Forecasting Methods for Intermittent Spare Parts De- mand in the Automotive Assembly Industry:

A Comparative Case Study

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**Abstract.** Spare parts demand forecasting in the automotive industry faces chal- lenges due to high demand variability and intermittent consumption patterns. These factors directly impact inventory levels, often resulting in either over- stocking or stockouts, which in turn affect assembly line performance and cus- tomer satisfaction. Accurate forecasting helps avoid overstocking, reduce lead times, and ensure service continuity. However, selecting an appropriate fore- casting method for such complex demand patterns remains a challenge. In this paper, we present a comparative study of three forecasting techniques: ARIMA, Exponential Smoothing, and Croston's method, selected for their suitability in managing irregular and lumpy demand patterns. The evaluation is based on re- al-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). Our re- sults reveal that no single method consistently outperforms the others across all parts, highlighting the importance of tailoring the forecasting approach to the specific demand characteristics of each item. Ultimately, this study offers prac- tical insights for decision-makers aiming to enhance planning strategies and strengthen resilience in the automotive industry.

**Keywords:** Spare Parts Forecasting, Intermittent Demand, Automotive Indus- try, ARIMA, Croston’s Method, Exponential Smoothing.