

ABSTRACT

This research aims to analyze and implement Demand Forecasting and Material Requirements Planning (MRP) to plan inventory for product X in order to minimize overstock and inventory costs at CV XYZ. The main issue faced by the company is the significant discrepancy between the forecast and actual sales, leading to excessive stock and losses from unsold products. Various forecasting methods were applied, including Single Moving Average, Weighted Moving Average, Exponential Smoothing, and Double Moving Average. However, the results showed that the Double Moving Average (DMA) 2x3 method produced the smallest error compared to the other methods, and thus was selected for demand forecasting. The application of DMA 2x3 successfully reduced overstock significantly, from 15,418 units to 3,534 units, positively impacting inventory management and reducing inventory costs. Additionally, the total costs, including ordering and storage costs, decreased from IDR 1,237,980,000 to IDR 1,063,378,152, representing a 14% reduction. Losses from unsold products also decreased from IDR 447,122,000 to IDR 102,486,000, which is a 77% reduction. Forecast validation was performed using Capacity Requirement Planning (CRP) to ensure that the MRP calculations, utilizing the Wagner-Whitin lot sizing technique, could meet the predicted production requirements. The CRP results showed that the company's production capacity was more than sufficient to meet the projected production needs, even with demand fluctuations. Overall, the implementation of MRP with DMA 2x3 and the Wagner-Whitin algorithm successfully reduced inventory costs, overstock, and forecasting errors, thereby improving the company's operational efficiency and profitability.

Keywords: *Forecasting, Moving average, Wagner-Whitin algorithm, Inventory cost, Overstock*