

**The Circular Economy revolutionises
business models, service and financing
solutions**

**How to bring circular economy from
strategy to action and revenues**
www.circularplaybook.fi

Sao Paulo 28.11.2019

Jyri Arponen, Senior Lead, Finnish Innovation Fund Sitra



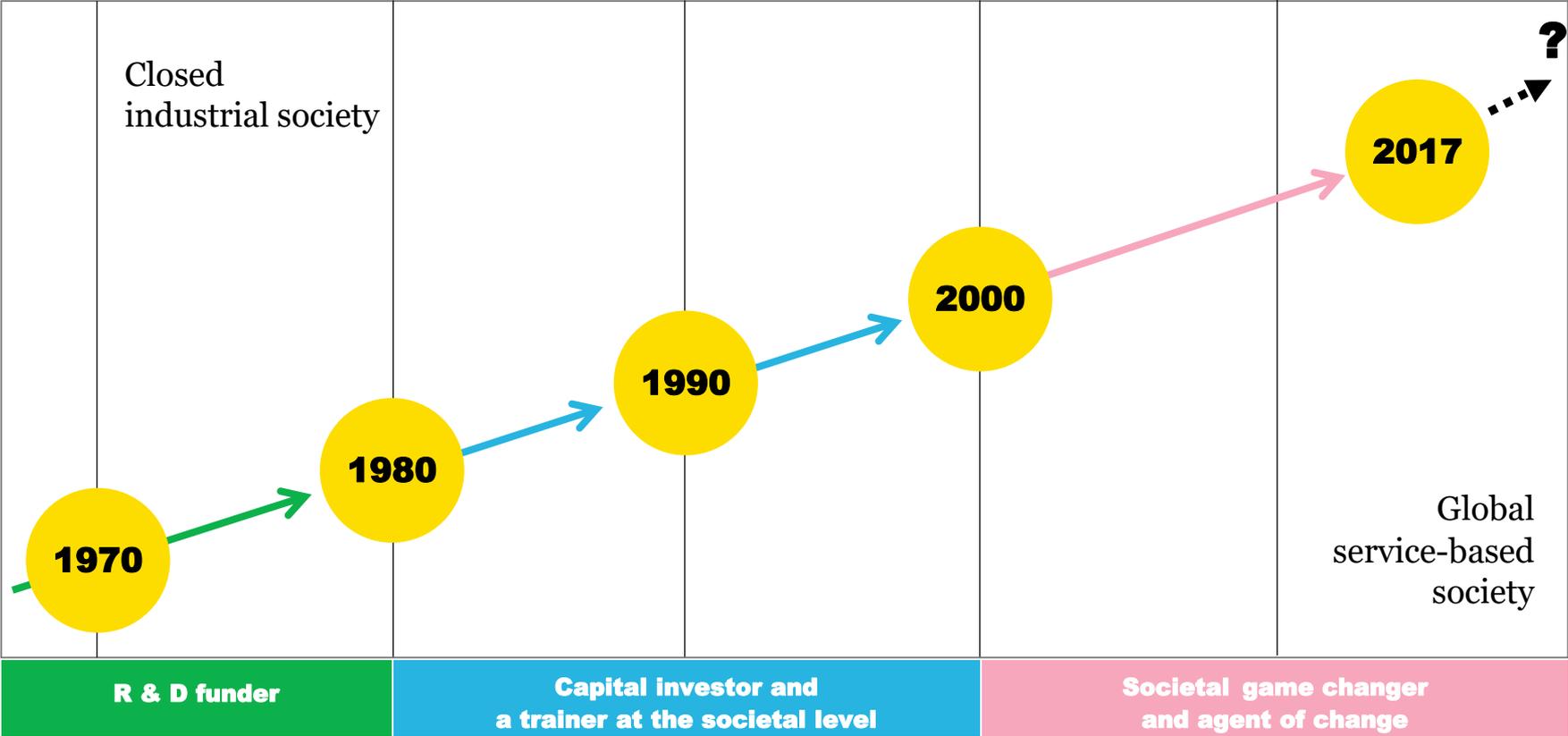
VISION

Finland will succeed as a
pioneer of sustainable
well-being.



SITRA

Sitra as an agent of change



Sitra and Circular Economy in Finland

- **Finnish Innovation Fund Sitra** is the main initiator in accelerating societal change towards circular economy.
- Finland published **the world's first Roadmap to Circular Economy** in September 2016
- **World Circular Economy Forum WCEF**, has been organized by Sitra in Finland 2017 and Japan in 2018. Next ones will be Finland 2019 and Canada 2020.
- **Winner of The Circulares 2018 in Davos** *The World Economic Forum Award for Circular Economy Public Sector.*
- Influencing in the EU: a member in **EU CE stakeholder group and EU CE finance expert group.**
- Strong societal and public commitment and intent – across sectors – to circular economy.
- **Tools built circular business case and ecosystem**

www.circularpalybook.fi

- **124 circular example cases of Finnish companies**

<https://www.sitra.fi/en/themes/carbon-neutral-circular-economy/>



★ SPECIAL HOLIDAY DOUBLE ISSUE ★

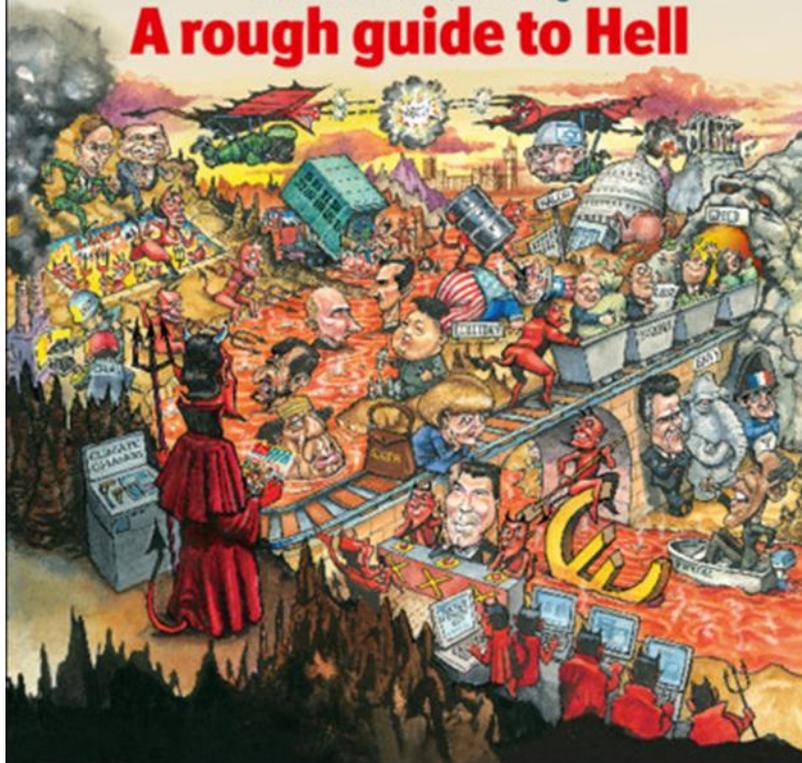
The Economist

DECEMBER 22ND 2012 - 360 PAGES 47N 2012 [Economist.com](http://economist.com)

Return of the wolf ★ Mardi Gras Indians ★
The battle of the Name of God ★ Comic strips
on the web ★ Africa's boomtown slum ★
Japan's Citizen Kane ★ The Spartathlon ★
King of con-men ★ India's bridge of dreams ★
The Holy Roman Empire and the euro crisis ★

...and much more, including

A rough guide to Hell



December 2013

SITRA

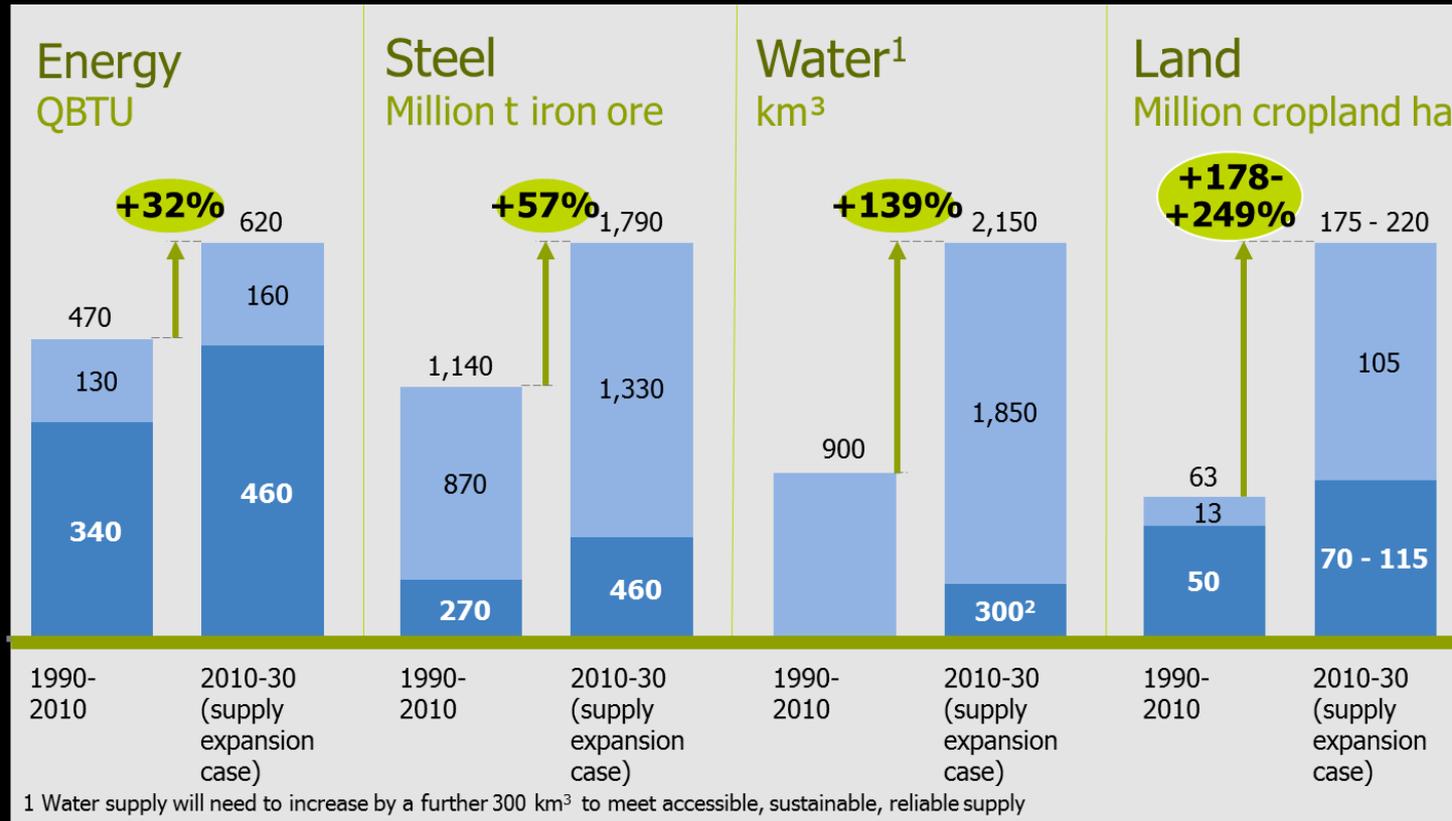
Do I have the say words...

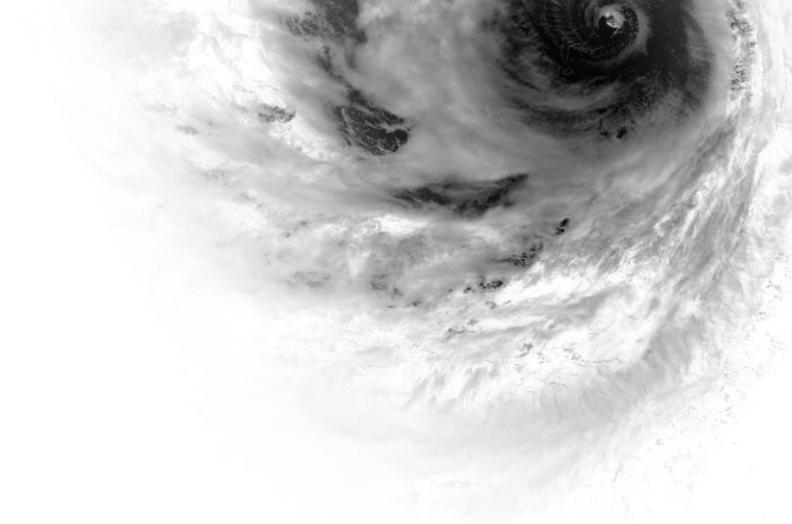


Challenge and Demand of 10 Billion



Satisfying the increasing demand of natural resources is challenging over 20-year time frame





Climate change

Biodiversity



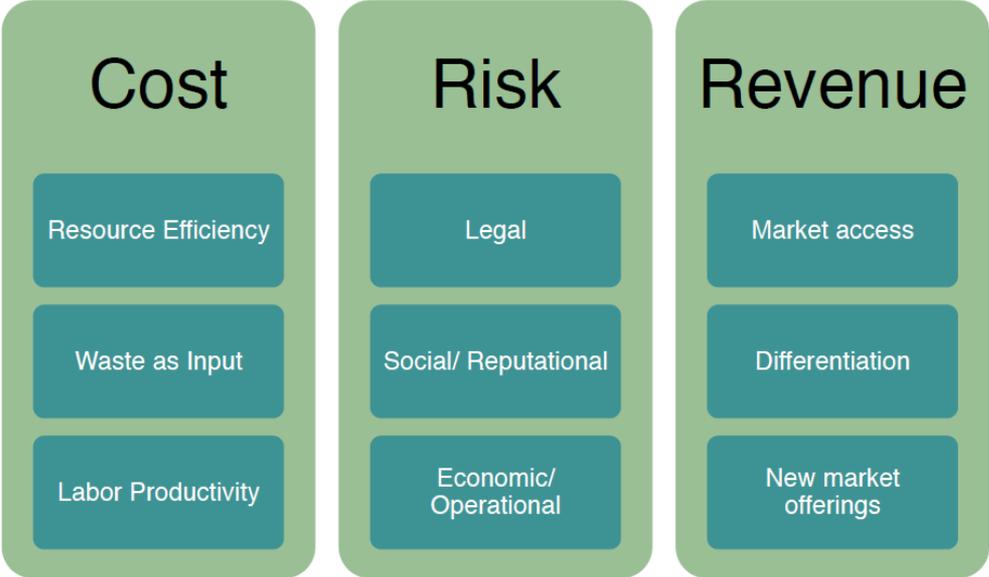
**Overconsumption
of natural
resources**



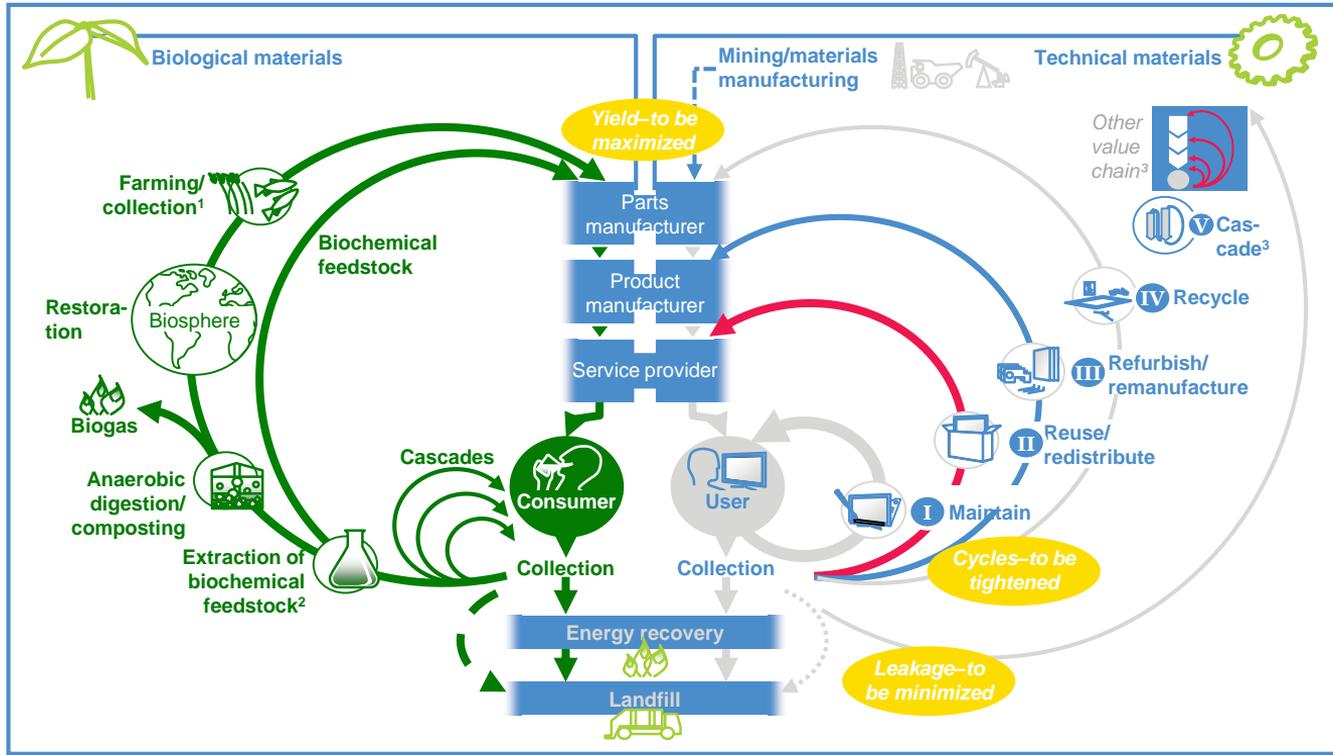


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Business Value Drivers for Sustainability



