Intermittent Spare Parts Demand Forecasting Methods in the Automotive Assembly Industry

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Abstract. Spare parts demand forecasting in the automotive industry faces challenges due to high demand variability and intermittent consumption patterns. These uncertainties directly impact inventory levels, often resulting in either overstocking or stockouts, which in turn affect assembly line performance and customer satisfaction. Accurate forecasting helps avoid overstocking, reduce lead times, and ensure service continuity. In this paper, we compare three forecasting techniques: ARIMA, Exponential Smoothing (ES), and Croston's method under different intermittence regimes. The evaluation is based on real-world data from a local automotive maintenance department and utilizes three statistical accuracy metrics: Mean Squared Error (MSE), Mean Absolute Deviation (MAD), and Weighted Absolute Percentage Error (WAPE). The results reveal that the TSB Croston variant outperforms the others across all parts. Ultimately, these findings offer insights for decision-makers seeking to refine planning strategies and strengthen resilience in the automotive industry.

Keywords: Intermittent Demand, Automotive Industry, ARIMA, Croston's Method, Exponential Smoothing.