



TAKING  
**COOPERATION**  
FORWARD



Training session | 04 November 2020



## Circular business models for SMEs



Luc Schmerber | BWCON

# CONTENT

1 Objective

2 Rationale for the circular transformation of businesses

3 Typology of existing circular business models for businesses

4 Examples from the industry

5 Supporting materials - tools



# OBJECTIVE

- Provide an overview of most popular approaches to circular business models for businesses
- Provide real examples of industrial circular business models
- Provide tools supporting the application of the models in practice



# RATIONALE FOR THE CIRCULAR TRANSFORMATION OF BUSINESSES (0)

- The content of the following slides does NOT address the rationale for the circular transition of the economy in general.
- It presents an overview of arguments making it potentially **economically rationale and sensible for each single business** to engage into its own circular transition.



# RATIONALE FOR THE CIRCULAR TRANSFORMATION OF BUSINESSES (1)

- Reduce dependance on scarce / non-renewable resources
    - > Resources costs volatility
    - > Supply unsure
    - > High price fluctuation for scarce resources
  
  - Contribution to mitigate climate change
- Increase of business resilience against external shocks



# RATIONALE FOR THE CIRCULAR TRANSFORMATION OF BUSINESSES (2)

- Preempt regulatory pressures down the line
  
- Improved customer interaction and loyalty
  - > Turn consumers into users
  - > Improved personalization, customization and retention
  
- Increase the attractiveness of the brand
  - > Customer's expectations are rising
  - > Investment criteria are changing



# RATIONALE FOR THE CIRCULAR TRANSFORMATION OF BUSINESSES (3)

- Less product complexity and more manageable life cycles
  - Accelerate digital transformation
- Increase in productivity



# T TYPOLOGY OF EXISTING CIRCULAR BUSINESS MODELS FOR SMES

## Circular business models

Definitions

Approach 1. Ellen Mac Arthur Foundation

Approach 2. Accenture

Approach 3. PwC

Approach 4. PBL





# CIRCULAR BUSINESS MODELS - DEFINITION

## Business model:

- “A business model describes the rationale of how an organisation **creates, delivers and captures value.**” (A. Osterwalder, Y. Pigneur, Business Model Generation, 2009)

## Circular business model / circular economy business model

- A circular business model is first a business model
- A circular business model aims at decoupling economic activity from the consumption of finite resources.

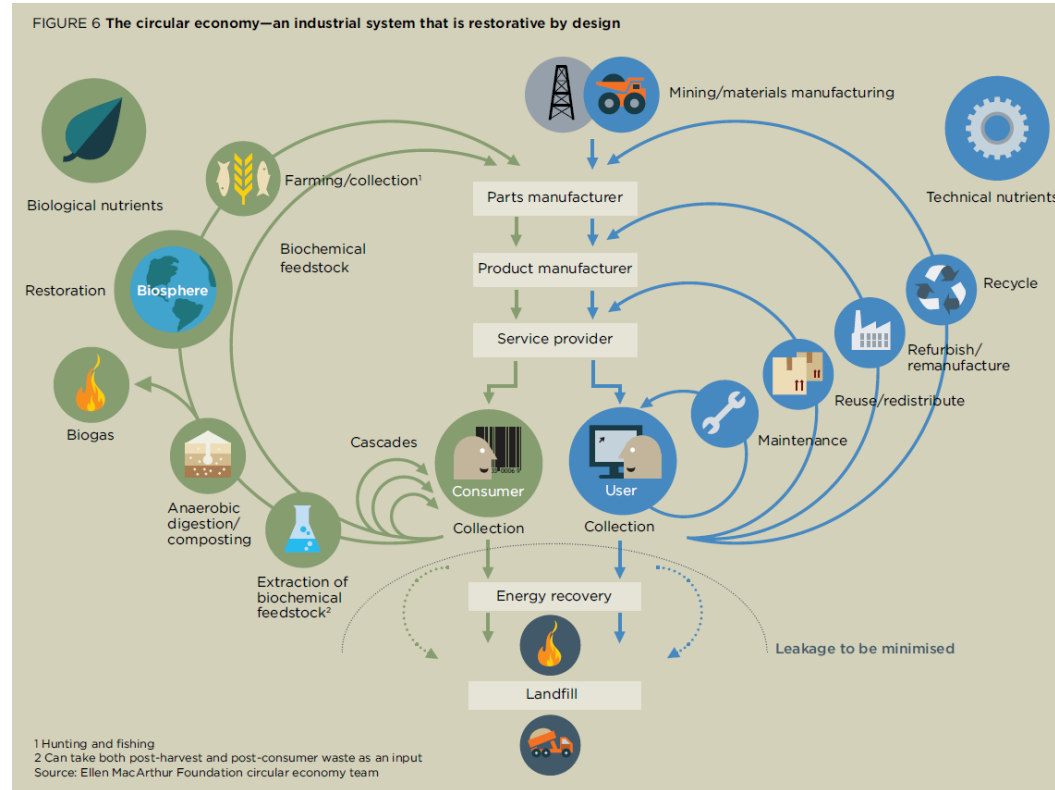


# APPROACH 1. ELLEN MACARTHUR FOUNDATION PRINCIPLES FOR THE CIRCULAR ECONOMY

- Design out waste
- Build resilience through diversity
- Rely on energy from renewable sources
- Think in systems
- Waste is food



# APPROACH 1. ELLEN MACARTHUR FOUNDATION RESTORATIVE INDUSTRIAL SYSTEM



# APPROACH 1. ELLEN MACARTHUR FOUNDATION

## 4 SOURCES OF VALUE (1)

- The **‘power of the inner circle’**:
  - > minimising comparative material usage vis-à-vis the linear production system
  - > the less a product has to be changed in reuse, refurbishment and remanufacturing and the faster it returns to use, the higher the potential savings on the shares of material, labour, energy, and capital embedded in the product
  
- The **‘power of circling longer’**:
  - > maximising the number of consecutive cycles (be it reuse, remanufacturing, or recycling) and/or
  - > maximising the time in each cycle.



