

INNOVATIONS AND THEIR IMPLICATIONS - AN INTERNATIONAL PERSPECTIVE

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The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic visual effect.

What is circular
economy?

What is circular economy?

- Many definitions of 'circular economy', but aims to be different to the classical 'linear economy'
- First coined in 1988 by Kneese (1988), however, first principles have been around since the 1960s (see Boulding 1996 - 'spaceship earth')
- Almost impossible to define a single definition?!?

[HTML] [Conceptualizing the circular economy: An analysis of 114 definitions](#)

[J Kirchherr](#), [D Reike](#), [M Hekkert](#) - Resources, conservation and recycling, 2017 - Elsevier

... of the **circular economy** concept. For this purpose, we have gathered 114 **circular economy definitions** ... Our findings indicate that the **circular economy** is most frequently depicted as a ...

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Well what is CE then?!

- “A circular economy is an **industrial system** that is restorative or regenerative by intention and design. ... It **replaces the ‘end-of-life’ concept** with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals, which impair reuse, and aims for the elimination of waste **through the superior design** of materials, products, systems, and, within this, **business models.**” - Dame Ellen McArthur Foundation (Ekins, 2020)



How has circular
economy evolved over
recent years?





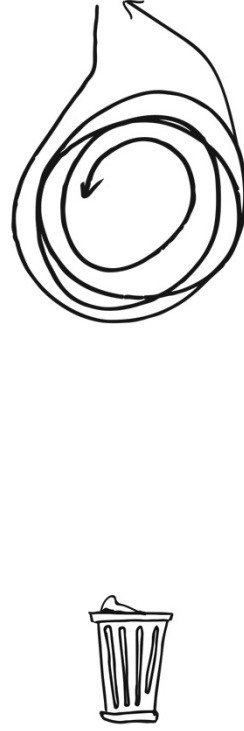
LINEAR ECONOMY



RECYCLING ECONOMY



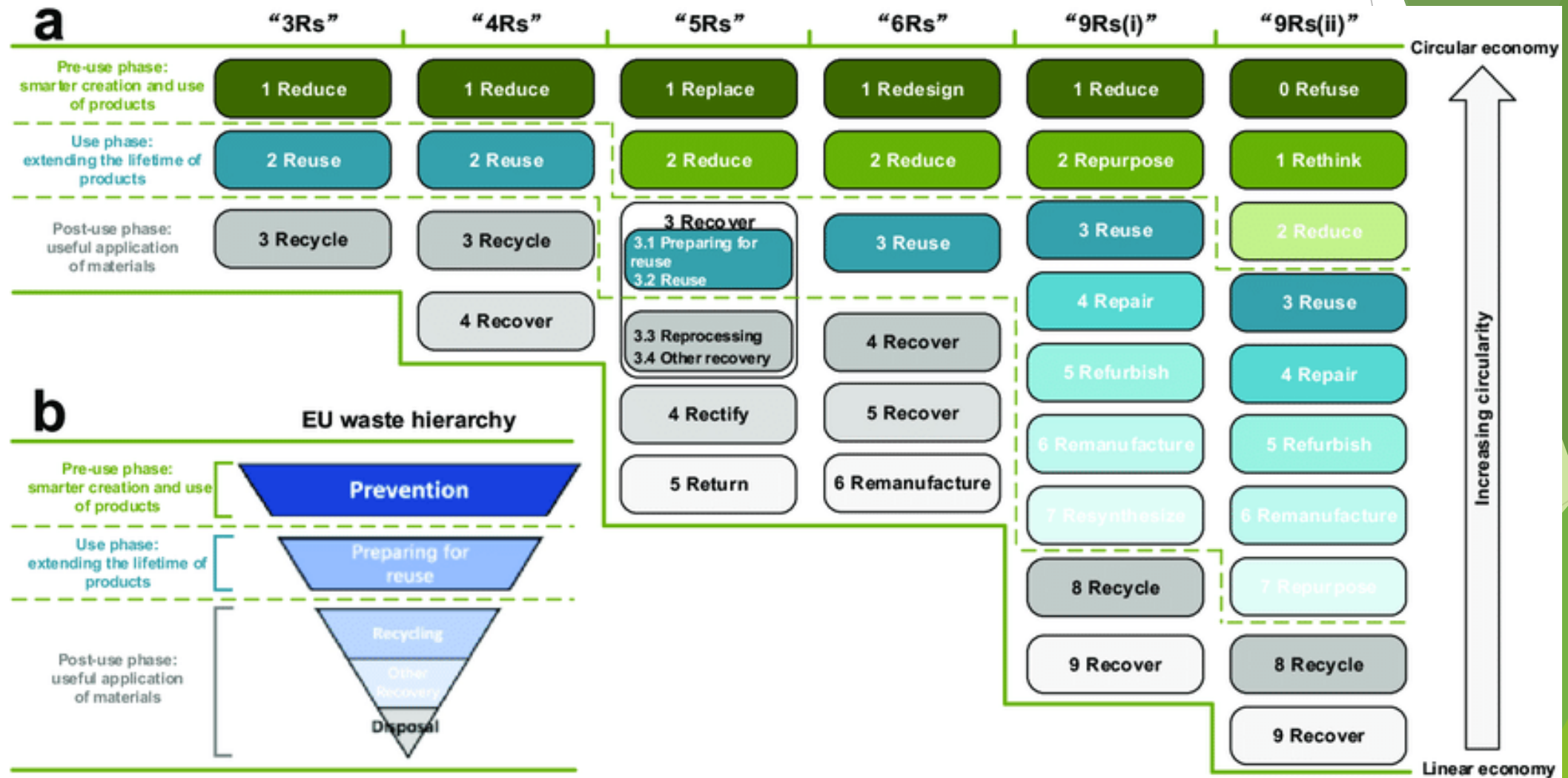
CIRCULAR ECONOMY



CC by Circular Flanders



Circular evolution



Source: Zhang et al. (2022)

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What has driven this
change?



An example of a circular economy approach - Stadia

- ▶ First purpose built stadium
Goodison Park
- ▶ Built using Victorian constructions methods (**Linear Economy Approach**)
- ▶ Inability to increase capacity
(Bullens Road Stand has not changed since 1928).



Goodison Park, the first purpose built football stadium in the world, during redevelopment.

World Cup leaves Brazil with bus depots and empty stadiums

By Bruce Douglas
Reporter, Rio de Janeiro

🕒 29 March 2015 | [Football](#)

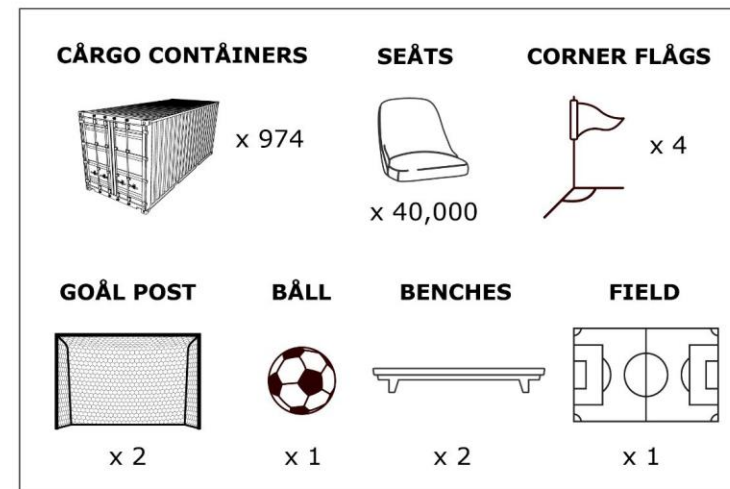
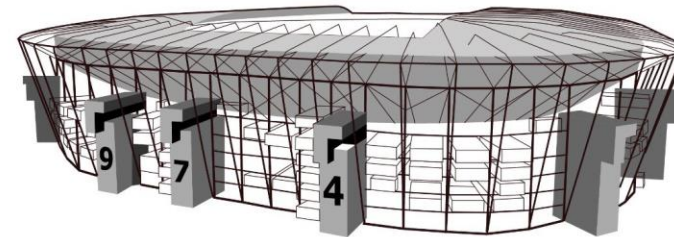


Source: BBC

An example of a circular economy approach - Stadia

- ▶ Since 2000s there have been a drive to change the linear approach to stadia construction (Wergeland and Hognestadt (2021))
- ▶ Qatar 2022 aiming to be carbon neutral and embrace CE technology (Al-Hamrani, 2022)
- ▶ Stadium 974 the first 'reusable stadium'

STADIUM 974



ASSEMBLE THIS STRUCTURE TO BRING JOY TO FOOTBALL FANS. DO NOT LEAVE CHILDREN UNATTENDED.
974 - A STADIUM MANUAL. POWERED BY QATAR 2022.

