

Exploratory Analysis and Development of Sustainable Lean Six Sigma Methodologies Integration for Effective Operation and Risk Mitigation in Manufacturing Sectors

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Abstract : The Nigerian manufacturing sector plays a pivotal role in the country's economic growth and development. However, it faces numerous challenges, including operational inefficiencies and inherent risks that hinder its sustainable growth. This research aims to address these challenges by exploring the integration of Lean and Six Sigma methodologies into the manufacturing processes, ultimately enhancing operational effectiveness and risk mitigation. The core of this research involves the development of a sustainable Lean Six Sigma framework tailored to the specific needs and challenges of Nigeria's manufacturing environment. This framework aims to streamline processes, reduce waste, improve product quality, and enhance overall operational efficiency. It incorporates principles of sustainability to ensure that the proposed methodologies align with environmental and social responsibility goals. To validate the effectiveness of the integrated Lean Six Sigma approach, case studies and real-world applications within select manufacturing companies in Nigeria will be conducted. Data were collected to measure the impact of the integration on key performance indicators, such as production efficiency, defect reduction, and risk mitigation. The findings from this research provide valuable insights and practical recommendations for selected manufacturing companies in South East Nigeria. By adopting sustainable Lean Six Sigma methodologies, these organizations can optimize their operations, reduce operational risks, improve product quality, and enhance their competitiveness in the global market. In conclusion, this research aims to bridge the gap between theory and practice by developing a comprehensive framework for the integration of Lean and Six Sigma methodologies in Nigeria's manufacturing sector. This integration is envisioned to contribute significantly to the sector's sustainable growth, improved operational efficiency, and effective risk mitigation strategies, ultimately benefiting the Nigerian economy as a whole.

Keywords : lean six sigma, manufacturing, risk mitigation, sustainability, operational efficiency

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