CHAPTER 1

INTRODUCTION

Background

In today's economy, where the economy is keep on growing and the business is always developing. Businessman and entrepreneur are required to operate more effectively and more efficiently to deal with greater competition in order to maintain sustainability of the company.

As the economy is growing, nowadays many property developer keep on creating and building new residences, apartment, even shopping malls. Many people are now interested in creating a beautiful house or place through wall painting. Paint company are now also offer many range of colours, some even offers up to 10.000 colours that the customer can choose.

UD. Sumber Mas is a sole proprietorship company that primarily engaged in paint products and other needs for painting. UD. Sumber Mas is located in Cengkareng, West Jakarta, and it is established in 2000. To support the business, UD. Sumber Mas employs 35 employees that divided into 2 workplaces which are the store and also the warehouse. UD. Sumber Mas is one of the biggest paint store in Jakarta and it has been awarded for it has the highest sales for some brands in Jakarta.

Since there are so many options for colours that the customer can choose, UD. Sumber Mas need to manage their inventory level wisely so that they can minimize the inventory cost, but still be able to meet the customers demand at the same time. Therefore, a balance between inventory level and inventory planning is an important factor.

Before buying inventory, UD.Sumber Mas always forecast the projection of demand, but this projection is only based on intuition and years of experience. Which sometimes:

- It will hold up the cash flow where all the money and capital is in a products form and result in the company not able to pay their payable to the supplier. This will cause the company got blacklisted from the supplier.
- Leads to overwhelmed warehouse, where there is no more space for other products to be stocked and may lead to customer dissatisfaction where the products that they want might not be available.
- A potential of expiring products, when it is stored too long.

Table below shows the comparison between the total demand and the total inventory in the company for Mowilex Emulsion E 100 (White), Dulux W/S Ws 1290 (Brilliant White), Nippon Vinilex Easy Wash 300 (White) from October 2011 – September 2015.

Table 1.1 Comparison Between Total Demand and Items Ordered From October 2011– September 2015

Items	Period	Inventory Stocks in Litres	Demand in Litres
MOWILEX EMULSION E 100 (WHITE)	October 2011 - September 2012	415.029	373.900
	October 2012 - September 2013	462.748	424.540
	October 2013 - September 2014	603.911	557.064
	October 2014 - September 2015	650.400	599.450
Dulux W/S WS 1290 (Brilliant White)	October 2011 - September 2012	562.927	526.100
	October 2012 - September 2013	630.896	563.300
	October 2013 - September 2014	634.620	584.330
	October 2014 - September 2015	666.191	589.550
Nippon Vinilex Easy Wash 300 (White)	October 2011 - September 2012	255.484	202.180
	October 2012 - September 2013	266.890	201.080
	October 2013 - September 2014	297.260	296.500
	October 2014 - September 2015	367.114	303.400

