

Analyzing the Collaboration Between Industry 4.0 And Circular Economy Towards Supply Chain

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ABSTRACT

Purpose: This review paper aims to analyze the interconnection of Industry 4.0 (I4.0) and the Circular Economy (CE) within the supply chain management concept, focusing on how these standards can collectively lead to improved sustainability and efficient operations. The study pursues to identify the collaborations between digital technologies and circular economic practices while submitting a thorough knowledge of their collective influences on supply chain applications and sustainability.

Design/Methodology/Approach: A systematic literature review was conducted, developing outcomes, based on several research articles, that analyze the association amongst Industry 4.0 technologies, such as the Internet of Things (IoT), big data analytics and automation, and circular economy moralities. The review incorporates empirical studies, theoretical frameworks, and case studies to deliver a complete interpretation of the present research states on this topic.

Findings: The findings determine that the collaboration between the Industry 4.0 technology applications evidently boosts the performance of circular economy practices in the supply chain field. Digital tools increase efficient resource management, zero waste base, and enhanced collaboration among stakeholders, collectively leading to sharpened operational efficiency and sustainability. Furthermore, the review emphasizes the demand for collaborations in-between several industries and stakeholder involvement as a critical success factor for the effective implementation of circular-based business models.

Practical implications: The consequent findings of this review study can direct the followers to adopt short-term circular economy initiatives within their existing supply chains while uplifting Industry 4.0 technologies. Since digitalized solutions not only heighten resource use, but also endorse interconnective performance among cross-industries, organizations are advised to adopt them, thus increasing the inclusive supply chain flexibility.

Research Limitations: This review study is restricted to the space of early studies; those may not be able to comprehend the entire relevant research under this topic. In addition to that, the suddenly converting nature of Industry 4.0 and circular economy thoughts insists the enduring research work to step with the latest expansions and practices.

Originality value: Through granting an inclusive combination of how Industry 4.0 and circular economy philosophies can be unified within supply chains, this study adds further values to the prior structure of knowledge. It highlights the necessity for additional observed research to discover the real-world applications and findings of this combination in different industrial frameworks.

Keywords: *Industry 4.0, Circular Economy, Supply Chain Management, Sustainability, Collaboration.*