

# Performance indicators for circular production at GLN: the case of a plastic product manufacturing

## Background

As manufacturing companies are increasing the level of digitalization in their operations, more data is becoming available, thus unlocking the opportunities for higher levels of performance beyond a single machine, process, facility area and even beyond the factory gates. However, data models are not always suitable and existing data not fully exploited to address the goals of economic, social and environmental sustainability. We need better performance indicators based on the principles of eco-efficiency and circular economy (CE) to identify and evaluate different scenarios and support fact-based decision making for industrial sustainability.

## Aim and objectives

The industrial case is based on a plastic product manufacturer based in Portugal (GLN). The project aims to compare different scenarios using CE indicators and identify potential environmental benefits in manufacturing performance.

The objectives are three-fold:

1. Assess the alignment between CE indicators and sustainability principles (eco-efficiency);
2. Create a data model to support CE indicators based on data available at the case company for selected production scenarios (three material scenarios vs mould configurations);
3. Identify potential data gaps or uncertainty affecting the usefulness of the CE indicators.

## Tasks

1. Review scientific literature on circular and eco-efficient production relevant to the case;
2. Develop a mathematical model to connect product and production data with different CE indicators applied to the production scenarios;
3. Perform a sensitivity analysis to identify the aspects of the data model which are the most important to deliver useful results for process design and process improvements in line with sustainability principles.

## Requirements

MSc programmes: Production/Materials/Industrial Design Engineering, Product Development, Industrial Ecology.

We are looking for two students with a good understanding of industrial systems and life cycle thinking. They should have a strong interest in environmental sustainability. Additional merits include Circular Economy, Life Cycle Assessment and other environmental analysis courses.

Thesis work starting January 2022, 30 credits / 20 weeks.

To apply, contact the examiner with your CV and academic transcripts in English. Welcome!

## Contact information

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