-use by another consumer of discarded product which is still in good condition and fulfils its original function
	R4	Repair	Repair and maintenance of defective product so it can be used with its original function
	R5	Refurbish	Restore an old product and bring it up to date
	R6	Remanufacture	Use parts of discarded product in a new product with the same function
	R7	Repurpose	Use discarded products or its part in a new product with a different function
Useful application of materials	R8	Recycle	Process materials to obtain the same (high grade) or lower (low grade) quality
	R9	Recovery	Incineration of material with energy recovery

Circular strategies within the production chain, in order of priority Source: (Morseletto, 2020)

Circularity Thinking tools and flow

A. Determining Readiness and Market Fit

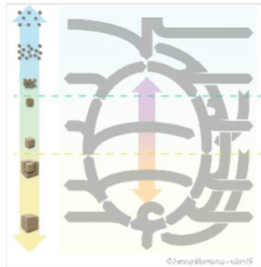
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Circularity Compass



Map the resource flows

The Circularity Compass helps to understand, how resources flow in the current (product) system and how they could flow instead. In a first step, the user draws the a rough reflection of the current resource flows into the template, where they enter the system and where they leave it.

Big Five Structural Wastes



Hunt the waste

The Big Five Structural Wastes tool helps identify five types of structural waste. Used in combination, the Circularity Compass and the Big Five Structural Wastes help to indicate and illustrate wasteful practices along the life cycle of a product system.

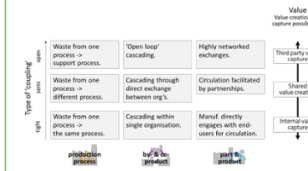
Circular Strategy Scanner



Identify suitable circular strategies

The Circular Strategy Scanner allows for linking circular strategies, business processes and eco-design principles on different levels. It helps the user to get an overview and understanding of potential circular strategies.

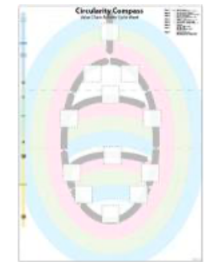
Circularity Grid



Organize couplings and system implications

The Circularity Grid systematically analyses the manner in which circular systems are different from linear ones, and what makes them more complex by understanding the different types of coupling between systems.

Activity Cycle

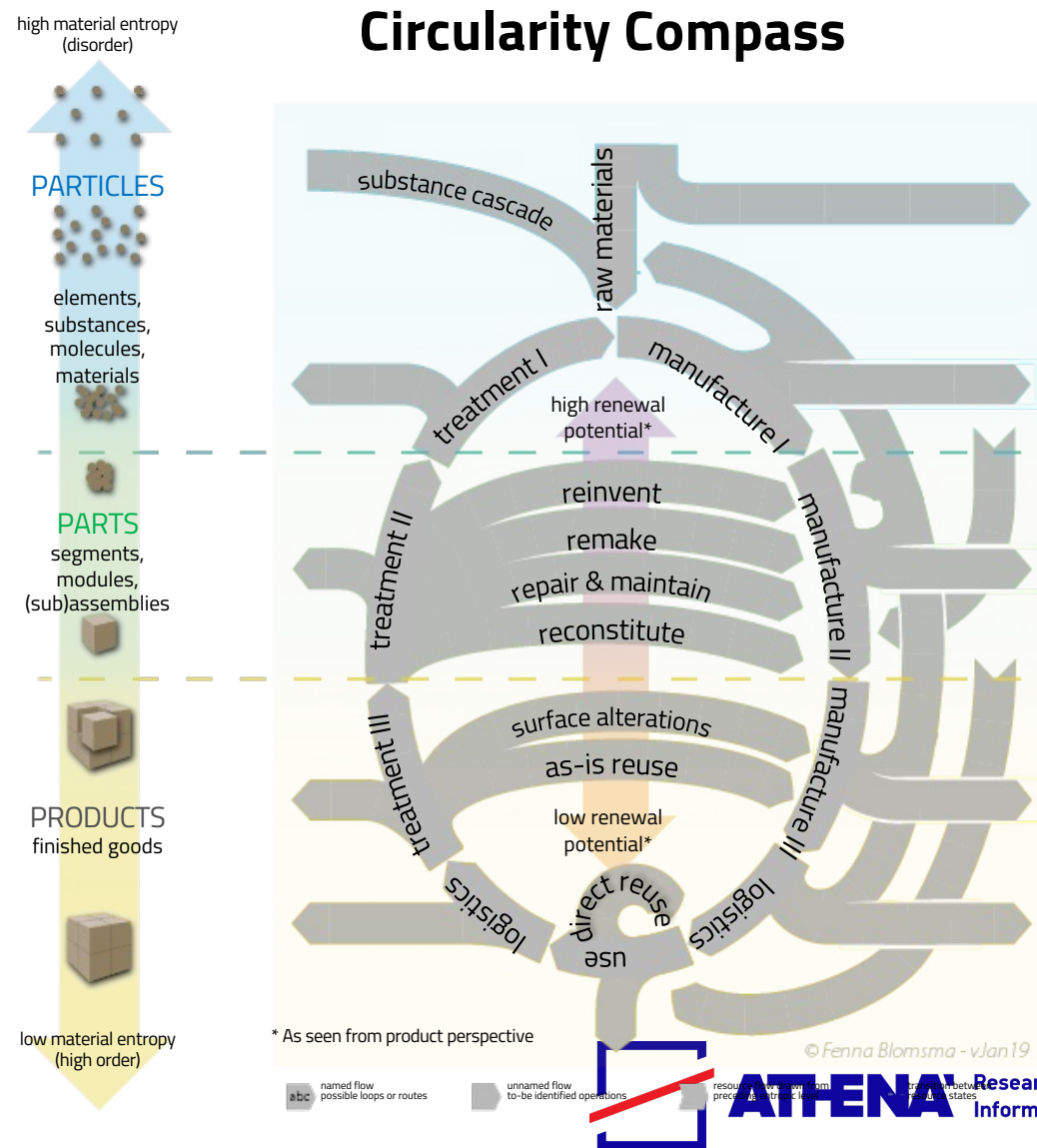


Manage stakeholder activities

The Activity Cycle can help to identify what the key stakeholders need to do to make the new value chain along the chosen circular solution a reality and help to consider the potential of certain stakeholder collaborations.

