



Embedding innovation, enterprise and the circular economy into teaching and learning

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Speaker(s):

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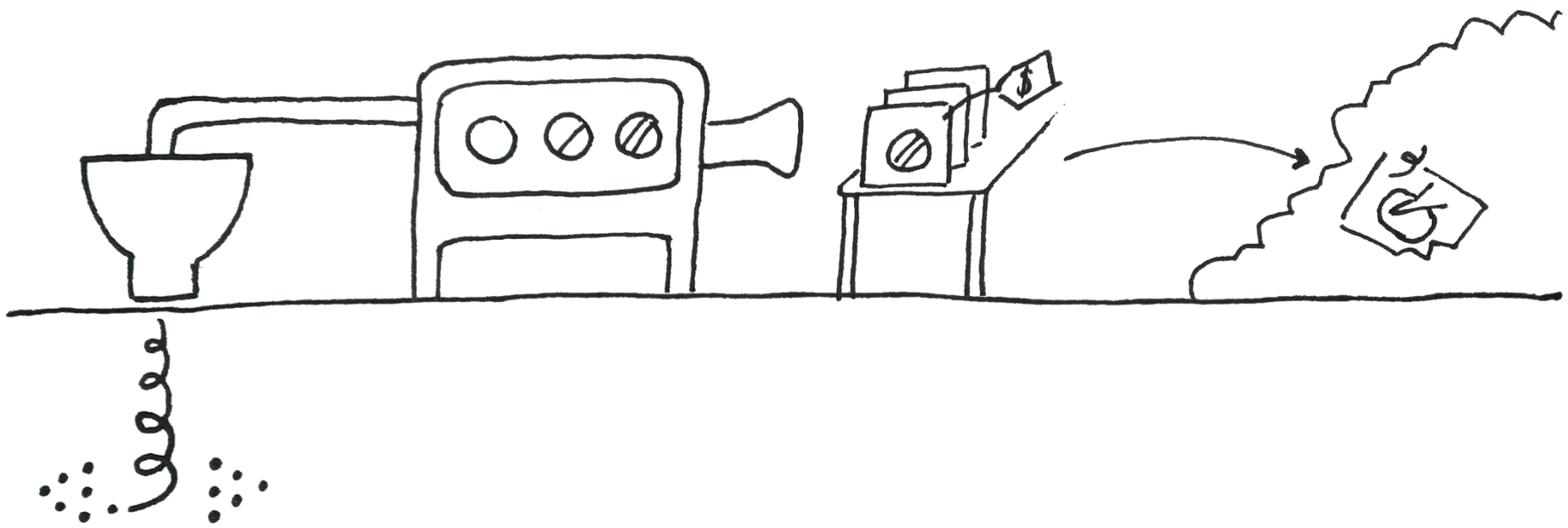


UNIVERSITY of
BRADFORD

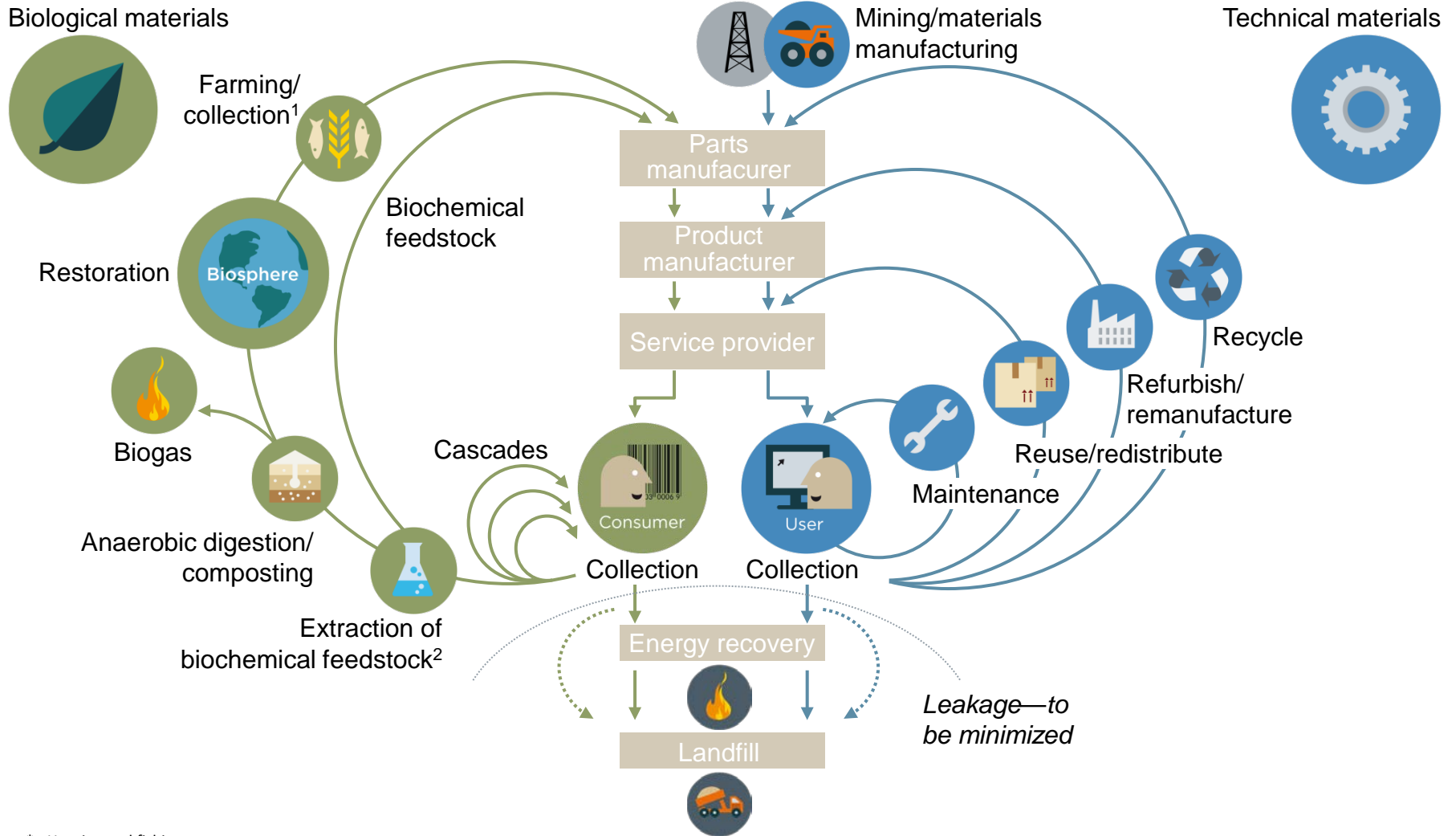
Role of Higher Education in the Circular Economy

