Special session:

"Ultra-efficiency for Sustainable Manufacturing towards Circular Economy"

Organized by:

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While in 1987 the Earth Overshoot Day was on December 19th, in 2023 this day was already reached on the 4th of May. Rapid advances in the fields of information, communication and production technologies, knowledge management and possibilities for designing resource and energy-efficient production processes based on robotics and AI-based methods will highlight a wide range of solutions but also challenges for implementing sustainable production strategies.

Sustainable production strategies have to become more integrative in order to meet current challenges of a scarcity of resources, a lack of skilled labor and an efficient use of industry data. Both academics and practitioners still need to increase their focus on zero resource loss, zero human potential loss and zero data loss strategies. At the same time increasing digitization provides new data for a real-time control of organizational processes and for a more human-centered design in production systems. However, human factors like stress and ergonomics, safety and skill development still lack consideration when developing future company strategies and decision-making procedures. This may entail the creation of human-centric models and tools that consider the health and job satisfaction of labor as well as the effects of human factors on the effectiveness of production operations and the dependability of systems. Also green strategies in manufacturing have multifold perspectives implying that they are highly diversified in terms of resources management. For this reason, it is crucial that future research is focused on defining an approach to describe the relationship between key performance indicators of different green strategies and elaborating repercussions of workflows and specifically on manufacturing processes. An increasing gap between the unused potential and the limited adoption of circular economy strategies arises from the challenges that companies encounter while transitioning from a linear economic model to a circular one.

Therefore, we propose this session researching links between economic, ecological, and social sustainability and ultra-efficiency of operations in smart manufacturing. The session will focus on methods and tools to design, to assess, and to implement solutions for economic, ecological, and social sustainability using digitization.

This special session calls high-quality contributions that investigate the main research challenges, reviews, case studies, and applications related to the following topics (but not limited to):

Zero resource loss for ecological sustainability:
- Energy and resource ultra-efficiency
- Resource utilization and waste reduction
- Eco-design principles
- Life cycle assessment

Zero human potential loss for social sustainability:
- Human competencies in circular economy
- Socially responsible manufacturing
- Workload reduction optimization

Zero data loss for economic sustainability:
- Twin transition
- Data-driven resource optimization
- Digital twins for waste reduction

PAPER SUBMISSION:
Authors are invited to submit draft papers reporting original research of theoretical or applied nature, on the topics of the session. Final manuscripts are limited to 6 pages.

SPECIAL SESSION CODE: xxxxx
When you submit your paper to the IFAC system, you will be required this ID number in order to associate your paper to the special session: https://ifac.papercept.net/

IMPORTANT DATES:
Full paper submission deadline: **31st January 2024**
Reviewing papers: **15th March 2024**
Final paper submission deadline: **15th April 2024**
Early registration deadline: **30th April 2024**
Late registration deadline: **31st July 2024**
Conference date: **28th - 30th August 2024**