IJARSCT
International Journal of Advanced Research in Science, Communication and Technology
International Open-Access, Double-Blind, Peer-Reviewed, Refereed, Multidisciplinary Online Journal
ISSN: 2581-9429
Volume 6, Issue 2, January 2026
Impact Factor: 7.67

Enhancing Supply Chain Management Using Six Sigma

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Abstract: *Lean Six Sigma (LSS) has emerged as a powerful continuous improvement strategy by integrating the waste elimination philosophy of Lean with the defect reduction and variability control focus of Six Sigma. Over the past two decades, LSS has evolved from a manufacturing-centric methodology into a versatile approach applicable across service, healthcare, education, and construction sectors. The construction industry, particularly construction supply chain management, continues to face challenges such as cost overruns, schedule delays, poor coordination among stakeholders, material wastage, and quality inconsistencies. In this context, Lean Six Sigma offers a structured, data-driven framework to address inefficiencies holistically.*

The present study provides a detailed and structured review of 22 research papers compiled in Paper 16 (merged), focusing on Lean Six Sigma applications in construction and construction supply chain management. Adopting a review framework similar to the 2018 structured review paper, the literature is systematically classified based on sectoral application, research methodology, tools and techniques employed, benefits achieved, and challenges encountered. The review highlights dominant trends such as increased use of DMAIC, value stream mapping, statistical analysis, and hybrid Lean–Six Sigma models in construction-related studies.

The findings reveal that Lean Six Sigma implementation leads to significant improvements in cost efficiency, waste reduction, process reliability, quality enhancement, and stakeholder coordination within construction supply chains. However, barriers such as lack of top management commitment, resistance to change, inadequate training, and fragmented project environments continue to limit widespread adoption. The paper identifies critical research gaps and proposes future research directions, including integration with digital technologies and development of sector-specific LSS frameworks. This review serves as a comprehensive reference for researchers and practitioners aiming to enhance construction supply chain performance using Lean Six Sigma.

Keywords: Lean Six Sigma, Construction Supply Chain Management, Lean Construction, Six Sigma, DMAIC, Continuous Improvement, Literature Review

DOI: 10.48175/IJARSCT-30820