Peter Hopkinson

**CIRCULAR
ECONOMY
RESTORATIVE
BY DESIGN**



"REDESIGN"



* Hunting and fishing

** Can take both postharvest and postconsumer waste as an input recycling, wastewater reuse, and other industrial energy efficiency

Source: Ellen MacArthur Foundation circular economy team drawing from Braungart & McDonough and Cradle to Cradle (C2C)

Key concepts and principles

*Think in
Systems*



system optimisation

Waste = food



design out waste

*Renewable
Energy*



run on renewables

*Diversity
and
Resilience*



celebrate diversity

Complementary Frameworks



*Performance
Economy*

*Blue
Economy*

Biomimicry



*Cradle
to Cradle*

*Regenerative
Design*

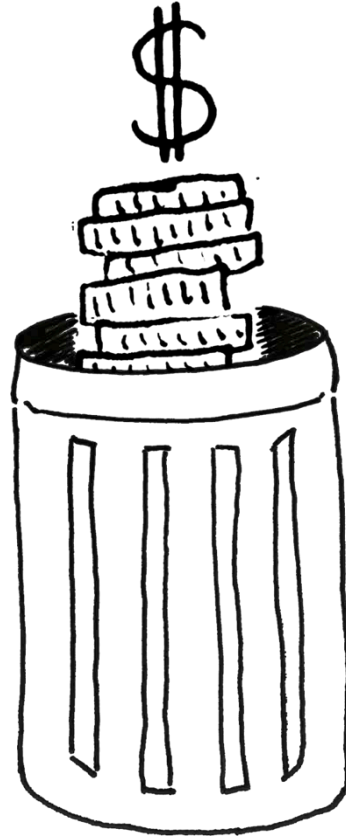


*Natural
Capitalism*





\$ 3.2 trillion
value



\$ 2.7 trillion
lost as waste.

The pressure on resource productivity is rising...



Resource constraints

Price volatility at an all time high and depleting reserves



Increasing demand

3bn new middle class consumers expected to enter the market by 2030



New type of consumer

Shift in consumer attitudes towards access over ownership



Shift in demographics

Steady increase in the number of people living in cities, reducing cost of end-of-use collection



Advances in technology

Innovations in information/industrial technologies and end-of-use treatment methods