The Circular Economy – a system restorative by design to retain more volume and value within the economy



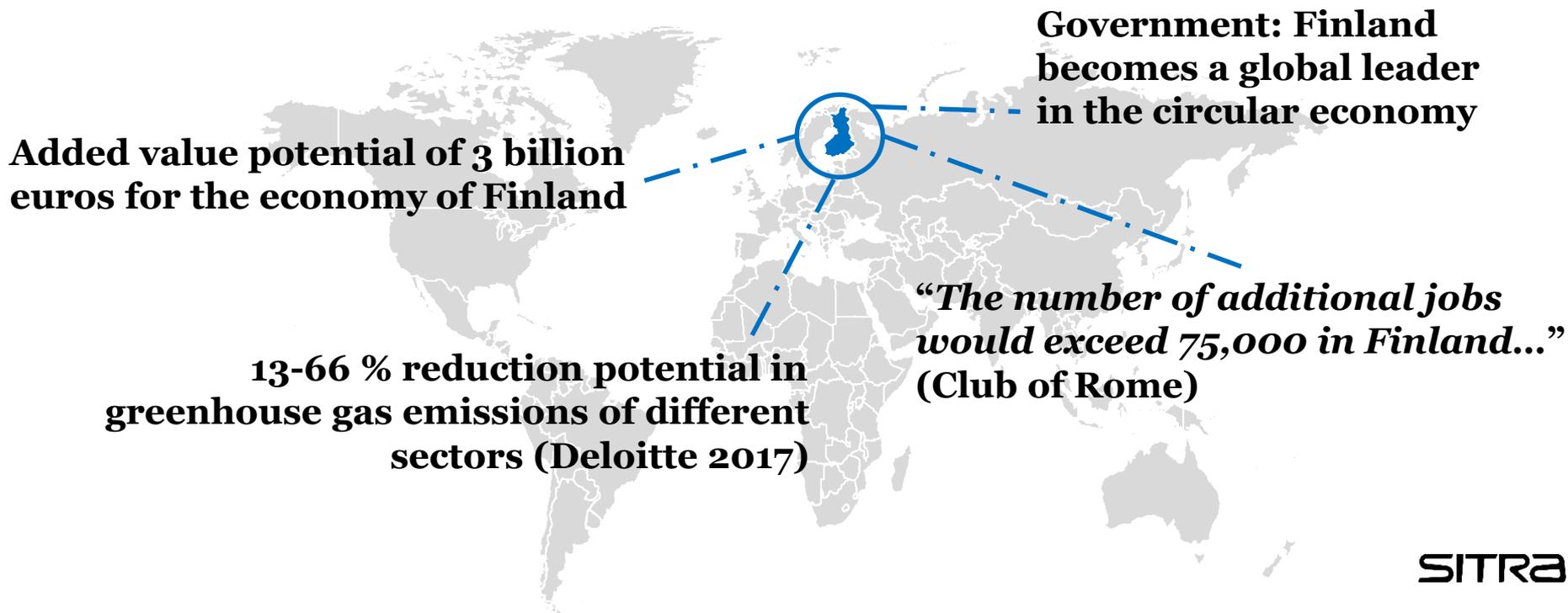
¹ Hunting and fishing

² Can take both post-harvest and post-consumer waste as an input

³ Refurbish/remanufacture and recycle across value chains, i.e., materials do not reenter own value chain anymore

***A circular economy* is an economic model of the future, in which natural resources are used within the Earth's carrying capacity.**

FINNISH ROADMAP TO A CIRCULAR ECONOMY 2016-2025



Key players in the circular economy

**CENTRAL
GOVERNMENT**



**MUNICIPALITIES
AND CITIES**



ENTERPRISES



CITIZENS



FINNISH ROAD MAP TO A CIRCULAR ECONOMY 2.0



Challenge

Funding for well-being is based on an economic model, which wastes natural resources

Objective

Let's fund our well-being in a genuinely sustainable manner. Finland's transition to a circular economy by year 2025.

What does the road map contain?

- **4** strategic goals
- **4** visions for the key players
- **29** measures

What was the road map created for?

- Under the leadership of Sitra, together with the stakeholders and Deloitte
- Mapping the current situation of the circular economy
- **25** specialist interviews
- **110** participants in the workshops
- **350** ideas and comments

Strategic goals towards a circular economy in Finland

- 1. Renewal of the foundations of competitiveness and vitality.**
- 2. Transfer to low-carbon energy.**
- 3. Natural resources are regarded as scarcities.**
- 4. Everyday decisions working as driving force for change.**



Circular economy is crucial to Paris goals

Production and use of only **four materials** – steel, cement, aluminium and plastics – **eat up the remaining carbon budget by 2100.**

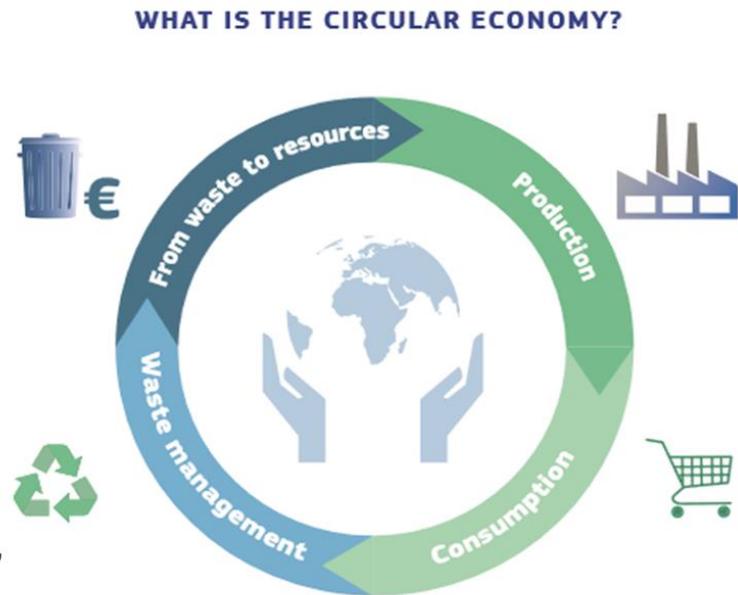
Circularity can reduce the emissions by 56 % by 2050.

Sitra, European Climate Foundation, Material Economics (2018)



EU's 2018 Circular Economy Package: Closing the loop of product lifecycles for economic and environmental benefits

- The Circular Economy Package is designed to
 - stimulate Europe's transition towards a circular economy,
 - boost global competitiveness,
 - foster sustainable economic growth and
 - generate new jobs.
- Key pillars of the Package:
 - Transform the way **plastics and plastics products** are designed, produced, used and recycled. By 2030, all plastics packaging should be recyclable.
 - Harmonise the **regulation on waste, products and chemicals**.
 - Making the use of 27 **critical raw materials more circular**.
 - Common **monitoring framework** at EU and national level, incl:
 - Materials use: Production, consumption, waste management, secondary raw materials, actual re-use volumes
 - Economic aspects: investments and jobs, innovation, funding and number of patents in circular fields etc



The EC's monitoring framework as a roadmap for innovation & investment need

Monitoring progress towards a circular economy is a **challenging task**. The transition towards a circular economy is not limited to certain materials or sectors. It is a systemic change that affects the entire economy and involves all products and services. Ideally, indicators should primarily capture trends in preserving the economic value of products, materials and resources as well as trends in waste generation.



Strasbourg, 16.1.2018
COM(2018) 29 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS

on a monitoring framework for the circular economy

{SWD(2018) 17 final}

Circular economy monitoring framework

1 EU self-sufficiency for raw materials

The share of a selection of key materials (including critical raw materials) used in the EU that are produced within the EU

2 Green public procurement

The share of major public procurements in the EU that include environmental requirements

3a-c Waste generation

Generation of municipal waste per capita; total waste generation (excluding major mineral waste) per GDP unit and in relation to domestic material consumption

4 Food waste

Amount of food waste generated

7a-b Contribution of recycled materials to raw materials demand

Secondary raw materials' share of overall materials demand - for specific materials and for the whole economy

8 Trade in recyclable raw materials

Imports and exports of selected recyclable raw materials



5a-b Overall recycling rates

Recycling rate of municipal waste and of all waste except major mineral waste

6a-f Recycling rates for specific waste streams

Recycling rate of overall packaging waste, plastic packaging, wood packaging, waste electrical and electronic equipment, recycled biowaste per capita and recovery rate of construction and demolition waste

9a-c Private investments, jobs and gross value added

Private investments, number of persons employed and gross value added in the circular economy sectors

10 Patents

Number of patents related to waste management and recycling

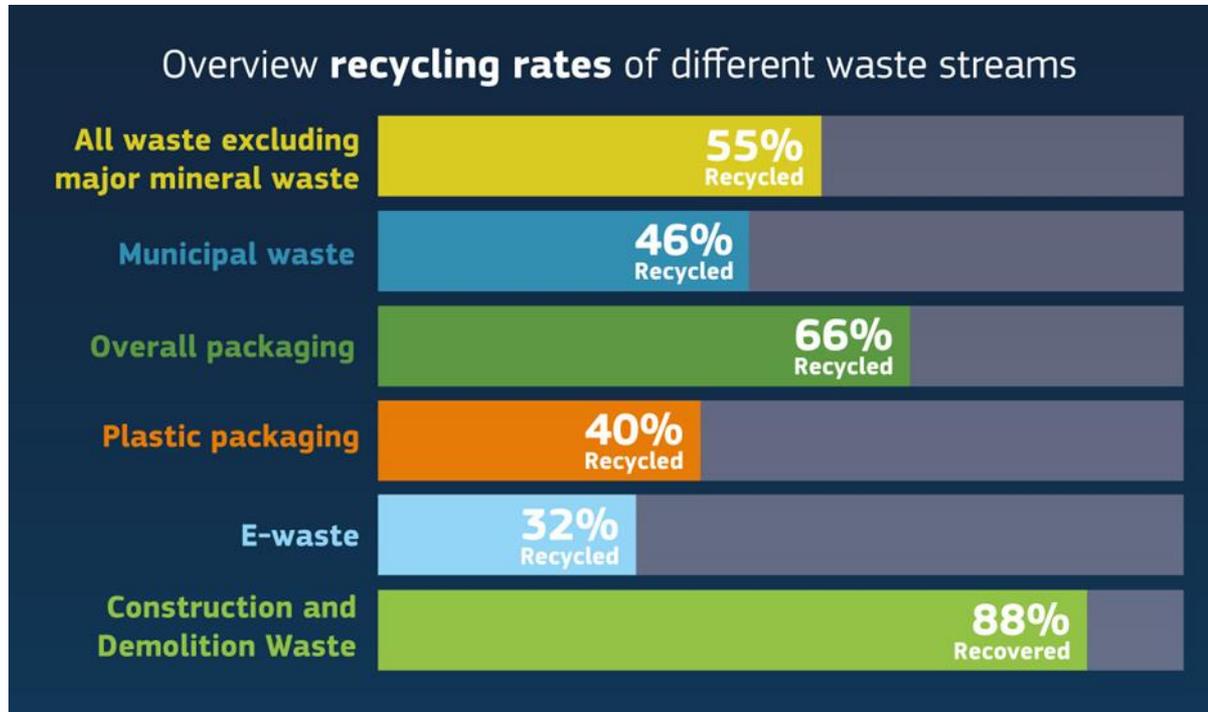
Waste & recycling targets on municipal, national and EU levels

- Examples of key legislative proposals on waste and recycling targets:
 - A common EU target for recycling 65% of municipal waste by 2030;
 - A common EU target for recycling 75% of packaging waste by 2030;
 - A binding landfill target to reduce landfill to maximum of 10% of municipal waste by 2030;
 - A ban on landfilling of separately collected waste;
 - Promotion of economic instruments to discourage landfilling ;
 - Simplified and improved definitions and harmonised calculation methods for recycling rates throughout the EU;
 - Concrete measures to promote re-use and stimulate industrial symbiosis - turning one industry's by-product into another industry's raw material;
 - Economic incentives for producers to put greener products on the market and support recovery and recycling schemes (eg for packaging, batteries, electric and electronic equipments, vehicles).

EU-28 the key performance indicators

- how much **garbage** is produced,
- how much **food waste** is produced,
- how much of that **waste is recycled**,
- how much of that recycled material is **actually reused**,
- the volume of **recyclable materials traded**,
- how many **patents** are filed having to do with the circular economy, and
- how many **jobs** are created in “circular economy sectors” (e.g. and maintenance).

The Circular Economy goes beyond traditional material efficiency and recycling. It structurally challenges the product life-cycle and strengthens cooperation in the cross-sectorial ecosystem



The transition to a circular economy increases investments, value added and jobs, and stimulates innovation.

Jobs, growth and investment in circular economy sectors



3.9 million jobs



Value added in 2014
EUR 141 billion

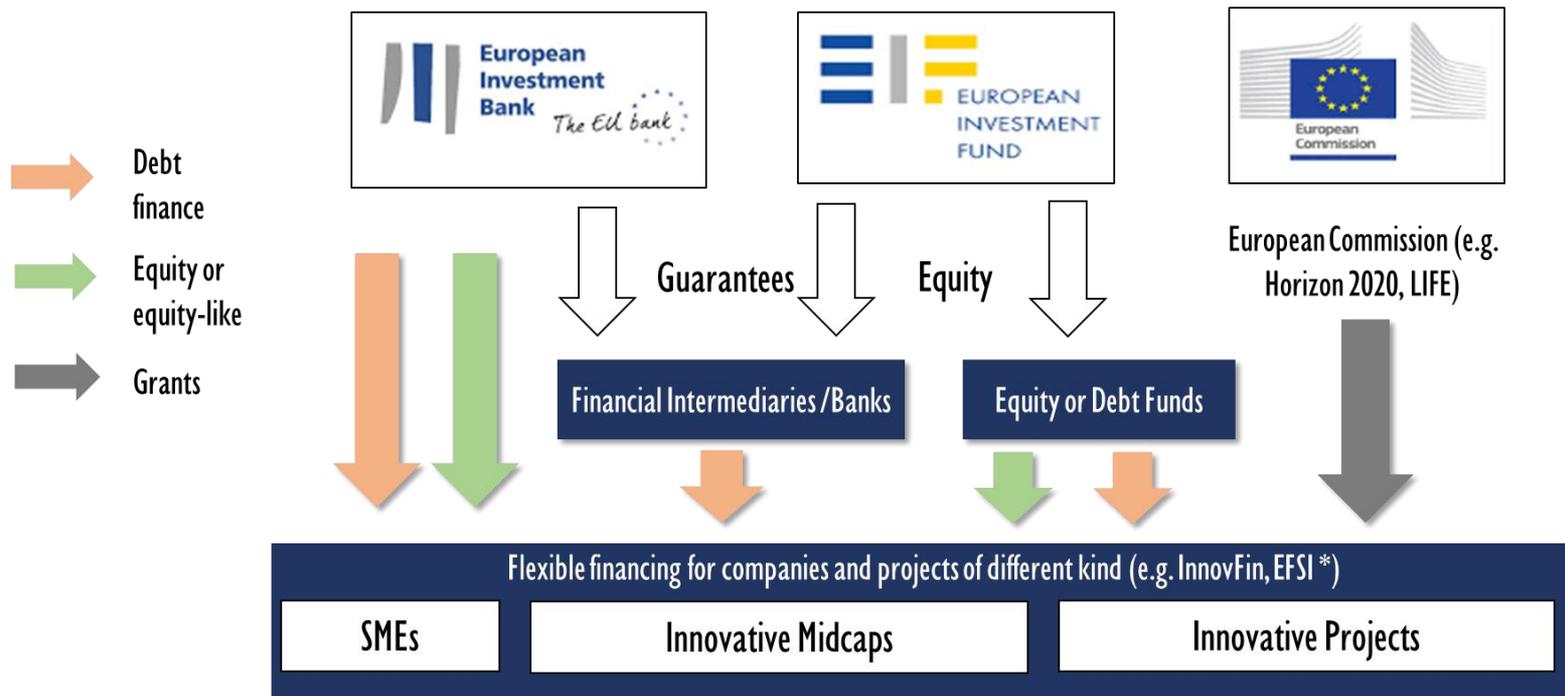


An increase of **6.1 %**
compared to 2012



Private investments
EUR 15 billion

EU financing: Various programmes, and many administering entities



* InnovFin and Horizon2020 are two EU-level programmes with broad industry coverage and a focus on improving access to finance for SMEs and innovative projects.

Circular Economy report (2015) and Roadmap to Finland (2016-2025)

Service models (leasing etc)

- Service leasing
- Subscription
- Performance contract
- Value sharing

Modularity / design

Remanufacturing

Distance monitoring, Internet of Things

International examples and market leader views

- Value sharing of achieved customer productivity improvements

Example companies in Finland

- Traditional maintenance strong in many companies, but best examples from performance-based pay, value sharing and other service models are seen.

THIS IS HOW WE CREATE A **Circular economy** IN FINLAND

Initially, Finland's circular economy will grow from the following five areas:

- Sustainable food system**
Consumers choose food that has been produced through the wider use of raw materials that starts in primary agricultural production. Nutrients are recycled.
- Forest-based loops**
Global competitiveness will increase with new commercial products, services, co-operation models and digital technology.
- Technical loops**
Minimizing the use of virgin raw materials and maximizing the length of material and product life cycles create a competitive edge.
- Transport and logistics**
Transport will develop into a seamless, smart system that uses fossil-free fuels.
- Common action**
Legislators, companies, universities and research institutes, consumers and citizens, and vibrant regions are all needed to achieve systemic change.

Primary sector
The raw materials are capital for the primary sector. Sustainable raw materials.

Manufacturing industry
Long-term products that can be repaired and maintained will be brought onto the market. Materials can be identified and separated at the end of the product's life cycle.