# APPROACH 1. ELLEN MACARTHUR FOUNDATION

## SOURCES OF VALUE (2)

- The **‘power of cascaded use’**:
  - > diversifying reuse across the value chain, as when cotton clothing is reused first as second-hand apparel, then crosses to the furniture industry as fibre-fill in upholstery, and the fibre-fill is later reused in stone wool insulation for construction—in each case substituting for an inflow of virgin materials into the economy—before the cotton fibres are safely returned to the biosphere.
  
- The **‘power of pure circles’**:
  - > uncontaminated material streams increase collection and redistribution efficiency while maintaining quality, particularly of technical materials,
  - > which, in turn, extends product longevity and thus increases material productivity.



# APPROACH 1. ELLEN MACARTHUR FOUNDATION RESOURCES

- Ellen McArthur Foundation, 2013. Towards the Circular Economy: Economic and business rationale for an accelerated transition. Available at: <https://www.ellenmacarthurfoundation.org/publications/towards-the-circular-economy-vol-1-an-economic-and-business-rationale-for-an-accelerated-transition>
- Ellen McArthur Foundation. WHAT CAN I DO WITHIN MY BUSINESS? Available: <https://www.ellenmacarthurfoundation.org/explore/what-can-i-do-within-my-business>



# APPROACH 2. ACCENTURE

## SOURCES OF VALUE

- ❑ **Wasted resources** are materials and energy that cannot be continually regenerated, but instead, are consumed and forever gone when used.
- ❑ Products with **wasted lifecycles** have artificially short working lives or are disposed of even if there is still demand for them from other users.
- ❑ Products with **wasted capability** sit idle unnecessarily; for instance, cars typically sit unused for 90 per cent of their lives.
- ❑ **Wasted embedded values** are components, materials, and energy that are not recovered from disposed of products and put back into use.



# APPROACH 2. ACCENTURE

## FIVE MAIN CIRCULAR BUSINESS MODELS

Reform use of resources



### CIRCULAR SUPPLY CHAIN

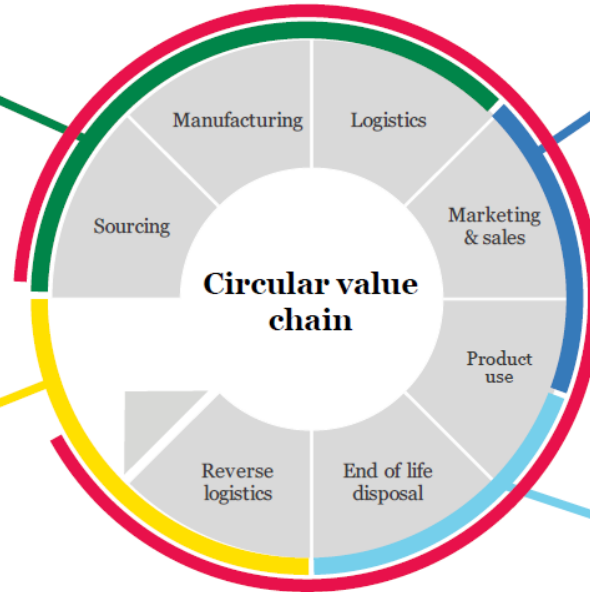
Use of renewable energy, bio-based or potentially completely recyclable materials

Recover value in waste



### RECOVERY & RECYCLING

Recovery of usable resources or energy from waste or by-products



Optimise capacity use



### SHARING PLATFORM

Increased usage rates through collaborative models for usage, access, or ownership

Offer outcome oriented solutions



### PRODUCT AS A SERVICE

Offering of products for use with retention of product ownership which incentivises increase in resource productivity along the whole life cycle

Extend life cycles



### PRODUCT LIFE EXTENSION

Extension of the life cycle through repair, maintenance, upgrading, resale and remanufacturing



Source: Circular economy business models for the manufacturing industry





















# APPROACH 2. ACCENTURE

## FIVE BUSINESS MODELS - SUB-MODELS

### Companies can explore the sub-models individually or as powerful combinations

Business model	Sub-model	Description
 <b>Circular Supply Chain</b>	 Build to last	Design products that are durable and easy to repair (e.g. modular).
	 Circular supplies	Use recyclable materials in production, e.g. renewable and bio-based materials, chemicals & energy to increase recovery rates.
 <b>Sharing Platform</b>	 Share	Develop solutions that enable increased use of capacity.
 <b>Product as a service</b>	 Product as a service	Offer customers to use a product against a subscription fee or usage based charges instead of owning it.
	 Performance as a service	Offer customers to buy a pre-defined service and quality level and commit to guaranteeing a specific result.
 <b>Product Life-extension</b>	 Repair & Maintain	Deliver repair and maintenance services to extend the life of existing products in the market.
	 Upgrade	Improve product performance by upgrading existing components with newer ones.
	 Resell	Resell products that have reached their useful life to second and third hand markets.
	 Remanufacture	Take back and perform industry-like restoration or improvement of original functionality of products and remarket them with lower price.
 <b>Recovery &amp; Recycling</b>	 Recycle / upcycle	Collect and recover materials of end-of-life products and reuse them in own production.
	 Return	Return wasted parts and materials to the source (e.g. waste and by-products from own production).