Stadium 974 Diagram - Doha

Many industries have reviewed their approaches to embrace a more circular approach.

Cultural & Political Attitudes

➤ The EU's 5 Most Innovative Countries (Ellerbeck, 2022)

1. Sweden
2. Finland
3. Denmark
4. Netherlands
5. Belgium

➤ Non-EU Countries Within Europe

1. Switzerland (Innovation Leader)
2. Norway (strong Innovators)
3. UK (Strong Innovators)

Cultural & Political Attitudes

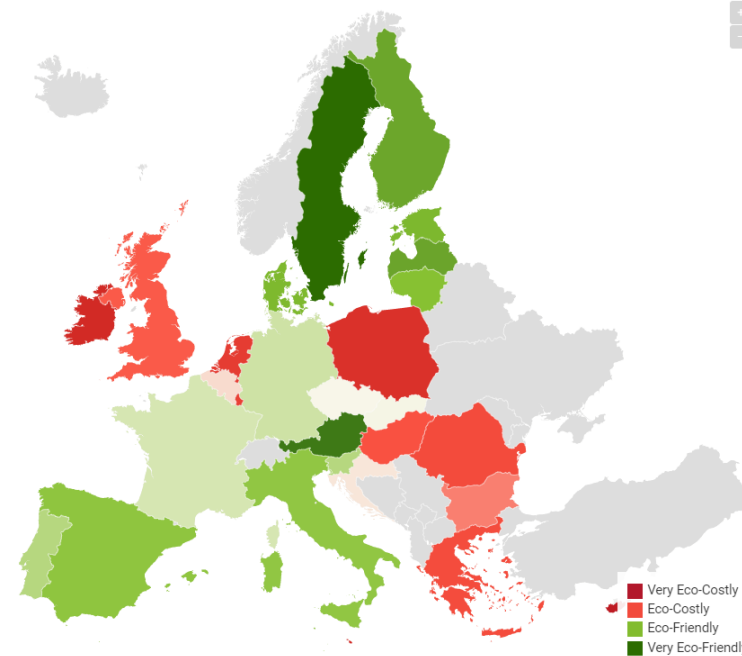
➤ The EU's 5 Most Innovative Countries (Ellerbeck, 2022)

1. Sweden (Very Eco-Friendly)
2. Finland (Eco-Friendly)
3. Denmark (Eco-Friendly)
4. Netherlands (Eco-Costly)
5. Belgium (Eco-Costly)

➤ Non-EU Countries Within Europe

1. Switzerland (Innovation Leader) (Very Eco-Friendly)
2. Norway (strong Innovators) (Very Eco-Friendly)
3. UK (Strong Innovators) (Eco-Costly)

Eco-Costly Countries in EU



Get the data • Created with Datawrapper

GreenMatch, 2022

Circular Economy Indicators

EUROPEAN COMMISSION, 2022

► SUSTAINABLE RESOURCE MANAGEMENT

This set of indicators examines the performance of the EU Member States in transforming their economies toward circularity by **lowering resource demands**, thereby **increasing resource security** and **lowering pressures on the environment** domestically and abroad.

► SOCIETAL BEHAVIOUR This set of indicators reflect **citizen awareness, engagement** and **participation in the circular economy**.