HERE IS THE FOCUS
Process planning will decrease the energy needed for processing huge amounts of raw materials. Use of side streams will be taken into consideration.

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Key take-aways

- 1 Need for taking the next step and realize **concrete business opportunities**
- 2 Most unexploited opportunities remain within **new business and service models**

What circular economy means for business?

Between 2018 and 2050, the global investments in emissions-free energy will amount to some **10,000 billion US dollars**



The global cleantech market, relevant to Finland, will be worth **3,000 billion US dollars** (per year) in 2050



Policies implemented in line with the Paris Agreement would increase the GDP of the EU 28 by **1.1 per cent in 2030** (compared to baseline)



Our national economy needs business **with high added value**

“Shift to cleaner energy would nudge up EU output, report shows

EU’s GDP would be 1.1% higher by 2030 if Paris Climate pact implemented, Eurofound says.”

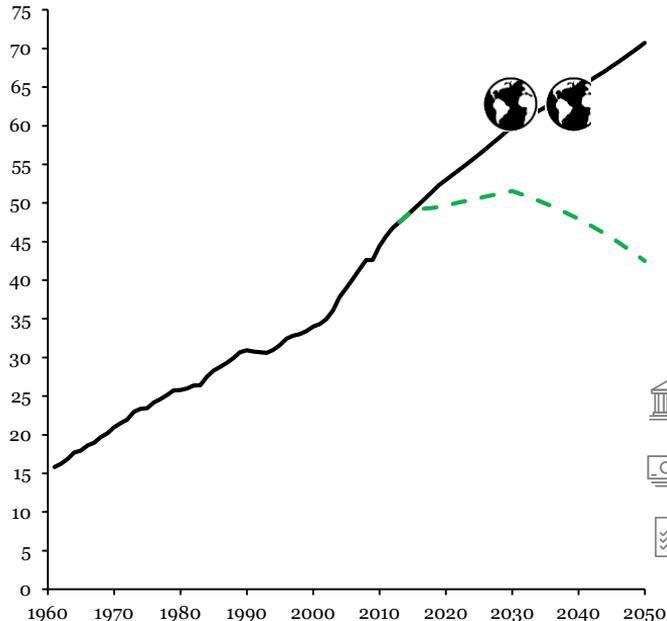
-Financial Times,
12.2.2019

Our overuse of natural resources drives regulators, investors and companies towards sustainability



Development of resource demand¹

Billion tonnes



Sources: 1: Accenture, Appendix 2 for more details, 2: CNN, 3: CDP



Regulatory pressure is increasing



Investments are shifting towards responsible businesses



Businesses raise supplier requirements



New consumption pattern needed



Gap in supply is driving changing market conditions



In 2015, the UN general Assembly, representing 193 countries, set the Sustainable development goals. Goal 12 aims, amongst others, at decoupling economic growth from natural resource use



BlackRock CEO Larry Fink asks companies to make positive contribution to society²



Companies request suppliers to disclose sustainability performance – 27% of CDP supply chain programme members, representing \$2.7 tn in procurement spend, have supplier carbon emission targets³



4 + 1 tools for companies



- 1.** Circular economy business tools for the manufacturing industry PLAYBOOK
 - 2.** The LOOP Ventures programme for companies
 - 3.** The Fiksu arki goes China competition for companies
 - 4.** Motivational profiles for consumers
- + 1** The most interesting companies in the circular economy in Finland

What next?

Scale up Circular Business Models!



Product-life extension



Product as a service



Sharing platforms

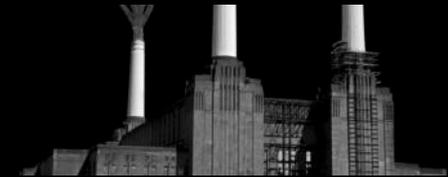


Renewability



Resource efficiency and recycling

**Circular Economy Playbook
- from 50 to 800 companies**



COMPANIES



The most interesting companies in the circular economy in Finland

A list of companies to inspire economic change.



Fiskars has a resale service, where consumers can sell their used crockery to Iittala shops.

Vapaus.io provides companies with environmentally friendly vehicles.

Parking Energy's service converts block heater points into electric vehicle charging points.

Betolar turns industrial surplus materials into low carbon construction materials.

THERE IS A STRONG BUSINESS CASE FOR CIRCULAR ECONOMY AND THE RIGHT TIME TO START IS NOW

From linear...



...to circular...



...creating opportunities

\$4.5 trillion

Global growth potential to 2030

60 - 85%

Reduced environmental footprint

Up to 7x

Higher value in lifecycle revenues vs. new sales

Up to 100%

Reduced exposure to critical raw material

1/3

Of global CEOs already explore circular economy business models

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Focus on the change to customer-centricity and digitally enabled business models



- Factory remanufacturing process**
1. Visual check of returned units
 2. Clean returned units
 3. Dismantle returned units
 4. Clean components
 5. Quality-check components to reconditioning standard
 6. Assemble product
 7. Test product, as in production





Outotec



ABB

KONECRANES®
Lifting Businesses™



PONSSE


WÄRTSILÄ

Valmet 

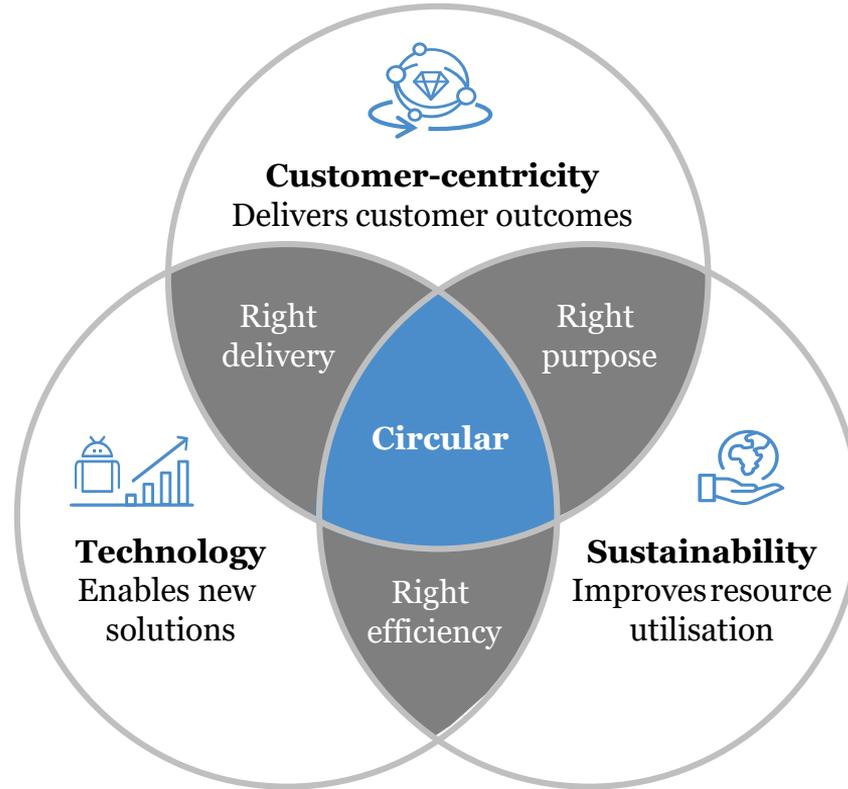


The Biofore Company  UPM



 ABLOY®

Three drivers underpin the shift towards circular



Better customer values can be delivered through offering outcomes instead of selling products



From selling products...

... to offering outcomes



Profit is generated by selling as **many products** as possible, **fuelling inefficiencies** along the value chain

Example: From Rolls Royce selling engines...



Profit is generated by **delivering solutions** that fit specific customer needs, **minimising inefficiencies** and **increasing consumer experience**

... to Rolls Royce selling “Power by the hour” to customers for a fixed charge per hour of operation, per ship. Rolls Royce offers planned maintenance and monitoring services for the equipment aboard from on-shore with the help of sensors¹

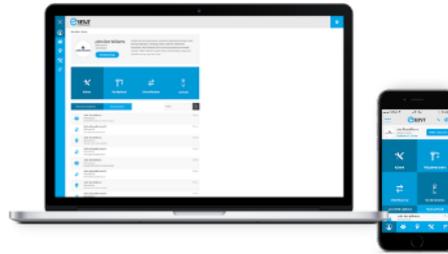
Source: 1: Company website

Technology adaptors are already successfully using the three drivers to generate value and oppose disruptors



Tamturbo provides 'Compressed air-as-a-Service' to industrial companies

-  Compressor has high-efficiency electric motor
-  Customers avoid high initial investment and hassles with maintenance
-  Compressors are reinstalled at new clients at the end of contract



eRent offers a platform to track, manage, rent and rent out equipment

-  Service combines digital tracking methods, internet of things and cloud services
-  Customers get easily accessible, mobile application
-  Platform maximises usage rate of equipment



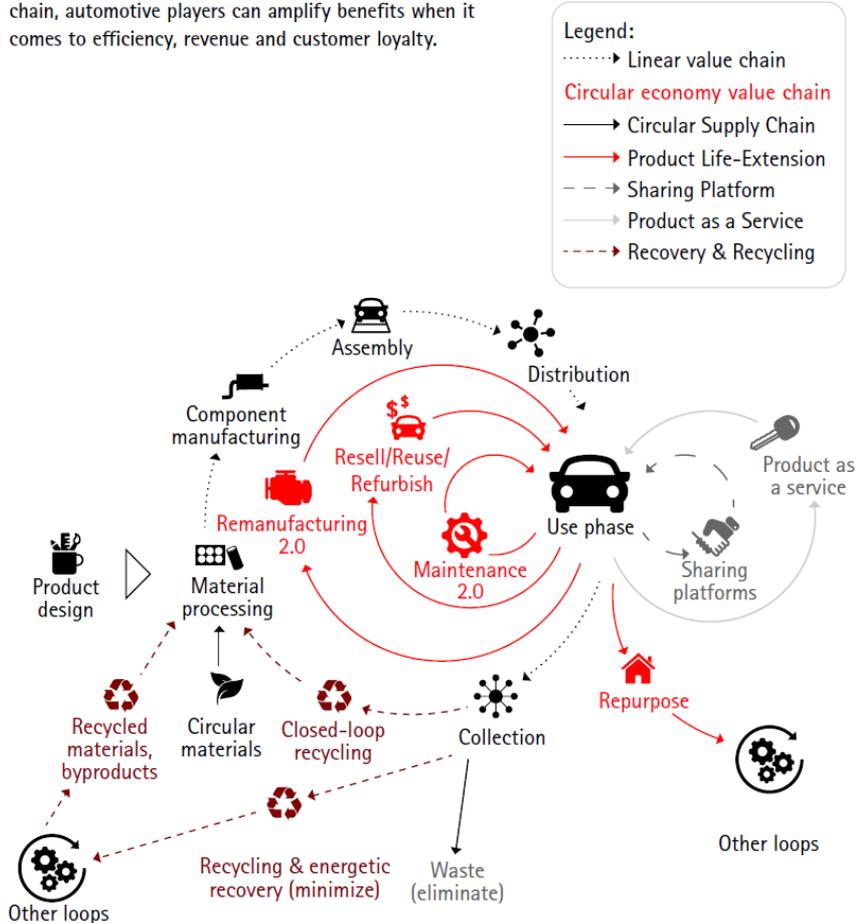
Wärtsilä subsidiary Eniram offers full visibility of onboard operations of a vessel with an analytics solution

-  Advanced algorithms decompose and model data
-  Mobile app was jointly developed with customers
-  Fuel savings are derived from optimisation and breakdown is reduced

Automotive's latest model: Redefining competitiveness through the circular economy

Source: Accenture

Figure 1: By driving circular principles throughout the value chain, automotive players can amplify benefits when it comes to efficiency, revenue and customer loyalty.





AIRFAAS GLOBAL DIGITAL ECOSYSTEM

- ▶ Your new supplier portal is a global digital ecosystem – your portal grows without your effort.
- ▶ System integrity and security is high and your partners and data is safe – third-party evaluation by Finnish VTT (Technical Research Centre of Finland)



Inefficiency in the cargo handling chain: separate blocks between actors without connectivity

Planning & Execution: plan and execute all moves across terminal/
Increases throughput and lowers cost

Analytics for better operational decision making

Capture all billable events for accurate and timely billing

€17 BILLION inefficiency
19milj. CO2eqv tonnes on moving only empty containers

Automate & improve truck turn times

Optimise vessel load and discharge across cranes

Optimise rail load and discharge processes

Track vessel operational performance and environmental compliance

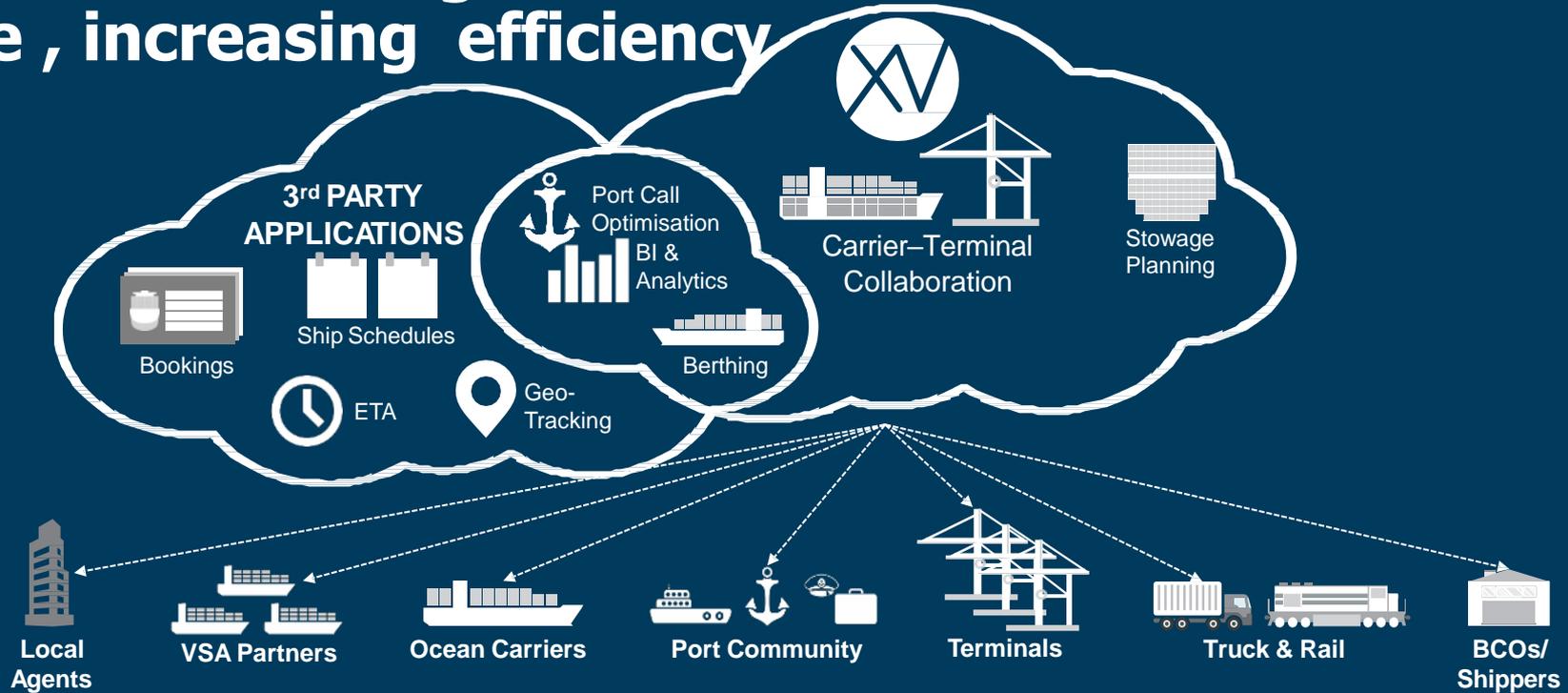
Optimise container yard moves, save cost and reduce moves