STEP 1: Circularity Compass

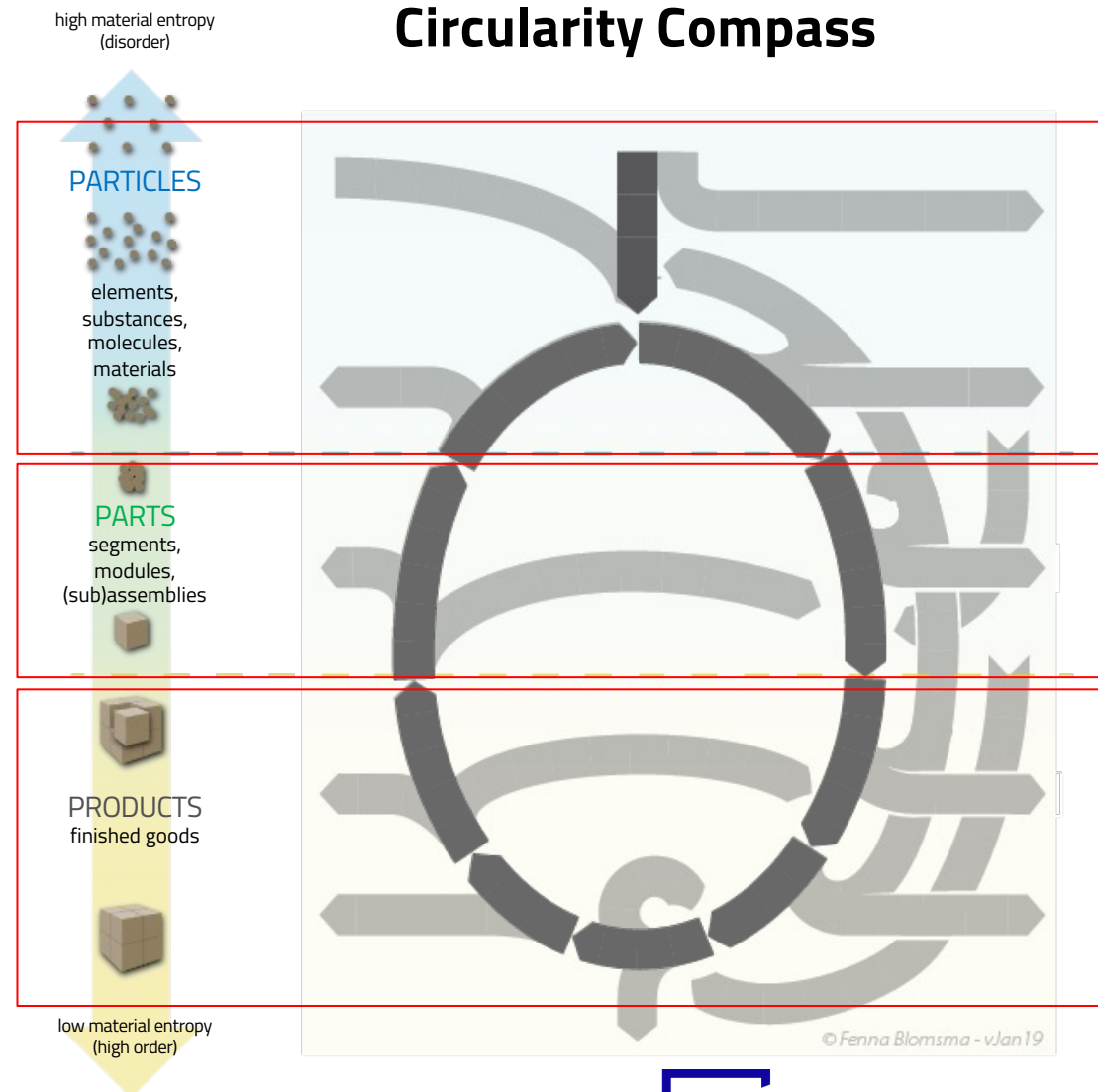
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- It presents a classification of all stages that a manufacturer faces
- It maps all resource flows considering life-cycle stage of the product
- It considers all forms of resources (particles, parts, products)

STEP 1: Circularity Compass

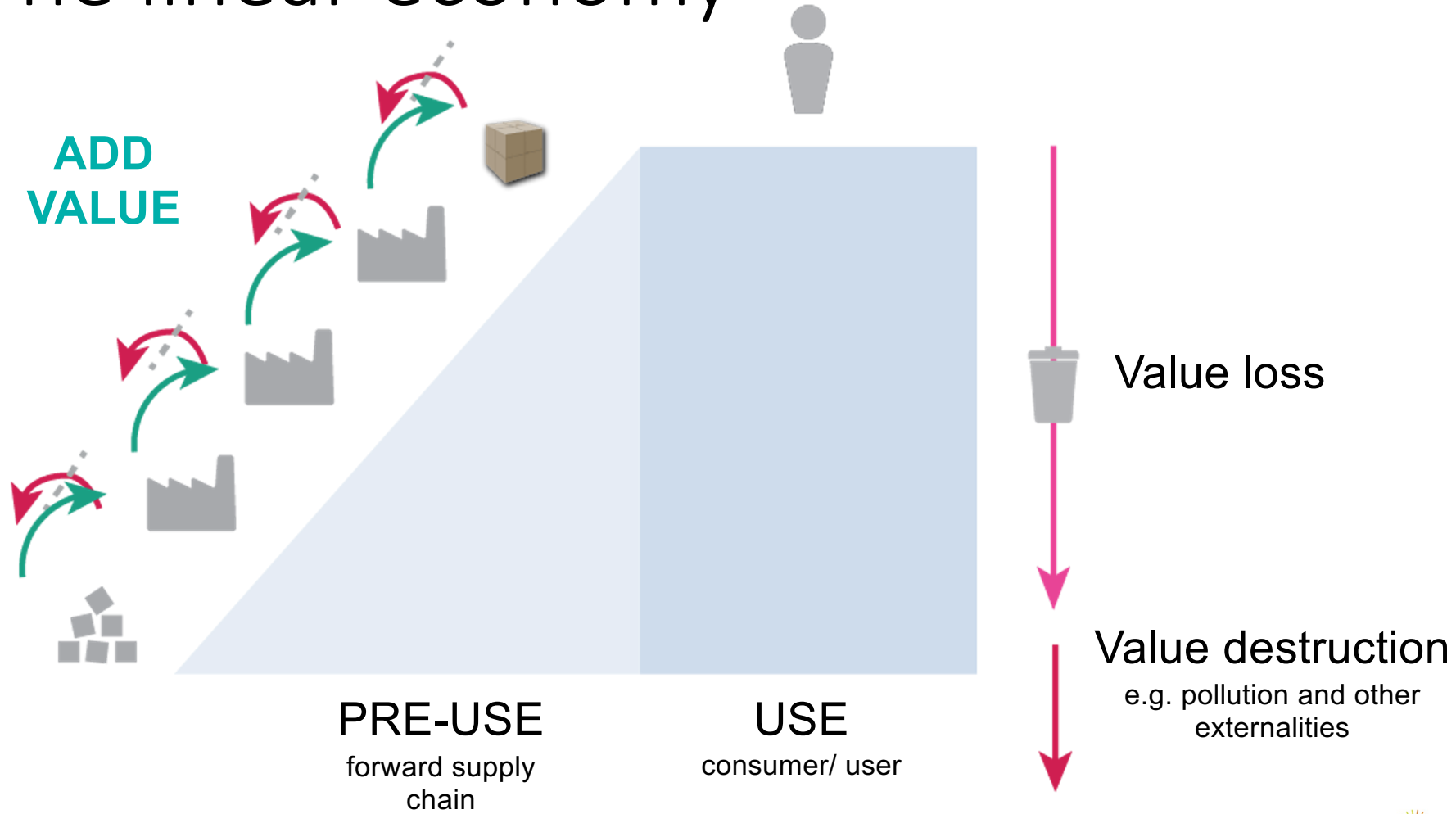
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This diagram helps us to identify different circular strategies, that have different renewal potential

