Assessing Human-Centricity in Manufacturing Supply Chains: A Framework for Industry 5.0 Transition

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Abstract. The transition to Industry 5.0 requires a fundamental change in supply chain management, where human-centricity emerges as a critical pillar alongside digitalization. Despite growing recognition of this need, existing frameworks often fail to holistically assess human-centric principles within supply chains, particularly in balancing technological advancements with worker well-being. This study addresses this gap by proposing a novel Human-Centric Assessment Model (HCAM) that enables organizations to systematically evaluate human-centric practices across their supply networks. This model is built upon five fundamental dimensions: Human-Machine Collaboration, Workforce Well-being, Adaptive Learning, Ethical Use of Technology and Resilience. The development of this framework incorporated multiple research methodologies. We conducted an extensive literature review to establish theoretical foundations. The model further classifies maturity into four levels from Initial to Optimized, enabling organizations to benchmark their progress. To demonstrate real-world application, we implemented the framework in a case study within the automotive sector. Besides, this research provides several actionable insights for practitioners. In fact, it presents a maturity assessment tool that enables companies to benchmark their current state and identify improvement priorities. This study not only bridges the theory-practice gap in human-centric supply chains but also establishes a foundation for future research in responsible technological adoption. As Industry 5.0 continues to evolve, our findings suggest that the most sustainable competitive advantage will belong to organizations that successfully harmonize technological capabilities with human potential.

Keywords: Industry 5.0, Human-Centricity, Supply Chain, Ethical Digitalization.