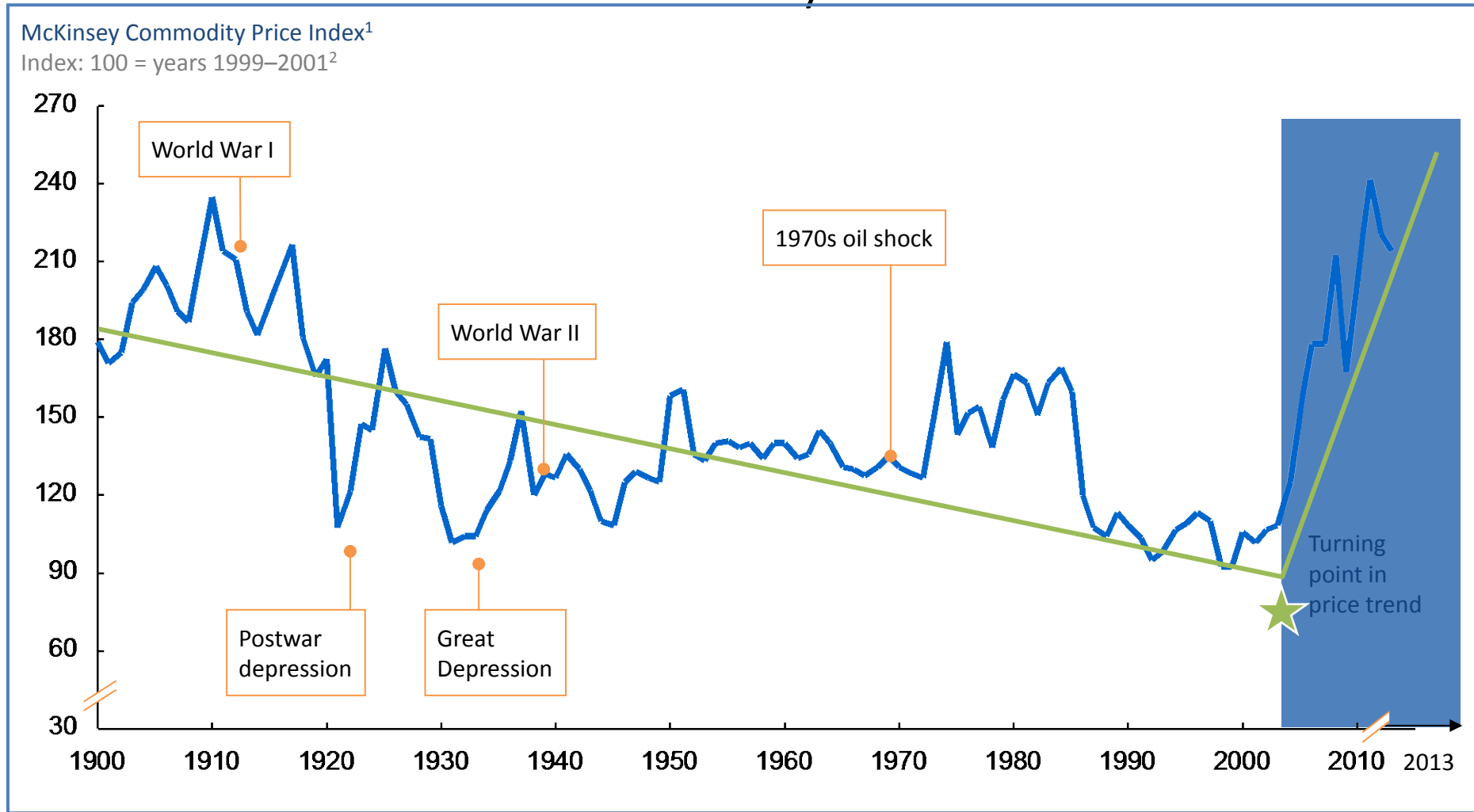


Mobilized government

Carbon, energy & waste regulation becoming more favourable of circular setups

...while key enablers are coming into place

Strong market signals on raw material price increase and volatility



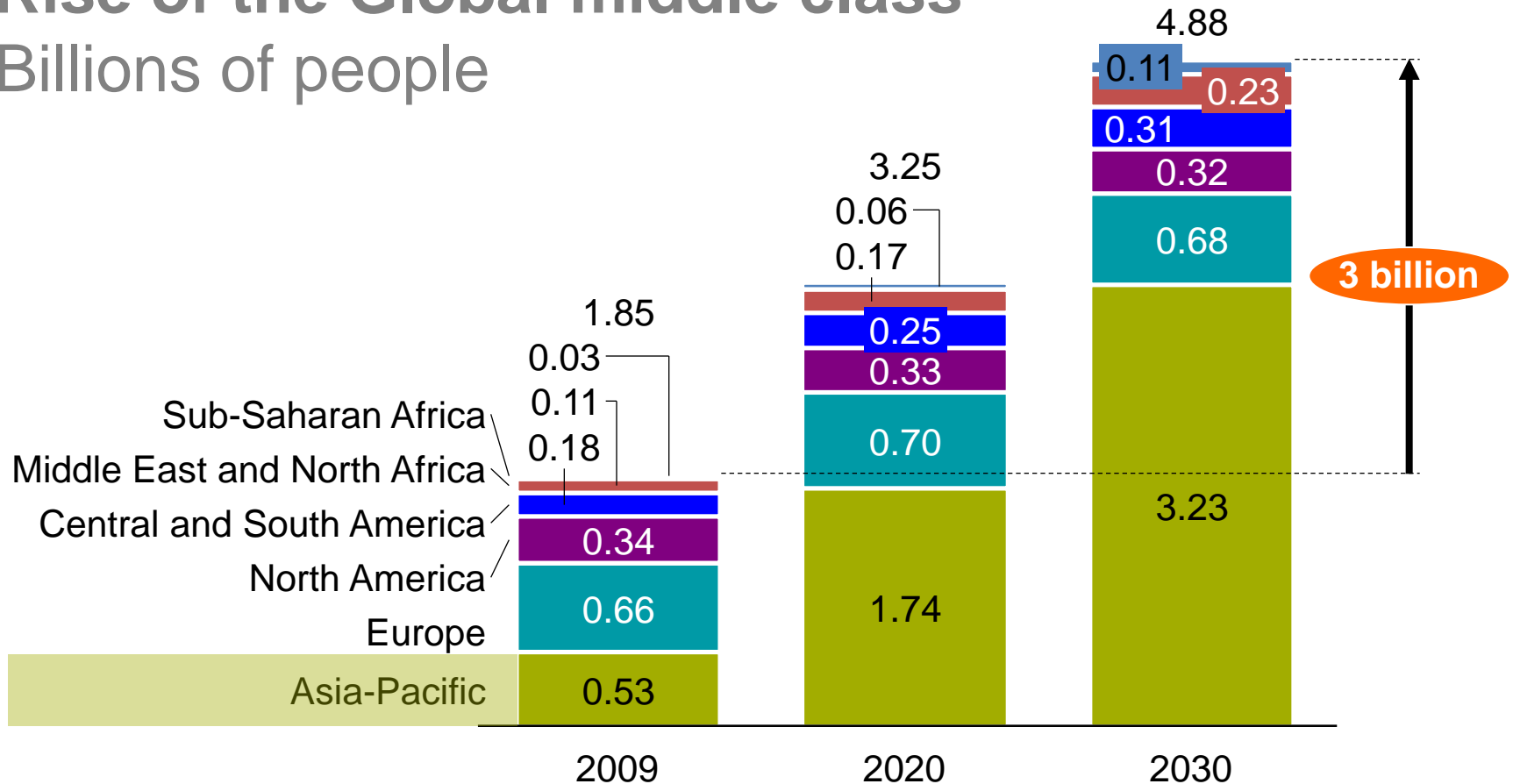
1 Based on the arithmetic average of four commodity sub-indexes: food, non-food agricultural items, metals, and energy.