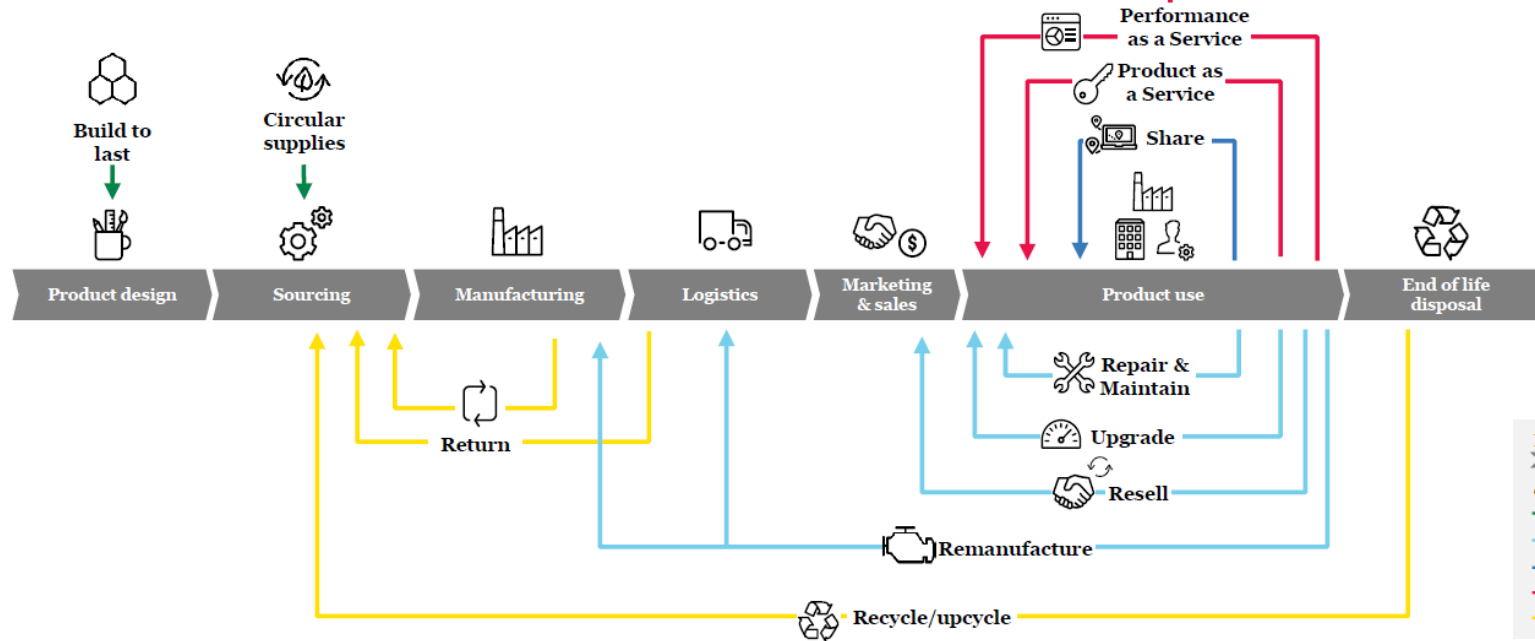
**Example synergy:**  
Modular product design enables enhanced reparability and upgradeability



Source: Circular economy business models for the manufacturing industry

# APPROACH 2. ACCENTURE FIVE BUSINESS MODELS - ILLUSTRATION

*As a service models are mostly concerned with the product use phase, but address inefficiencies across the value chain*



## Additional circular business models

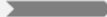
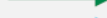




- ### Circular supply chain
- Recycled direct materials
  - Sustainable indirect materials

- ### Sharing platform
- Virtual sharing platform
  - Physical sharing platform

- ### Recovery & Recycling
- Recover
  - Downcycle

- ### Product life extension
- Restore
  - Repurpose
  - Refresh

**LEGEND**

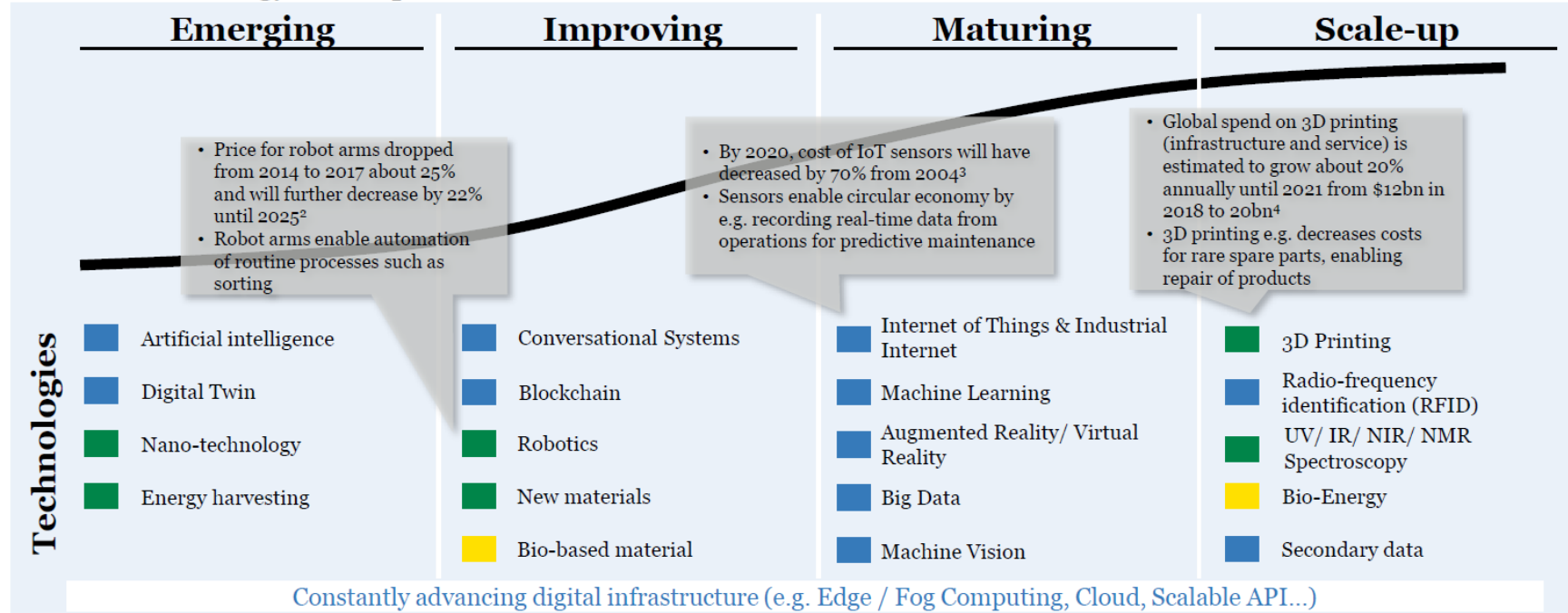
-  Linear value chain
-  Circular Supply Chain
-  Product Life Extension
-  Sharing platform
-  Product as a service
-  Recovery & Recycling

