

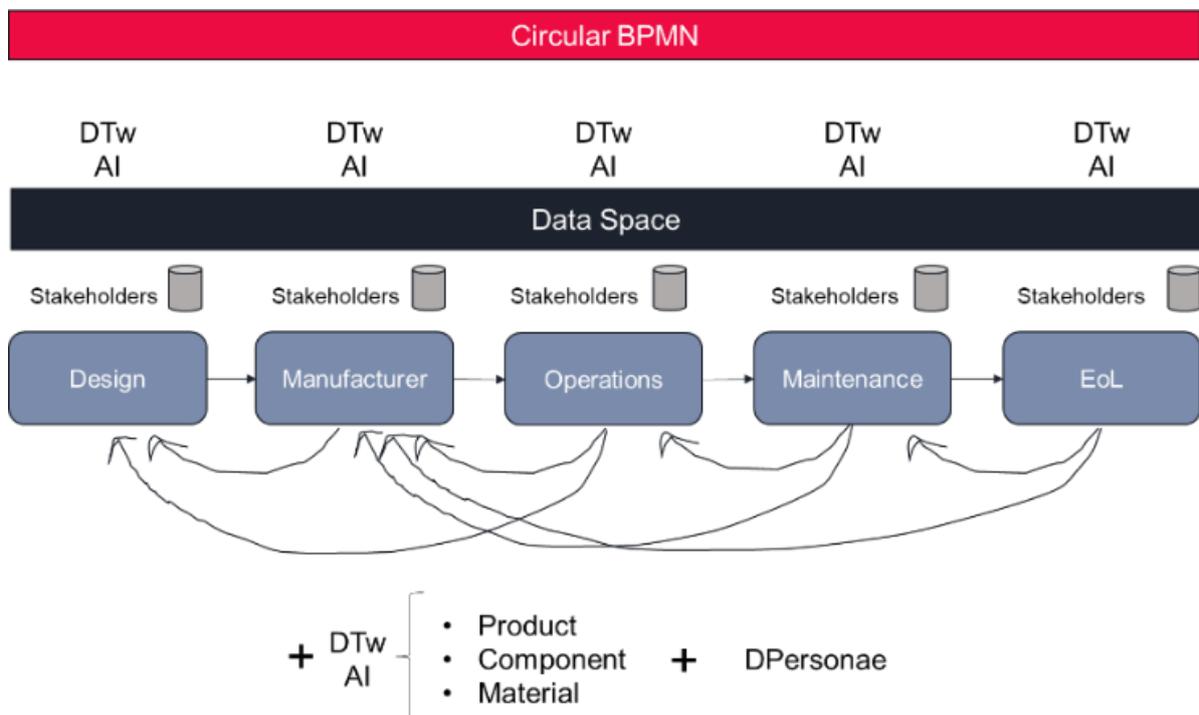


AI Platform for Integrated Sustainable and Circular Manufacturing

2nd Press Release

Circular TwAI AI Solutions and Industrial Experiments: Scenarios, KPIs, Pilots, and More Unveiled | 30 August 2023

The circular scenarios, requirements, KPIs, pilots, system specifications, and Technical, Ethical and Business Requirements for the Circular TwAI AI solutions and industrial experiments have been defined.



To develop the Circular TwAI holistic view of AI-enhanced Circular Manufacturing, harmonising human-AI interaction, data spaces, and AI toolkits, and supporting Circular value chains and business models, the industrial pilots' scenarios were analysed, and the requirements for the Circular TwAI Methodological Framework, the Data Space for Circularity, and the AI implementation toolkit were derived.

The Circular TwAIIn Methodology has been adopted, employing the Requirements Engineering and V&V Methodology. This comprehensive approach encompasses a complete requirements life-cycle management method, collecting and harmonising scenarios, needs, and requirements from different project pillars. Specific data structures, known as handbooks, facilitate information sharing throughout the requirements life cycle.

For each use case of the WEEE, BATTERY, and PETROCHEMICAL pilots, detailed analyses have been carried out on stakeholders, KPIs (expected impact and goals), data availability (type, repositories, semantics, ontologies, types, management plan), AI needs, data sovereignty, Data Space needs (including manufacturing aspects like materials, processes, equipment, and products), circularity aspects, business models, and monetisation policies.

The need for common Data Spaces for circular value chains has been analysed in the industrial pilots. A FAIR dataset has been defined, incorporating domain-specific Data Models and Ontologies (Circular). An Industrial Data Platform with details on IDS connectors, App store, and Clearing House, along with confidentiality and trust models combined by AI algorithms to implement Data Sovereignty agreements, have also been specified.

The ecosystem of AI-based Digital Twins for Circular Manufacturing has been defined, structured to facilitate integration and interactions. This enables collaborative intelligence based on a swarm of Circular Digital Twins to empower AI applications across the entire circular value chain. To this end, three highly relevant sources of data and information to train and feed the human-AI applications have been identified: the (de-)manufacturing process, the product to be de-manufactured, and the human operator.

The Project in a Nutshell

Circular TwAIIn will research, develop, validate, and exploit a novel AI platform for circular manufacturing value chains, which will support the development of interoperable circular twins for end-to-end sustainability.

Based on the use of trustworthy AI techniques, the project will enable human-centric sustainable manufacturing, fostering the transition towards Industry 5.0 as well as the integration and combination of different data from various sources, with the intent to exploit the advantages of seamless data sharing within trusted and effective manufacturing data spaces, over the entire product life cycle considering sustainability aspects.

Circularity and end-to-end sustainability through trusted AI technologies will be promoted in 3 industrial use cases, both in the discrete manufacturing and the process industry.

- De- and Re-Manufacturing Li-Ion Battery Packs in e-mobility by COBAT, RAEEMAN and POLIMI
- De- and Re-Manufacturing Consumer WEEE by RECYCLIA, REVERTIA and AIMEN
- Energy Optimisation in Petrol-Chemical Production Plants by SOCAR and TEKNOPAR

Partners

The Consortium consists of 21 Partners across 11 European countries. An experienced and multidisciplinary group that will contribute the most towards achieving the project objectives.



Contacts

Project Coordinator: Engineering

Angelo Marguglio angelo.marguglio@eng.it

Technical Manager: Politecnico di Milano

Sergio Gusmeroli sergio.gusmeroli@polimi.it

Follow Us