2 Data for 2013 are calculated based on the average of the first three months of 2013.

SOURCE: Grilli and Yang; Pfaffenzeller; World Bank; International Monetary Fund; Organisation for Economic Cooperation and Development (OECD) statistics; Food and Agriculture Organization of the United Nations (FAO); UN Comtrade; Ellen MacArthur Foundation; McKinsey Global Institute analysis

Rise of the Global middle class*

Billions of people



* Based on daily consumption per capita ranging from \$10 to \$100 (in purchasing power parity terms)

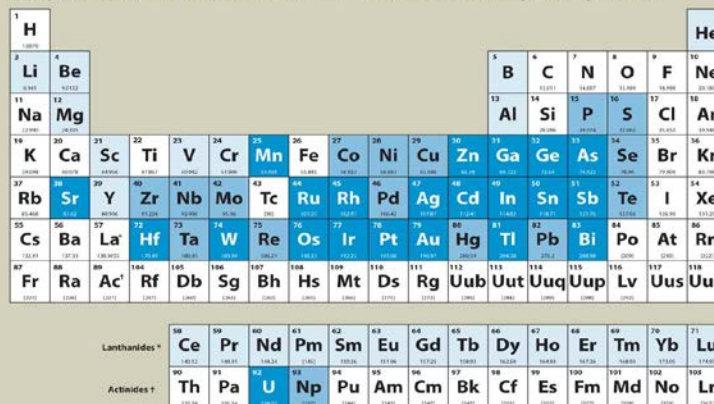
Source: OECD

Supplies of key resources are limited, while recycling rates for many remain low

Remaining years until depletion of known reserves (based on current rate of extraction)

- 5-50 years
- 50-100 years
- 100-500 years

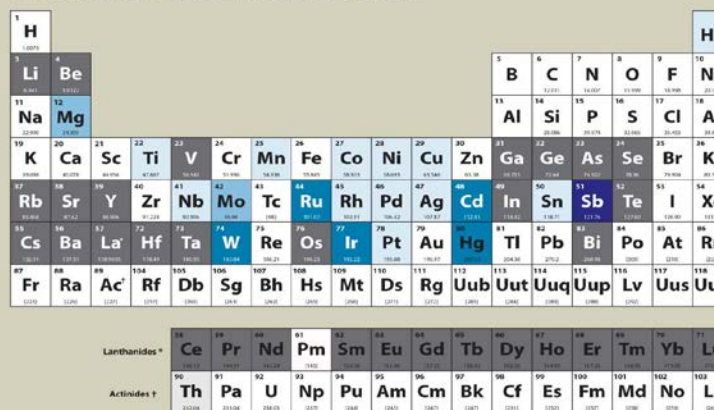
Many resources are forecasted to run out within a relatively short period...



...while only few materials are recycled at scale

Current rates of recycling

- <1%
- 1-10%
- 10-25%
- 25-50%
- >50%
- No data available



SOURCE: Professor James Clark, Green Chemistry, The University of York

Circular design is likely to deliver a resource performance far beyond the incremental efficiency improvement

	Carpet	Fridge	Furniture	
Linear system	Resource intensity Annual average change ¹	+3%	-2%	-2%
	Market growth Annual average ²	+7%	+8%	+5%
Circular system	Assumed no. of lifecycles	2	3	4
	Material intensity Reduction potential	-50%	-67%	-75%



1 In Germany, based on resource productivity growth 1995 - 2005; resources include material, energy, and water

2 Globally, growth rates for carpets and fridges are 2009 - 14E averages, for furniture 2004 - 09 averages

Source: German System of Integrated Environmental and Economic Accounting; Euromonitor (2011); Centre for Industrial Studies (2011); Freedonia (2011); Ellen MacArthur Foundation circular economy team

Where to focus to make the transition – four Building Blocks

Analysis of circular economy case studies highlights that the majority focus on four essential building blocks.



**Circular
product
design**



**New business
model**



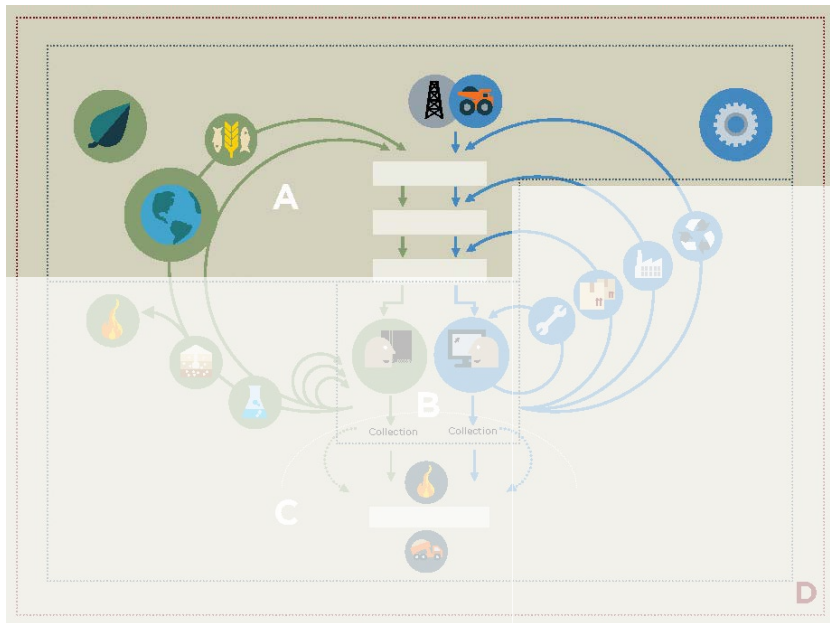
**Reverse
cycles /
Cascades/**



**Systemx
conditions**

Building Block A - Circular product design and production

In many case examples, improvements in product design and material selection reduce the cost of moving products into tighter reverse circles, without compromising structural integrity or function.