Source: Circular economy business models for the manufacturing industry



# APPROACH 2. ACCENTURE TECHNOLOGIES FOR THE CIRCULAR ECONOMY

Level of technology development<sup>1</sup>



Sources: 1: Accenture, Appendix 2 for more details, 2: IEEE Engineering360; 3: Bank of America, Merrill Lynch; 4: International Data Corporation (IDC)

Legend: Type of technology ■ Digital ■ Physical ■ Biological

Source: Circular economy business models for the manufacturing industry



# APPROACH 2. ACCENTURE RESOURCES

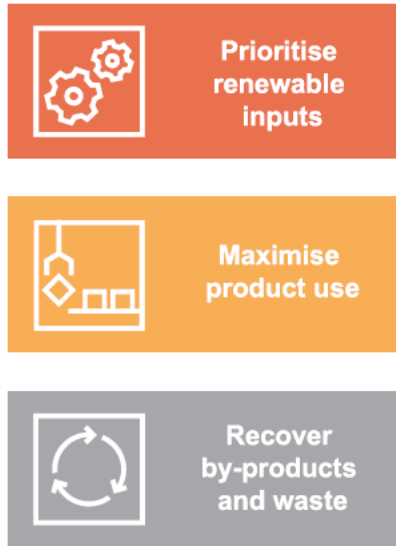
- Lacy, P., et al., 2015. Circular Advantage: Innovative Business Models and Technologies to Create Value in a World Without Limits to Growth. Available at: [https://www.accenture.com/t20150523T053139\\_w\\_/us-en/\\_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Strategy\\_6/Accenture-Circular-Advantage-Innovative-Business-Models-Technologies-Value-Growth.pdf](https://www.accenture.com/t20150523T053139_w_/us-en/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Strategy_6/Accenture-Circular-Advantage-Innovative-Business-Models-Technologies-Value-Growth.pdf)
- Circular economy business models for the manufacturing industry - Circular Economy Playbook for Finnish SMEs. Available at: <https://www.sitra.fi/en/publications/circular-economy-business-models-manufacturing-industry/>
- Waste to Wealth - Executive Summary. Available at: <https://thecirculars.org/content/resources/Accenture-Waste-Wealth-Exec-Sum-FINAL.pdf>



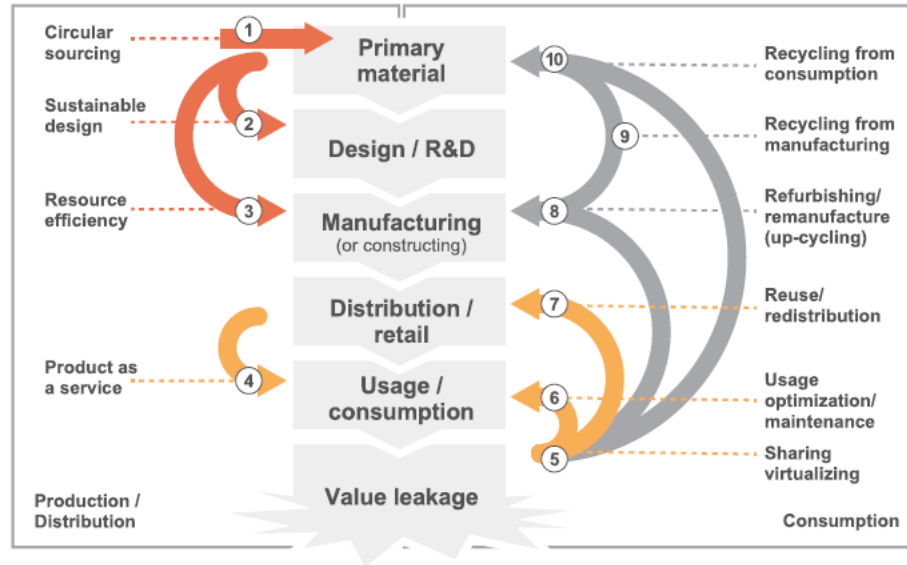
# APPROACH 3. PWC

## 3 PRINCIPLES - 10 STRATEGIES (1)

### 3 Principles



### & 10 Corresponding Strategies



Source: PwC (2019) The road to Circularity



# APPROACH 3. PWC

## 3 PRINCIPLES - 10 STRATEGIES (2)

CE initiatives		Definitions
Prioritise renewable inputs	① Circular sourcing	Replace finite resources / materials with renewable, bio-based, or recycled materials in the production process
	② Sustainable design	Design products - and select raw materials - such that they can be effectively disassembled, reused, repaired and up-cycled
	③ Resource efficiency	Optimise usage of raw materials / resources – minimise waste – in the production process
Maximise product use	④ Product as a service	Provide a service in areas that were traditionally sold as products; increases the product lifecycle through repurposing at the end of usage
	⑤ Sharing/ virtualising	Share durable assets such as cars, rooms, appliances, and digitise products to increase their lifetime (e.g., books, music, shopping, autonomous vehicles etc.)
	⑥ Usage optimisation/ maintenance	Increase performance / efficiency of a product and prolong life through maintenance
	⑦ Reuse/ redistribution	Purchase and sell second-hand and previously owned products to increase product lifecycle
Recover by-products and waste	⑧ Refurbishing/ remanufacture	Remanufacture products or components for a new usage, instead of down-recycling
	⑨ Industrial symbiosis Recycling from manufacturing	Waste or by-products from manufacturing become the inputs for another product
	⑩ Recycling from consumption	Recycle discarded materials after the end of consumption

