

Special session proposal for IJCIEOM 2025 conference SPS4

1. Session title: Convergence of AI, Data, and Robotics (ADR) Technologies in Manufacturing Business Processes – Best Practices from HORIZON EU Projects: AIDEAS, s-X-AIPI, and Circular TwAIIn

2. Session objectives:

- The HORIZON-CL4-2021-TWIN-TRANSITION-01-07 “Artificial Intelligence for sustainable, agile manufacturing” called for higher TRL Innovation Actions supported by both AI, Data and Robotics and Made in Europe Partnerships. Three projects have been selected for funding: AIDEAS (AI Driven industrial Equipment product life cycle boosting Agility, Sustainability and resilience), s-X-AIPI (self-X Artificial Intelligence for European Process Industry digital transformation) and Circular TwAIIn (AI Platform for Integrated Sustainable and Circular Manufacturing). This HEP topic was a unique opportunity to bridge the gap between AI technology’s most recent advancements (ADRA) and their application and adoption by the Manufacturing Industry (Made in Europe). Now that all three projects are in their latest stages, it is time to draw some conclusions, best practices and lessons learned in the common reference framework of the Draghi report and World Manufacturing Forum 2024 recommendations: how to conjugate EU competitiveness in a global landscape with Sustainability and Circularity and at the same time preserve EU values and distinctive priorities, especially regarding human factors and environmental protection. In this session, AIDEAS will focus on AI technologies to support the life cycle of industrial equipment (design, manufacturing, use and repair/reuse/recycle) to improve the sustainability, agility and resilience of European machinery manufacturing companies.; s-X-AIPI will focus on the balance of autonomy and Human-in-the-Loop systems in the Process Industry (Asphalt, Steel, Pharma, Aluminum), enhancing operational efficiency and sustainability through self-X AI capabilities; Circular TwAIIn will specifically focus on End-of-Life and Circular 9R paradigm for the Batteries, WEEE and Petro-chemical industries. We propose a 2-hour workshop, where after the presentation of the outcomes and recommendations from the three projects, an expert panel (open to the audience) will be set up to discuss how AI technologies could be supportive of the Industry 5.0 transition, for a competitive human-centric, resilient and sustainable manufacturing in Europe.

3. Organizer(s):

Organizers:

- Sergio Gusmeroli – POLIMI - sergio.gusmeroli@polimi.it
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