Optimise vessel stowage planning

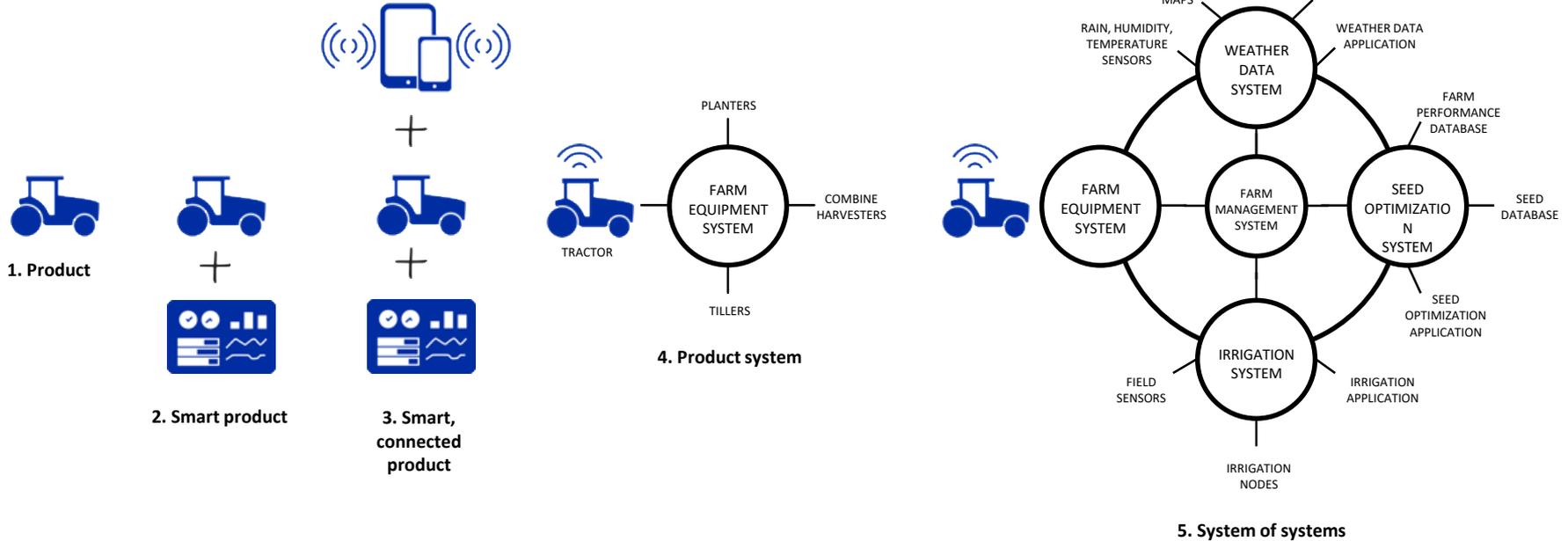
Optimise vehicle routing and costs

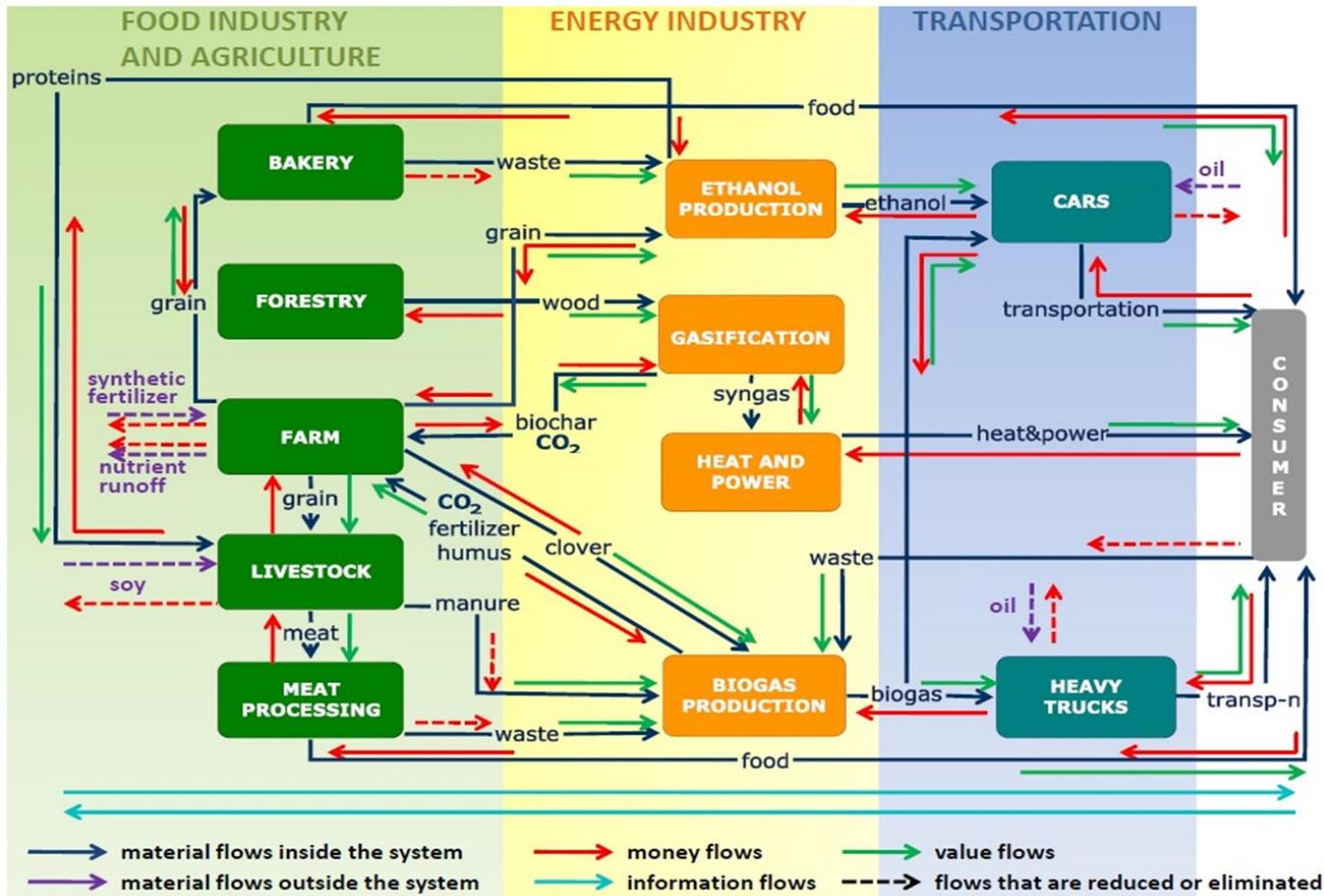
Source: McKinsey

Cargotec provides common digitalised platform enabling the data flow in real-time, increasing efficiency



Redefining Industry Boundaries



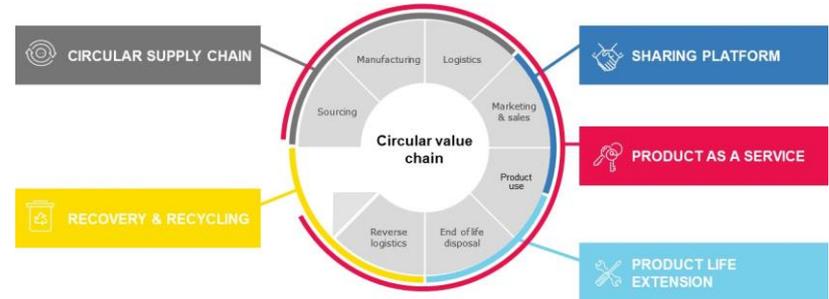


FROM LINEAR TO CIRCULAR

From Linear...



...to Circular



Focusing on the change to customer-centricity and digitally enabled business models

Source: Accenture



#kasvuakiertotaloudesta @SitraFund @jyri_Arponen @TechFinland @Laura_Juvonen @AccentureFI @Pekka_Vanne

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The Challenge of the Alignment

To generate instant acceptance and commitment requires an answer to one question:



What is it for me?

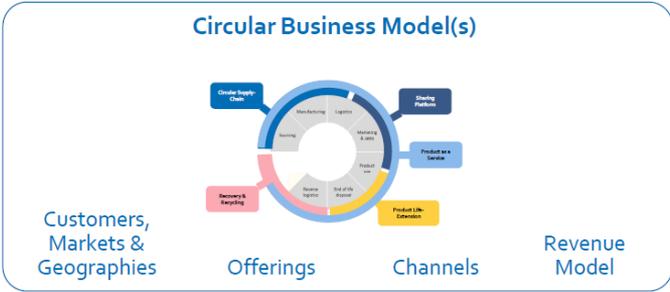
Substantial value can be unlocked by going circular

Sources of value creation		Impact case examples	
Cost savings	Reduced material volume	 Lend Lease	Lend Lease used scaffolding wood from construction process in furnishing and landscaping of the London Olympic Village
	Reduced material prices	 H&M	Supplier of H&M is able to substitute 40% of virgin fibers with recycled ones, which would otherwise be lost to waste
	Reduced material price volatility	 Bosch	Bosch hedged material price volatility by bringing material back at pre-agreed prices
	Reduced input prices	 RENAULT	Renault cut the total costs of ownership of cutting fluid (input and process) by 33% through CE collaboration with suppliers
Revenue growth	Participation in secondary sales	 RICOH	Ricoh established a "GreenLine" product achieving significant sales volume in otherwise untapped market segments and high profitability (twice that of new products)
	Capturing premium via non-sales based services	 Vodafone	Vodafone Red Hot program gives access to latest phone and helped stabilize market share dilution
	Growing market share	 SAB MILLER	SABMiller helps maintain market dominance in South Africa due to the use of returnable glass bottles
Strategic repositioning	Stimulating innovation	 TEIJIN <small>Human Chemistry, Human Solutions</small>	Teijin developed the ECOCIRCLE™ and developed proprietary process to recycle polyester creating strategic lock-in with Patagonia
	Regulatory strategy	 PHILIPS	Philips committed to using 10% recycled plastics in their products by 2015, staving off potential EU EcoDesign regulations
	Tighter control of supply chain	 Kingfisher	B&Q/Kingfisher collaborated closely with raw material supplier and manufacturer to develop and source for circular product line

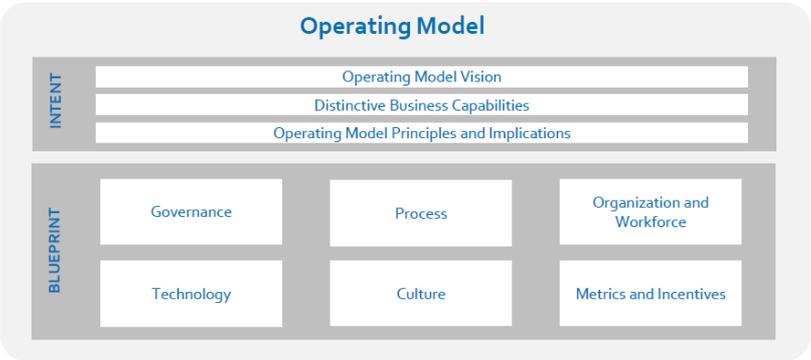
It All Starts with the
Business Model.

The circular business models can help you capture trapped value in inefficiencies and Go-to-Market effectively to your customers

CIRCULAR STRATEGY



EXECUTION



With the Circular Economy Playbook and tools you achieve circular advantage and measurable business cases www.circularplaybook.fi

The playbook consists of 6 chapters with circular economy concepts, best practices and tools to guide your business to identify and define your circular economy opportunity and develop a plan to realize circular advantage

PLAYBOOK
CHAPTERS

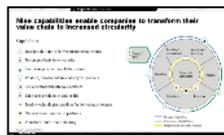
1. Why circular economy?



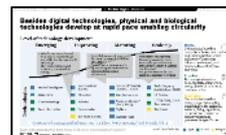
2. What opportunities exist?



3. Which capabilities are required?



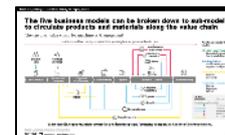
4. Which technologies can support?



5. How to design the transformation journey?



6. Industry deep dives



EXAMPLE
TOOLS¹

Value case tool



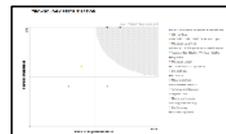
Business model development toolkit



Capability maturity assessment



Technology maturity assessment



Roadmap development



Business model canvas



¹ Additional tools available in the playbook

Circular economy is about turning inefficiencies in linear value chains into business value

Inefficiencies of linear value chains



UNSUSTAINABLE MATERIALS

Material and energy that cannot be continually regenerated

– for example, direct and indirect materials are not renewable or bio-based

UNDERUTILISED CAPACITIES

Underutilised or unused products and assets

– for example, products are not operating full hours or full functionality is not useful

PREMATURE PRODUCT LIVES

Products are not used to fullest possible working life

– for example due to new models and features or lack of repair and maintenance

WASTED END-OF-LIFE VALUE

Valuable components, materials and energy are not recovered at disposal

– for example, not recycled or recovered at end of life

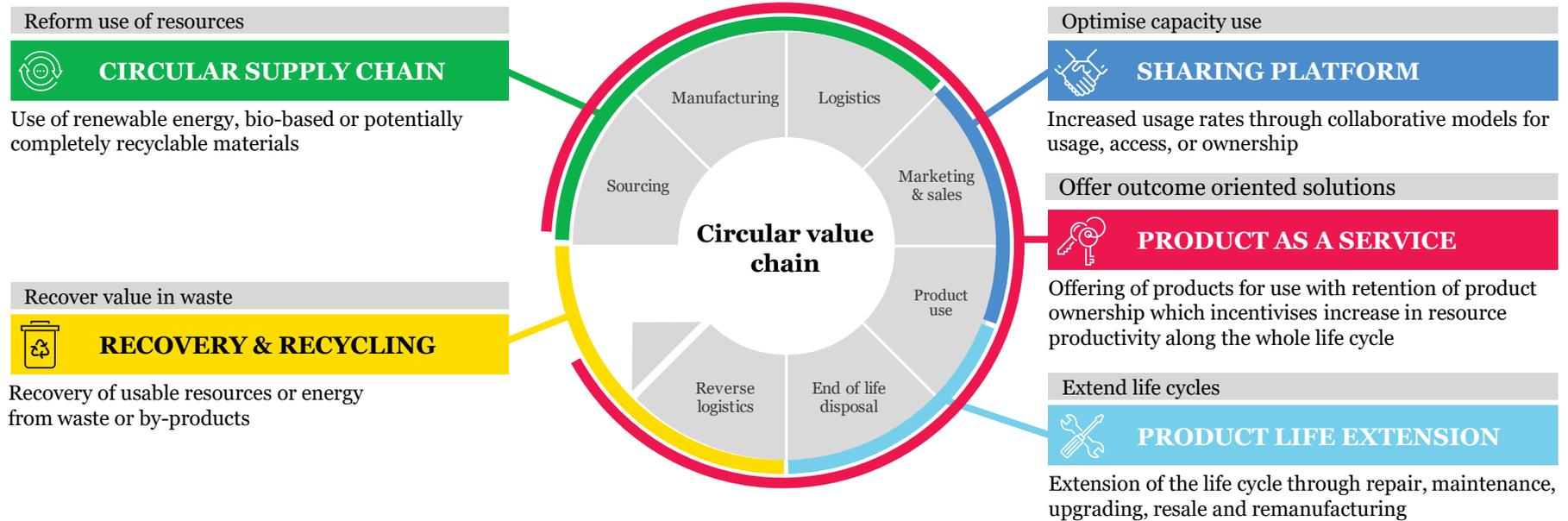
UNEXPLOITED CUSTOMER ENGAGEMENTS

Sales organisation focus on selling functionality of product rather than the customer problem

– for example, missing opportunities to engage customers throughout the product life-cycle to offer additional services and add-on sales

Source: Accenture, Appendix 2 for more details

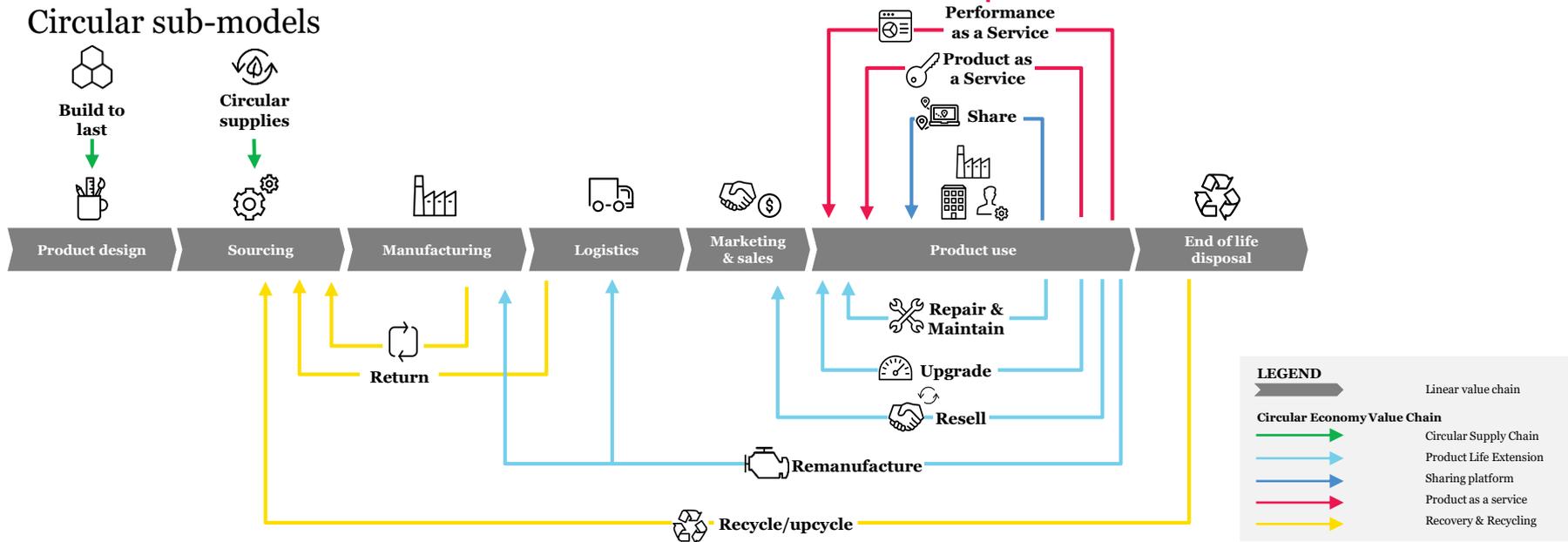
Five business models reduce the inefficiencies and create value for companies, investors and environment