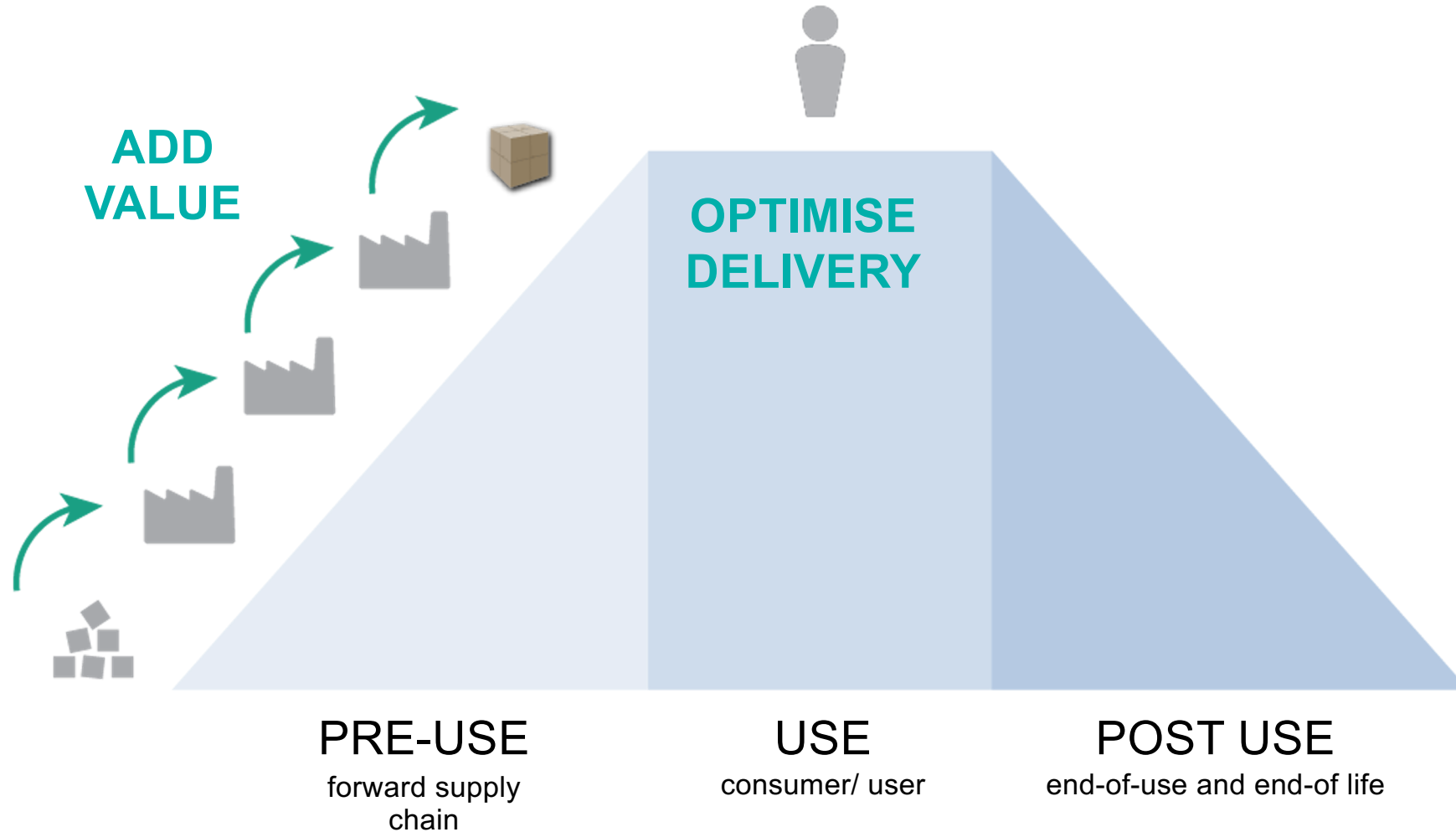
STEP 2: The Value Hill

The linear economy



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STEP 2: The Value Hill



A. Determining Readiness and Market Fit

B. Financing your venture

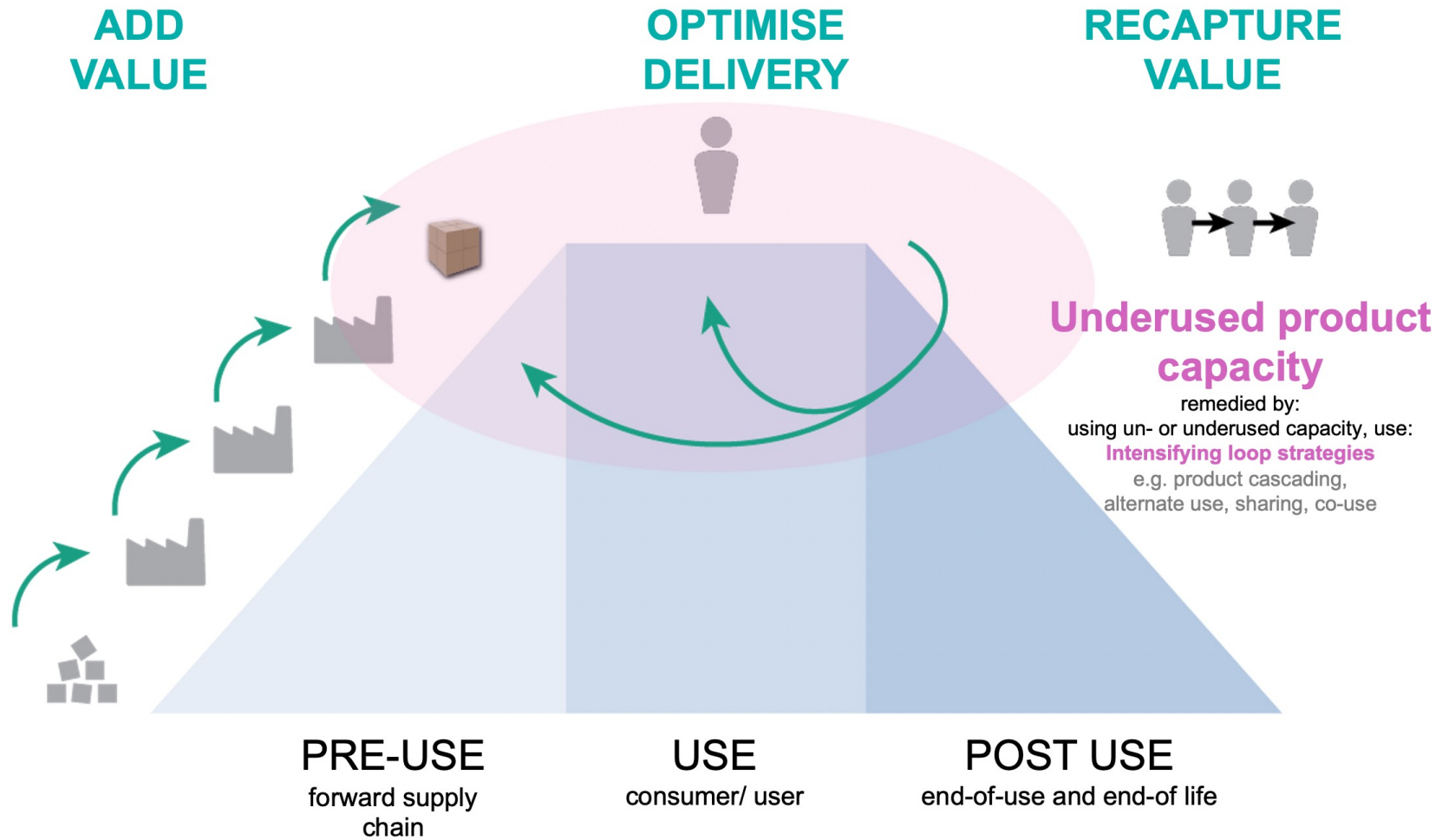