Focus areas for new designs include:

- **Material** selection
- **Modularisation** (e.g., to allow replacement of certain modules)
- **Standardisation**
- Design for easier **disassembly** (e.g., through flexible mounting techniques)
- Design to **last**
- **Production process efficiencies** to minimise waste





Other approaches to Emotional Durability

Patagonia

“**We** make useful gear that lasts a long time. **You** don’t buy what you don’t need.”

DON'T BUY THIS JACKET



DESIGNED FOR PROFESSIONALS

The new bottle design of Werner & Mertz Professional, that has been developed together with customers, brings a number of firsts to the cleaning market. It clearly differentiates from market standard and through its individual, exclusive and attractive design it supports creating a motivating work environment.



Leak-proof, color coded flip top cap

Trusted brand provides decades of industry experience

Self-explanatory product names

Multilingual product descriptor

Easy to understand „how-to-use“ pictogram series for correct product application

Clear application area illustration

German quality

Color coded labels follow the industry color standard

Pioneer for integrally sustainable solutions

Reliable EAN Code

Pack sizes follows industry standard

Square design ensures maximum use of cleaning trolley's load capacity

Recessed grips with anti-slip nubs for safe and convenient handling

Additional upside-down scaling for convenient and reliable product dosage

Backside:
Self-explanatory product names

Backside:
Product descriptor, legal specification and use recommendation in 29 languages values linguistic diversity

Certifications are additional proofs for quality

pH-scale provides clear measure on acidity and alkalinity

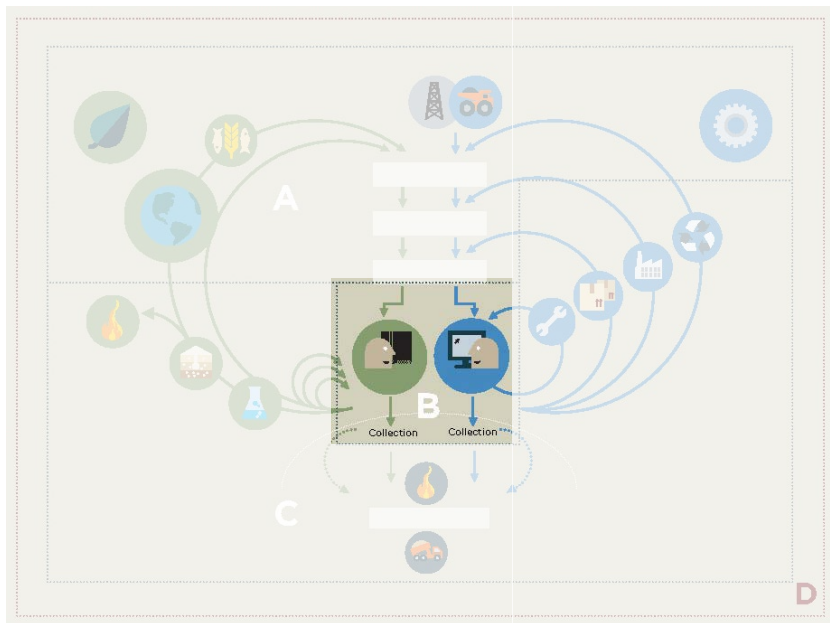






Building Block B - New business models

The ability to translate better designs with longer-lasting usage into attractive value propositions is essential for more circular products to compete successfully against highly efficient, low-cost, linearly produced products



- Examples of new models:
 - **Consumer as user**
 - **Performance-based models** (e.g., leasing, hiring)
 - **Products become services** (e.g., combining products with building kits and training)
- **No one-size-fits-all solution:** good knowledge of value chain participants' needs and ongoing innovation are required to find a fitting model

Under-utilised resources





ASSET PRODUCTIVITY IS A MULTI-MILLION DOLLAR BLIND SPOT IN YOUR HEALTH SYSTEM
Cohealo's asset mobilization and analytics platform enables hospitals to more efficiently manage medical devices.



