

**MANUFACTURING EFFICIENCY VS INFRASTRUCTURE GAPS:
BARRIERS TO LEAN MANUFACTURING ADOPTION IN INDIA**

TANISHA GUPTA

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Chennai- 600025

ABSTRACT

This study explores the impact of lean manufacturing adoption on firm productivity and investigates the institutional and operational barriers that influence adoption patterns across formal, private Indian manufacturing firms. Despite the well-documented benefits of lean practices in enhancing efficiency, adoption rates remain limited. Drawing on nationally representative data from the 2022 World Bank Enterprise Survey, this study first assesses whether lean implementation leads to measurable productivity improvements, using Total Factor Productivity (TFP) as the performance indicator. The analysis then examines a broad set of determinants influencing lean adoption, including firm-level characteristics such as size, export orientation, R&D activity, and management quality, as well as external constraints like electricity reliability, crime incidence, land availability, regulatory burdens, and exposure to informal competition. The results highlight that while lean adopting firms demonstrate significantly higher TFP, widespread adoption is hindered by infrastructural and institutional constraints. By integrating these external dimensions, the study contributes new empirical evidence to ongoing debates around productivity enhancement and industrial modernisation in India.

Keywords: Lean Manufacturing; Manufacturing Efficiency; Infrastructure Gaps; Total Factor Productivity (TFP); Indian Manufacturing Sector; Operational Efficiency