Source: PwC (2019) The road to Circularity



# APPROACH 3. PWC

## ESSENTIAL TECHNOLOGIES



### Artificial Intelligence (AI)

**Technology:** software algorithms that are automating complex decision-making tasks to mimic human thought processes and senses

**Benefits:** able to learn, understand, reason, plan and act when fed with data



### Internet of Things (IoT)

**Technology:** ecosystem of sensors, embedded computers, and “smart” devices

**Benefits:** able to communicate among themselves and with private/public cloud services in order to collect, analyse and present data about the physical world



### Additive Manufacturing/3-D Printing

**Technology:** creating three-dimensional objects based on digital models by “printing” successive layers of material

**Benefits:** various materials can be used, e.g. wood, glass, living cell for bio-printing; minimise waste



### Robotics

**Technology:** machines with enhanced sensing, control and intelligence used to automate, augment or assist human activities

**Benefits:** increase efficiency and productivity



### Blockchain

**Technology:** digital ledger that uses software algorithms to record and confirm transactions with reliability and anonymity

**Benefits:** increase traceability, transparency, efficiency, enhance security



### Drones

**Technology:** unmanned aerial vehicles

**Benefits:** extremely versatile due to great variation in their capacity, size, abilities and functions



### Virtual Reality (VR)

**Technology:** implies a complete immersion experience, which is 100% computer-generated

**Benefits:** innovations can be presented without actually producing them



### Augmented Reality (AR)

**Technology:** offers a real world experience with computer-generated overlays









**Benefits:** mixture of real and computer world



Source: PwC (2019) The road to Circularity



# APPROACH 3. PWC TECHNOLOGIES & STRATEGIES

CE initiatives									
Prioritise renewable inputs	① Circular sourcing	✓				✓			
	② Sustainable design	✓		✓				✓	
	③ Resource efficiency	✓		✓	✓	✓	✓		
Maximise product use	④ Product as a service		✓						
	⑤ Sharing/virtualising		✓					✓	✓
	⑥ Usage optimisation/maintenance		✓	✓			✓	✓	✓
	⑦ Reuse/redistribution	✓							
Recover by-products and waste	⑧ Refurbishing/remanufacture	✓	✓	✓	✓	✓			
	⑨ Industrial symbiosis Recycling from manufacturing					✓			
	⑩ Recycling from consumption	✓	✓		✓	✓			

Source: PwC (2019) The road to Circularity





# APPROACH 3. PWC RESOURCES

- PwC (2019), The road to Circularity. Available at <https://www.pwc.nl/en/assets/documents/pwc-the-road-to-circularity-en.pdf>
- PwC (2019), The Essential Eight: your guide to the merging technologies revolutionising business now. Available at: <https://www.pwc.com/gx/en/issues/technology/essential-eight-technologies.html>



# APPROACH 4. PBL (NETHERLANDS ENVIRONMENTAL ASSESSMENT AGENCY)

## 3 TYPES OF CE TRANSITIONS

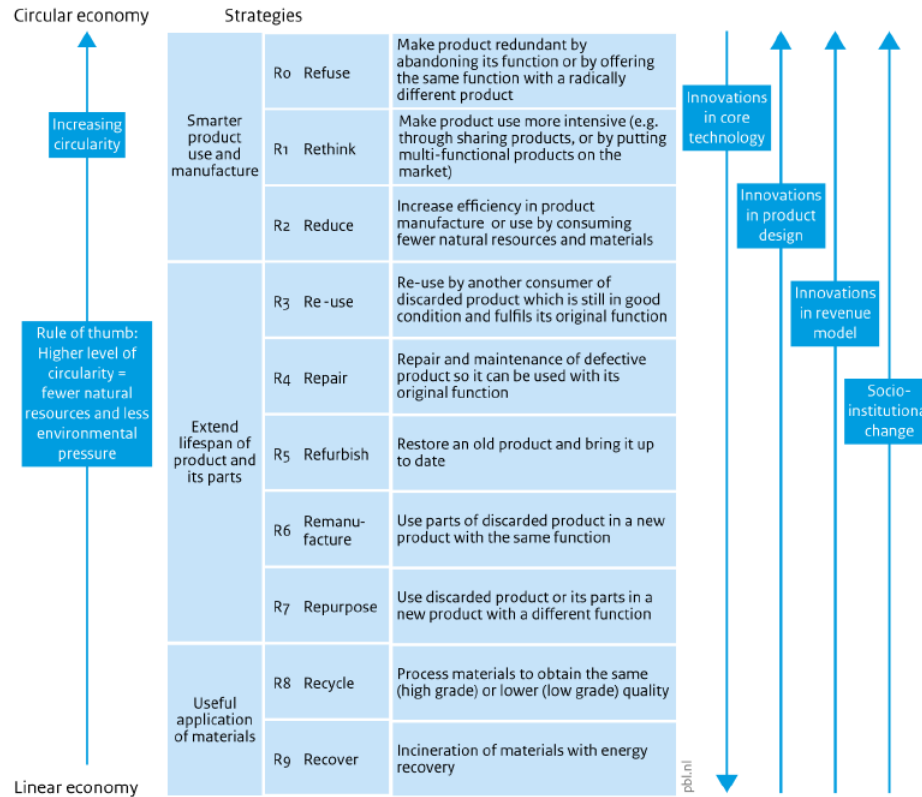
Three types of CE transitions may be distinguished with regard to the use of technology in product chains:

- CE transitions in which the emergence of **specific, radically new technology is central and shapes the transition**. This means radical innovation in core technology, i.e. the specific technology around which a product is centred. Socio-institutional change is needed to give the new technology a place in society. A typical example is the recent emergence of bioplastic which has already secured its place.
- CE transitions in which **socio-institutional change is central** and where technological innovation plays a secondary role (incremental innovation in core technology). A good, perhaps somewhat extreme example is that of packaging-free shops.
- CE transitions in which **socio-institutional change is central**, but are **facilitated by enabling technology**. An example is the transition to what has become known as the sharing economy. This transition from owning a product to purchasing its services primarily involves socio-institutional change, but this is not possible without information technology to link service providers and users.



