

Design and operations framework for the Twin Transition of manufacturing systems

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ABSTRACT

Manufacturing companies are facing what recently has been called the Twin Transition. They must conduct a digital transition as well as a transition from mere linear toward more circular value creation. The research presents an integrated Design and Operations Framework for digital and circular manufacturing systems. Defined process phases of the framework are described which address: the maturity assessment, Objectives and Key Results, the design (Des) and operations (Ops) of the manufacturing system, and a training concept. The authors follow a qualitative research approach for developing the integrated DesOps Framework for Circular and Digital Manufacturing Systems. The framework is conceptualized by combining state-of-the-art procedures and methods in the field of maturity and readiness assessment, Objectives and Key Results, Systems Engineering, and DesOps. Eventually, a case study is utilized for verifying the principal efficacy of the conceptualized framework. The research intends to scientifically contribute to the field of manufacturing systems design by proposing a novel design framework. From industrial application perspective, the research intends to contribute to improving decision-making in manufacturing companies by providing them with a practical-oriented guideline for transforming their manufacturing systems in the sense of the Twin Transition.

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