

The Significance of Multidisciplinary Research in Driving  
Innovations and Breakthroughs

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**OPTIMIZING RESOURCES WITH AI AND IMPLEMENTING  
CIRCULAR ECONOMY STRATEGIES IN IT SUPPLY CHAINS FOR A  
SUSTAINABLE FUTURE**

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**Abstract**

AI-Industry 4.0 nexus in IT supply chains emphasizing sustainability is being examined in this study. There are nine areas in supply chain management that have been advanced as having sustainable concern matching the SDGs. One interest aspect is how AI can somehow bring a change in circular economy operations, specifically improving production practices and supply chain efficiency. The paper describes some drivers such as digital technologies that lead to agility and resilience in knowledge-based supply chains, coupled with strategic solutions for socially sustainable supply chains. Industry 4.0 has been conducted in this paper to improve circularity of operations and performance of firms whereby blockchain technology emerges as a critical enabler of green manufacturing and recycling. The paper also discusses AI adoption challenges within industries such as food and agriculture and weighs in on legal issues and effects of automation. It emphasizes digitalization of logistics, identifies barriers to sustainable innovation, and calls for interdisciplinary settings to address sustainability challenges.

**Keywords:** - Artificial Intelligence (AI), Circular Economy, Sustainable Supply Chain, Industry 4.0, Blockchain Technology, Digitalization