C. From Zero to Hero

D. Case study: Solmeya

E. Circular Economy: How can I identify new market opportunities using Circularity concepts?

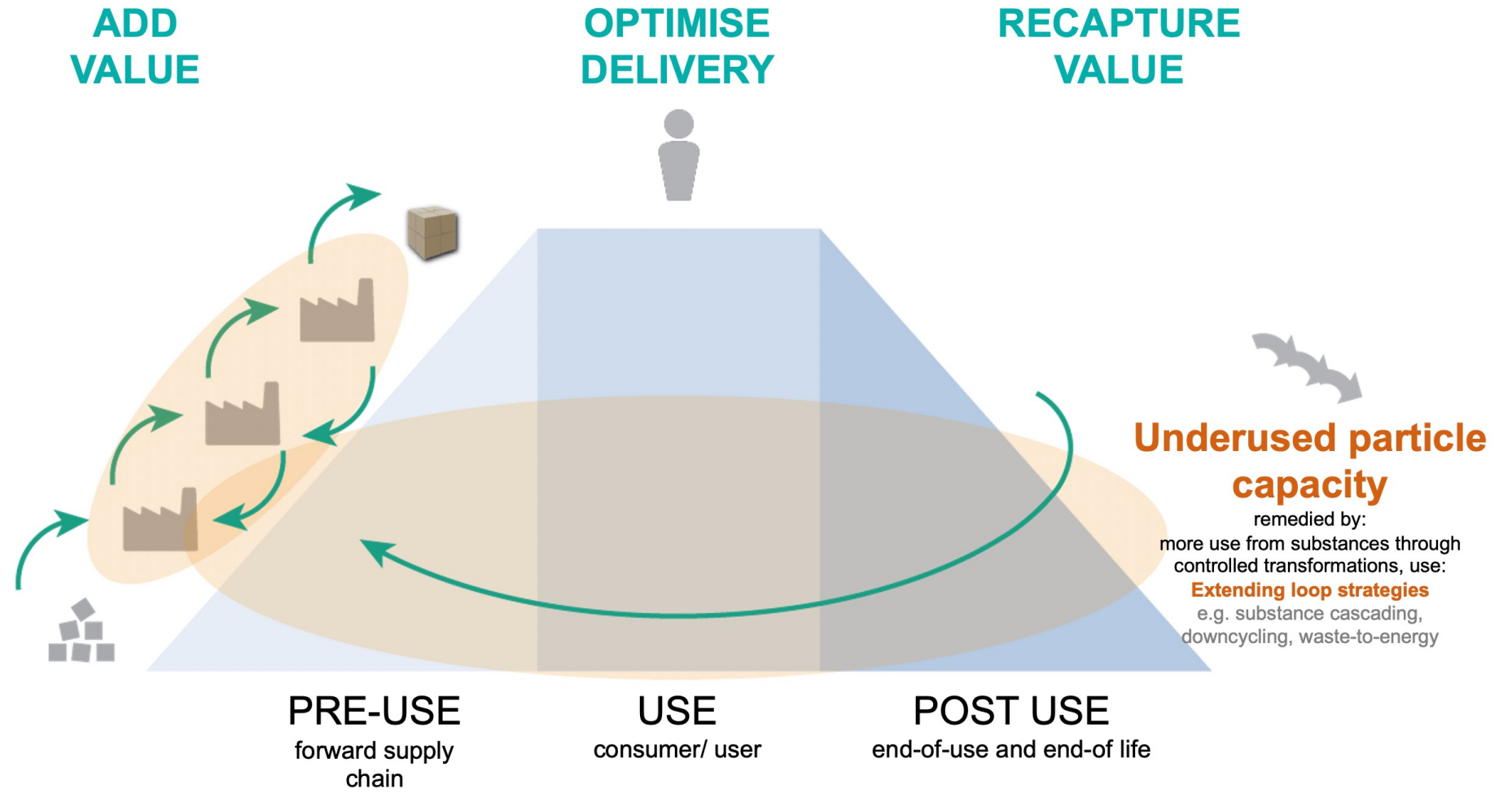
STEP 3: Circular Strategy Scanner

