From Compliance to Responsibility: Measuring Responsible Sourcing in Automotive Supply Chains

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Abstract.
This paper presents a process-based framework to measure responsible sourcing in automotive supply chains, adapted to different vehicle types, including Electric Vehicles (EVs), Internal Combustion Engine Vehicles (ICEs), and Hybrids (HVs). Moving beyond traditional compliance-focused approaches, the study treats responsibility as a proactive, value-creating dimension, operationalized through fifteen qualitative and quantitative indicators across key sourcing sub-activities, including supplier selection, contracting, material acquisition, supplier development, and circular sourcing. A six-step methodology is adopted to ensure rigor and clarity, starting with defining the scope and purpose, scoping sourcing processes, defining responsibility dimensions, developing indicators, adapting to the automotive context by vehicle type, and finally presenting the framework. Findings show that EV sourcing leads in traceability, circularity, and AI-enabled risk management, HVs demonstrate moderate adoption, and ICEs remain more compliance-oriented. Indicators such as Verified Material Origin Rate, Circular Sourcing Rate, CO_2 Emission per Recovered Unit, and AI-Based Risk Score Reduction illustrate how social, environmental, and technological enablers can be embedded in daily sourcing decisions. The framework provides a measurable pathway to operationalize responsible sourcing in automotive supply chains within the Industry 5.0 paradigm.

Keywords: Responsible sourcing, Electric Vehicles (EVs), Internal Combustion Engine Vehicles (ICEs), Hybrids (HVs), Industry 5.0.