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Current Practices in Sustainability-related Performance Indicator Use: Categorisation, Challenges, and Future Wishes

Sinah Malz, Kristina Säfsten and Paraskeva Wlazlak

Background: Integrating sustainability and circularity into product realisation is critical for the green transition, yet its implementation through performance indicators remains limited.

Method for indicator categorisation: To explore current practices, we conducted 41 semi-structured interviews across eight manufacturing companies, identified performance indicators mentioned by practitioners, and categorised them by sustainability aspect and dimension and related circular economy principle. The table below summarises the sustainability categorisation, the number of companies mentioning them, and example performance indicators:

Sustainability Dimension	Sustainability Aspect (Number of companies mentioning)		Example Performance Indicator
Environmental	Solid Waste Generation	(7)	Amount of Scrap
	Energy Consumption	(7)	Energy Consumption in Production
	Gaseous Emissions	(6)	Greenhouse Gas Emissions
Environmental / Social	Material Safety / Community Health and Safety	(5)	Hazardous Substances in Products
Environmental	Material Consumption	(3)	Material Usage / Utilisation Rate
	Product Architecture	(2)	Modular Design
	Water Consumption	(1)	Fresh Water Consumption
Economic	Management	(1)	Number of New Legal Requirements

Main results: Most indicators relate to environmental aspects such as solid waste generation, energy consumption, and emissions, with social and economic dimensions rarely addressed. The only social aspect addressed - community health and safety - was directly linked to the environmental aspect of material safety. For circularity, the principle of *reduce* was most frequently matched, while *reuse* and *recycle* appeared less and *recover* was least represented.

Challenges and Future wishes from practitioners regarding the use of performance indicators were also extracted from the interviews:

Challenges: • Difficulty defining meaningful sustainability indicators. • Trade-offs between sustainability goals and business priorities. • Lack of systematic integration into product realisation processes. • Limited knowledge and fragmented data management.	Future Wishes: • Improved knowledge and awareness across organisations. • Strategic integration of indicators from management to operational levels. • Robust tools and reliable data for measurement.
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Conclusion: Current practice favors environmental performance indicators, while social and economic aspects are rarely addressed, limiting a holistic approach to sustainability. Indicators often remain at a strategic level without operational integration, and companies struggle with fragmented data and limited knowledge. Circularity is mostly reflected through the principle of *reduce*, with *reuse* and *recycle* less common and *recover* least represented. Future research should develop frameworks and digital solutions that enable company-wide integration supported by reliable data and capacity-building, ensuring indicators cascade from strategic goals to operational measures