Institute for Machine Tools and Industrial Management (*iwb*)
TUM School of Engineering and Design
Technical University of Munich

GenAI-Enhanced Systematic Review: Data-Driven Decision Support Systems in Production Ramp-Up Management

Motivation

In today's competitive and innovation-driven markets, companies face increasingly shorter product life cycles (PLCs). Products are being developed, launched, and replaced at a faster pace than ever before. This trend poses new challenges for production ramp-up management, where organizations must quickly and efficiently scale up manufacturing processes while maintaining quality and cost-effectiveness. To address these challenges, data-driven decision support systems (DDSS) are gaining importance as tools to enable better, faster, and evidence-based decisions during ramp-up.

However, while the relevance of DDSS in production management is widely recognized, a comprehensive overview of the current state of science and practice in this field is still lacking. Furthermore, the role of grey literature and practice-driven insights (e.g., from consulting firms or international organizations) is underexplored, despite their practical relevance.

Objective

The aim of this thesis is to provide a systematic literature review on the state of science and practice regarding data-driven decision support systems in production ramp-up management, conducted according to the PRISMA framework.

The work will consist of three key parts:

Exploratory research and market analysis on how product life cycles have changed over time, with a focus on shorter innovation cycles and their implications for production.

Systematic literature review, combining academic sources (Scopus, Web of Science, etc.) and grey literature (reports from consultant firms, international organizations, …),

supported by the ASReview tool for screening.

Integration of generative AI tools (e.g., Deep Research, ChatGPT-based approaches) into the literature search process, to expand coverage beyond traditional databases and include relevant grey literature.

The outcome will be a structured and critical overview of existing research and practice, highlighting current gaps, challenges, and opportunities for the application of DDSS in production ramp-up management.

Qualifications

- Some exposure or a strong interest in production engineering
- Interest in the application of Active Learning and GenAI for systematic literature reviews
- Familiar with Latex or willingness to learn it.
- Solid English communication and writing skills. German is beneficial.

Why *iwb*?

- Personal and thematic supervision
- Professional perspective at an excellent institute of the TUM

Contact

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