# APPROACH 4. PBL

## CIRCULAR STRATEGIES IN PRODUCTION CHAIN



TAKING COOPERATION FORWARD



# APPROACH 4. PBL RESOURCES

- Potting, J., et al., 2017. Circular Economy: Measuring Innovation in the Product Chain. Available at: <http://www.pbl.nl/sites/default/files/cms/publicaties/pbl-2016-circular-economy-measuring-innovation-in-product-chains-2544.pdf>



# EXAMPLES FROM THE INDUSTRY

## Circular supply chain

- Renewable Resources
- Efficiency & Waste Prevention

## Sharing Platforms

## Product as a Service

## Reuse & Repair & Product-life Extension

## Waste as a Resource

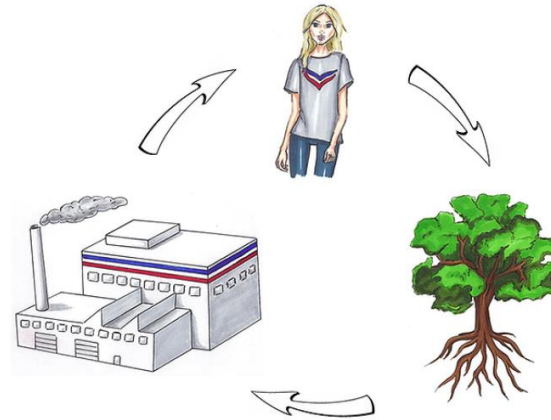


# CIRCULAR SUPPLY CHAIN EXAMPLES

## TRIGEMA - Cradle to Cradle clothing (<https://www.trigema.de/en/sustainability/cradle-to-cradle/#>)

### Cradle-to-Cradle

TRIGEMA Change<sup>®</sup> is part of a new strategy towards healthy and environmental friendly clothing: Organic products made of 100% organic cotton optimized according to Cradle-to-Cradle<sup>®</sup> standards. All Cradle-to-Cradle-certified products made by TRIGEMA have been optimised for biological recycling in cooperation with the international environmental institute EPEA.



### The Cradle-to-Cradle<sup>®</sup> Principal

This system is closely modelled on the natural systems. Its foundation are closed circuits, which do not generate waste and help us to preserve valuable resources for future generations.

Features of the organic garments we developed:

- recyclable
- utilise resources instead of consuming them
- 100 per cent composed of wholesome, non-critical substances
- of particularly high quality
- their raw materials have been produced in an ecologically safe manner
- the resources used for their production can be reinserted into the nutrient cycle when the product reaches the end of its useful life
- they never turn into waste
- deren Materialien ökologisch erzeugt werden
- neither their manufacturing process nor the products themselves generate any unusable or toxic substances

In short, these products are: Organic, Cradle-to-Cradle-certified, Produced locally and fair.



# CIRCULAR SUPPLY CHAIN EXAMPLES

neustark- building on CO2 (<https://www.neustark.com/>)

## The Challenge...

Concrete is the most widely used manmade material in the world.  
It comes with two big environmental challenges:

1

The production of concrete is responsible for  
**6% of global CO<sub>2</sub> emissions.**

If it was ranked as a country,  
the concrete industry would be the 3rd  
largest emitter in the world.

2

With over 1 billion tons/year, concrete from  
construction & demolition is the  
**world's single largest waste stream.**

This number is set to double decade after  
decade.

## Our Solution

A scalable containerized  
technology

+

Setting up a  
value chain

1

Our partners  
capture carbon emissions  
from concrete production  
from the atmosphere.

2

The CO<sub>2</sub> is permanently turned  
into calcite stone inside the  
pores of the demolished  
concrete aggregate.

The CO<sub>2</sub> treatment positively  
alters the properties of the  
demolished concrete.

3

This carbonated aggregate is  
used instead of mined  
aggregates for fresh concrete.

Through the carbonated  
aggregate, less cement is  
used in concrete production.



# SHARING PLATFORMS EXAMPLES

Kiertonet, Kiertonet by Kiertoa Oy is an online auction platform, where public-sector organisations can easily sell goods, property, equipment and machinery they no longer need (<https://kiertonet.fi/>)



Silta

750 €

**Päättynyt**

MYTY



Hoffmann MU 2 lohenpyrstö  
liitoskone

370 €

**Päättynyt**

MYTY



Kirjastoauto Volvo B10M

4 450 €

1.11. 20:00



Perävaunu Kafi

1 100 €

1.11. 20:00



Metos astianpesukone

440 €

28.10. 18:00



YRITYS

istumistieporras-70938



Hätäpoistumistieporras

650 €

28.10. 19:00



Lukkoja

425 €

**Päättynyt**

MYTY



Trukki

900 €

28.10. 17:00





# SHARING PLATFORMS EXAMPLES

- [Airbnb](#), Airbnb is a platform for flat sharing
- [AirFaas](#), Combi Works runs AirFaas, a platform for production equipment
- [Blablacar](#), Blablacar is an online marketplace for carpooling
- [Blox Car](#), Blox Car enables people to rent their car out on an hourly, daily or weekly basis
- [Cine.equipement](#), Cine.equipement is a marketplace for film equipment
- [Couchsurfing](#), CouchSurfing is a global homestay and social networking service accessible, part of the gift economy where hosts are not allowed to charge for lodging
- [eRENT](#), eRENT is a Track & Rent Platform for equipment management
- [Flinc](#), Flinc is a Ridesharing platform for employees of bigger companies



# PRODUCT AS A SERVICE EXAMPLES

Fluid Intelligence offers an oil-monitoring system or lubrication as a service  
(<https://www.fluidintelligence.fi/>)



## Connect your oils to act early

Fluid Eye® is an intelligent maintenance solution. It foresees fluid performance changes on your machinery so early that you have time to make cost-effective maintenance decisions and prevent downtimes.

