

**APPAREL RETAIL DEMAND FORECASTING  
TO MANAGE INVENTORY IN CV. PERDANA MANDIRI**

**A THESIS**

**Submitted in Partial Fulfillment of the Requirements for the Degree of  
Bachelor of Engineering in Industrial Engineering**



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**IDENTIFICATION PAGE**  
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submitted by

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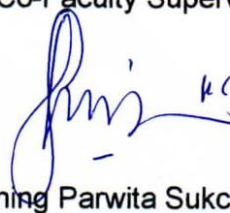
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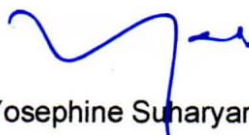
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## DECLARATION OF ORIGINALITY OF RESEARCH

I certify that the research entitled "Apparel Retail Demand Forecasting to Manage Inventory in CV. Perdana Mandiri" in this thesis has not already been submitted for any other degree.

I certify that to the best of my knowledge and belief, this thesis which I wrote does not contain the works or parts of the works of other people, except those cited in the quotations and bibliography, as a scientific paper should.

In addition, I certify that I understand and abide the rule stated by the Ministry of Education and Culture of The Republic of Indonesia, subject to the provisions of Peraturan Menteri Pendidikan Nasional Republik Indonesia Nomor 17 tahun 2010 tentang Pencegahan dan Penanggulangan Plagiat di Perguruan Tinggi.

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The author hopes this report can be useful to the society, especially for those working at CV. Perdana Mandiri and X clothing store as it gives knowledge and insights concerning the related topic.

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## ABSTRACT

Demand forecasting is important in any part of business including retail. It assists to determine the order quantity from suppliers, safety stock in inventory, and inventory management for normal selling condition and for when there would be promotions (marketing strategy like discounts). CV. Perdana Mandiri has a clothing store with inventory problems (overstock and understock). As per request from the company, the name of the clothing store is disguised as X clothing store. A forecast tool was developed using Microsoft Excel to help X clothing store carries out demand forecast easily. The methods used in the forecast tool were simple averages, moving averages, and exponential smoothing (single exponential smoothing, double exponential smoothing, and triple exponential smoothing). Forecasting was done by grouping their SKUs to a family code group. Trial and error were done to achieve the best forecasting method with the minimum forecast error in every code group. All sixty-six code groups were forecasted, and it resulted in sixty-one code groups with triple exponential smoothing as their best methods, three code groups with single exponential smoothing as their best methods, and two code groups with simple average method as their best forecasting method.

Keywords: retail, apparel, time series forecasting, seasonal data forecasting



# CHAPTER 1

## INTRODUCTION

### 1.1. Background

Retail is always the last process in distribution process in almost every company (Berman and Evans, 2013). Retail features all products from food, kitchen utensils, stationary, gadgets, decorative products, clothes, etc. There are many types of retail business and there are complex methods to manage a retail store depending on the products sold.

CV. Perdana Mandiri is a company running in the retail business. CV. Perdana Mandiri has a clothing store in Yogyakarta. By the request of the company, the name of the clothing store is disguised as X clothing store in this thesis. It sells mainly clothes that are remains of exported products from many brands. The company started operating in 2015 and currently, they have 22 employees working in 2 shifts. The store is open from 9 AM to 9 PM.

X clothing store has 2 floors. The first floor is for clothes and accessories for baby, kids, and teenagers. The second floor is for clothes and accessories for adults. Clothes that are sold are for both male and female. In the store, there is one storage room at the back of first floor where inventories are stored.

The main problem faced by the company is that the company did not look at sales data when ordering from the suppliers which resulted in overstock of some products that do not sell well and understock of some products that sell well. This can be seen in the number of special priced products sold which was higher than most of the products sold. The special priced products are products sold in a cheap price because they do not sell well in their original price.

### 1.2. Problem formulation

The problem faced by the company is the overstock and out of stock situations which happened because the company arbitrary decides what to order and its quantity. The company did not use the past data sales when deciding the item and quantity to order.

### **1.3. Objective**

The objective of this research is to provide methods of demand forecasting that can be easily practiced by X clothing store, to help determine their inventory quantities. Their past demand data will be analyzed to forecast the monthly demand of products for the following month or year.

### **1.4. Scope and Limitation**

The scope and limitation considered are as follows:

- a. The analysis is done only on products actively sold;
- b. Information of any price of clothes and cost the company spent cannot be disclosed;
- c. The data used are secondary data obtained from the X clothing store. It is about the number of items sold and its stock from January 2016 to December 2018;
- d. The forecast tool is designed for groups of product and not for individual level of product (not for every item);
- e. The forecast tool is made with the assumption that the company has the personnel to do the code grouping or that their database can do the code grouping;
- f. The forecast tool is designed to be used at the end of the month.