

Application of Artificial Intelligence for Optimizing Grinding Wire Procurement in the Automotive Parts Industry: A Case Study of an Auto Parts Manufacturer

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Abstract

In the automotive parts industry, efficient supply chain management—specifically the raw material procurement process—is a critical factor for operational success. This study focuses on optimizing the ordering process for "Grinding Wire," a primary raw material essential to the production line. The core challenge identified is that traditional procurement methods, which rely heavily on staff experience or basic Material Requirements Planning (MRP) systems with fixed reorder points, struggle to cope with demand volatility. Such inefficiencies frequently lead to costly production stoppages due to stockouts or excessive inventory holding costs from overstocking. To address these issues, this research proposes a digital transformation (DX) approach by integrating Machine Learning (ML) techniques with real-time data collection and visualization systems. Utilizing historical data from the organization's ERP system (2023–2025), the study develops predictive models alongside a streamlined reporting application. The results are integrated into a Google Workspace-based dashboard to support strategic, data-driven decision-making. The implementation of this system is expected to significantly enhance forecasting accuracy, reduce operational costs, and ensure a continuous material supply for the manufacturing process.

Keywords

Digital Transformation, Machine Learning, Demand Forecasting, Inventory Management, Automotive Industry.

Biographies

Phattarawadee Tookokkrud is a master's student in the Systems Engineering Program at Suranaree University of Technology. His research focuses on digital tools to enhance supply chain efficiency and production stability in the automotive sector.

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