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Abstract

Exploring the Effectiveness of Artificial Intelligence to Augment Frontline Leadership in North American Manufacturing: Opportunities and Risks

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Frontline leadership is crucial to the success of team-based manufacturing operations; however, it also comes with challenges. Manufacturing has extensive experience leveraging artificial intelligence (AI) for technical applications, but the use of AI to support leadership skills is less prevalent. Leadership skills and leadership-augmenting AI tools were identified through journals, case studies, and industry articles. Skills were prioritized using principles of Social Cognitive theory concerning employee motivation, and the AI tools were analyzed using the Socio-Technical Systems model, employing the concept of joint optimization to identify important considerations that minimize social and ethical impacts. A total of twenty-five AI tools were identified as practical in manufacturing for augmenting the ten key leadership skills. Transformational leadership theory was used to determine that an AI-augmented leader could effectively motivate team members if considerations such as over-surveillance and loss of empowerment, empathy, and trust are addressed. The findings from a review of existing literature indicate that AI-augmented leadership can lead to faster decision-making, personalization, and an enhanced employee experience, provided that AI tools are carefully selected, equipped with relevant data, and viewed as a support that requires human oversight. AI is best used to enhance - not replace - human leadership skills.

Keywords: artificial intelligence, leadership, manufacturing, AI Augmentation

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