Source : UD. Sumber Mas

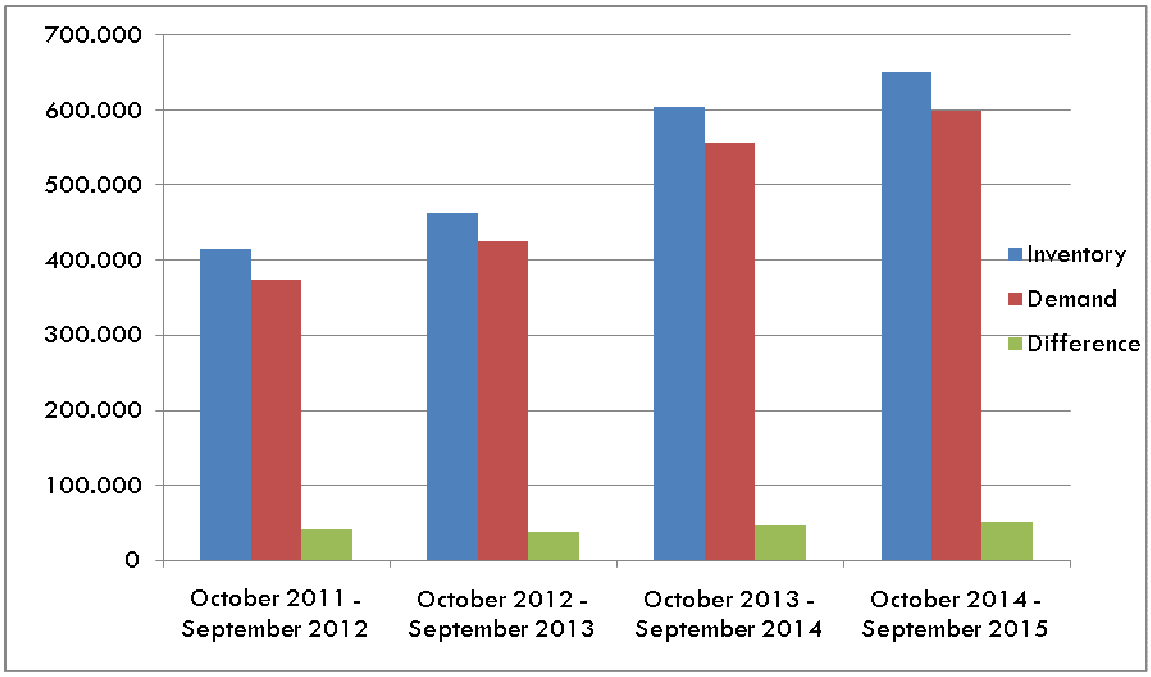

Figure 1.1 Comparison Between Inventory Stocks and Demand For Mowilex

Source : Author

Figure 1.1 shows that there is a quite high differences between the inventory stocks and demand for Mowilex Emulsion E100 (White). In October 2011-September 2012 there is41.129 litres differences between the inventory stocks and demand. There is 38.208 litres differences between the inventory stocks and demand in October 2012 – September 2013. In October 2013-September 2014, there is 46.847 litres differences between the inventory stock and demand, and 50.950 litres in October 2014-September 2015.

