

INTRODUCTION AND MOTIVATION

- Product lifecycles must be extended to tackle the growing amount of human produced e-waste
- Digital Twins for lifecycle-prolonging of products could help tackling the following challenges:
 - Insufficient information regarding product composition and condition
 - No uniform data set for lifecycle predictions
 - Insufficient preparation of product for Reuse and Repair
- The goal of the project is therefore to assess product conditions and research solutions to enable repair of products to extend their lifecycle with a Lifecycle Workbench (LCW)**



RESEARCH QUESTION

- How can lifecycle extensions be realized?
- What kind of data is relevant to assess products?
- How can digital Services help in the lifecycle prolonging process?
- How can products be designed in the future to boost repairing?

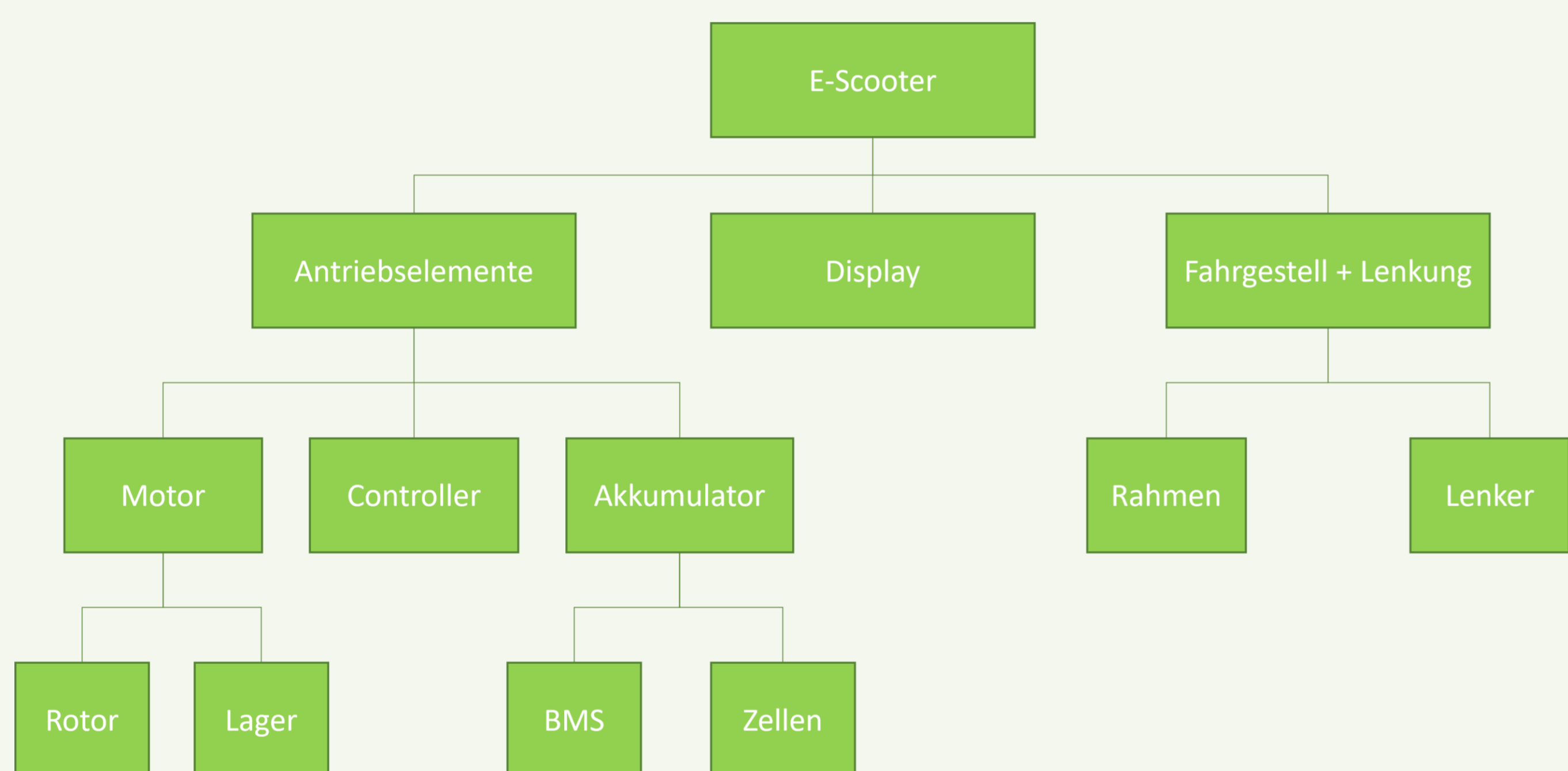


Fig. 1: E-Scooter product breakdown structure (PBS)

APPROACH AND METHODS

- Requirements Engineering via Domain Storytelling and Use-Case design
- Assessment and usage of different pre-trained models for machine learning based condition assessment
- Usage and Evaluation of planning systems like Planning Domain Definition Language (PDDL)
- Evaluation of automated systems to aid monitoring and repairing
- Conception of an LCW for assessment and monitoring of products