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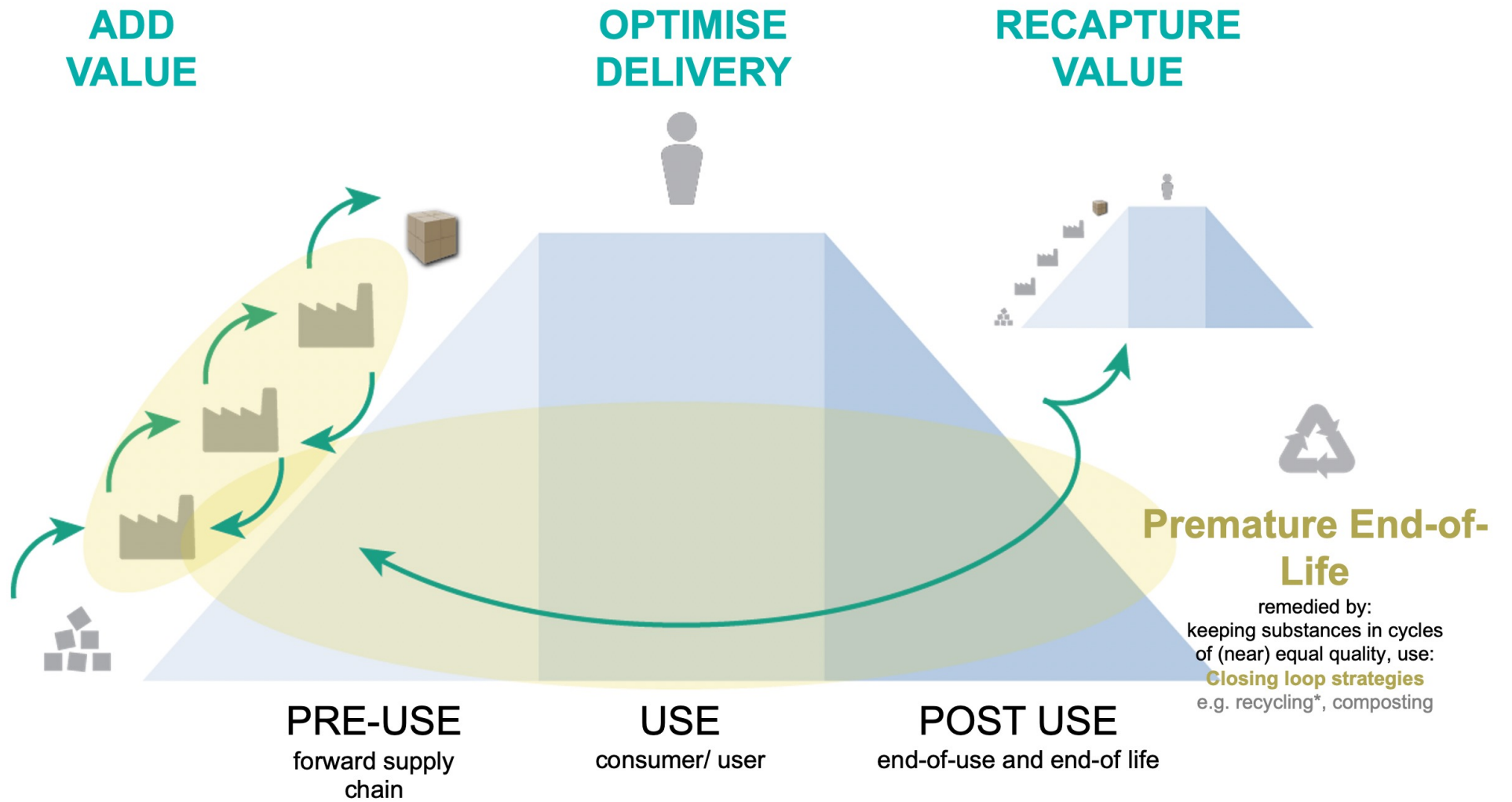
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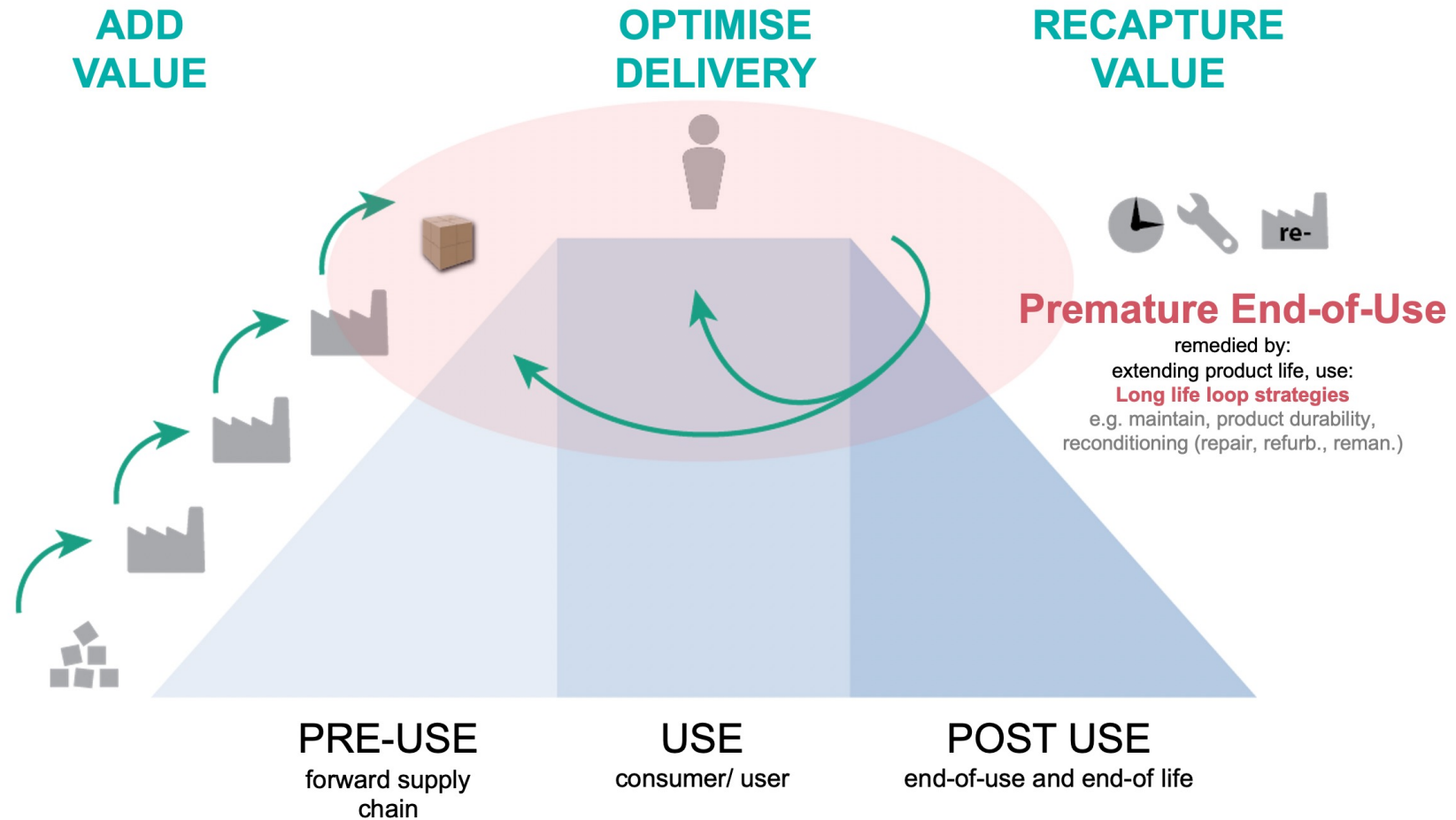
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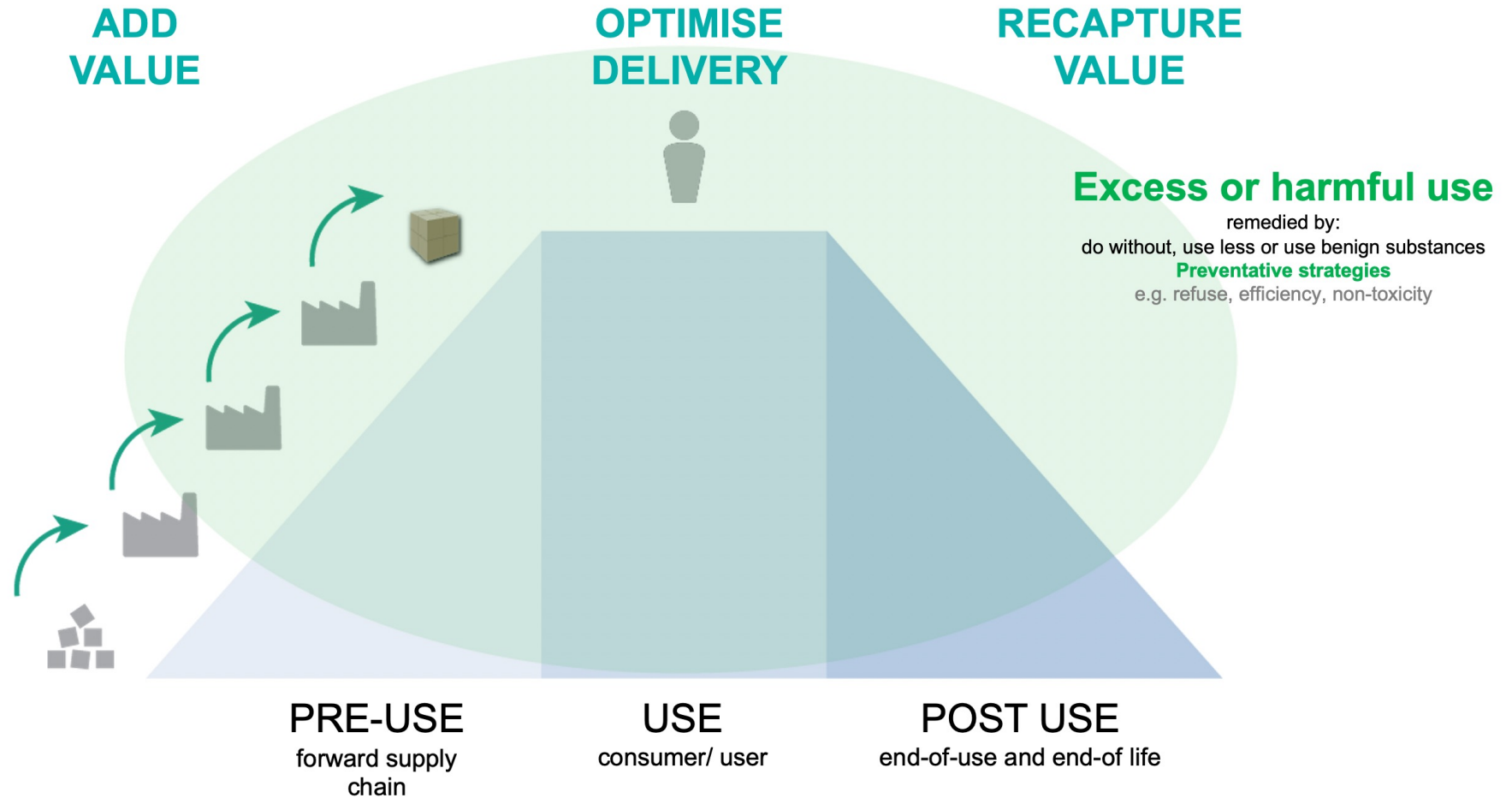
