

Implementation of Demand Response-ARMA Model for Long-Term Demand Forecasting (Case Study: Borneo Diesel)

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Abstract

Highly competitive markets require companies to enhance their performance in order to maintain their competitive position. One effective approach is to improve supply chain management through accurate demand forecasting. For this purpose, this study applied the Demand Response-ARMA (DR-ARMA) model, a derivative of classical-ARMA method in order to generate an accurate forecasting model for a local company located in Pontianak, West Borneo. The dataset used in this study is characterized by a high sparsity level of 77.37%, where DR-ARMA demonstrates superior performance in handling sparse demand patterns. The results showed that DR-ARMA is able to forecast demand more accurately, with average error percentage of 7.35%, compared to classical-ARMA model with the average error percentage of 205.11%. Considering the results, the implementation of DR-ARMA allows SMEs such as Borneo Diesel to minimize inventory risks, particularly dead stock, excess stock, stockouts, and holding costs.

Keywords: Sparse Data, Long-Term Forecasting, Demand Response, ARMA, Supply Chain