

MEASURING THE IMPACTS OF A CIRCULAR ECONOMY

Introduction

The promise of a circular economy (CE) lies in reducing negative sustainability impacts of the linear economy without jeopardising growth and prosperity. However, to date, this promise has largely been assumed rather than measured. Without this measurement, well-intended CE strategies can lead to unintended consequences and burden shifting. CE is an integral component of both recent and upcoming international policy frameworks as well as private sector initiatives. Yet, it remains unclear how companies should assess and report the impacts of CE practices in line with the Sustainable Development Goals (SDGs).

Work Package 5 (WP5) of the [Cresting](#) project explored both current and potential future approaches to assess and report the sustainability of CE strategies within the private sector. This document summarises our **research objectives, findings, recommendations** and hints at **possible future CE-related trends**. It is written for academics, companies and practitioners interested in assessment approaches for the transition towards a CE.



WP5.1: Measuring CE sustainability: methodological and practical issues

Anna M. Walker



Supervised by Andrea Raggi, a.raggi@unich.it

Objectives:

- Creating an [overview of assessing sustainability in circular inter-firm networks](#).
- Identifying criteria of sound sustainability assessment approaches in a CE context and comparing their application in academia and practice.
- Assessing the potential complementarity and synergies between CE and sustainability assessment approaches applicable to geographical contexts.
- Identifying how the social dimension can be integrated into the sustainability assessment of CE practices on an inter-firm level.

Results:

- Assessment approaches from industrial ecology mostly address the environmental dimension based on life cycle thinking, while those from circular supply chain management often cover all three sustainability dimensions, but consider fewer indicators.
- Criteria for sound assessment approaches:
 - a) balance sustainability dimensions, aligned with SDGs,
 - b) consider intergenerational nature of sustainability,
 - c) involve stakeholders and
 - d) be based on life cycle thinking.
- Previous application of life cycle-based methods can facilitate the implementation of CE assessment approaches.
- [The social dimension of sustainability is often not considered part of CE, but requires attention](#). While social life cycle assessment (S-LCA) is a promising tool, companies consider it too complex and unstandardised.



WP5.2: Assessment approaches for CE at company level

Erik Roos Lindgreen



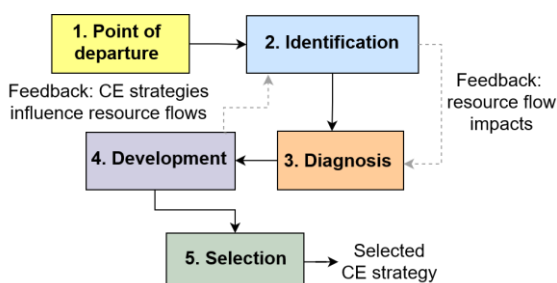
Supervised by Roberta Salomone, roberta.salomone@unime.it

Objectives:

- Inventory and categorise existing CE assessment approaches.
- Identify best practices of assessment to design and validate a CE and sustainability assessment framework.
- Apply CE and sustainability assessment to an industry case study to determine its improvement potential.

Results:

- [Existing CE assessment approaches are highly diverse](#) in terms of scope, scale, use of existing assessment methods and end-user involvement.
- CE assessment might not indicate whether a solution is sustainable. [Therefore, it is recommended to make use of existing life-cycle methods such as life cycle assessment \(LCA\).](#)
- Depending on your company’s experience with assessment, CE assessment (see figure below) consists of the iterative steps: (1) develop sustainability vision, (2) identify resource / energy flows and impact areas most relevant to stakeholders (3) impact assessment (4) develop CE strategies that target priority resource flows (5) decide optimal solution (optional).



WP5.3: Integration of CE within sustainability reporting practices and approaches

Katelin Opferkuch



Supervised by Sandra Caeiro, scaeiro@uab.pt

Objectives:

- Systematically review sustainability reporting frameworks and literature to identify current guidance for integrating CE within sustainability reporting.
- Develop and apply a content analysis approach, to examine how (and if) CE is currently being integrated within corporate sustainability reports and processes.
- Develop and validate a conceptual framework for integrating CE within sustainability reporting.

Results:

- [Majority of reporting frameworks currently do not mention CE](#), of those that do, most:
 - a) Format: produce supplementary CE-material or integrate CE within existing waste management guidelines,
 - b) Content: Define and assess CE using the definition and indicators from Ellen MacArthur Foundation (EMF).
- There is a high awareness of CE from sustainably ranked companies, however, low integration (<20%) within the following corporate sustainability processes: (1) CEO-engagement, (2) materiality assessments, (3) sustainability performance assessment.
- Reporting approaches integrating CE should prioritise the following four elements: 1) CE-specific targets, 2) CE strategies planned/implemented, 3) collaborations and partnerships for CE-related activities, 4) context-specific CE-KPIs.

CE & sustainability – Corporate perspectives and assessment practices

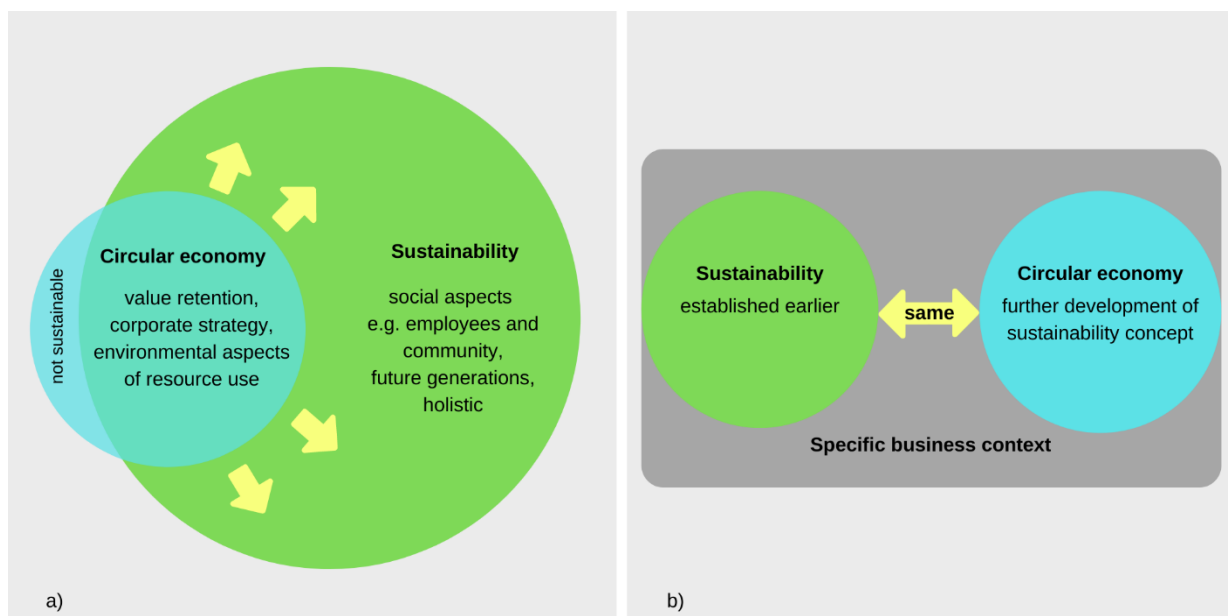
Through a survey with 155 companies and interviews with a subset of 43 companies engaged with CE practices in Italy and the Netherlands, [we found that companies considered the CE and sustainability concepts to be tightly intertwined](#). More specifically, two perspectives emerged, as depicted in the figure below: perspective (A) CE is implemented to achieve sustainability, and perspective (B) the difference between CE and sustainability is not so important.

The included companies mainly designed their CE solutions with the intention to accelerate the transition to a more sustainable society. **They thus have the goal of being sustainable, rather than being circular in itself.**

When asking the companies about their assessment practices, we found that:

- The most used assessment approaches for CE practices in our sample were self-developed sustainability indicators and LCA.