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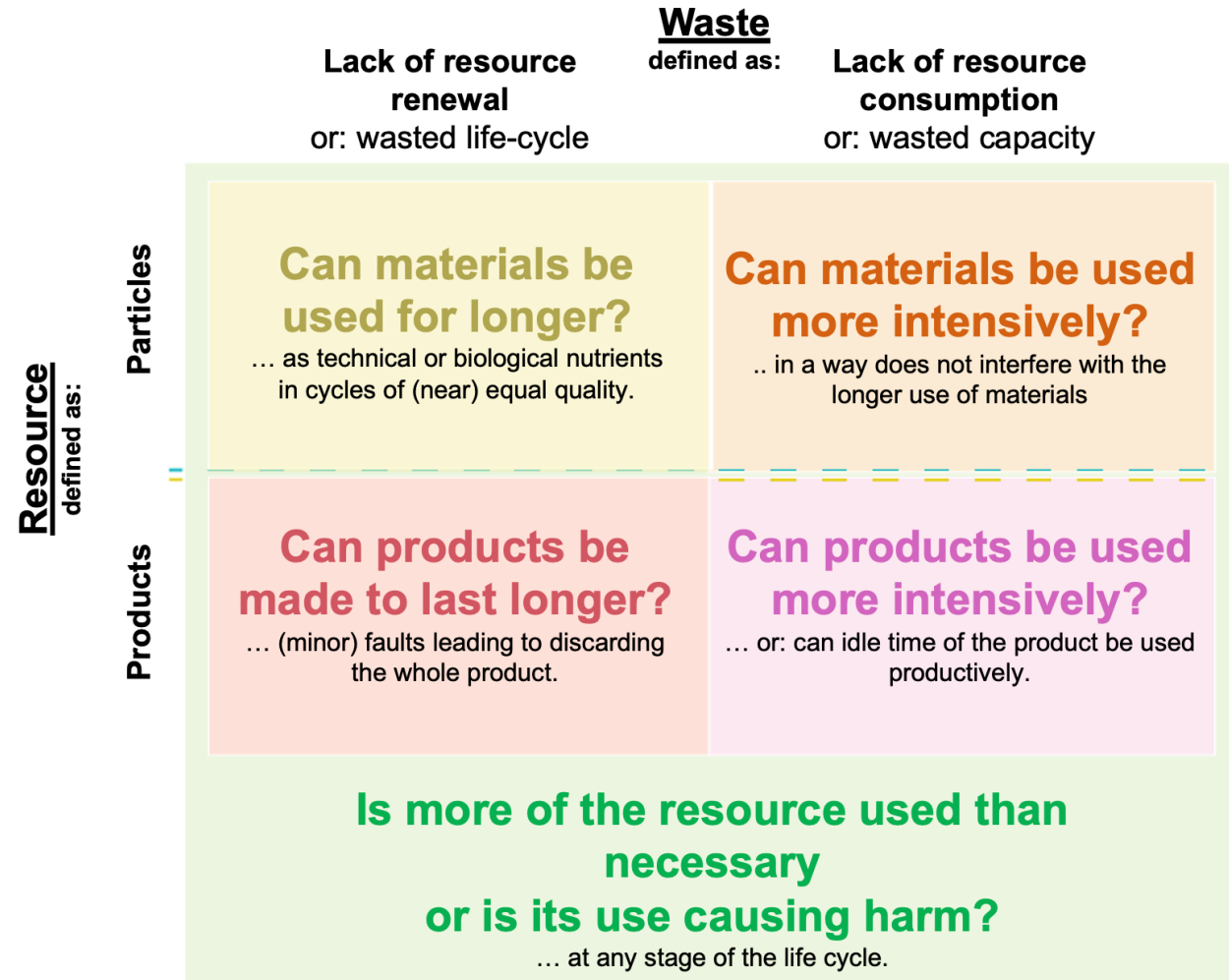
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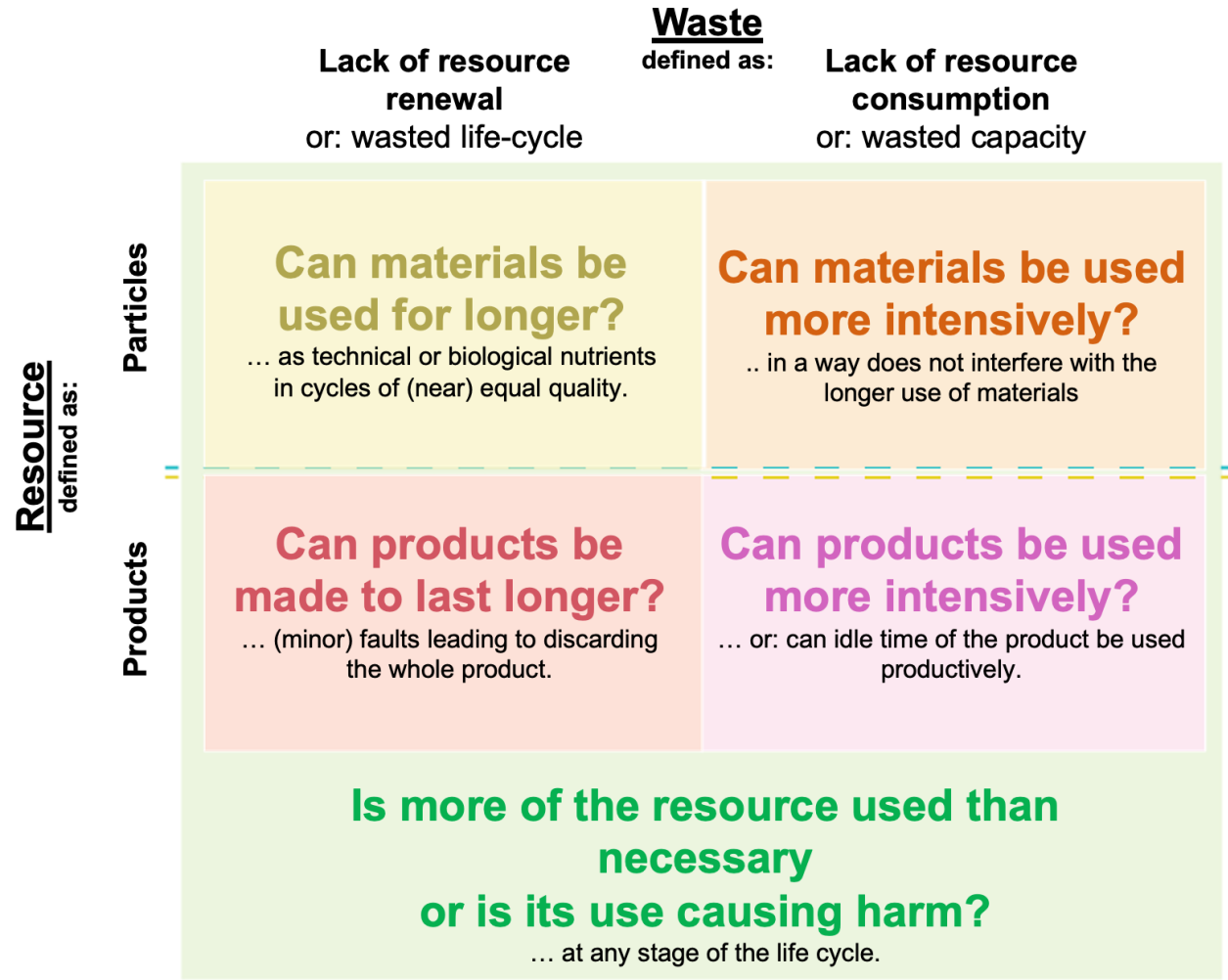
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Adapted from: Blomsma (2018)