It's ideal for raw material and energy production, process industries, logistics and material handling.

**See** details in real-time

**Smart** analytics

It **Speaks** to your team

**Save** by acting early



# PRODUCT-LIFE EXTENSION EXAMPLES

Konecranes' Lifecycle Care service concept extends the life cycle of industrial equipment and maximises their safety and productivity (<https://www.konecranes.com/parts>)

## Parts design and manufacturing capabilities



### Rebuilding

A new part is not always the best answer. Urgent repairs can sometimes be accomplished by rebuilding or refurbishing in less time than it would take to order a new part or component, especially with long lead time items. Stocking rebuilt motors, gear cases and brakes for spares or backup is an option that can reduce inventory costs.



### Reverse engineering

Replacement parts can be manufactured through reverse engineering for any make and model of overhead crane. Reverse engineering can help solve the problem when crane parts are obsolete or the OEM is no longer in business. It allows for enhancements to the material, design or manufacturing process to improve performance and increase lifespan of the part.



### Made-to-order parts

We can make parts to your specification. Manufactured parts can include hooks, rope drums, gears and shafts. Available in select locations, [contact us](#) for details.



### Component and assembly modernisation

In addition to offering new components and assemblies, Konecranes specializes in engineering and modernisation of components and assemblies to replace those that are obsolete or no longer meeting manufacturing and industry standards.



# WASTE AS A RESOURCE EXAMPLES

UpCircle creates Cosmetics from waste (<https://upcirclebeauty.com/pages/our-values/>)

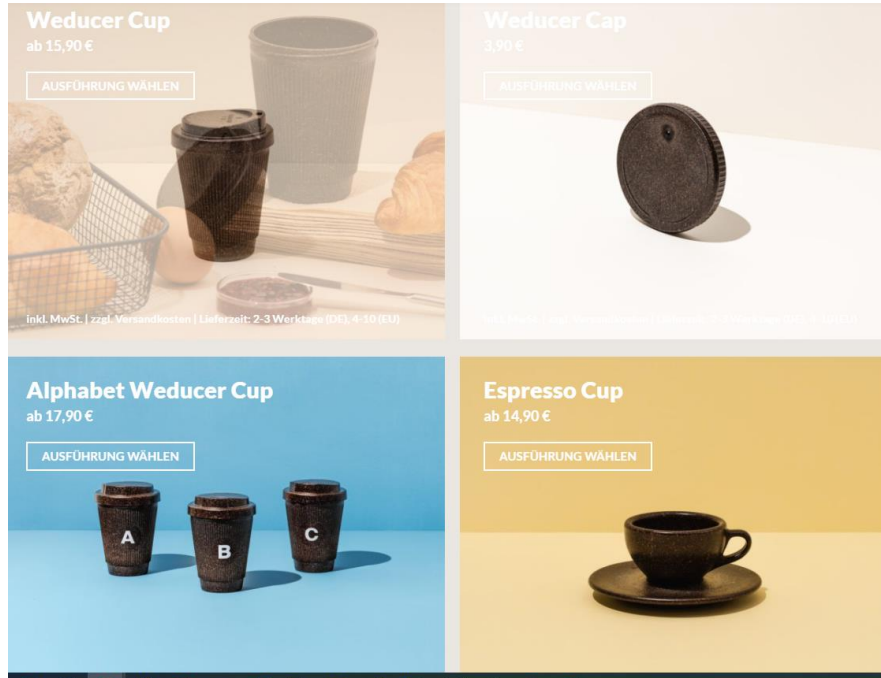


Skincare is a crowded market, and 'natural' is the new "normal". Each product in our range sources and rescues by-products from other industries – the food and drink industry in particular. In recent years we have seen the dramatic rise of natural, then organic, then vegan and cruelty-free beauty, but we believe circular / by-product beauty will be the next step – we're proud to be pioneering that movement.



# WASTE AS A RESOURCE EXAMPLES

Kaffeeform uses a sustainable material made from used coffee grounds and other renewable resources to produce coffee cups (<https://www.kaffeeform.com/>)



# SUPPORTING MATERIALS - TOOLS

Business model canvas

Circular economy business models for the  
manufacturing industry - Circular Economy Playbook  
for Finnish SMEs