► BUSINESS OPERATIONS

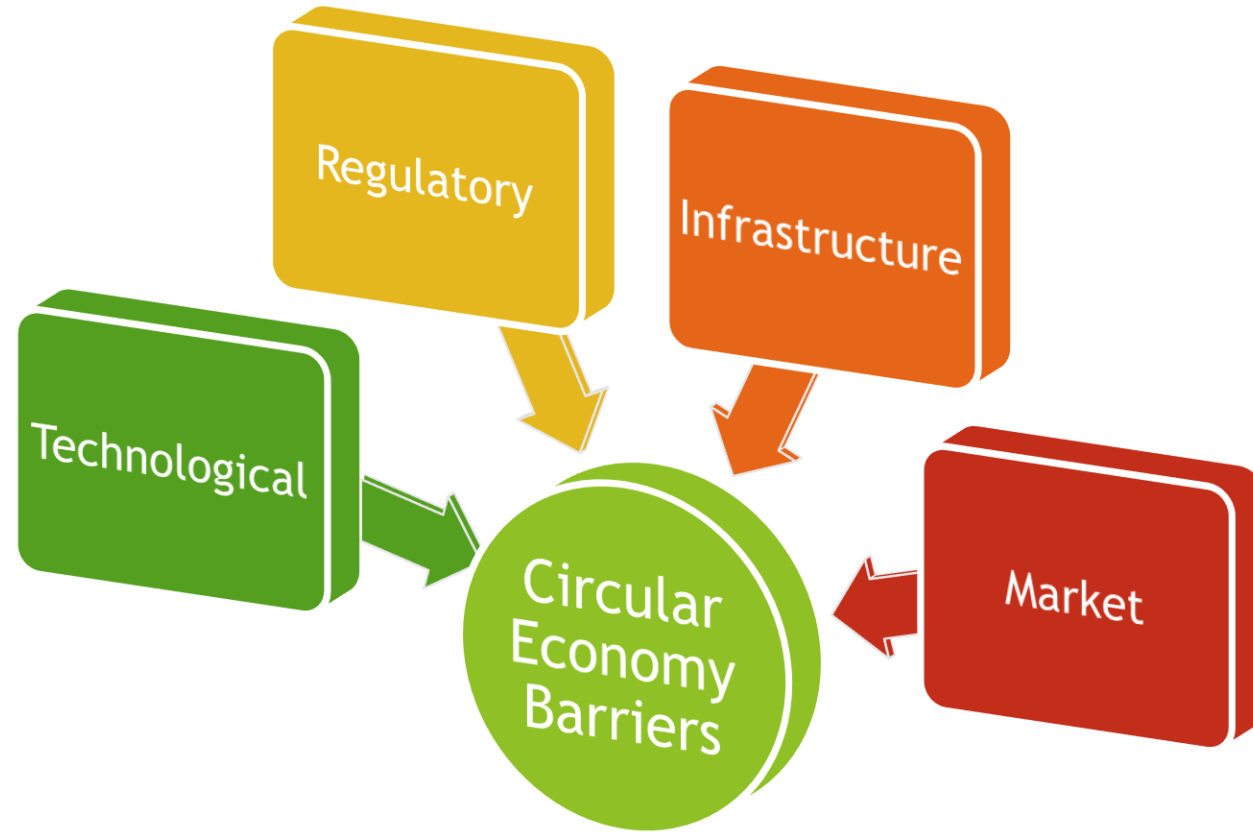
This set of indicators depicts **eco-innovation activities** toward changing and **adapting business models** according to the **principles of a circular economy**.

Circular Economy and Political Agenda

- ▶ Circular Economy Action Plan - Developed by the EU
- ▶ Non-EU members developed country-specific measures and investment plans
- ▶ Zurich's Pledge to the Circular Economy
- ▶ Material testing for a Circular Construction Industry
- ▶ Waste from the Aviation Industry used in production of running shoes



Barriers and Incentives for CE implementation



TECHNOLOGICAL

Barriers

- ❑ Lack of technologies to implement CE
- ❑ Lack of Affordable/Economical Recycling Technologies
- ❑ Lack of technical expertise in SMEs - Design to End of life
- ❑ Logistics

Support / Incentive / How they have been overcome

- Australia is investing \$70 billion in grants and incentives for technological support to industries and CE innovation (Global Australia, 2022)
- Japan's J4CE , a collaboration between 18 odd industry experts to explore viable technologies for economical recycling of industrial/domestic waste (J4CE, 2022)
- More and More Asian countries and Brazil exploring Reverse Logistics to reduce waste and land fill, specially in electronics and consumer goods.
- Electronics giants such as HP (Hawlett Packard Enterprise, 2022) and Dell (Dell Technologies, 2022) considering circular economy at the design stage of their consumer electronic products.