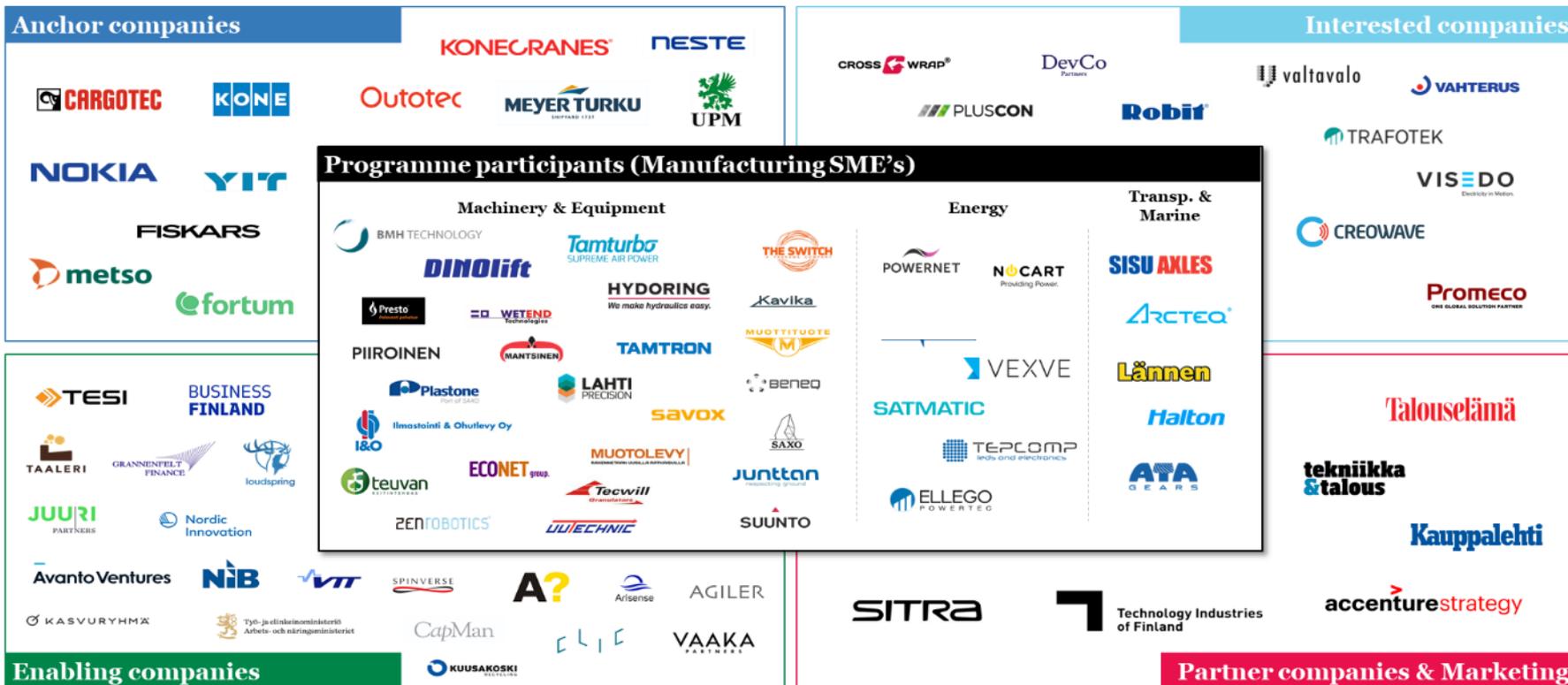
Business model specific sub-models modify different steps of the value chain to make it circular

As a Service models are mostly concerned with the operation phase, but span across the value chain

Circular sub-models



We engaged a large group of players in the Finnish manufacturing ecosystem, time for global scale up



In addition we engaged some other interesting companies

Anchor company engagement

NOKIA

- **Kick-off event presentation** on CE journey and activities
- **Internal workshop** to identify new CE opportunities
- **Launch event presentation** on CE strategy and programs

CARGOTEC

- **Kick-off event presentation** on CE as part of new business development by Soili Mäkinen, CIO

KONECRANES

- **Launch event presentation** on CE activities and Lifecycle Care Program by Nathalie Clément, Director, Corporate Responsibility and Satu Kaivonen, Environmental Specialist

metso

- **Session** to learn about the playbook and tools, and identify new CE opportunities

Outotec

- **Participation in SME workshops** to share learnings and inspiration
- **Session** to learn about the playbook and tools, and identify new CE opportunities



Beneq: New Modular Product Designs



Company description

Beneq® is the Home of ALD. Its Atomic Layer Deposition solutions improve the performance and durability of electronics and optics. They are the invisible advantage in leading semiconductor, IoT, 5G and automotive applications.

Beneq was founded in 2005. The Beneq factory in Espoo, Finland, is where atomic layer deposition was applied in industrial production for the first time in 1984. Today, it is the largest ALD-dedicated production facility in the world.

In 2017, the turnover of Beneq corporation was 21.3 million euros, of which 97% came from outside of Finland. In the end of August 2018, Beneq employed 146 people.

The circular opportunity

The traditional project-based approach in the ALD equipment business has resulted in customized products that are not ideal for upgrading, maintenance and support. They are sometimes complex and slow to produce, too.

To tackle the issues, Beneq Thin Film Solutions set out to create a new modular product architecture that supports easier upgrades and recycling. The new product designs have been from the start planned so that they will be easy to manufacture, repair and upgrade.

Benefits

The target of the new product designs is to save space and materials and to make the equipment easier and faster to manufacture. The advanced product architecture will also allow new business models, such as take-back programs and pre-owned equipment offering. It will also serve as a basis for new lifecycle services and maintenance programs.



Applied business model



Piironen: Meeting room as a service PIIRONEN

Company description

Piironen is a Finnish family-owned company that operates in four different business areas. Besides designing, manufacturing, selling and marketing its own collection of furniture for use in public spaces, the company also manufactures high-quality metal components, undertakes metal plating and offers form pressing and upholstery services for the furniture industry.

Piironen's factory and headquarters are located in South-West of Finland, in Salo. The company has partners and clients around the world and one third of its turnover comes from exports.

The circular opportunity

High costs make investments in high-quality meeting room furniture challenging especially for small companies. Furthermore, due to high costs, meeting furniture is typically upgraded with very long time intervals, not following changes in needs.

To tackle these challenges, Piironen is exploring the opportunity to offer complete meeting rooms as a service, with high-end design furniture and other equipment tailored to customer needs. To deliver the solution, Piironen has partnered with three other companies, and is piloting the solution with a hotel chain.

Benefits

The meeting room as a service solution allows Piironen's customers to avoid large investments without compromising the quality of their meeting environment. At the same time, the solution facilitates upgrading and reusing furniture, extending the lifecycle of products. Overall, the solution brings Piironen closer to its customers, and enables the company to deliver on circular economy principles.



Applied business model



Sisu Axles: Predictive axle maintenance



Company description

Sisu Axles is an independent axle manufacturer for heavy duty truck, military, container handling and industrial applications. The company specializes in heavy duty rigid planetary reduction axles and independent suspension systems.

Sisu Axles serves its international customers from its assembly plant located in the southern part of Finland, the town of Hämeenlinna. The majority of its products end-up being exported to various locations around the globe. The company's axles can be found on virtually every continent, from the United States to Australia and Russia to Antarctica.

The circular opportunity

The products of Sisu Axles are often used in applications where the operators are selling availability or a certain output per operating hours. In this type of operations it is crucial to be able to minimize vehicle downtime and especially eliminate unexpected maintenance needs.

To help its customers in their continuous effort to increase productivity and availability, Sisu Axles is now exploring opportunities of predictive maintenance.

Benefits

Typically, customers of Sisu Axles are doing preventive maintenance based on a predefined maintenance regime. With predictive maintenance, operators can call vehicles into service only on a need to service basis, reducing unnecessary maintenance and allowing the vehicle to continue in operations. Furthermore, the operators can get early warning messages of commencing component problems, preventing potential catastrophic failures. As a result, vehicles have higher availability, and they can be kept longer in use.



Applied business model



Tamturbo

JUST AIR

100% Oil-less High Speed Turbo
Compressors

Air as a Service €/m³

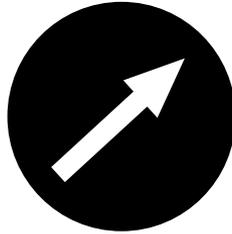


Why would you invest in circular business in addition to sustainability drivers and ecological impact ?



Impact on EBITDA

- Operational efficiency & minimizing waste
- Risk management
- Waste as an input
- Productivity



Impact on Revenue

- Expanded offering and new partnerships
 - New markets
- Increased customer centricity & intimacy
 - Differentiation



Impact on Brand Value

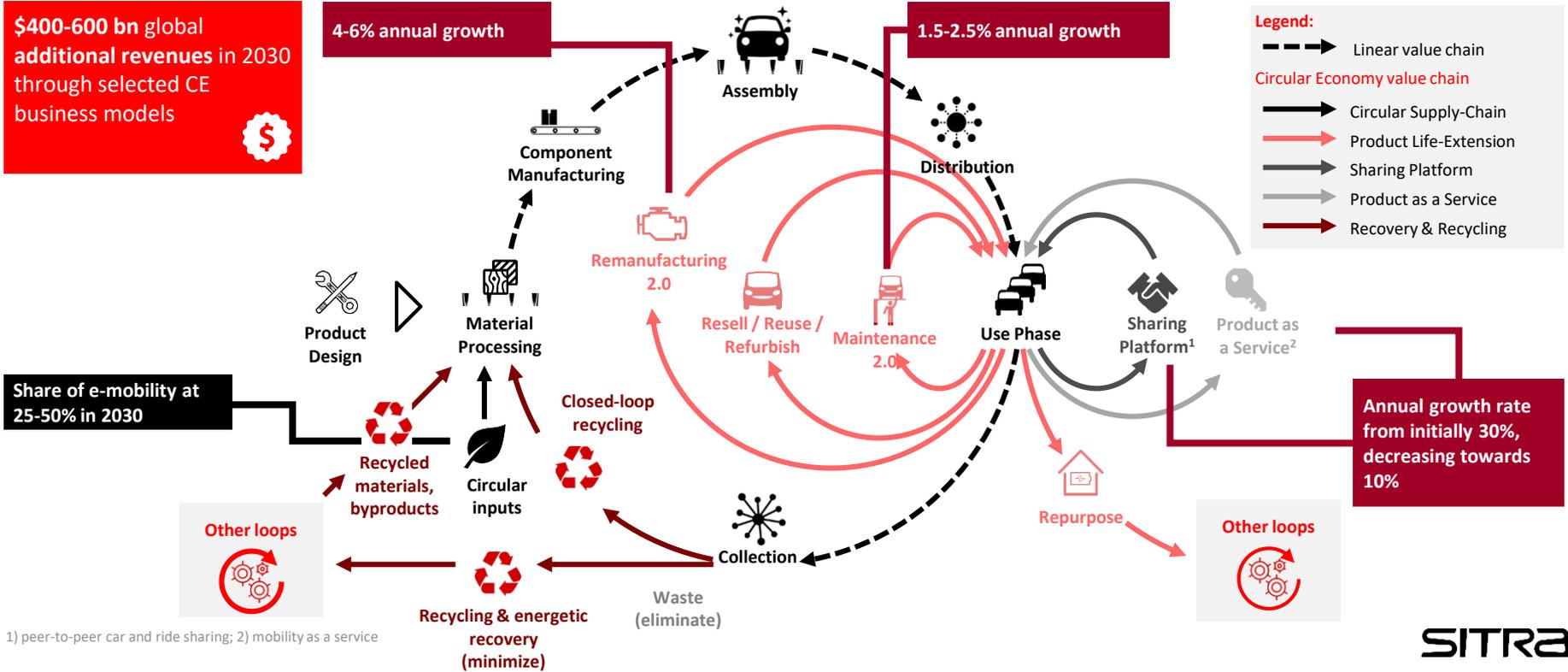
- Investors
 - Legal
- Employees
- Partners
- Customers

EARLY MOVERS HAVE ALREADY STARTED

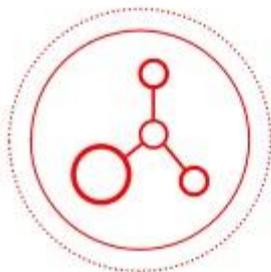
	Machinery & Equipment	Marine	Energy	Transportation
CIRCULAR SUPPLY CHAIN				
SHARING PLATFORM				
PRODUCT LIFE EXTENSION				
RECOVERY & RECYCLING				
PRODUCT AS A SERVICE				

Business Models Redefines the Business Ecosystems

Example: submodels and CE math in Automotive



The circular customer connection



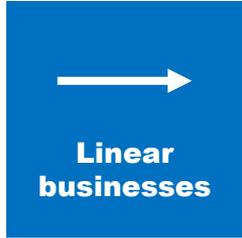
Transforming operations to harness circular business models means gaining a direct connection to the customer.

The result?



More profitable revenue streams - ongoing service over one-off sales

Actors that make up the circular ecosystem generates value and attracts investors

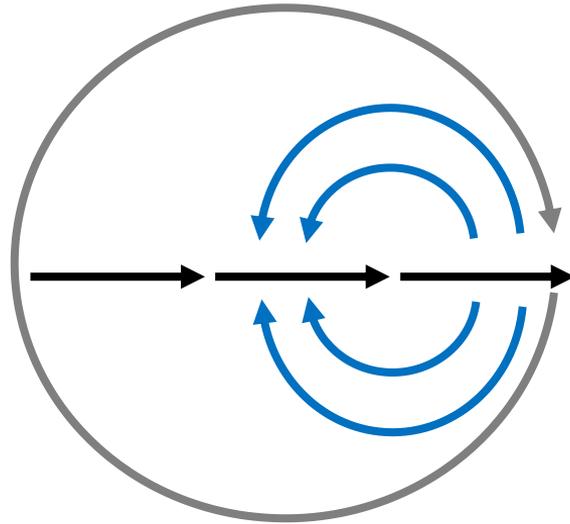


VOLVO
Manufacturer of automotive

sunfleet
VOLVO CAR SHARING
Provider of automotive sharing platform

SPRINGWORKS
Connected car platform for services offerings

Illustrative example



— Linear businesses — Circular businesses — Enabling businesses

Other Industries

The Selected sectors have mature ecosystems across Nordics for circular collaboration

- EXECUTIVE SUMMARY

- Nordic countries, including Sweden, Denmark, Finland, Norway and Iceland, have all defined ambitious targets to drive a transition towards a circular economy
- Four manufacturing sectors have a large footprint across all Nordic countries, mainly – Machinery & Equipment, Transportation, Energy and Maritime, with a strong case to transition to circular business models
- In addition, circular business models are broadening industry's scope, as new actors are entering the market to exploit inefficiencies from linear models
- Circular and enabling businesses are necessary complements to the more traditional linear businesses to collaboratively close the loops in the manufacturing industry – a circular economy cannot be achieved by one actor alone
- **Based on our research, we have found that all four sectors have the majority of ecosystem actors in place, operating across the Nordic market, in order to achieve ecosystem collaboration for circular economy**

Ecosystem maturity

 Machinery & Equipment H	<ul style="list-style-type: none">• Overall high maturity, some circular capability gaps in Norway & Denmark• Ensure value chain oriented scoping to raise Nordic circular collaboration
 Transportation H	<ul style="list-style-type: none">• Build a cross-border ecosystem around Swedish OEMs since all actors are available in the Nordics• Ensure customer engagement to close the loop at end-of-life
 Maritime M	<ul style="list-style-type: none">• Engagement can be created if benefits from holistic life-planning is explained, mainly end-of-life phase opportunities currently not exploited
 Energy M	<ul style="list-style-type: none">• Limit sector scope to one energy type• Ensure involvement of customer and technology enablers to drive service-models during use phase

The program brings together various small and large companies and organizations across the Nordic manufacturing industry

Machinery & Equipment	Maritime	Energy	Transportation
               	             	            	               

Enabling companies









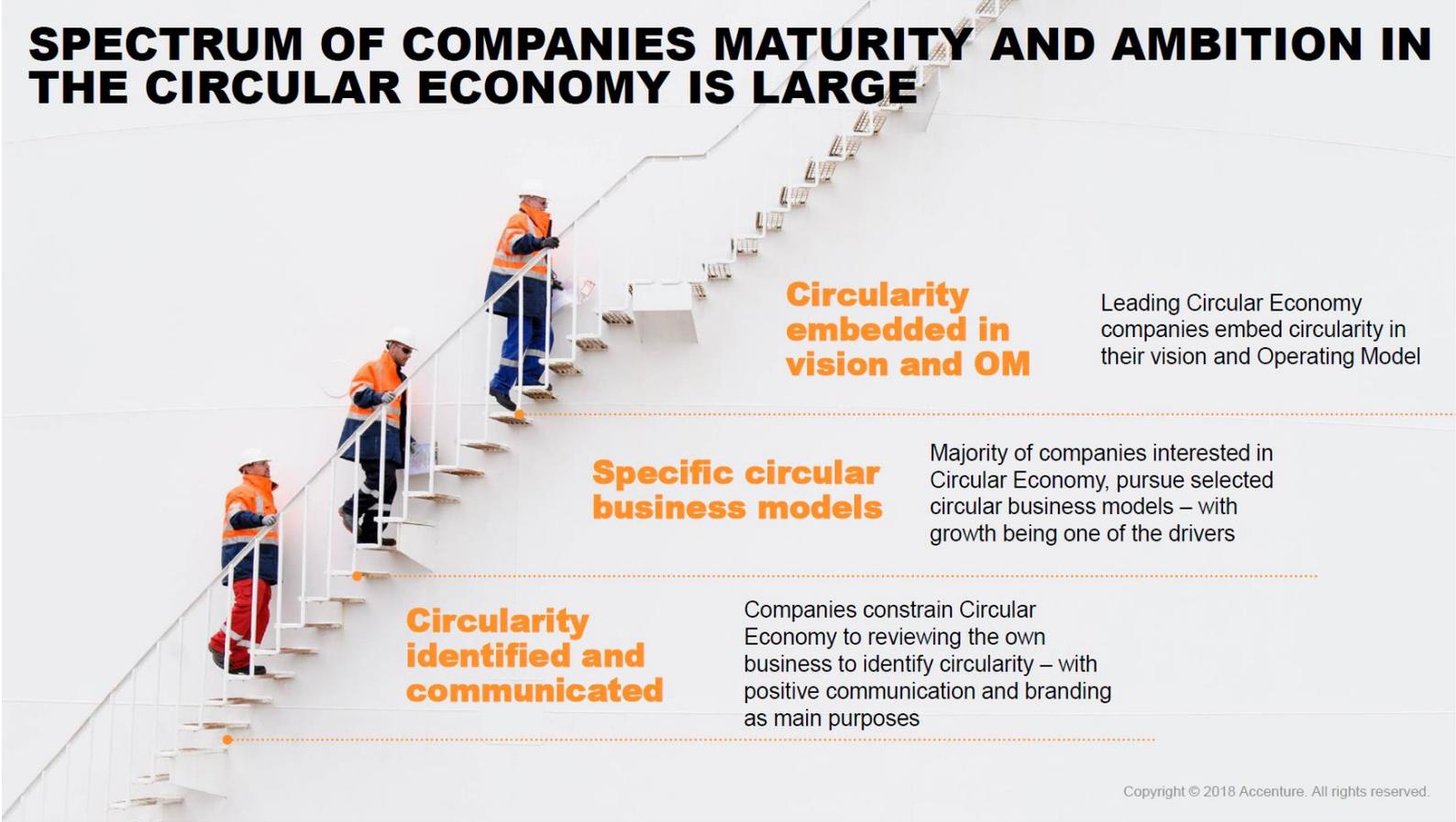








SPECTRUM OF COMPANIES MATURITY AND AMBITION IN THE CIRCULAR ECONOMY IS LARGE



Circularity embedded in vision and OM

Leading Circular Economy companies embed circularity in their vision and Operating Model