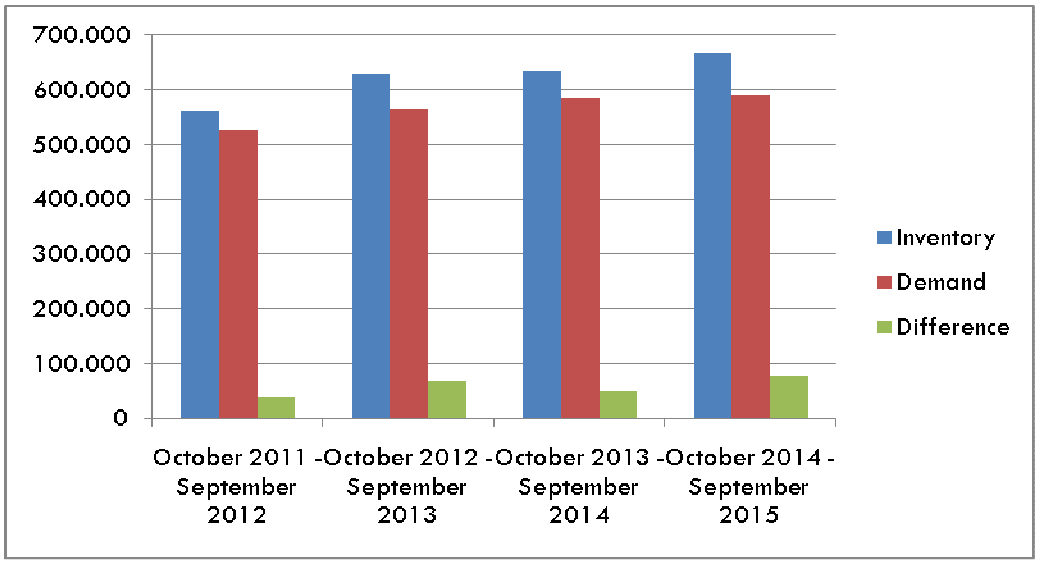

Figure 1.2 Comparison Between Inventory Stocks and Demand For Dulux

Source : Author

Figure 1.2 shows that there is a quite high differences between the inventory stocks and demand for Dulux Weathershield W/S 1290 (Brilliant White). In October 2011-September 2012 there is36.827 litres differences between the inventory stocks and demand. There is67.596litres differences between the inventory stocks and demand in October 2012 – September 2013. In October 2013-September 2014, there is50.290litres differences between the inventory stock and demand, and 76.641litres in October 2014-September 2015.

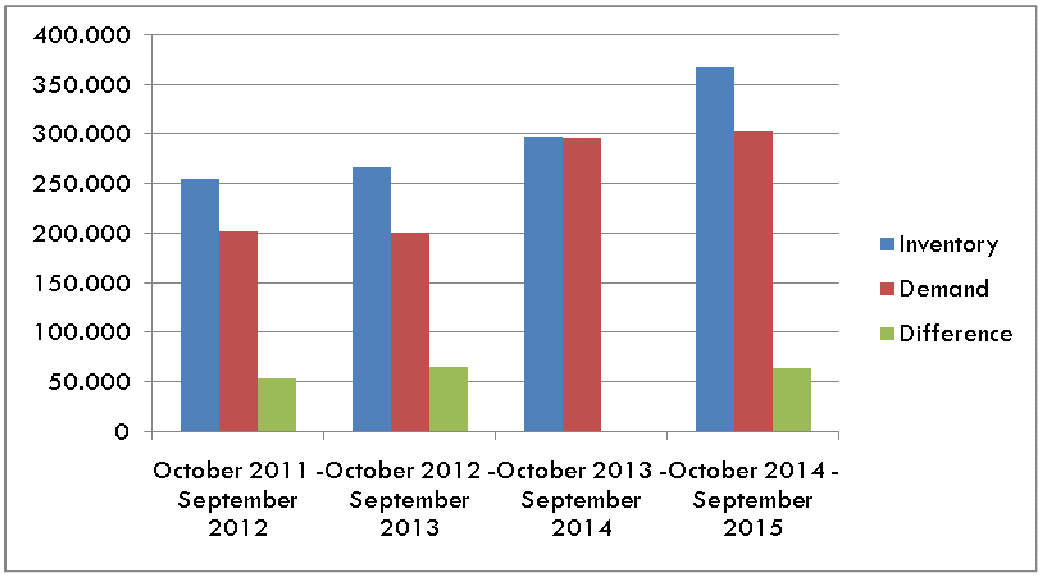

Figure 1.3 Comparison Between Inventory Stocks and Demand For Vinilex

Source : Author

Figure 1.3 shows that there is a quite high differences between the inventory stocks and demand for Dulux Weathershield W/S 1290 (Brilliant White). In October 2011-September 2012 there is53.304litres differences between the inventory stocks and demand. There is65.810litres differences between the inventory stocks and demand in October 2012 – September 2013. In October 2013-September 2014, there is 760litres differences between the inventory stock and demand, and 63.714litres in October 2014-September 2015.

Because of that, author is interested to propose forecasting model and economic order quantity model. There are 3 items that will be analyze in this research which are , Mowilex Emulsion E 100 (White), Dulux W/S Ws 1290 (Brilliant White), Nippon Vinilex Easy Wash 300 (White). Those items are the items that have the highest sales in UD. Sumber Mas. Forecasting will help the owner to predict the demand of customer more accurately and for economic order quantity it will help the owner to ordered the correct or the right amount of products, so it will reduce the overstock, and of course minimize the inventory cost but in the other hand owner still able to fulfill the customers needs and satisfy the customer.

