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SCREENING OF DRIVING INDICATORS FOR SUPPLY CHAIN LOW-CARBON TRANSFORMATION BASED ON INFORMATION ENTROPY-VARIANCE INFLATION FACTOR (IE-VIF) METHOD

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Abstract

Supply chain assessment indicators for low-carbon transition evaluate development capacity and promote supply chain transformation. This study proposes 25 primary indicators for low-carbon transformation in supply chains. These indicators are grounded in product lifecycle theory and carbon footprint influence mechanisms. They encompass three key dimensions: consumers, products, and supply chain network structure. To enhance expert recognition of the selected indicators, effectively reduce their information redundancy, and improve their interpretative capacity, a quantitative screening method based on IE-VIF is introduced. Information entropy identifies the interpretative capacity of the indicators, while the variance inflation factor minimizes the overall information redundancy of the 25 primary indicators. Research findings demonstrate that the overall interpretative strength of the index set filtered by the IE-VIF method reaches 1.0647, with a cumulative information contribution rate of 85.05%. The final 20 indicators effectively capture the key drivers of low-carbon transformation in supply chains while minimizing information redundancy. This indicator system offers a scientific and practical tool for assessing low-carbon transformation capability in supply chains, significantly contributing to both theoretical advancement and practical application in sustainable supply chain management.

Key words: IE-VIF method, supply chain, transformation driven indicators

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