ACME CORPORATION MEMORANDUM

TO:	The ACME Management
FROM:	Matt Adeola, Nala Ford, Mary Fisher, Sai Kavya Padmaraju
SUBJECT:	ACME Corporation Case Study
DATE:	April 26, 2021

INTRODUCTION

The purpose of this memo is to provide recommendations on forecasting models to help ACME corporation to manage the inventory and distribution decisions. We evaluated various forecasting models with the given demand for products Q-36 and Q-37 at store1 and store2 and determined the forecast model which is most appropriate for the company. Based on our study, we recommend ACME to use Moving average with seasonality model for each product store combination which has the lowest Mean Absolute Percent Error (MAPE) of approx.19%,27% at store1 and 25%,12% at store2 for products Q-36,Q-37 respectively. We also recommend the company to use Exponential Smoothing with Trend and Seasonality model to forecast Total Sales of Each Product and Total Sales of Each Store. This has a MAPE of approx. 17%,12% for total sales of product Q-36,Q-37 respectively and MAPE of approx. 16%,6% for total sales at store1,store2 respectively.

APPROACH

We evaluated different models to improve the forecasting of the ACME management's most popular products, the classic "old school" Illudium Q-36 Explosive Space Modulator (ESM), and the recently released Illudium Q-37 Explosive Space Modulator. With the provided data on daily demand for the two products at Store 1 and Store 2 we worked on eight different data series which are 4 series for Sales of each product at each store, 2 series for total sales of

each product and 2 series for total sales at each store. We ran each of these eight different data series through the following forecast models like Regression, Cumulative, Naive, Moving Average, Moving Average with Seasonality, Moving Average with Number of Days, Exponential Smoothing, Exponential Smoothing with Trend, Exponential Smoothing with Seasonality and Exponential Smoothing with Trend and Seasonality in order to select the most appropriate model. Based on this we then chose the models with the lowest MAPE as the most appropriate forecast model for each of the data series.

RECOMMENDATIONS

Sales of each product at Store 1:

We recommend using Moving Average with Seasonality to forecast sales of each product Q-36 and Q-37 at store 1. Based on historical data, such a forecast should be unbiased and have a MAPE of approximately 19% and 27% respectively.

Sales of each product at Store 2:

To forecast sales of each product Q-36 and Q-37 at store 2 we recommend using Moving Average with Seasonality. Based on historical data, such a forecast should be unbiased and have a MAPE of approximately 25% and 12%. From our analysis on all the forecast methods, this forecast had the lowest MAPE.

Total Sales of Each Product:

We recommend using Exponential Smoothing with Trend and Seasonality to forecast total sales of product Q-36 and Q-37. Based on historical data, such a forecast should be unbiased and have a MAPE of approximately 17% and 12%, respectively.

Total Sales of Each Store:

We recommend using Exponential Smoothing with Trend and Seasonality to forecast

total sales of each store (store 1 and Store 2). Based on the historical data provided, we were able to find a MAPE of approx.16% for store 1 and 6% for store 2. While going through the forecasting model Exponential smoothing with Trend and Seasonality, we determined to get the lowest MAPE and to have the model work for our data, we needed an alpha of 0.2, a beta of 0.1 and a gamma of 0.05 for both stores.