

The Digital Path to Circularity: Examining the Roles of Innovation, Adaptability, and Technological Uncertainty in Supply Chains

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Abstract

Purpose: Achieving Circularity in supply chains amidst rapid digital transformations and high technological uncertainty it remains a challenge for most organizations. So the aim of this study is to examine the use digital supply chain management technologies in enabling circular supply chains in the face of technological uncertainty while focusing on the mediating roles of supply chain innovation and adaptability. **Design:** Dynamic capability Theory was employed to explore in-depth about the the conditions under which digital supply chain management enables circular supply chain management. Quantitative analysis was conducted using survey data which was collected from 206 manufacturing firms in Pakistan across various industries. This paper explores how supply chain innovation and adaptability works as mediators and technological uncertainty moderates these relationships. Data was analyzed using SPSS Process Hayes to explore and interpret data with both direct and indirect pathways to provide robust findings. **Findings:** The Findings reveals that digital supply chain management significantly impacts circular supply chain management practices directly and through supply chain innovation and supply chain adaptability, technological uncertainty moderates these relationships influencing the impact strength of digital supply chain management. DSCM adoption enhances the organizations flexibility, operational efficiency, and sustainability which helps organizations respond to environmental and market challenges effectively. Findings of this study supports the theoretical link between DSCM and CSCM and offers practical insights for building circular and resilient supply chains. **Value:** This study offers a novel contribution by examining the integration of digital supply chain can lead towards circularity through the lens of supply chain innovation and adaptability. This paper empirically confirms and conceptualises that DSCM enables CSCM under different levels of technological uncertainty, and they are not just parallel terms. This study provides enriching understanding of how organizations can build dynamic and future ready supply chains and also provides strategic steps for organizations to align their digital supply chain initiatives with circularity goals in rapidly changing environment's.

Keywords: Digital supply chain management, Circular Supply chain management, Supply chain innovation, Supply chain adaptability, Technological uncertainty