STEP 3: Circular Strategy Scanner

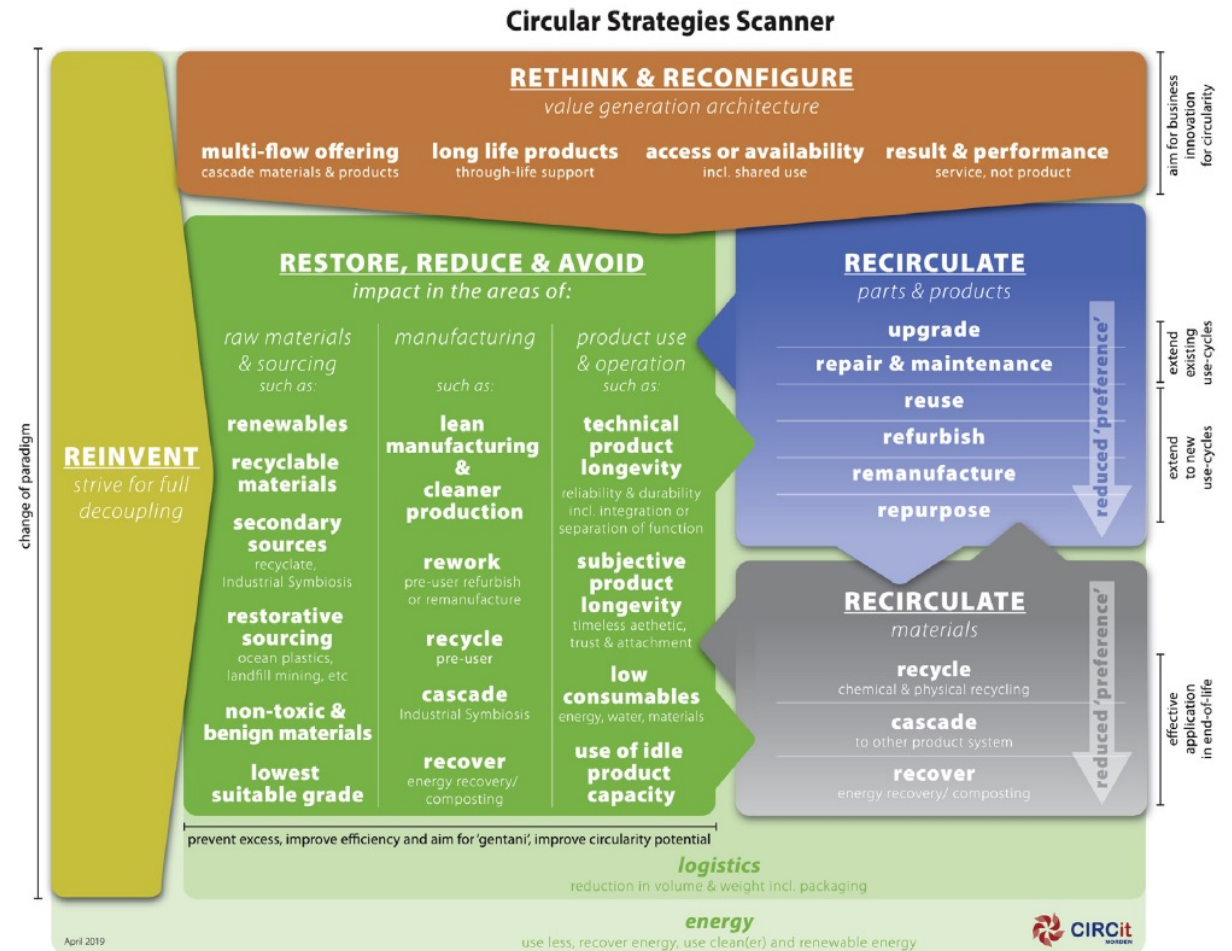
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STEP 3: Circular Strategy Scanner

- ❖ The **Circular Strategy Scanner** is a framework developed to provide **inspiration and guidance** on potential **circular products, process and business concepts** that could be explored and developed.
- ❖ It can be used to both **reflect on current strategies and to find (scan) opportunities**, from incremental part, product or process improvements to rethinking business models and complete reinvention.
- ❖ It incorporates **three core Circular Strategy Levels**. These have then been grouped into **five Circular Strategy Dimensions** (indicated be the different colours in the framework).
- ❖ Their placing also indicates connections between different circular strategies and how choices may affect others (particularly at the Business Model or Paradigm Redesign level)



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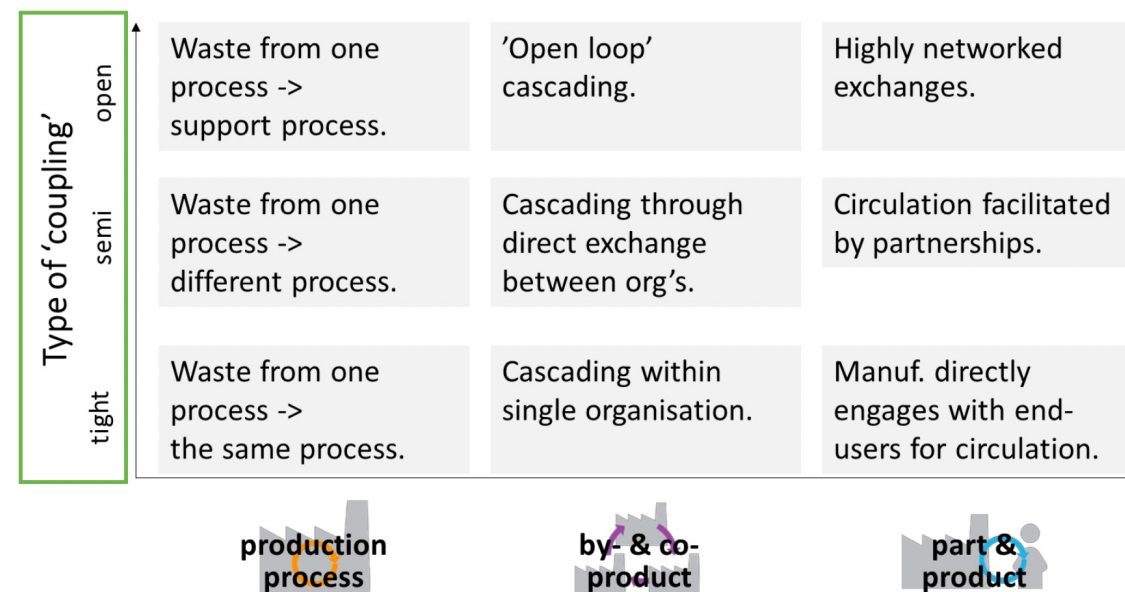
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STEP 4: Circularity Grid

Types of Coupling

- ❖ The Circularity Grid contains a set of **'archetypes'** or **'ideal examples'**. There can of course be a debate where exactly an example or business case should be placed.
- ❖ The Grid is presented as nine discrete boxes - archetypes - but hybrid or 'in between' forms can be found, especially on the **'coupling'** dimension.
- ❖ The Grid is a tool to think through relationships by offering clear and contrasting cases: it is meant for generating insight and learning. Reality is always much messier than the models: but that doesn't mean that the principles are not useful!