Specific circular business models

Majority of companies interested in Circular Economy, pursue selected circular business models – with growth being one of the drivers

Circularity identified and communicated

Companies constrain Circular Economy to reviewing the own business to identify circularity – with positive communication and branding as main purposes

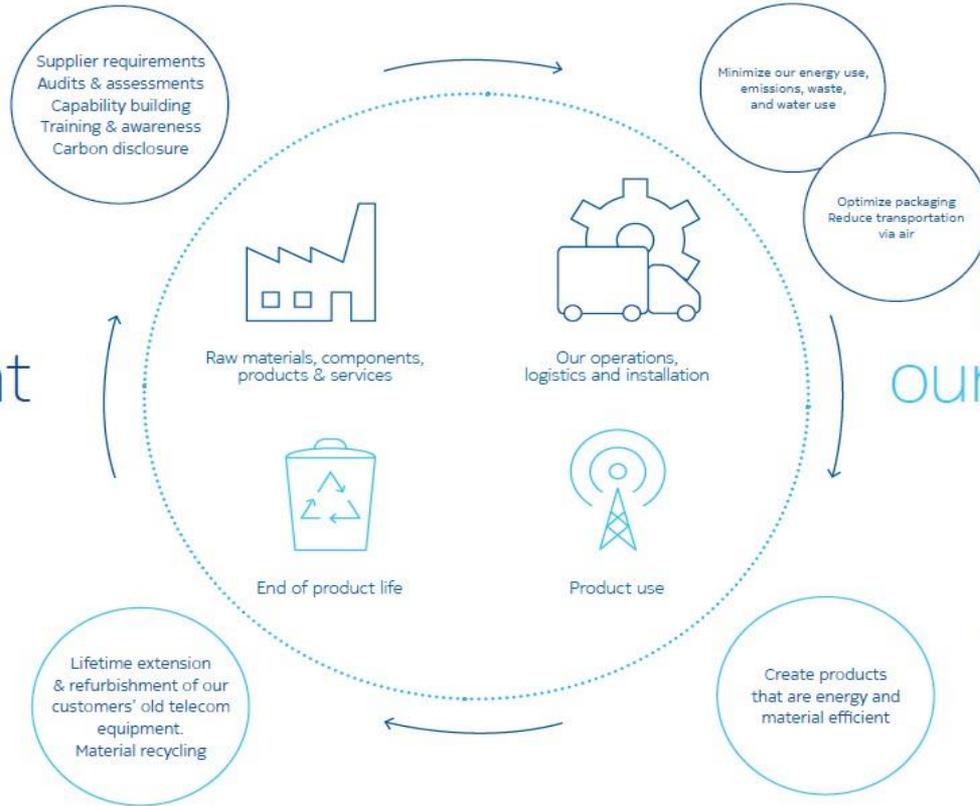
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Environmental management : efficiencies

Minimizing our footprint

Ensure our own operations are eco-efficient

Support a more eco-efficient supply chain



Maximizing our handprint

Helping customers deal with increased data traffic in a sustainable way

Helping other industries to reduce their energy use and emissions

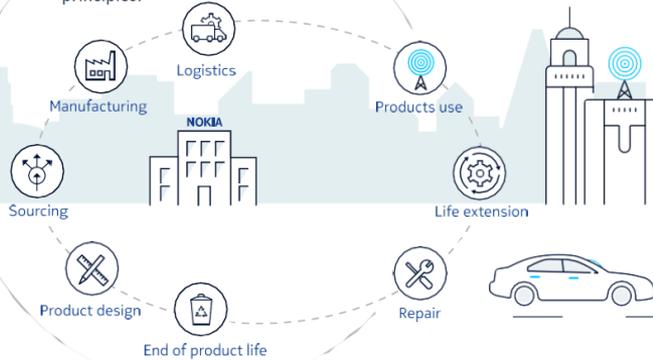
Refurbish and recycle old telecoms equipment

Product-level impact

We up-grade, repair, reuse and recycle our products

Operational impact

We run our operations and develop our products using circular-economy principles.



Societal impact

Digitalization of products and services supporting sharing economy



Operations

Office waste, packaging waste, product design

143 kg

waste per
employee

3700 tons

of packaging
reused

70%

less material
mobile network
product 2/3/4G

Products

Up-grade, repair, reuse, recycle

Zero

touch update for
networks

68 000

units reused, 2600
tons recycled

99%

materials utilized
at the product end
of life

Society

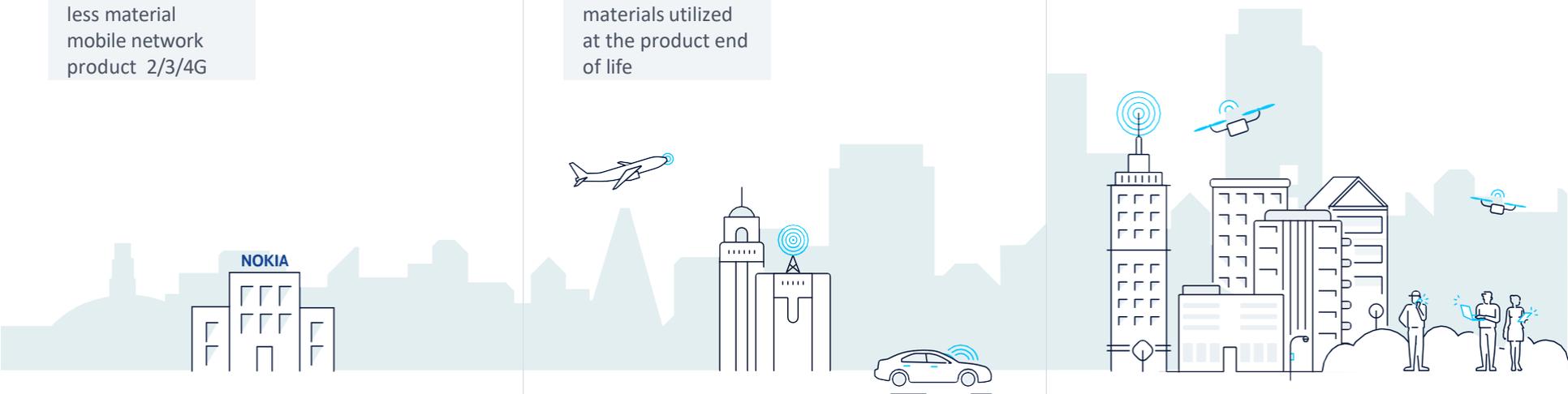
Digitalization enables optimization of the
global resource use

91%

global circularity
gap

Share

to avoid waste



Sustainability work flow

VISION

To be the no. 1 branded consumer goods company in Storage in Northern Europe and the leading household player in the Nordics

MISSION

Orthex Group develops, produces and markets functional household products to customers and consumers. Our offering is based on appealing and innovative concepts, responsibly produced mass market products of high quality and leading brands.

Aspects	<p>ECONOMIC</p> <p>Growing and profitable business Sustainable products Customer satisfaction</p> 	<p>ENVIRONMENTAL</p> <p>Environmentally sustainable choices Resource efficiency Responsible production and consumption</p> 	<p>SOCIAL</p> <p>Caring for our people Stakeholder engagement Product safety</p> 
	KPI'S	<p>Turnover Long lasting and recyclable products Delivery performance rate</p>	<p>Share of Bio and Recycled material Production scrap rate Energy efficiency</p>

Sustainable products

Long lasting and high-quality products with a timeless design

DISPOSAL / RECYCLING

After use the product can:

- Be recycled and the raw material reused when producing new products
- Burned and used as energy. The energy gained is as high as in virgin oil

CONSUMER USE

Our high-quality products are developed to last for decades and improve everyday life.

TRADE

We always deliver good quality and support our customers to fulfil consumer needs.



PRODUCT DEVELOPMENT

We design functional, high-quality and long-lasting products that can be recycled after use. We always optimize the use of raw material and design the products to be logistically as efficient as possible. Our products are designed to be as efficient as possible to produce and transport.

MANUFACTURING

We have ambitious targets in reducing the use of electricity and waste in production. We actively look for new bio based and recycled materials and strive to minimize the use of material in all products and packaging. We use recycled or FSC marked packaging whenever possible.

TRANSPORTATION

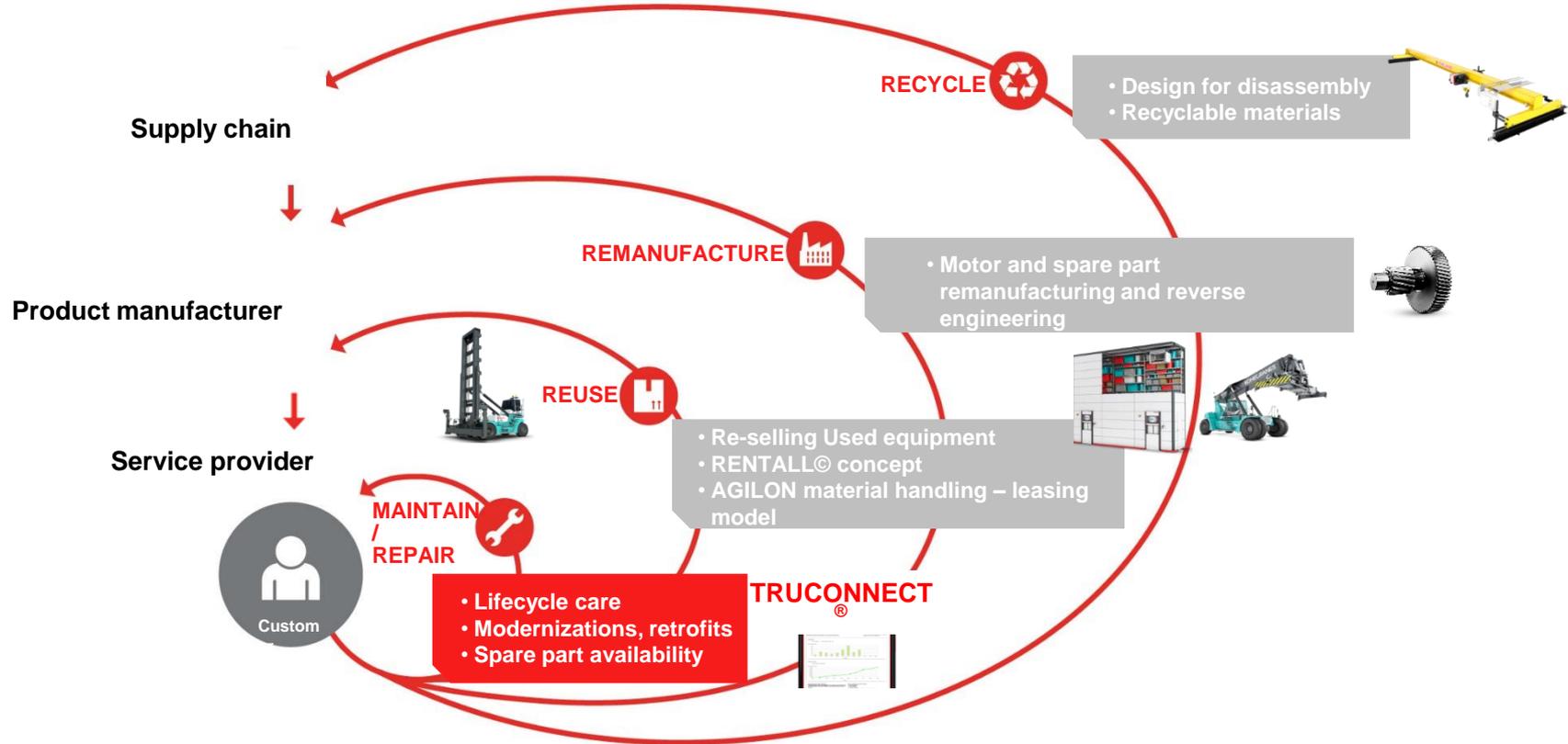
When developing new products, we always consider the optimisation of logistics. When transporting the products, we minimize the use of packaging.



Global reach



Towards circular economy with services



Konecranes Lifecycle Care aims to get more value from the existing products, while decoupling value creation from resource consumption

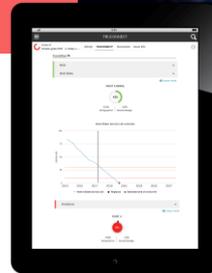


Digitalization boosts circular economy

Providing data on the state of components in real time, enabling the knowhow when to maintain, replace or repair components – at the right time.



- Conversational systems
- Machine learning
- IoT & Industrial internet
- Machine vision, virtual reality
- Augmented reality
- Big Data
- Optimization and analysis
- Digital twin
- Artificial intelligence

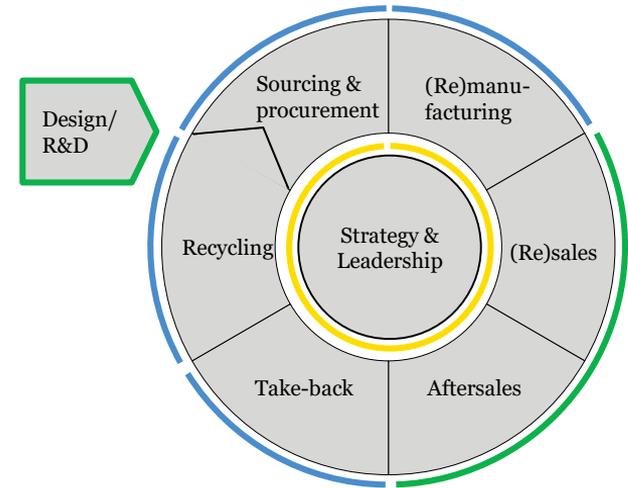


CHANGING THE GAME REQUIRES NEW CAPABILITIES



	 TRADITIONAL INNOVATION	 SERVICE INNOVATION
 WHAT?	<ul style="list-style-type: none"> Understand Customer usage and expected Product Attributes 	<ul style="list-style-type: none"> Design and live Customer Experience / Journey
 HOW?	<ul style="list-style-type: none"> Leverage traditional and robust processes 	<ul style="list-style-type: none"> Perform iterative design and prototyping (to test, fail, learn and rebound quickly)
 WHO?	<ul style="list-style-type: none"> Leverage companies distinctive forces and expertise around Product / Service 	<ul style="list-style-type: none"> Manage an open ecosystem and perform open innovation – acquiring / partnering with new talents
 CORE SKILLS	<ul style="list-style-type: none"> Traditional Product / Service know-how is “at the heart” 	<ul style="list-style-type: none"> Design Thinking and Big Data / Analytics are the heart
 MOTIVATION	<ul style="list-style-type: none"> Perform Innovation cycle in Years 	<ul style="list-style-type: none"> Perform Innovation cycle in Weeks / Months

3 KEY AREAS OF DEVELOPMENT TO MOVE FROM LINEAR TO CIRCULAR ECONOMY



Moving from a linear to a circular value chain requires different capabilities

Differences in required know-how when going circular

A) Customer value delivery

- Outcome-oriented solutions instead of products
- Products designed for long life cycles and recycling
- Customer-centricity in sales and support functions

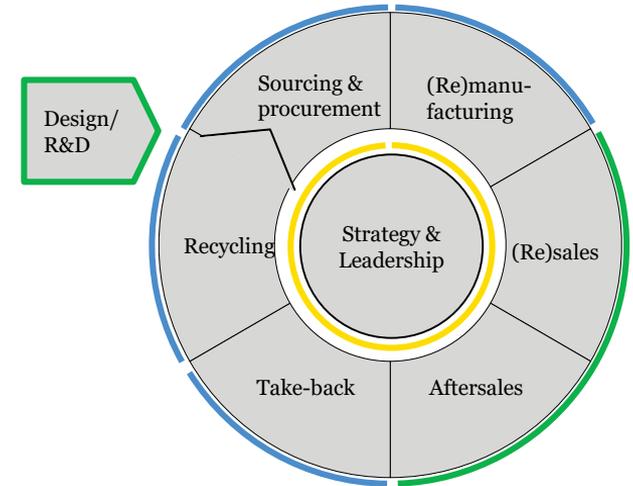
B) Resource handling

- Circular sourcing of material
- Closed loop production processes
- Skills for product life extension e.g. remanufacturing, take-back

