Karlsruher Institut für Technologie

Institut für Produktionstechnik

BACHELOR/MASTER-THESIS

# LLMS AS ENABLERS OF THE CIRCULAR ECONOMY

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## DESCRIPTION

Are you passionate about sustainability and AI? Do you want to explore how **Large Language Models (LLMs)** can drive innovation in the **circular economy**? Then this thesis is for you!
The transition to a circular economy requires data-driven solutions to optimize resource use, extend product life cycles, and improve supply chain efficiency. LLMs, such as GPT-based models, offer immense potential in predictive analytics, process automation, and decision support. They can analyze vast datasets, identify patterns in material flows, and provide insights for more sustainable decision-making. Whether in supply chain optimization, lifecycle assessment, or waste reduction strategies, LLMs could play a key role in enabling sustainable business models.

This literature review will explore how LLMs are applied in the circular economy, their potential for driving sustainability, and the challenges that remain. By synthesizing existing research, this study will provide valuable insights into how AI can support a more resource-efficient future.

## TASKS

- Conduct Literature Search– Identify and collect relevant publications on LLMs in the circular economy.
- Analyze & Synthesize Findings – Assess how LLMs support circular economy practices and identify challenges.
- Derive Insights & Future Directions – Summarize key findings, implications, and future research opportunities.

## ADDITIONAL INFORMATION

- Start: as soon as possible
- Duration: 6 Months
- Studies: Mechincal/Industrial Engineering or similar
- Required Documents: CV and transcripts of grades

## CONTACT

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