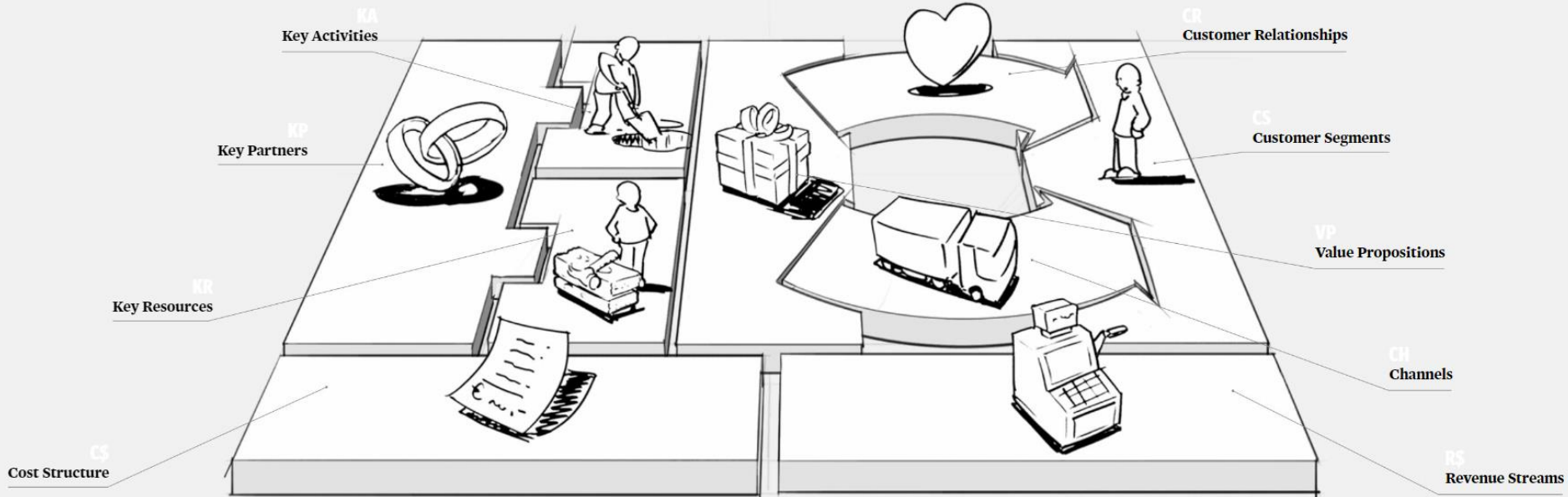
# BUSINESS MODEL CANVAS (1)

## Business model canvas

- Concept developed by Alex Osterwalder & Yves Pigneur in their book Business Model Generation which allows to describe and think through the business model of any business.
- It builds on the assumption that a business model can best be described through **nine basic building blocks** that show the logic of how a company intends to make money.
- The nine blocks cover the four main areas of a business model:
  - > Customer
  - > Offer
  - > Infrastructure
  - > Financial viability

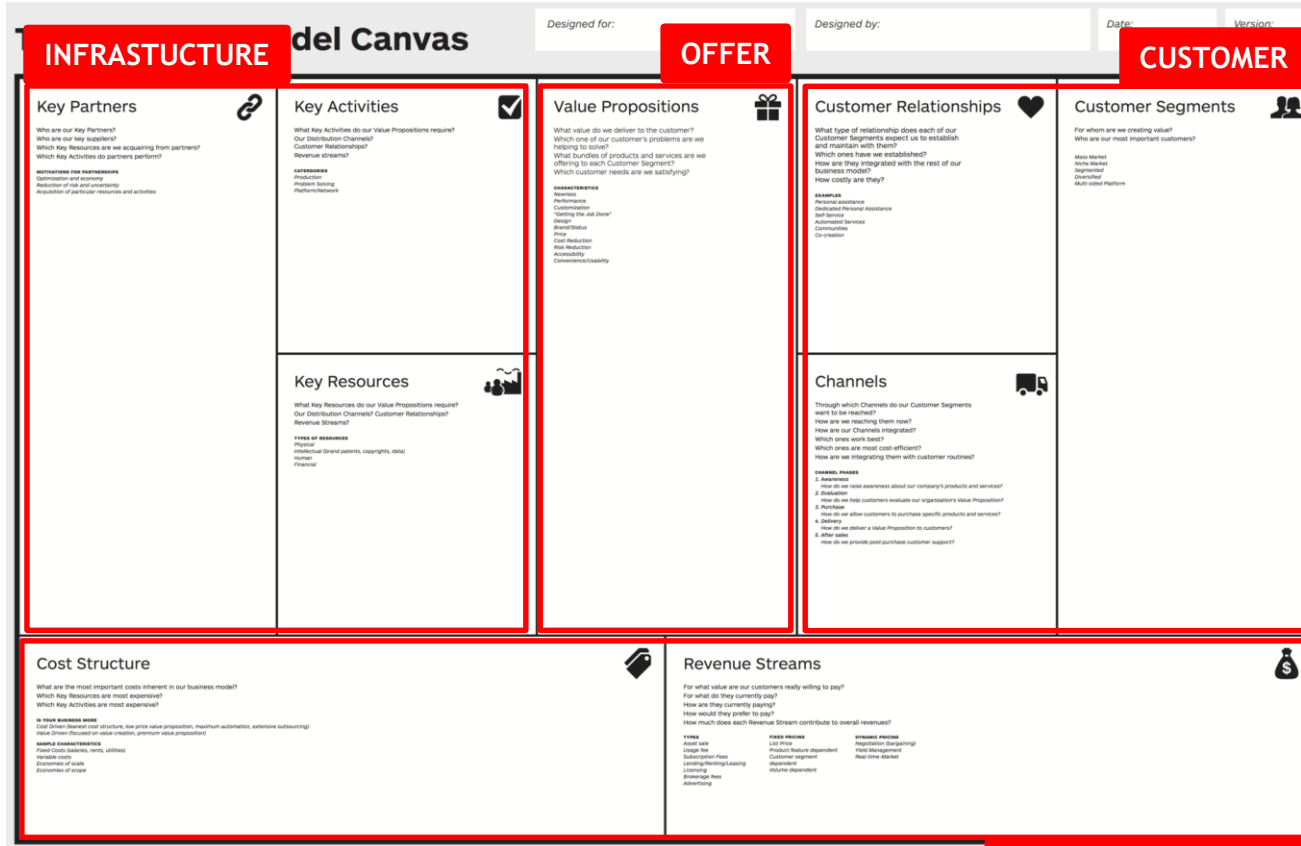


# BUSINESS MODEL CANVAS (2)





# BUSINESS MODEL CANVAS (3)



# SUSTAINBALE BUSINESS MODEL CANVAS

## The Sustainable Business Model Canvas

Designed by:

Designed by:

City:  State:   
Version:



# ADDITIONAL RESOURCES

## Business model canvas

- Business Model Generation. Available at: <https://www.strategyzer.com/books>
- Business Model Canvas Template. Available at: <https://www.strategyzer.com/canvas>