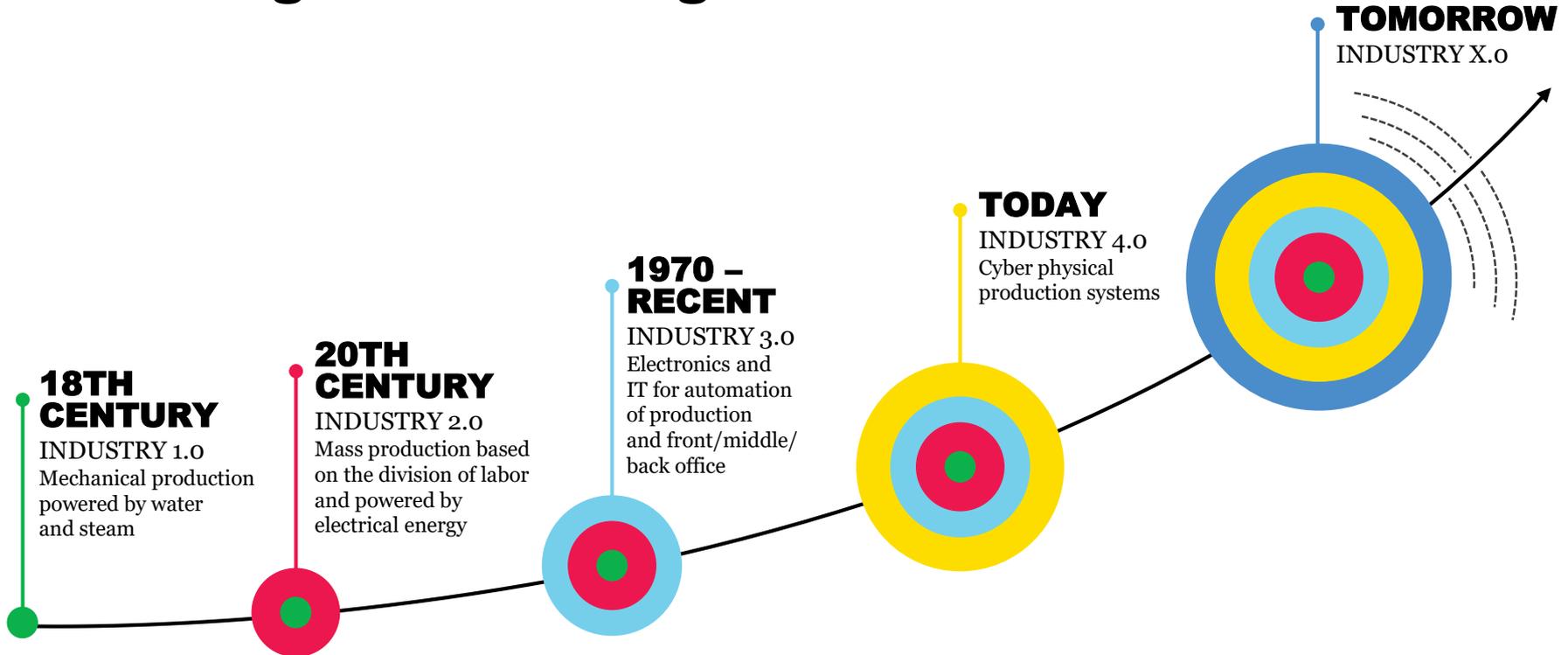
C) Organisation and collaboration

- Targets, metrics and incentives promoting circularity
- Ecosystem with customers, suppliers and peers for exchange of material, knowledge and experiences
- Skills to leverage digital technologies

Circular value chain



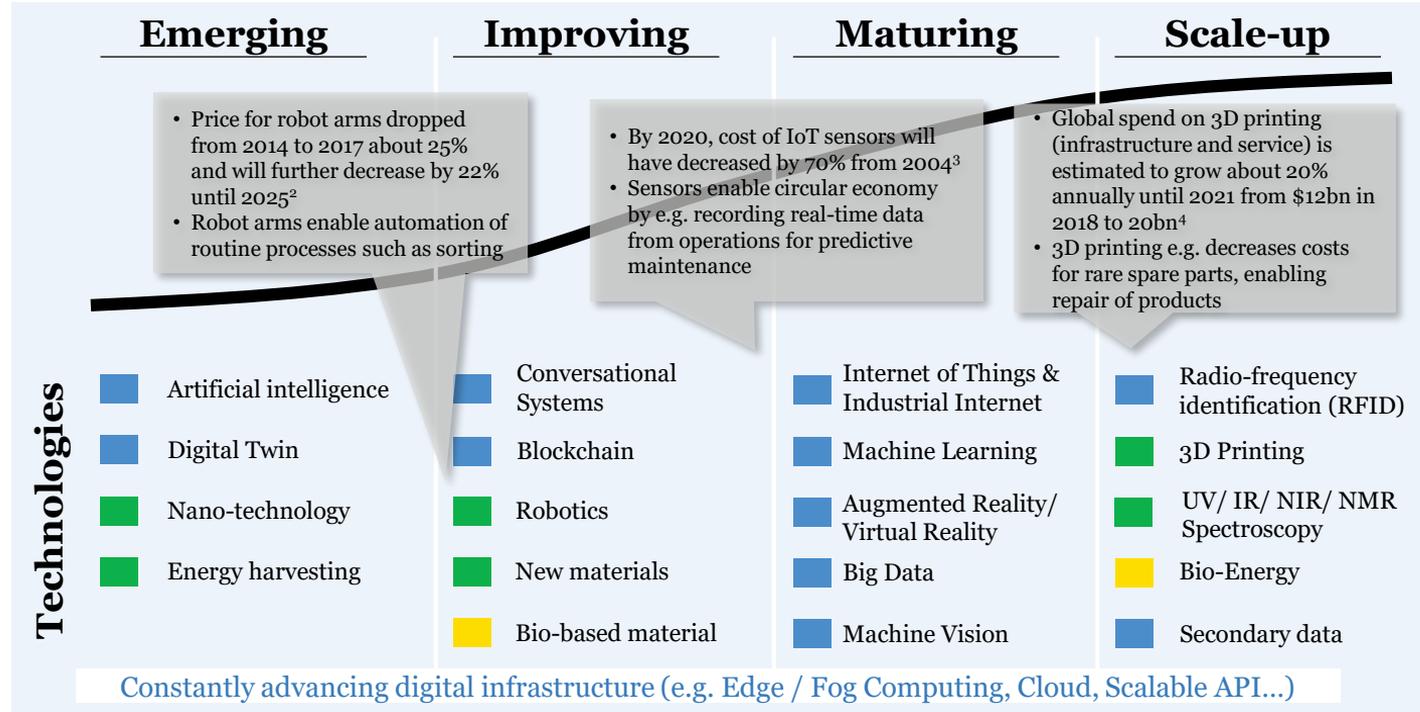
The increasing speed of technology development forms the term Industry X.0 referring to technologies used tomorrow



Source: Accenture, Appendix for more details

Besides digital technologies, physical and biological technologies develop at rapid pace enabling circularity

Level of technology development¹



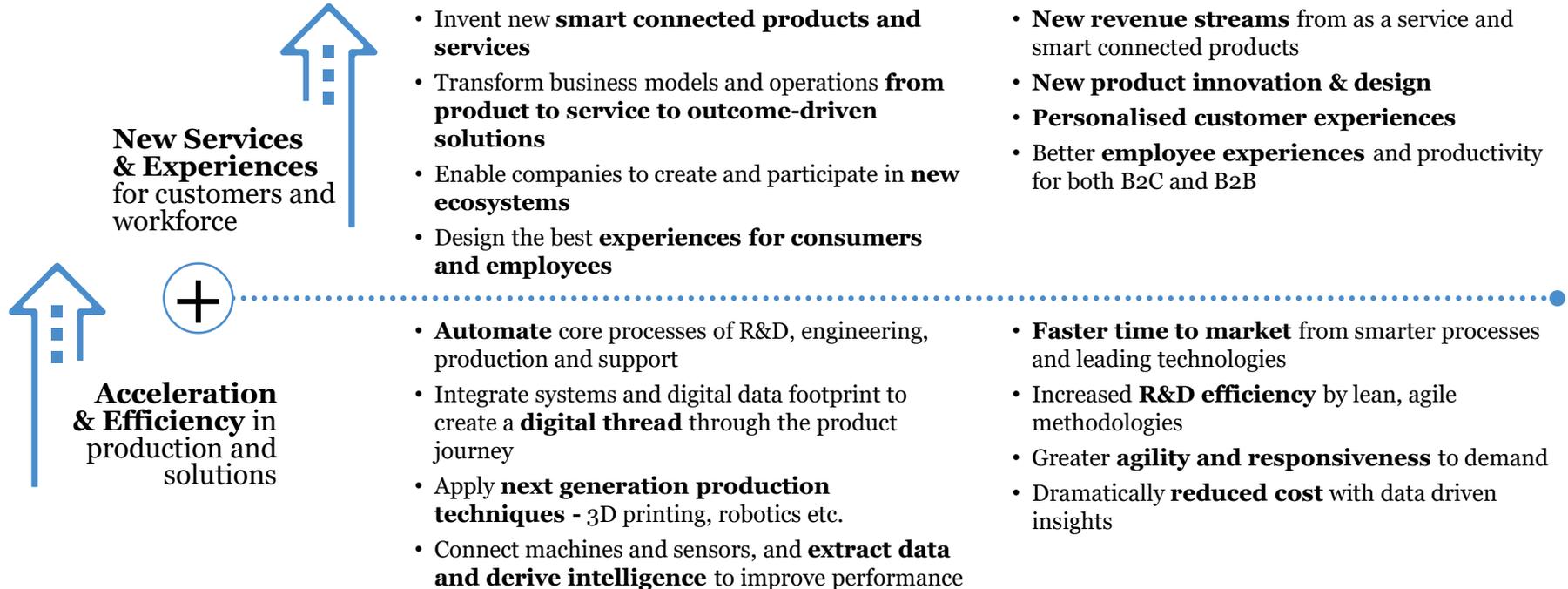
Digital: Technologies based on computer sciences, electronics and communication which make use of increasing information intensity and connectedness of physical resources

Physical: Technologies based on basic property of materials, energy, forces of nature and their interaction

Biological: Technologies based on biology, aspects including but not limited to biological systems, living organisms, or derivatives thereof, to make products and processes for specific use

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

Changes through Industry X.0 deliver tangible outcomes for companies



Source: Adapted from earlier Accenture publications, Appendix 2 for more details

New technologies are needed to enable the circular business models

Most interesting technologies enabling circular business models

SME input from workshops

Technology



Internet of Things & Industrial Internet



Big data



Radio-frequency identification (RFID)



Energy harvesting

Circular opportunities

Enables exchange of data generated in sensors and triggering of action, and therefore supports e.g. condition-based monitoring

Enables descriptive and predictive analytics, and can be used e.g. for delivering predictive maintenance services

Enables product identification throughout the lifecycle and thus facilitates e.g. product take-back

Enables capturing energy that would otherwise be lost, such as heat, light, sound, vibration or movement

Identified challenges

How to collect, analyse and **leverage data**?

How to ensure **data security** and quality?

How to **avoid risks** related to technology?

Technologies enabling more efficient data collection and usage are seen as most interesting, yet challenging



BLOCKCHAIN



SIMULATION



ARTIFICIAL
INTELLIGENCE



BIG DATA



CLOUD
COMPUTING



ADVANCED
ROBOTICS



AUGMENTED
REALITY



SYSTEM
INTEGRATION



INTERNET
OF THINGS



CYBERSECURITY



PREDICTIVE
ANALYTICS

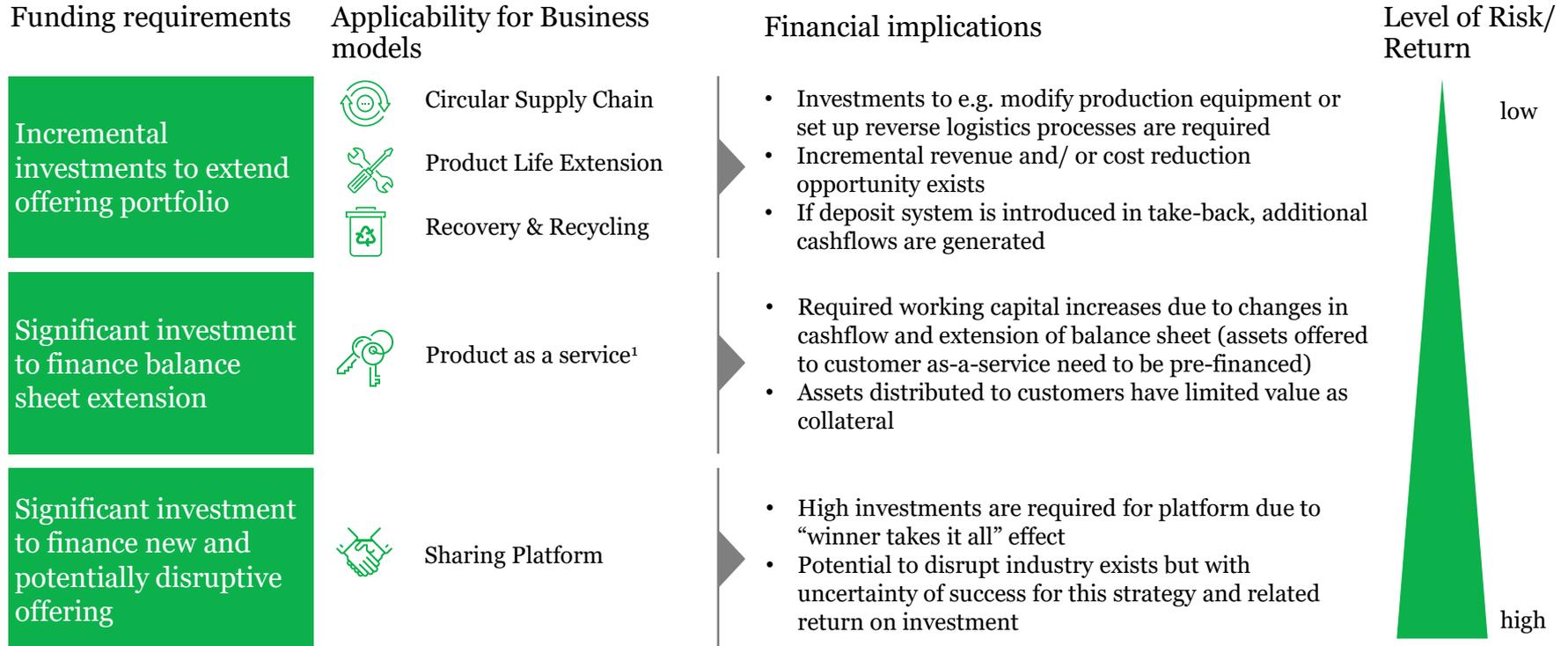


ADDITIVE
MANUFACTURING

Turning Technology into Solutions

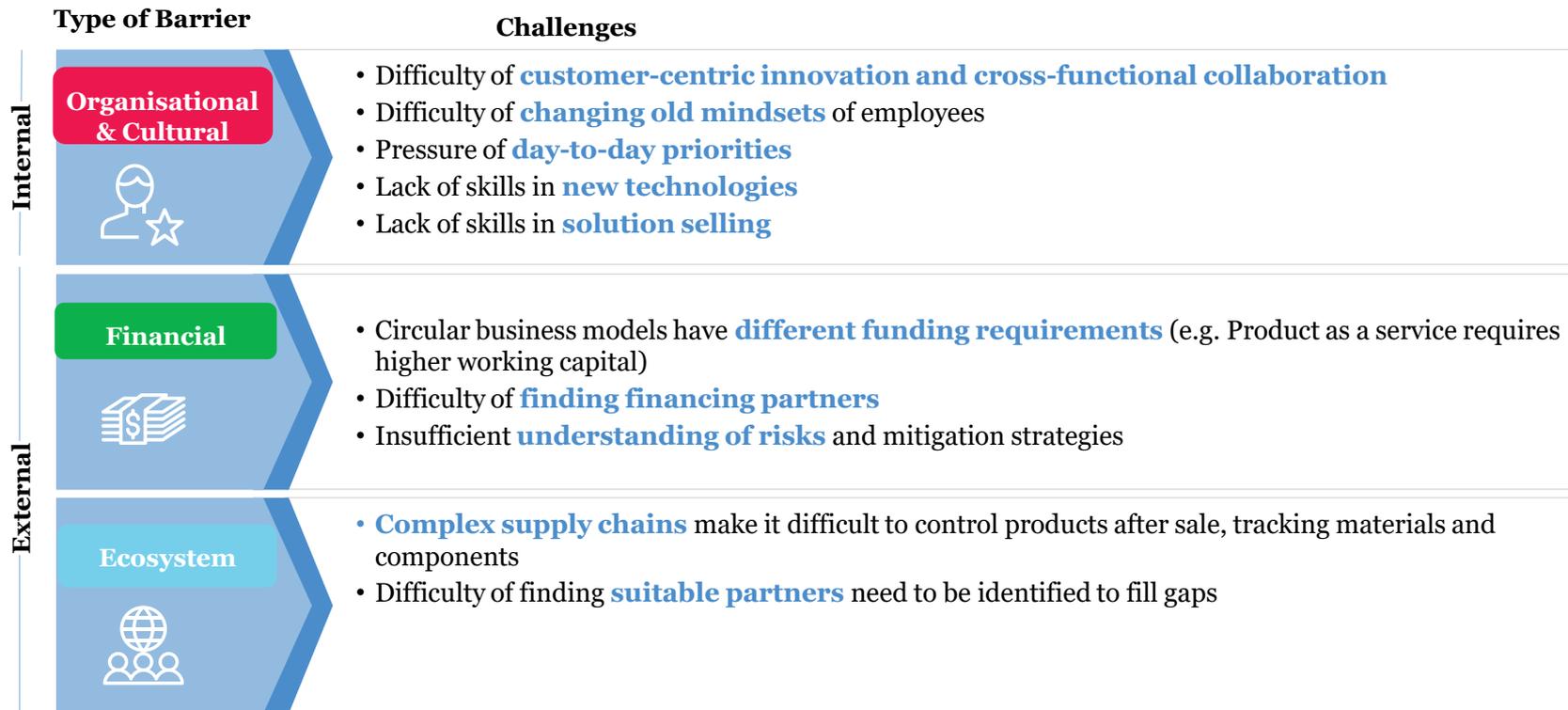


Circular business models have three funding requirements that vary in level of risk and return



