

EFFECT OF TOTAL PRODUCTIVE MAINTENANCE PRACTICES ON MANUFACTURING PERFORMANCE: SPECIAL REFERENCE TO APPAREL INDUSTRY IN COLOMBO DISTRICT IN SRI LANKA

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ABSTRACT

Sri Lanka's apparel industry is crucial, accounting for over 50% of exports, and significantly affecting foreign exchange and employment. However, manufacturers contend with global competition, which requires superior quality, quicker delivery, and lower costs. Traditionally, they have employed reactive maintenance, fixing machines post-failure, causing unpredictable breakdowns, wastage, and inventory defects. Effective manufacturing and maintenance strategies can enhance productivity, cost efficiency, product quality, and delivery speeds. Total Productive Maintenance (TPM), a proactive strategy, is essential for lean production to maximize asset use. By implementing TPM's preventive principles, Sri Lankan apparel manufacturers can minimize plant disruptions, enhance asset reliability, and reduce operating costs. Unlike reactive maintenance, TPM prevents failures through routine cleaning and inspection. The present study aims to address this critical gap by investigating the influence of planned maintenance, quality maintenance, training and development, and development management on cost efficiency, product quality, on-time delivery, and volume flexibility. A structured questionnaire was used to gather responses from 150 managers and owners of export-oriented firms with established TPM programmes. Correlation and regression techniques determine the nature and magnitude of the relationships between TPM practices and manufacturing performance. All the hypothesized maintenance elements exhibited strong positive correlations with manufacturing effectiveness, accounting for over 80% of the improvements. Planned maintenance activities emerged as the primary driver, with a standardized beta coefficient of 0.409, which significantly enhanced production stability. Development management strategies were essential for establishing a competitive advantage, with a coefficient of 0.237. Training initiatives and quality control exhibited comparable effects, with coefficients in the approximate range of 0.2, underscoring the importance of learning and conformance capabilities. These findings align with asset management theories positing equipment availability and change management as priority areas for leveraging TPM-led transformations in manufacturing excellence. Overall, this study contributes significantly to understanding the critical role of TPM in enhancing the competitiveness of Sri Lanka's apparel industry, offering theoretical insights and practical recommendations for industry stakeholders. Future observational audits and longitudinal tracking studies can yield more objective estimates of the transformed manufacturing capabilities.

Keywords: Total productive maintenance, planned maintenance, quality maintenance, training, development management