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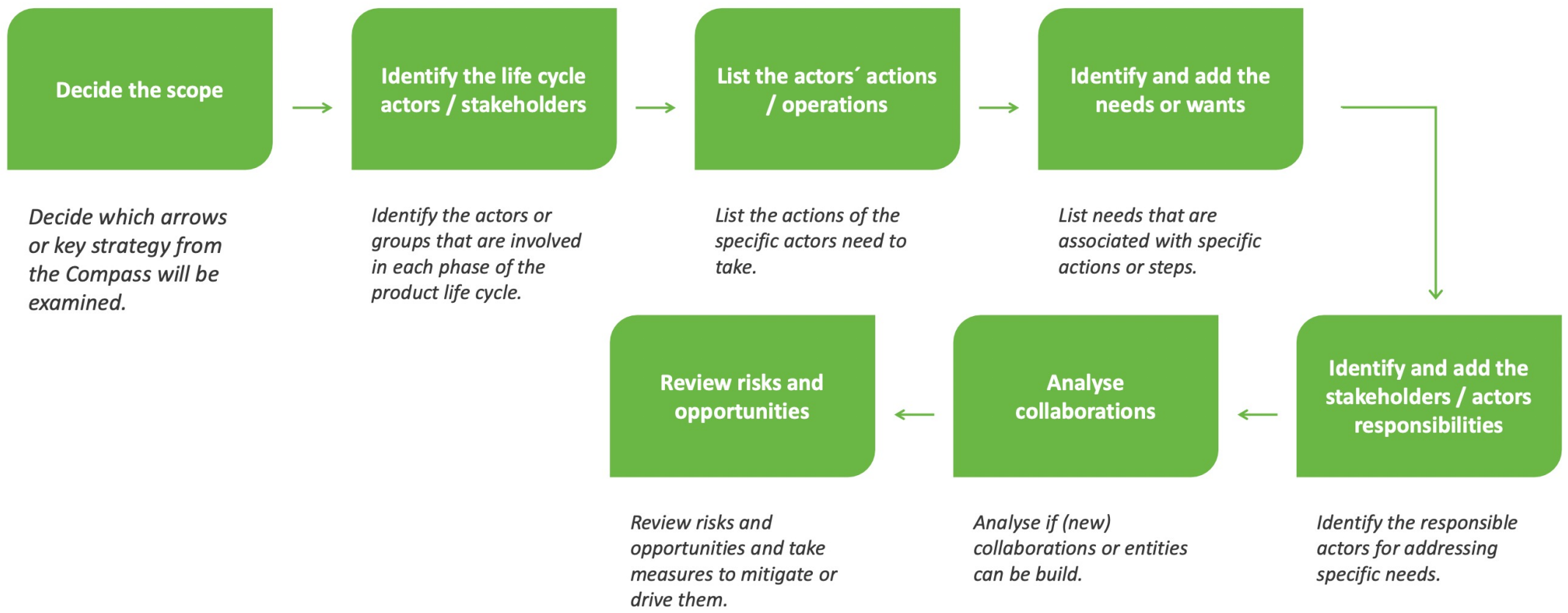
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STEP 5: Activity Cycle

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STEP 5: Activity Cycle

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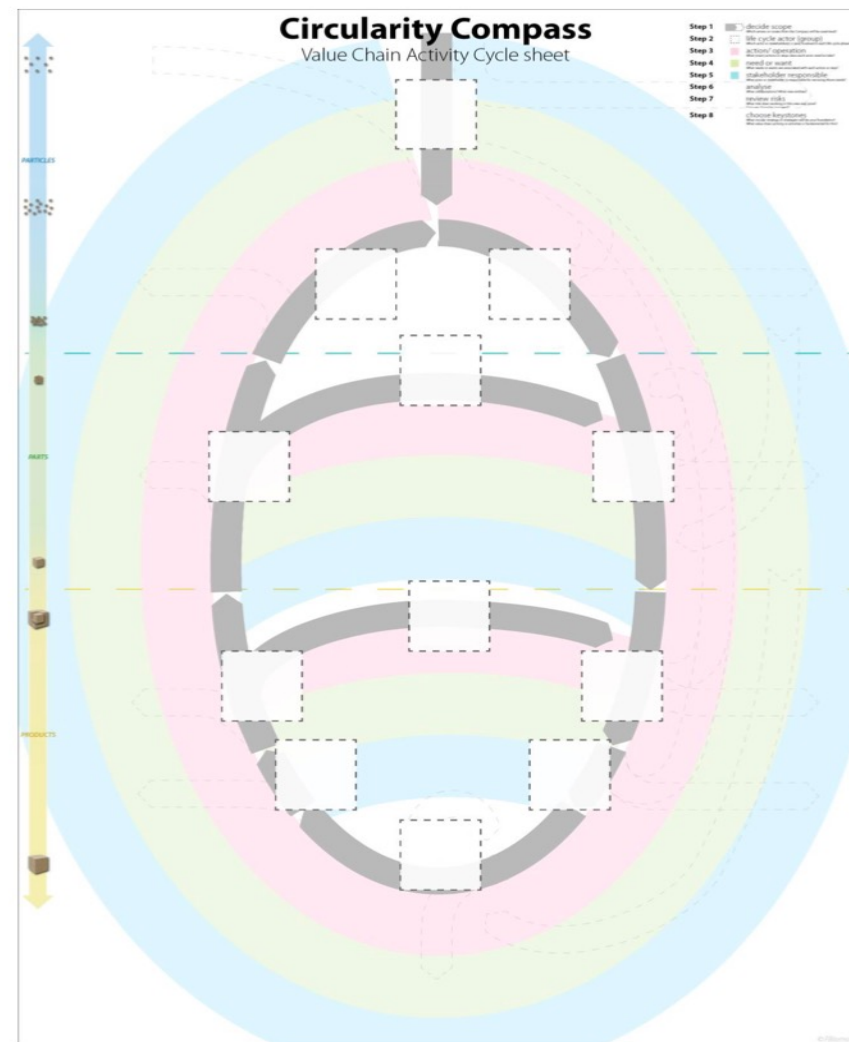
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- The Activity Cycle is based on the characteristics of the Circularity Compass and allows us to illustrate and work along the resource flow of a (product) system along its life cycle.
- The Activity Cycle also provides coloured space to capture details along the value chain regarding specific actions, regarding actors or stakeholders as well as their needs, etc.



Case example | British Sugar

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British Sugar is the sole British producer of sugar from sugar beet, partnering with over 3,000 growers to produce homegrown sugar. It is the leading producer of sugar for the British and Irish food and beverage markets, processing around eight million tonnes of sugar beet and producing up to 1.2 million tonnes of sugar each year, which is over half of the UK's sugar production.

British Sugar is one of the most efficient sugar processors in the world, producing more sugar than 20 years ago on 90,000 hectares smaller land. Their processes result in less than 200 grams of waste for every tonne of sugar produced. They have strong commitments, such as 30% CO2 reduction by 2050.

Their innovative approach to manufacturing also enables them to create a range of by- and co-products, that now make up over 50% of their revenue. These include selling removed soil and stone from the cleaning process for the construction sector, lime from the sugar purification process to the agricultural sector (used to correct soil acidification), food-grade CO2 into industrial refrigeration processes, and waste heat for greenhouses.



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Q&A





Thank you for your attention!

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