IMPLEMENTATION

PREPARE FOR BARRIERS



Source: Accenture

Behaviour, values and mindset changes are required to deliver outcome-oriented solutions

1. Address all components of culture



Behaviours

The outward signs of culture

They are informed by underlying values and mindsets

Values

The things we believe are most important

We have some awareness of our own values, but they are largely invisible to others

Mindsets

The assumptions we hold about the way the world is

These are often invisible to us and to others – the things we take for granted

“The way we do things around here”

Culture

Culture is the sum of how people in the organisation assume, believe, and act. This differentiates from competitors

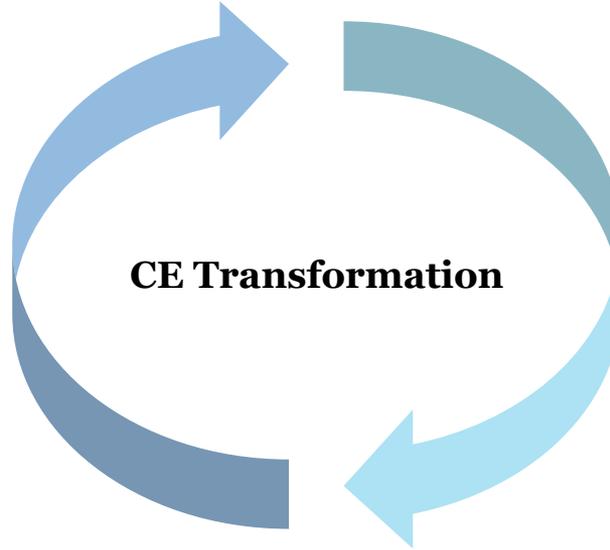
The transformation journey has two key elements:

I) Envision and plan and II) Deliver and adapt



Envision and Plan

Develop a vision of how your company will exploit the circular economy opportunities and plan the required changes

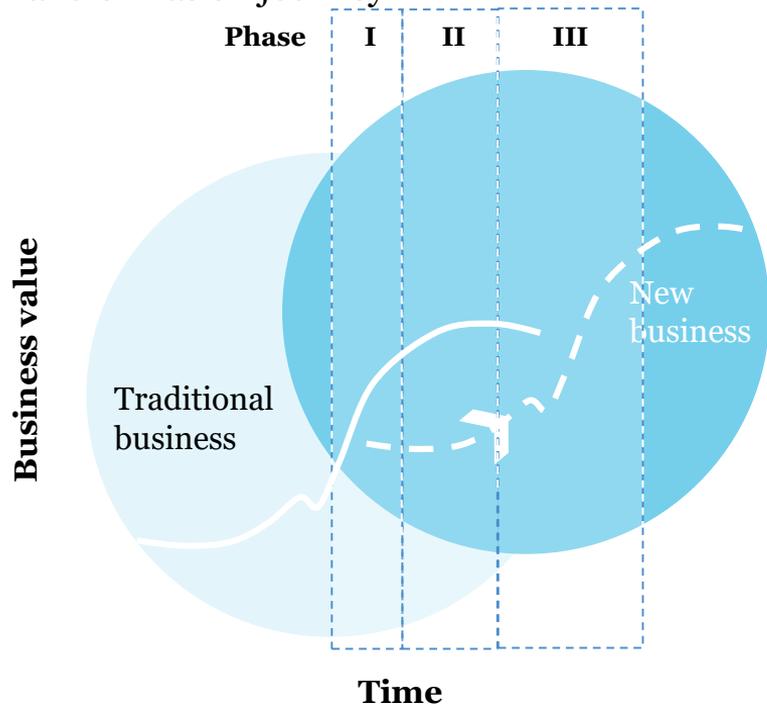


Deliver and adapt

Implement changes to transform offering, modify processes, develop ecosystem and become a circular business. Evaluate results and adapt plan as required

The transition from the traditional to the new circular business model is gradual and has three phases

Transformation journey

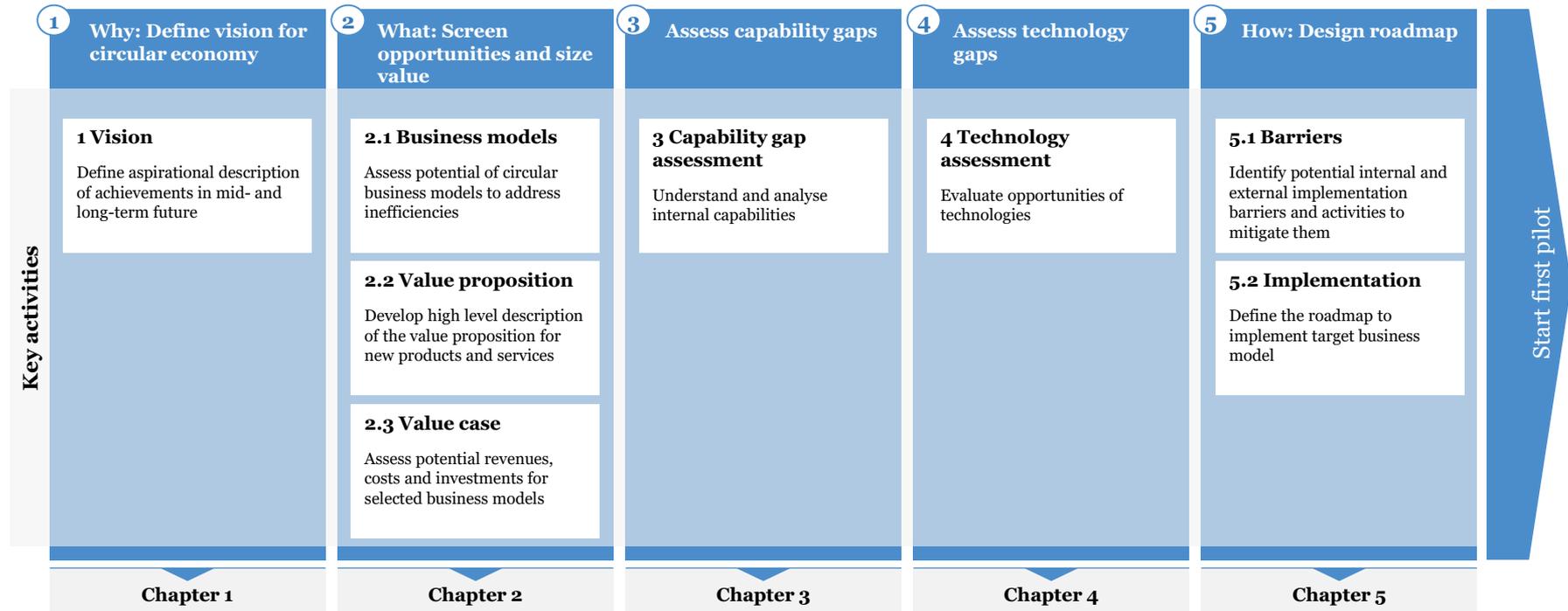


- I Explore & Shape** Develop concepts for target business models, look for partners, design and test prototype(s)
- II Attract & Win** Develop processes and partnerships and pilot new solution to convey benefits
- III Scale fast & keep growing** Adopt multiple circular business models across own operations and value chain

Source: Accenture

Five steps are critical to envision and plan a successful transformation

Envision and Plan



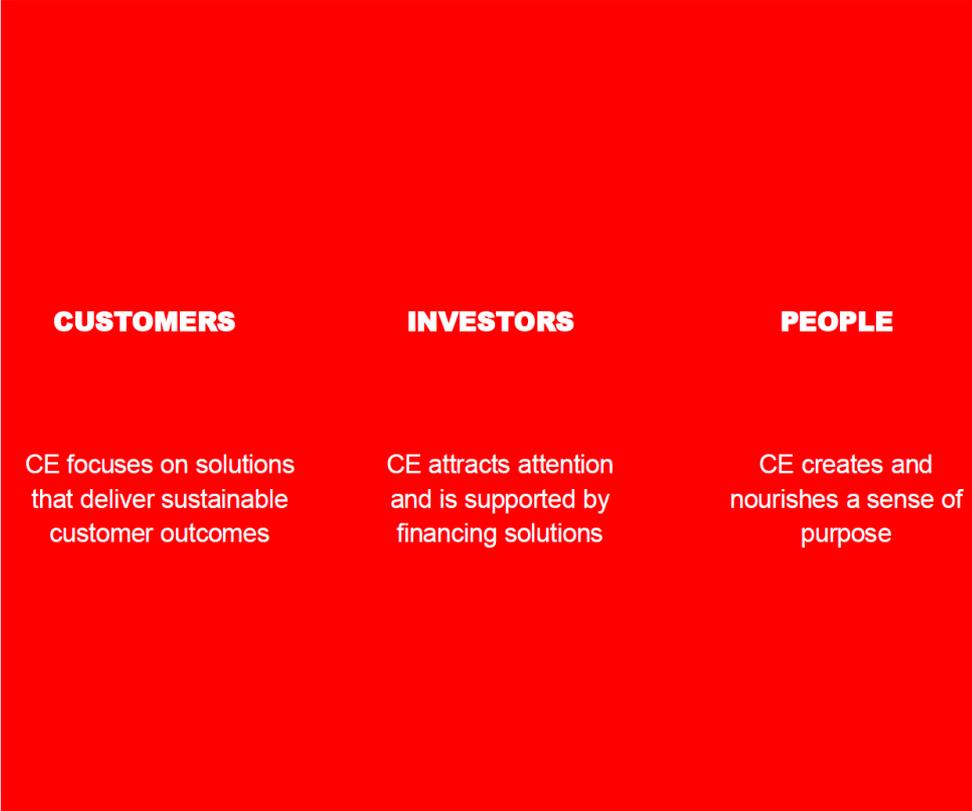
Not all capabilities have to be build internally, ecosystem partners can support

Illustrative examples

<p>1 Design solutions to deliver customer outcomes</p>	<ul style="list-style-type: none"> Providers of digital technologies Companies supporting on digital product life cycle management Designers for customer centric and digital design 		<p>6 Take back products at end-of-life</p>	<ul style="list-style-type: none"> Logistic companies to jointly develop return scheme or draw on existing services Companies with specialised return logistics offering 	
<p>2 Design products for circularity</p>	<ul style="list-style-type: none"> Companies and universities with know-how on e.g. circular materials Designers assisting circular design 		<p>7 Deploy technology and data for delivering outcomes</p>	<ul style="list-style-type: none"> Technology providers for e.g. IoT solutions Data-analytics companies and tools that help both gather and analyse data 	
<p>3 Source recycled or recyclable materials</p>	<ul style="list-style-type: none"> Raw material suppliers that already have circular economy initiatives Recycling companies Renewable energy companies 		<p>8 Orchestrate ecosystem of partners</p>	<ul style="list-style-type: none"> Knowledge and experience sharing networks and platforms Public programs on circular economy 	
<p>4 Produce, remanufacture and recycle products</p>	<ul style="list-style-type: none"> Providers of innovative production or remanufacturing technologies (e.g. robotics, 3D printing, artificial intelligence) 		<p>9 Transform mindset and steering</p>	<ul style="list-style-type: none"> Companies promoting transparency and reporting Networks offering guidance and good practices on transformation 	
<p>5 Sell outcomes and life-cycle service</p>	<ul style="list-style-type: none"> Partners that can assist in identifying customers (e.g. via Business Finland's search) Providers of sales intelligence and customer platforms 				

— Resource handling
— Customer value delivery
— Organisation and collaboration

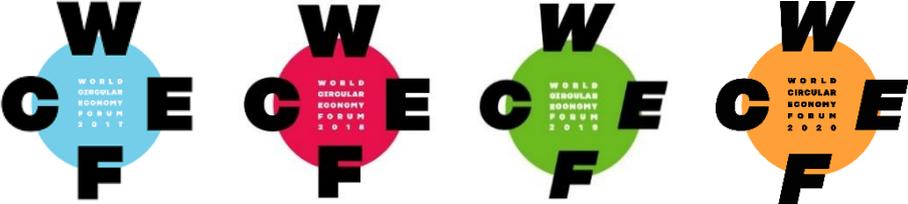
Circular engagement maximise customer value, attracts investors and creates sense of purpose



In Other Words

- a) Help define general and clear business benefits from circular adoption,
- b) Develop the right operating models to realize full benefit
- c) Establish the means to drive change.

World Circular Economy Forum



Facts about WCEF

1.

Organised once a year

2.

2+1 days

The forum itself lasts for two days. A third day can be reserved for side events, company visits and for any additional programme organised by the host country.

3.

By invitation only

The world's key circular economy thinkers and doers are invited to join in person or online.

4.

Free of charge

There is no entrance fee for WCEF participants..

5.

In English

All the event's programme and communication materials are written in UK English.



What and why is the WCEF?

The World Circular Economy Forum is an internationally recognised event and concept that presents the world's best circular economy solutions and gathers together the most recognised experts and decision makers in the field.

The event aims at accelerating the global transition towards a circular economy and achieving the UN Sustainable Development Goals.

WCEF is a global initiative of Sitra, the Finnish Innovation Fund. The first WCEF was organised in Helsinki in 2017.

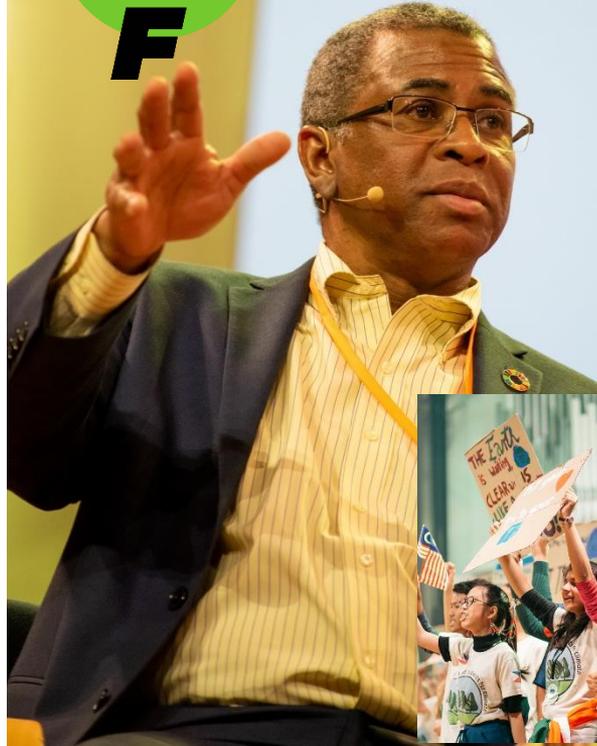
*For me everything was perfect, you are our **model for a successful event.***

*Impressed with the **high level positions and knowledge** of all speakers. At the same time, you felt like you were **welcome to take part** in discussions.*

*Young activists was a splendid idea. They are the main reason to work harder and scale it up. I was not the only one with **tears in my eyes.***

*10+ points for having **fair amount of women** on stage, and bringing your own young experts as moderators! **Leadership by example**, well done!*

QUOTES FROM PARTICIPANTS



WCEF IS A TRULY GLOBAL PUBLIC & PRIVATE PLATFORM

Year	Participants	Countries	Online participants
Helsinki 2017	1 630	92	1 405
Yokohama 2018	1 173	64	925
Helsinki 2019	2 207	98	1 695

Year	Business	Investor & Finance	Public sector	NGO	Research institute	Think tank	Media	Other
2017	440 (27 %)	46 (3%)	411 (25%)	234 (14%)	282 (17%)	61 (4%)	51 (3%)	105 (7%)
2018	392 (33%)	15 (1%)	276 (24%)	97 (8%)	153 (13%)	46 (4%)	56 (5%)	138 (12%)
2019	702 (32%)	97 (4%)	549 (25%)	282 (13%)	262 (12%)	52 (2%)	51 (2%)	212 (10%)

WCEF2019 – UPDATED CONCEPT, HUGE SUCCESS

2+1 days, 13 partners,
120 speakers

SESSIONS



17

PARTICIPANTS

2 207

REACH

SOCIAL MEDIA

(overall reach)

52 M

SIDE SESSIONS



12

+1 695 stream

2 800

GLOBAL JOURNALISTS

(opened our media releases)

3 000

SIDE EVENTS



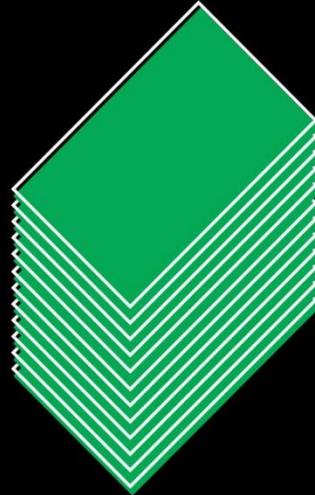
33

700

Thank you !



WELL-BEING



SUCCESS



**NATURAL
RESOURCES**

QUESTIONS ? - DISCUSSION

TALKS ABOUT THE FINNS' EMOTIONAL COLDNESS ARE NONSENSE. HERE ARE EXAMPLES OF PASSIONATE FEELINGS.



1. FURIOUS DELIGHT



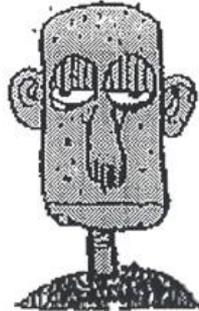
2. ENDLESS LAUGH



3. ENORMOUS JOY



4. SMARTING FRUSTRATION



5. DEEP SORROW



6. BITTER ANGER

circularplaybook.fi

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@sitrafund 



**RISE TO
SHINE!**

SITRA