ASSET MOBILIZATION

INCREMENTAL CASE REVENUE

ASSET COST AVOIDANCE

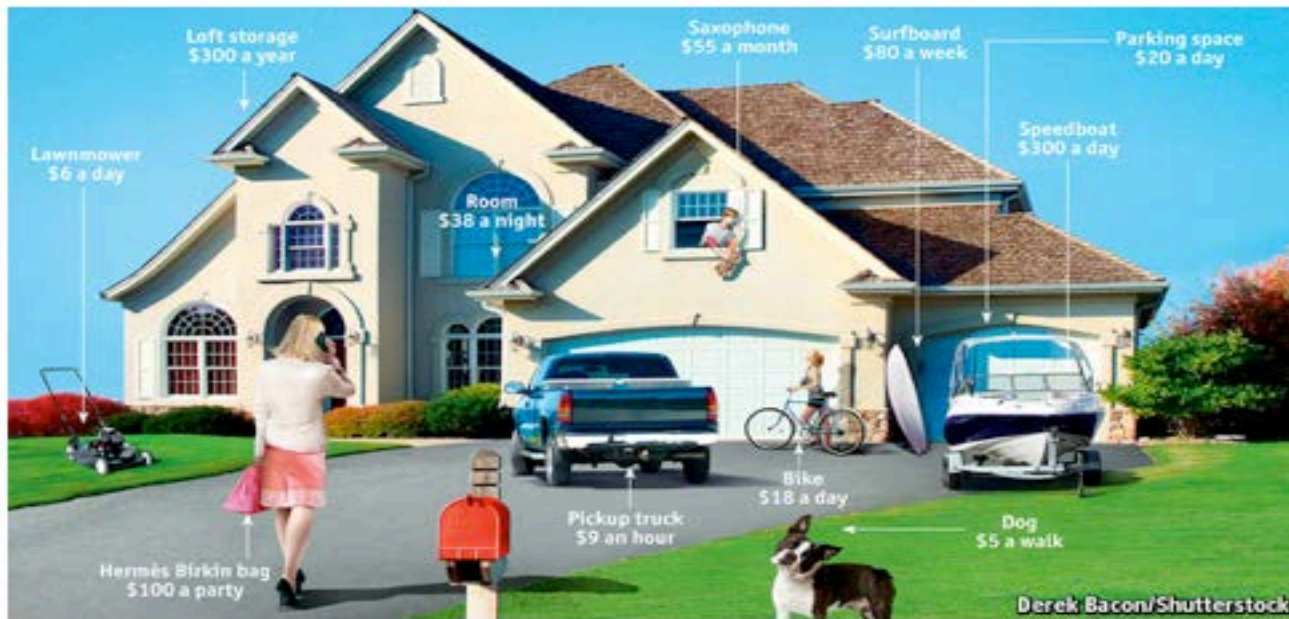
COHEALOSHARE PLATFORM



Sharing economy – what can't we share

Peer-to-peer rental

The rise of the sharing economy



The
Economist

Click Here to Access!





Smarter parking

ParkatmyHouse

FREE TO LIST

Where do you need to park? or

From Until

in cooperation with **BMW i**

List your space

A 3D isometric illustration of a white house with a blue roof and a red garage door. A large white 'P' is on the roof, indicating a parking spot. The house is on a green lawn.

Rent a private parking spot



Save money

Renting a private garage, driveway or car park space can save you up to 70% on your parking costs.



Safe & secure

Thanks to our feedback and review system, you can have peace of mind when booking.



Community

ParkatmyHouse is the largest online parking community. We'd love you to be part of it.



Quick & easy

You can search, book and pay for a parking space in under 5 minutes.



the guardian

Daily Mail

BBC NEWS

FT

The Daily Telegraph

itv

LE TOTE

Your closet. Expanded.

HOW IT WORKS

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BLOG

LOGIN ▾

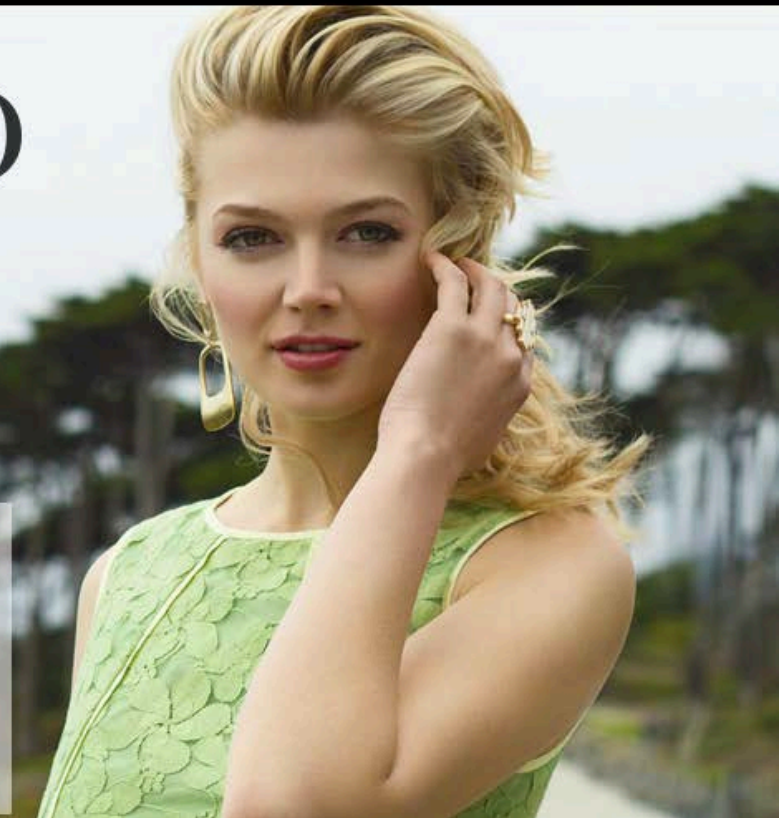
UNLIMITED

apparel & accessory RENTALS
for \$49 PER MONTH

GET STARTED TODAY!