Circular economy



REGULATORY

Barriers

- ❑ Lack of Government Policies to support CE
- ❑ Lack of Incentives for CE such as Taxes, Subsidies, Supply chain, incentives for use of secondary material
- ❑ Lack of Collaboration between Govt and Pvt., sector
- ❑ Lack of Promotion and Awareness
- ❑ Lack of law enforcement and poor accountability

Support / Incentive / How they have been overcome

- Circular economy: new EU and UK legislative reform measures for green economy (Emma Bichet, 2022)
- Ireland's Landmark Circular Economy Act signed into law (Gov.ie, 2022))
- Innovate UK (NICER), part of UK Research and Innovation, will invest up to £1 million in circular economy innovation projects (Gov.uk, 2022)
- Columbia's Green Taxonomy to Pave the Way for Financial Markets (Ministerio De Hacienda Y Credito Publico, 2022)
- Japan aims to expand size of circular economy to ¥80 trillion by 2030 (The Japan Times, 2022)

INFRASTRUCTURE & INSTITUTIONAL SUPPORT

Barriers

- ❑ Institutional support
- ❑ Waste Management - Recovery, transportation, sorting etc
- ❑ Informal system not well integrated with waste management
- ❑ Recycling for secondary use

Support / Incentive / How they have been overcome

- Songdo, South Korea, truck-free waste management system (Arbes & Bethea, 2014)
- Waste Streams: a concept for autonomous waste collection on the Amsterdam canals (AMS Institute, 2020)
- Zero waste city of America, San Francisco, California (United States Environmental Protection Agency, 2021)
- REmanufacturing in developing countries to reduce waste (Fatimah, 2014)



