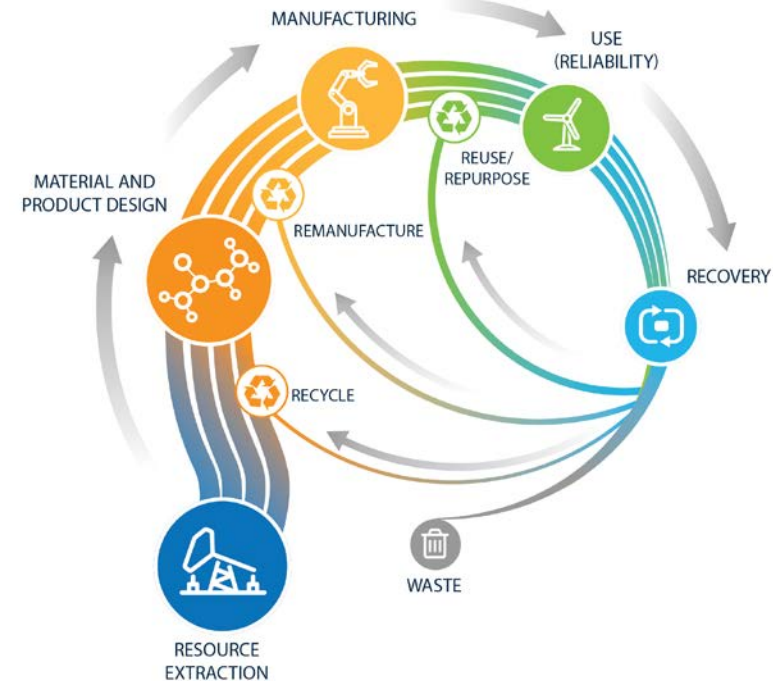


# Circular Economy Analysis – Lightning talk

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Plastics for the Circular Economy  
BETO Workshop  
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# Goal of CE

- CE aims to **minimize the extraction of natural resources**, and **maintain the value and utility of materials** already in the economy
- CE is a **sustainability strategy** needs to consider **unintended consequences and environmental impacts**. It is not just about recycling



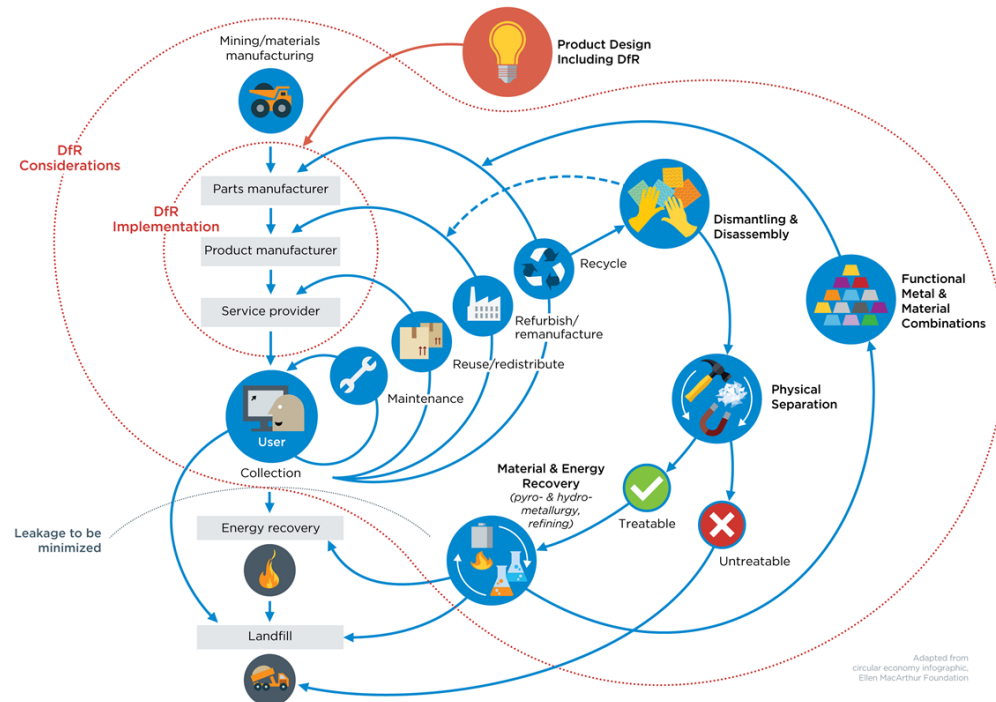
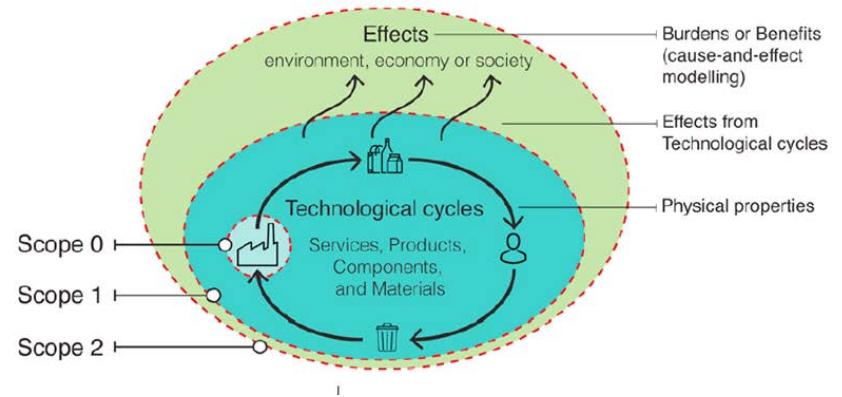
- Definition\*: CE
  - **replaces the ‘end-of-life’ concept** with reducing, alternatively reusing, recycling and recovering materials in production/ distribution and consumption processes.
  - **Operating at multiple levels-** at the micro level of products, companies, and consumers; the meso level of eco-industrial parks (EIPs) and similar networks; and the macro level of city, region, nation, and beyond,
  - aim of accomplishing sustainable development to simultaneously create **environmental quality, economic prosperity, and social equity**, all for the benefit of **current and future generations**

\*Kirchherr, et al. 2017. “Conceptualizing the circular economy: An analysis of 114 definitions.” Resources, Conservation and Recycling. Dec 1;127, 221–32.