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SIGN UP





KLEIDEREI
Abo-services

ChargeatmyHouse

ChargeatmyHouse

APPLY NOW

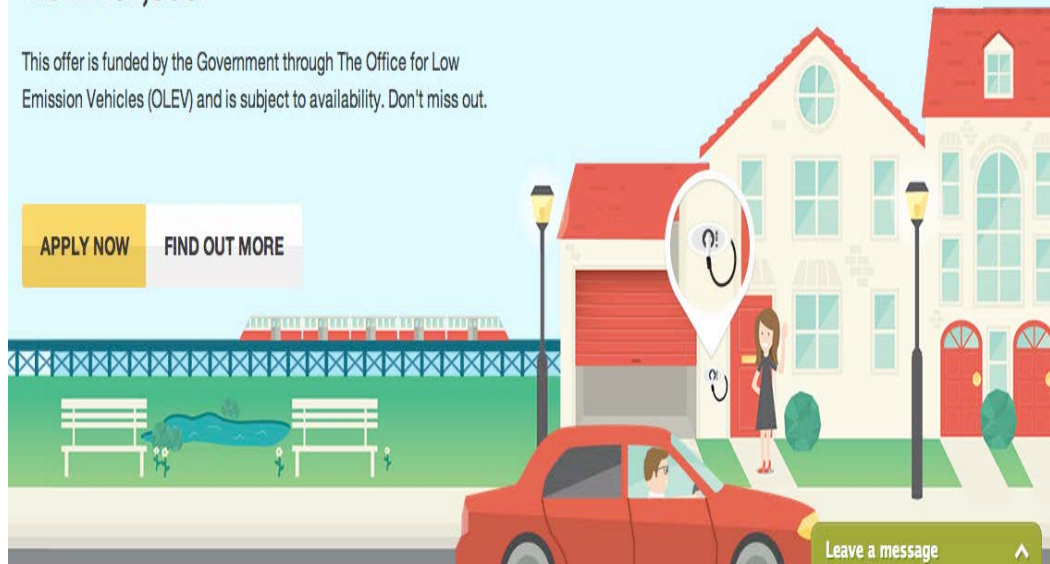


Get a free electric vehicle charge point worth £1,500!

This offer is funded by the Government through The Office for Low Emission Vehicles (OLEV) and is subject to availability. Don't miss out.

APPLY NOW

FIND OUT MORE



Leave a message



Other approaches to Service

Umicore

Pay-per-molecule:

Leasing precious metals,
like Ruthenium

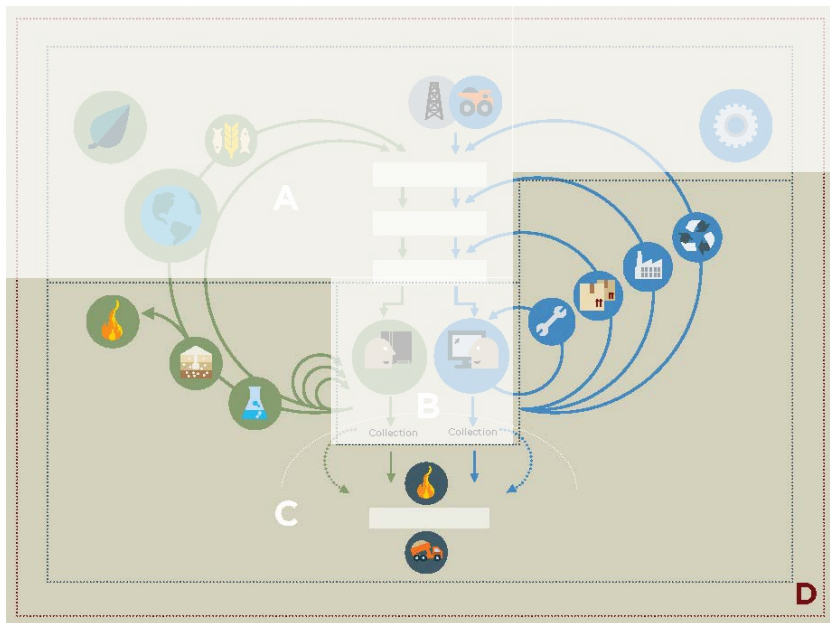


Remanufacturing Loop



Building Block C - Reverse cycle and cascades

Cost-efficient, better quality collection and treatment systems with effective segmentation of end-of-life products will be crucial to enable economically attractive circular designs. Building up the capabilities and infrastructure to close the loops is critical



Success factors for collection systems:

- Be **user-friendly** (addressing users' key reasons for making or not making returns, such as guaranteeing complete deletion of a user's phone data to allay privacy concerns)
- Be located in **areas accessible to customers and end-of-life specialists**
- Be capable of **maintaining the quality** of the materials reclaimed



In-store Dispenser System



Collecting Machine



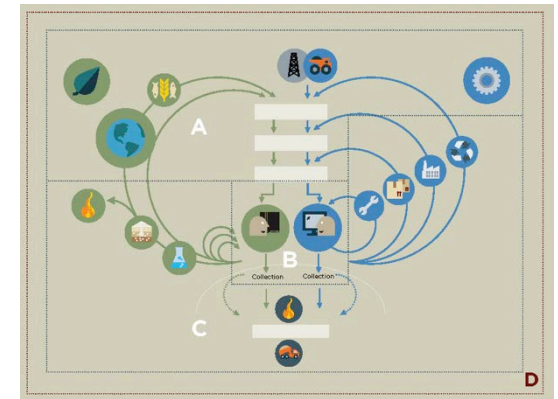
BT – Hub delivery and reverse logistics



Building Block D – Systems conditions

Effective cross-chain and cross-sector collaboration are imperative for the large-scale establishment of a circular system. Market mechanisms will have to play a dominant role, but they will benefit from support by policy makers, educational institutions, and popular opinion leaders

- 1. Develop and reinforce cross-value chain collaboration**, e.g. joint product development and infrastructure management, requiring
 - Cross-value chain business models
 - Visibility of material flow
 - Industry standards and match-maker mechanisms
- 2. Rethink economic incentives**, e.g. shift the tax burden away from labour / income and towards non-renewable resources
- 3. Provide a suitable set of international environmental rules**, by establishing standards and guidelines
- 4. Lead by example:** governments can use their own procurement and material handling processes to accelerate the spread of circular setups
- 5. Access to financing and risk management tools** to support capital investment and R&D