MARKET

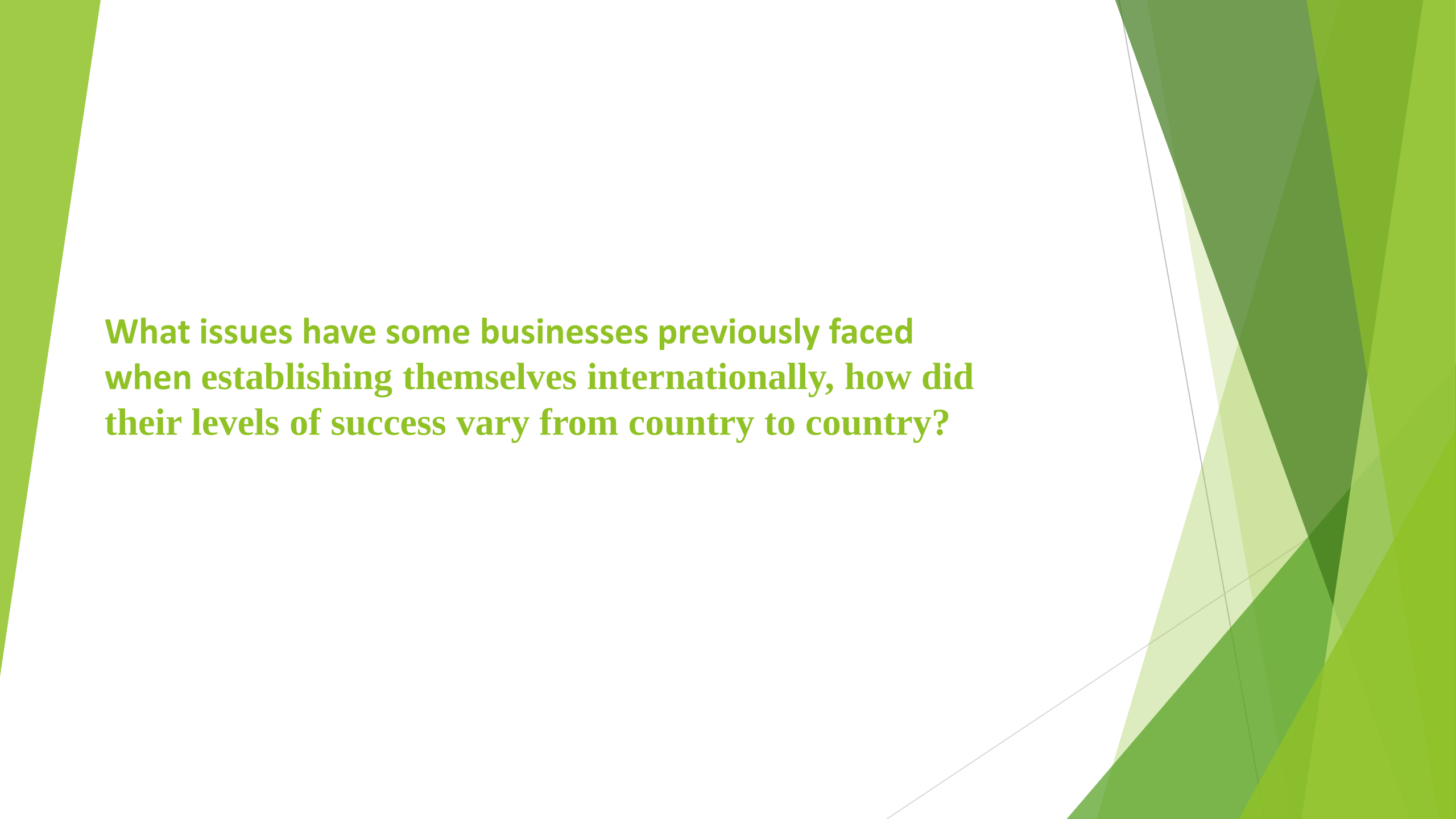
Barriers

- ❑ Capital & Funding
- ❑ Market Competition - Linear Economy based companies have more advantages over circular ones.
- ❑ Market Trends - Little or no demand for recycled products
- ❑ Challenges with recycling of Recycled materials -low cost materials

Support / Incentive / How they have been overcome

- International prize challenges to raise funds for CE such as Wevolver (WEVOLVER, 2022)
- Private investors such as BGF Circular Economy, circularitycapital, M&G Investments, etc
- Respond to the emerging market through (Siderius & Zink, 2022)
 - Humanizing the company goods
 - Stay true to the CE message
 - Address unmet & unsatisfied customer needs
 - Clear message on authenticity of purpose
- Support from demand network
 - Identify existing and emerging customer base for recycled/refurbished goods.
 - Guarantee the quality of goods and built trust
 - Develop niche demand network for CE goods through social media



The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic visual effect. The shapes are layered, with some appearing more prominent than others, and they extend from the top and right edges towards the center of the frame.

What issues have some businesses previously faced when establishing themselves internationally, how did their levels of success vary from country to country?

Challenges and barriers to circular approaches faced by businesses

The Copernicus Institute of Sustainable Development, Utrecht University and Deloitte white paper on Breaking the Barriers to the Circular Economy in the European Union (Kirchherr et al., 2017)

- Survey conducted with 153 businesses, 55 government officials and expert interviews with forty-seven leaders on the circular economy businesses, governments, academia and NGOs

