

# An investigation on lean–green performance of Indian manufacturing SMEs

An investigation on lean–green performance

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## Abstract

**Purpose** – Improved performance in operational (lean) and environmental (green) dimensions has been extremely critical to the global competitiveness of organizations. As the performance of small- and medium-sized enterprises (SMEs) is influenced by various external and internal factors, the purpose of this paper is to analyze the lean–green performance of Indian manufacturing SMEs by investigating the influential relationships of various factors along with the set of lean and green practices adopted by the firms.

**Design/methodology/approach** – The study employs a holistic approach by integrating multiple case study and data envelopment analysis (DEA) in eight manufacturing SMEs to verify a set of five propositions relating issues such as organizational factors, quality and environmental management certifications, implementation of lean and green practices with operational and environmental performance in Indian SMEs. Within-case analysis and cross-case analysis are used for a qualitative investigation of cases while DEA with four input variables, two desirable output variables and one undesirable output variable, is used for quantitative investigation with returns to scale (RTS) and damages to scale (DTS) analysis.

**Findings** – The RTS/DTS results suggest that Indian SMEs exhibit decreasing RTS and increasing DTS, implying that they need to decrease their operational sizes in order to improve the operational and environmental performance. The possible alternative and more practical strategy could be to introduce new technology innovation and holistic adoption of manufacturing excellence initiatives such as lean and green.

**Originality/value** – The research findings provide insights into the lean and green performance enhancement approach in the context of SMEs. The study extends key managerial implications and policy-related guidelines.

**Keywords** Multiple case study, Data envelopment analysis, Small- and medium-sized enterprises, Green performance, Lean performance, Returns to scale and damages to scale

**Paper type** Research paper