MAERSK

Materialpassports

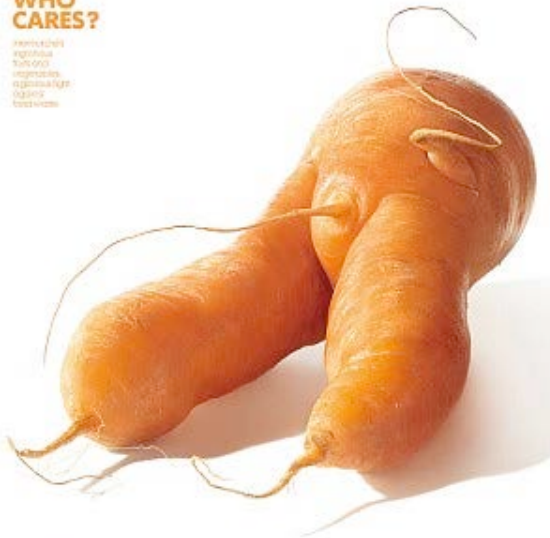


LAST CHANCE FOOD Customer Insight

THE UGLY CARROT

IN
A
SOUP
WHO
CARES?

intermarché
agricola
tuberoso
vegetables
vegetables
vegetables
vegetables



INGLORIOUS
fruits & vegetables
© Intermarché

Intermarché

THE RIDICULOUS POTATO

ELECTED
MISS
MASHED
POTATO
2014.

intermarché
agricola
tuberoso
vegetables
vegetables
vegetables

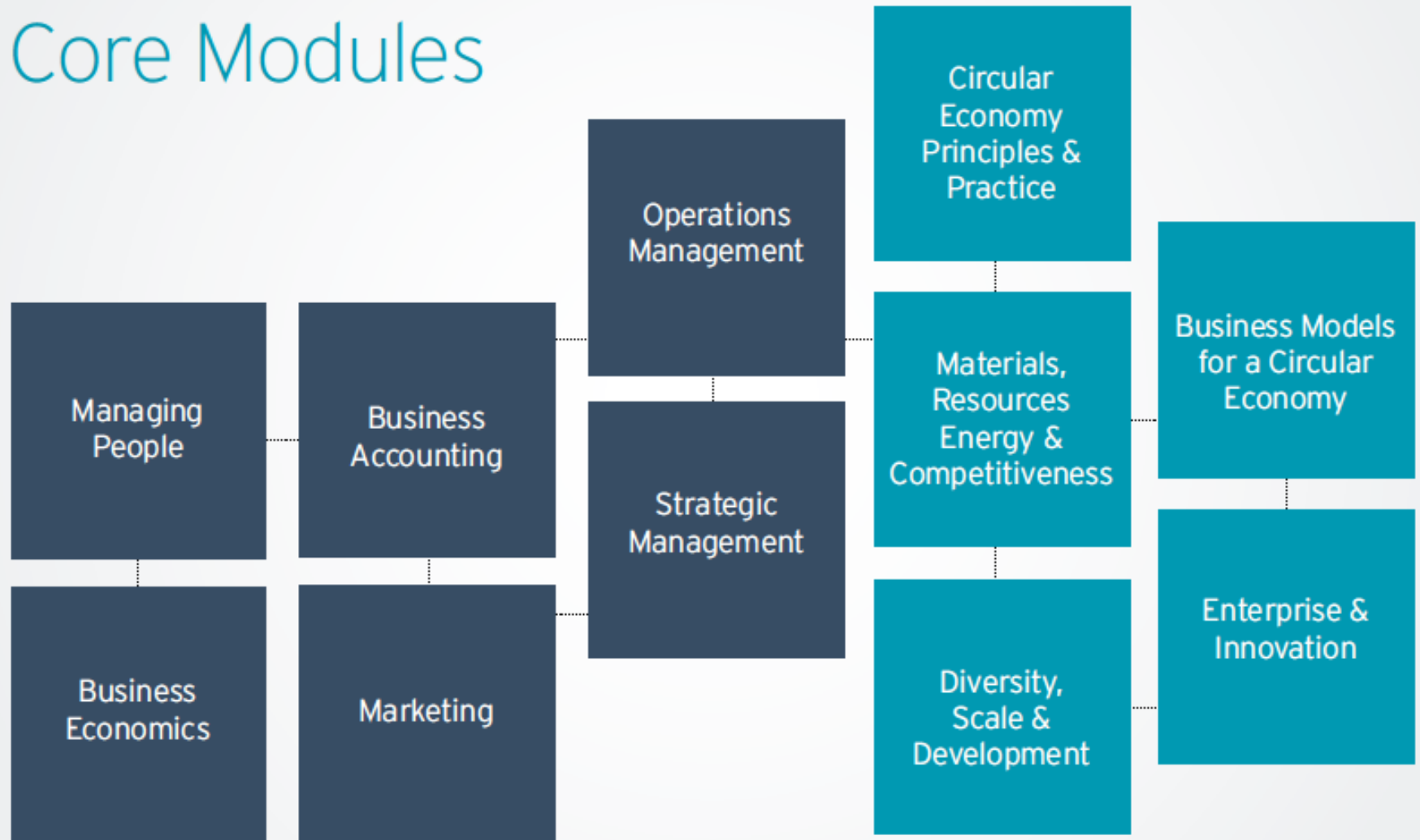


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Core Modules



Executive Education Introductory course:



