Taxonomy and Choice of Appropriate Set of Circularity Indicators
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**Circularity Indicators (CI)**

- The circular economy (CE) seems promising to meet the goals of sustainable development (Schneider et al. 2019).
- Yet, two key challenges have still to be addressed:
  i. How to support CE practitioners in this transition?
  ii. How to assess the circularity performance?
- Joint agreement on the need to measure the progress towards circularity in order to enhance and monitor the impacts, and benefits of this transition, (Gang et al. 2013) (EC, 2015) (Capuy et al. 2017).
- Due to an increasing number of CI with many different scopes, purposes and usages, the objective is to provide clarity on these indicators, so as to guide CE practitioners towards the right set of indicators, regarding their needs and requirements.

**Proposed Taxonomy**

- Research approach: Extensive literature review on CE-related indicators.
- Identification, analysis and classification of over 50 sets of circularity indicators developed and used by academics, businesses, consulting companies, environmental organizations and governmental agencies.
- In line and in complementarity with existing taxonomies of eco-design tools (Rousseaux et al. 2015) (Boures and Pérez-Belis, 2012) and of circular economy business models (Urbani et al. 2017)
- Clustering method: Proposition of a need-based taxonomy, driven by the usages of such indicators.
- Combinatory aspects: The approximately 200 possible pathways thought criteria combination - among the 50 sets of indicators inventoried - ensure a rapid convergence towards the most suitable circularity indicator(s).

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**Selection Tool**

1. **Presentation**

   **Goal:** To support the users in identifying and selecting the most appropriate circularity indicators in line with their objectives.

   **Audience:** Industrial practitioners (e.g. designers, engineers, managers) decision-makers and policy-makers working in CE projects.

   **Software:** Microsoft Excel worksheet based tool with macro enabled.

   **Database:** A pool of more than 50 sets of circularity indicators.

2. **Input Data**

   In the input interface of the Excel file, one can specify the desired features, by answering 8 multiple-choice questions, e.g. if one is interested in measuring the inherent circularity (i.e. recirculation of resources) or the consequences (i.e. impacts) of such circularity?

3. **Run the Search**

   Once the query is completed, a click on the round logo at the top starts the search.

4. **Outputs**

   The tool directs automatically to the results table of recommended indicators. It includes a short description of each selected indicator, its working principle, the data required to be computed, and a summary of its potentially useful usages.

5. **Explore, Test, & Implement**

   A direct internet access link to each of the recommended indicators and their assessment framework is also indicated. To get more information about the indicator, to experiment their associated assessment framework (e.g. formulas to compute, web-based tool, dynamic Excel spreadsheet, etc.) and, if relevant, to start implementing such indicator(s) in diverse circular economy project(s).

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**Use Cases - Experimentation**

- Focus on the micro level of CE (i.e. company, products, components and materials):
  - To explore how appropriate CI can help (re-)designing better circular products.
  - To experience the tool on CE use cases published in literature to test its robustness (e.g. on used starter engines, prototype tidal energy device, and catalytic converter).
- Perspectives: to link CI heuristics with tangible impacts; to keep the databank up-to-date.

   [Tutorial video](https://youtu.be/RnNwWyHRzic)
   [Industrial application](https://youtu.be/kd51SxX0Be4)