- Cultural
- Regulatory
- Technological
- Market

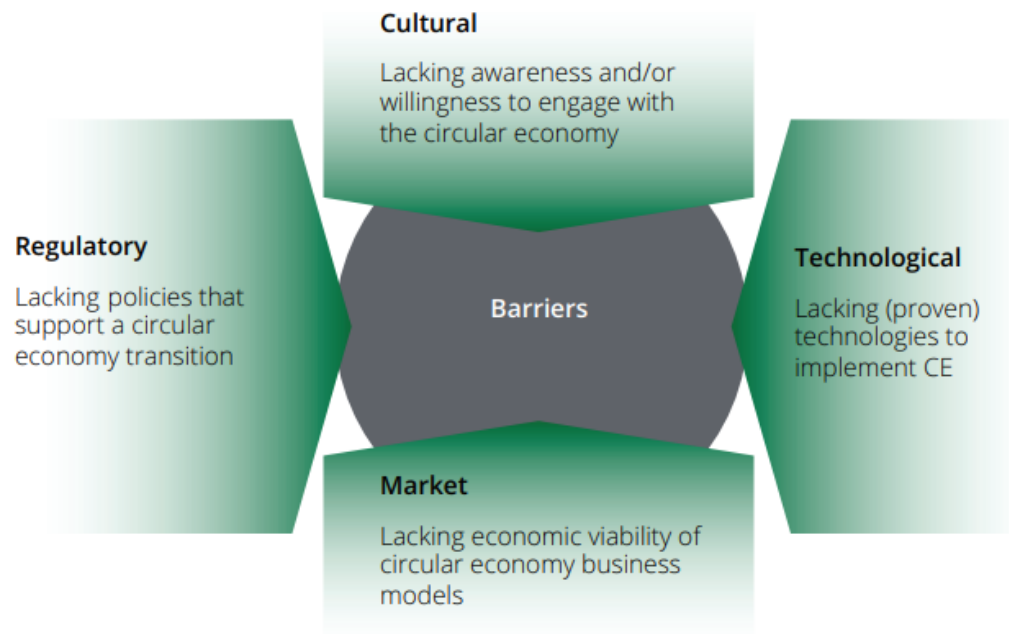


Figure 1: Categories of circular economy barriers (Kirchherr et al., 2017)

Challenges and barriers to circular approaches faced by businesses

Cultural barriers

- Cultural barriers emerged as the main barrier category for businesses transitioning towards CE.
 - Difficulties in finding and establishing circular supply chains
 - Lacking consumer interests and awareness
 - Operating in a linear system

Market barriers

- Market barrier we identified as the second category of prominent barriers.
 - Large upfront investment
 - Low virgin material prices resulted in circular companies producing products more expensive than traditional organisation with linear models
 - Subsidised energy prices for producing virgin materials..
 - Poor market pull for circular products, meant cost remained a main driver.

Challenges and barriers to circular approaches faced by businesses

Technological barriers

- Technological barriers found to be the least prominent barrier category to CE.
 - Circular design
 - lack of large-scale pilot projects
 - Positive result indicated technology had been established, less time would be wasted waiting on innovation.
 - Intervention strategies may achieve short- and medium-term result.

Regulatory barriers

- Obstructing laws and regulations, limited circular procurement, lacking global consensus were all rated in the report as intermediate pressing barriers
- The most pressing regulatory barrier identified was obstructing laws and regulations
- Prohibited cross boarder transport of waste material, prohibited use of material in products

Challenges and barriers to circular approaches faced by businesses

The Research concluded:

- Two main categories that presented most significant barriers to businesses transitioning to circular models
 - Cultural barriers - lacking consumer interest and awareness Combined with hesitant company cultures.
 - Market barriers – most significantly, low virgin material prices and high upfront investments
- Barriers are interrelated.
 - Interrelatedness of the four categories of CE barriers can result in chain reactions towards CE failure.
- An increase in circular start ups looking to scale up pose a risk to larger firms
- Larger firms hesitating to transit into circular models, risk of being left behind

How companies overcome challenges and barriers.

Case Study - Nike Inc.

Cultural success

- Initiating dialogue and championing sustainability among the global design community - "Circularity: Guiding the Future of Design" workbook and nikecirculardesign.co
- Extending material life - Refurbish/ recycle/ donation programs
- Move to Zero initiative
- Nike Grind – scrap and end of life footwear recycled to make
 - Nike products
 - Playgrounds
 - Running tracks
 - Home Depot gym tiles
- Supply Chain Collaboration
 - Working with and encouraging trusted stakeholders to embrace new circular models, influencing and changing how suppliers do business
- Bold marketing campaigns
 - Circular vision, 2025 targets



Fig 2. (Nike's Most Sustainably-Minded Performance Shoe Yet, 2022)

How companies overcome challenges and barriers.

Case Study - Nike Inc.

Technological success

- B.I.L.L (Fig 3)
- Circular design
 - Nike Forward
 - Nike Air Zoom Alphafly Next Nature (Fig 2)
- Ability to deliver high quality remanufactured products
 - Space hippie collection
 - Move to zero collection
 - Nike Re-Creation

Regulatory success

- Partnering Across the Industry
 - Collectively, calling for new recycling innovations
 - Collectively communicating with governments about restrictions of waste transportation and feedstock use to improve sustainability within the industry



Figure 3: Showing B.I.L.L Robots recycling used footwear (Nike, 2022)

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