PRELIMINARY RESULTS

- Digital Data Model for three different products for lifecycle data storage
- Conception of a platform-based Lifecycle Workbench
- Partially automated monitoring test

Outlook

- Testing the defined concepts in pilot projects with respective products
- Evaluation of the LCW and derivation of design recommendations
- Best practices for lifecycle management and reuse and repair strategies

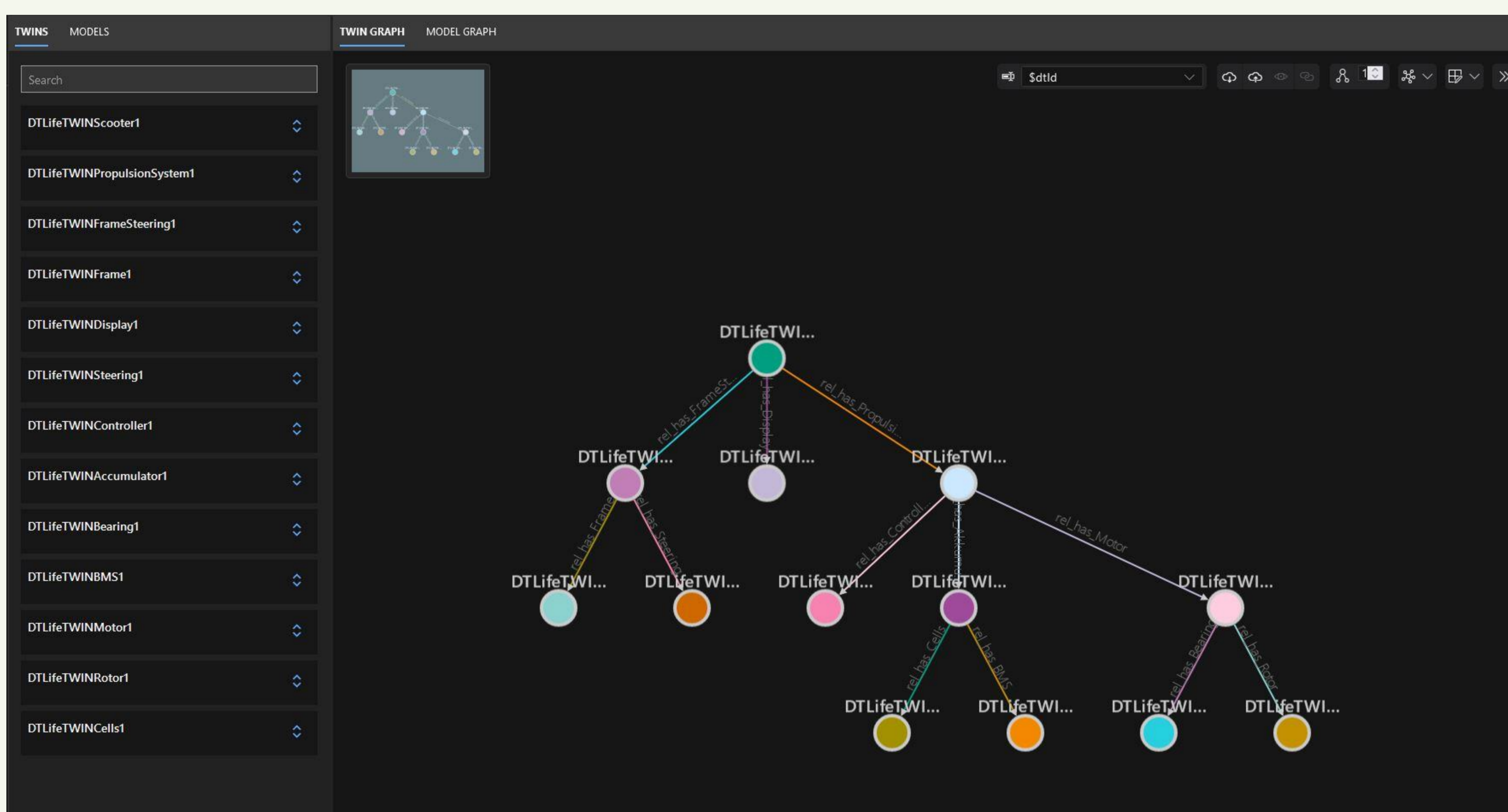


Fig. 1: E-Scooter digital twin structure designed via Digital Twin Definition Language (DTDLD)

Acknowledgement:

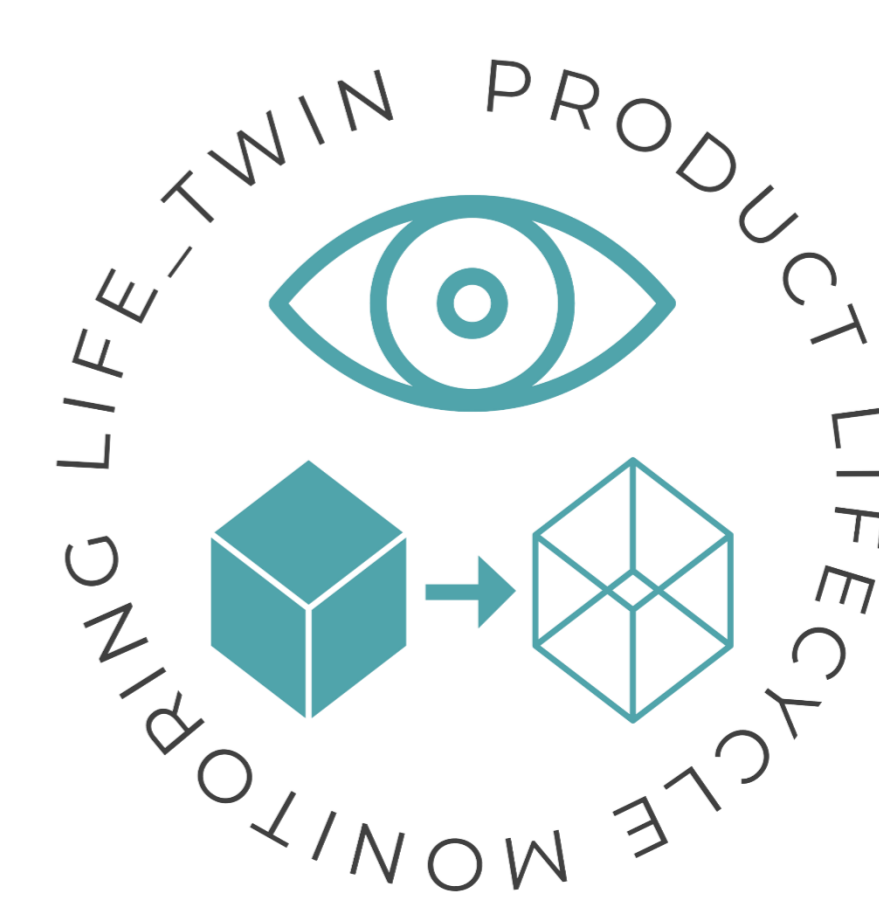
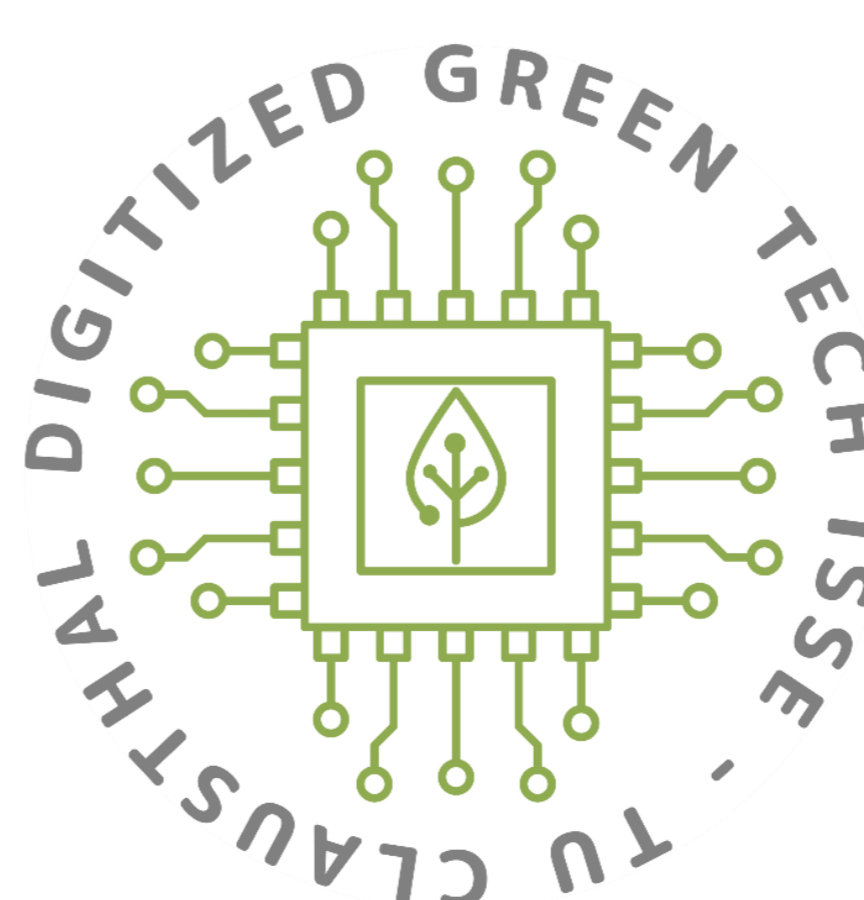
This research was funded by the Federal Ministry for Economic Affairs and Climate Action in the scope of the project "Life_TWIN".

Project partners: IMW Clausthal University of Technology, Robert Bosch GmbH, Hellmann Process Management GmbH & Co. KG and Bernhard Olbrich Elektroinstallation-Industrieanlagen GmbH

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aufgrund eines Beschlusses des Deutschen Bundestages