# Scope

- Covers industries and actors that are isolated from each other – not typically coordinating with each
- Ideally, need to be evaluating at the broadest scope to understand the impacts across the system
- Example: DfR thinking requires thinking far beyond the manufacturing industries (bottom figure)

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Adapted from circular economy infographic, Ellen MacArthur Foundation.

# Metrics

- Current metrics vary depending on CE maturity level, covers multiple different scales (micro – macro), with varying levels of simplicity.
- Metrics need to be able to
  - Cover all scopes
  - Include multiple criteria
  - Be simple to understand
- Bottom line – a single metric cannot simply convey all the important characteristics

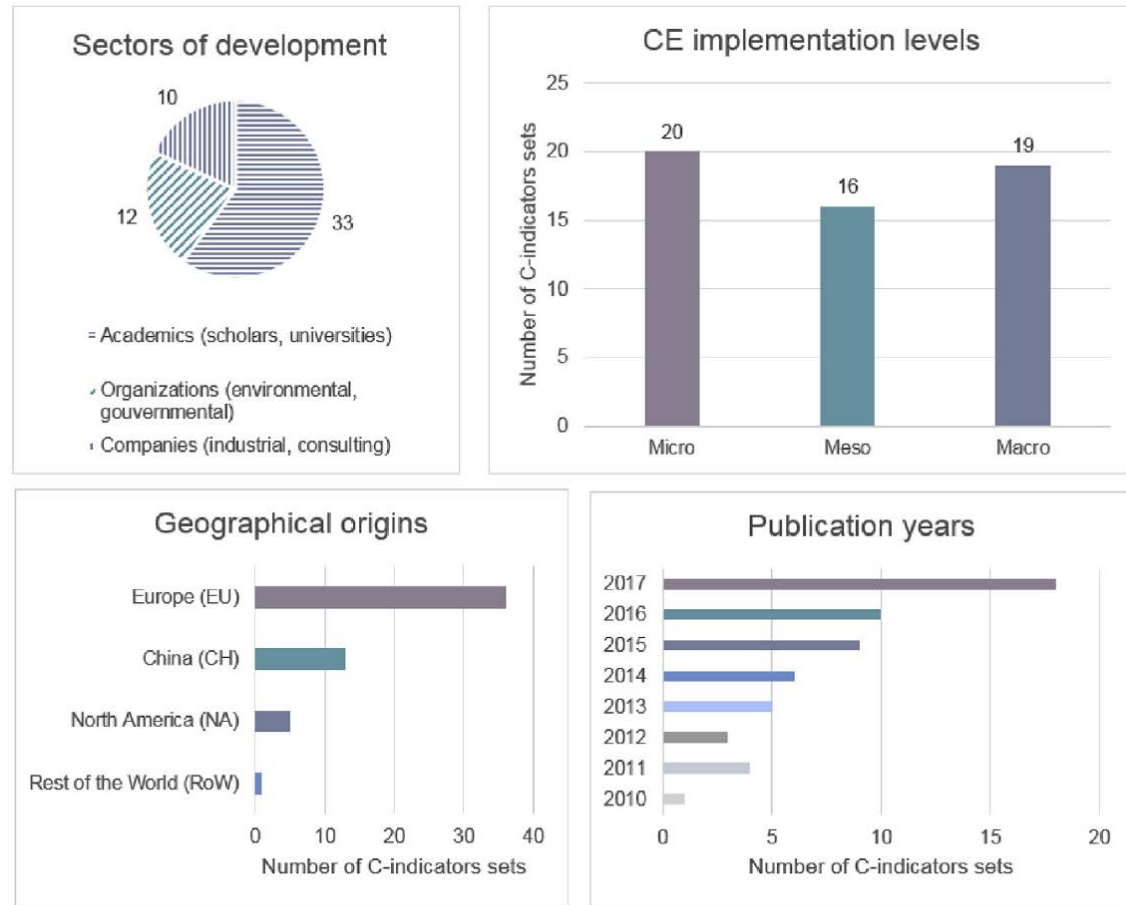


Fig. 3. Bibliographical study: distributions of the C-indicators identified.

# Research questions

- Technology analysis
  - Is the research we are doing making a difference?
  - Does the technology have unintended environmental consequences?
  - Is the technology economically feasible?
- System analysis
  - What are the regulatory barriers?
  - How does the technology work within the existing (and maybe future) economic and industrial system?
  - What are the decision factors for the different actors in the system?
  - Where are the bottlenecks in the larger system to include producers, consumers, material recovery/repair/reman actors?

# Tools / methodology

- There are a number of tools and methodologies available
  - Life cycle assessment, Economic input-output LCA, Systems Dynamics, Agent Based Models, Materials Flow Analysis, Dynamic MFA, Materials Flows through Industry tool, GREET model, etc.
- No one tool seems well suited to address all research questions
- Ideally, we should aim to have consistency in the analysis, utilizing common
  - Background data
  - Assumptions
  - Boundaries

# Thanks!

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