Problem Formulation

Based on the background explained above, the problems that will be researched by the researcher are:

1. Which are the forecasting methods between naive, moving average, weighted moving average, exponential smoothing, exponential smoothing with trend, and Linear Regression that will give the smallest MAD and MSE?
2. How much is the optimal amount of products that must be ordered every period?

Objective of The Research

There are some objectives from this research.Which are:

1. To decide which forecasting methods between naive, moving average, weighted moving average, exponential smoothing, exponential smoothing with trend, and Linear Regression that will give the smallest MAD and MSE.

2. To know how much is the optimal amount of products that must be ordered every period.

Benefit of The Research

A. For the company :

- As an additional information for the company's management in determining an effective and efficient inventory.
- As an input for the company's management for better estimation of demand, and minimize the cost of inventory.

B. For the author :

1. This research is expected to provide benefits and gain knowledge by comparing the theories studied in college with the reality in the company

C. For the reader :

2. As an information and reference in doing scientific research or as additional knowledge, especially in forecasting and inventory planning.

State of The Art

Table 1.2 State of The Art

Reserch Method	**Journal Description**	**Author**	**Research Result**
Forecasting	International Journal of Scientific and Research Publications Volume 3, Issue 10, October 2013 Demand Forecasting For Economic Order Quantity in Inventory Management	Mathew, Nair , & Joseph	Forecasts of future demand will determine the quantities that should be purchased,produced and shipped.In this work α,two data mining methods,artificial neural network(ANN) and exponential smoothing(ES) were utilized to predict the demand of the fertilizer(Ammonium Sulphate).The training data used was the sales data of fertilizer of the previous 3 years.Demand forecasted by artificial neural network is more accurate and

			have less inventory costs than exponential smoothing method.
Forecasting	International Journal of Inventive Engineering and Sciences (IJIES) Volume-1, Issue-9, August 2013 Demand Forecasting For Sales of Milk Product (Paneer) In Chhattisgarh	(Sahu & Kumar, 2013)	Forecasting method assessed includes single moving average (SMA), double moving average method (DMA), single exponential smoothing (SES), semi average method (SAM) and Naïve Method. The mean forecast error (MFE), mean absolute deviation (MAD), mean square error (MSE), root mean square error (RMSE) is used to measure the accuracy of forecasting methods. Based on accuracy, single exponential smoothing (SES) with α=0.3 produces the most accurate forecasting.
Forecasting	International Journal of	(Nenni, Giustiniano, &	Forecasting demand is a crucial

	Engineering Business Management Special Issue on Innovations in Fashion Industry Int. j. eng. bus. manag., 2013, Vol. 5 Demand Forecasting in the Fashion Industry: A Review	Pirolo, 2013)	issue for driving efficient operations management plans. Poor forecasting effects are stock outs or high inventory, obsolescence, low service level, rush orders, inefficient resource utilization and bullwhip propagating through the upstream supply chain
Quantity Discount Model	International Journal of Management Science and Engineering Management 2011 An all-unit quantity discount model under a Cournot competition with	(Navidi & Bidgoli, 2011)	The economic order quantity model is a fundamental model in inventory control that introduces retailer's optimal strategy under some conditions such as the unit cost of purchased product is constant and also the retailer and the supplier work in a monopolistic market and the effects

	incomplete information		of the behaviors of their competitors on their demand are ignored but in the real world, these conditions are hard to encounter
Economic Order Quantity (EOQ)	Int. J. Production Economics 2012 Economic order quantity and purchasing price for items with imperfect quality when inspection shifts from buyer to supplier	(Reazaei & Salimi, 2012)	The relationship between buyer and supplier with regard to conducting the inspection and resulting in a change the buyer's economic order quantity and purchasing price. We model and analyze the problem under two conditions: (1) assuming there is no relationship between the buyer's selling price, buyer's purchasing price, and customer demand; (2) assuming there is relationship between the buyer's selling price, buyer's purchasing price, and

			customer demand. Numerical examples are provided to illustrate the models**.**