- We observed differing perspectives on whether specific assessment approaches were designed for CE and/or sustainability, in line with the ambiguity of the relation between the two concepts.
- A majority of the companies developed tailor-made assessments. They mostly involved stakeholders making up the life cycle of a product system in the assessment process.
- A major barrier to assessment of CE practices is the lack of standards, which could explain why most companies' assessment practices involve tailor-made indicators related to resource flows.
- The learning process from developing tailor-made indicators was seen as highly valuable for companies, providing them with higher transparency on internal processes.
- Benefits of CE assessment include marketing, external communication to stakeholders and internal optimisation of CE strategies.
- **The assessment of resource flows is often a precursor for sustainability impact assessment but not a substitute**, given it does not cover sustainability aspects holistically.



Company perspectives on relation of CE and sustainability (Source: [own publication](#))

Recommendations

To academia:

1. **Support companies on their pathway towards SD** and acknowledge that assessing circularity itself would not serve this purpose.
2. **Identify and strengthen assessment capabilities of companies** to: (1) design assessment approaches that match company capabilities, (2) limit the introduction of new methods to reduce assessment fatigue.
3. **Build on previous research efforts** to incorporate social considerations through stakeholder engagement within sustainability assessment approaches.
4. **Use both core and tailor-made indicators**, facilitating both comparability of performance as well as flexibility for context-specific aspects
5. **Extract best practices** that demonstrate the efficacy of CE assessment and reporting practices, facilitating strategic change in organisations.

To practitioners:

1. **Take sustainable development as a point of departure** for implementing CE strategies, thus moving towards holistic assessment (i.e. including the social domain).
2. **Involve your stakeholders along the product life cycle** to help contextualise the assessment approaches, e.g. materiality assessment.
3. **Assess in two steps:** (1) map resource flows for valuable operational and strategic insights using approaches based on material flow analysis (MFA), (2) evaluate the sustainability impacts of these flows with life cycle-based approaches.
4. **Integrate the data collection of these assessment steps** to prevent assessment fatigue and prepare for the integration of CE within upcoming sustainability reporting requirements.

Future outlook on CE assessment

Sufficiency in the CE

Questions around reducing consumption (degrowth) and sufficiency are [insufficiently addressed](#) in CE discourse and assessment. Nevertheless, such alternatives to mainstream conceptions of economic growth will be [key to a sustainable future](#). In CE and its assessment, low-impact solutions (R0 - refuse) should be prioritised.

CE-related standards

In 2022 and 2023, the [ISO/TC 323](#) technical committee will introduce five new CE standards for organisations, including assessment. They will be aligned with existing standards for LCA and guidelines for S-LCA and MFA. The [EU Taxonomy Regulation](#) and upcoming [Corporate Sustainability Reporting Guidelines](#) (to be finalised in late 2022) both include CE explicitly as one of six environmental objectives, meaning SMEs and large European companies will be required to prepare CE-related data for inclusion within their sustainability reports by 2026, likely to result in increasing investments in CE and scrutiny of CE-related data.

Authors are members of Cresting WP 5:
Anna M. Walker¹, Erik Roos Lindgreen², Katelin Opferkuch^{3,4}, Andrea Raggi¹, Roberta Salomone², Sandra Caeiro^{3,4}, Tatiana Reyes⁵, Walter J.V. Vermeulen⁶, Tomas Ramos⁴, Alberto Simboli¹

¹Department of Economic Studies, University "G. d'Annunzio", Pescara, Italy

²Department of Economics, University of Messina, Italy

³Universidade Aberta, Lisbon, Portugal

⁴Center for Environmental and Sustainability Research (CENSE), NOVA University, Lisbon, Portugal

⁵CREIDD, University of Technology of Troyes, France

⁶Copernicus Institute of Sustainable Development, Utrecht University, the Netherlands