Inventory Analysis of Goods Increasing Sales: a Case in a Distributor Company

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A R T I C L E   I N F O

A B S T R A C T

The phenomenon of this research is the delay in the delivery of goods by PT Wicaksana Overseas International Tbk to consumers (distributors). The purpose of this study is to analyze the application of the inventory forecasting method, the obstacle that occurs in the fulfillment of the stock of goods, and the efforts that need to be made to overcome these obstacles. This research is a descriptive research in which the author collects data through interviews, observation, documentation, and literature study, and describes the results of the research as is according to existing data sources. Sources of data collected for this study included primary data, i.e. results of interviews, and secondary data, i.e. the data obtained from PT Wicaksana Overseas International Tbk. The results of this study are: (1) Inventory forecasting on sales indicates that if sales promotions increase, on average the demand planning team will increase the amount of inventory by about 30% of normal inventory; (2) the company's obstacles in meeting the availability of goods are limited production of goods, especially raw materials, sales promotion plans or promo plans that are not communicated with the company's internal team (demand planning, sales and marketing teams), small warehouse capacity, and outlets' delays in making payments; (3) the company's efforts in dealing with obstacles to the availability of stock of goods is to be re-assured with the client or colleagues about the time required to solve the problem of producing goods, to carry out good coordination between clients or colleagues with the company's internal team, to expand the warehouse area in the Jakarta surroundings, and continue to make financial improvements.

1. INTRODUCTION

A distribution company in carrying out its business activities is closely related to the inventory of goods to be distributed. Forecasting or forecasting is to examine current and past company policies and see the extent of their influence in the future (Lewis, 1982; Vikaliana et al., 2020).

Forecasting in a trading business activity is necessary because there is a time lag or delay between when a company policy is set and when it is implemented (Ali et al., 2017; Rangkuti, 2007). Delays in the delivery of inventory from the manufacturer often occur, where delays greatly influence the fulfillment of inventory (Ali et al., 2017).

Table 1 . Client Stock Fulfillment Percentage –PT stock. Wicaksana

Year 2021	Target	Realization
January	60%	60%
February	86%	85%
March	74%	74%
April	84%	83%
May	86%	85%
June	65%	65%

Source: Demand planning team forecasting calculation data

This data is based on calculations by the demand planning team in 2020 and 2021. Where the percentage of stock fulfillment in January-June 2020 was 84%. And for the January-June 2021 period, the average is 76%.

PT. Wicaksana Overseas International Tbk is a company engaged in the distribution of Fast Moving Consumer Goods/FMCG products (products that sell quickly and are often consumed by consumers). In carrying out this business activity, the author would like to raise the issue of inventory procurement methods applied by companies to increase sales.

FMCG goods are products that are purchased for consumption every day. Almost everyone in the world uses FMCG goods all the time. They are consumers on a small scale starting from production kiosks, grocery stores, supermarkets, and warehouses. Buyers of wholesale goods who resell the goods they purchased are also included in the user group. Goods that are included in FMCG include milk, snacks, rice, fruit and vegetables, meat, paper, soap, toothpaste, and over-the-counter medicines sold in pharmacies. FMCG goods do have a high turnover rate. The large demand accompanied by a large number of consumers has made many business actors play in this sector. The FMCG industry has become very competitive with many business actors. Business actors do not only come from giant companies but also from small to medium-scale businesses to home businesses.

PT. Wicaksana Overseas International as a company operating in the distribution of FMCG products currently has large clients from Unilever Indonesia, Unilever International, MARS, Coca-Cola, Signify Philips, Bentoel, and KAO Brands products. By implementing a supply chain management strategy, PT. Wicaksana Overseas International can manage the flow of products and materials well between suppliers, companies, and distributors. However, the efforts made by PT. Wicaksana Overseas International often experiences obstacles in the distribution of goods, such as delays in the delivery of goods caused by several factors, such as land route congestion, lack of goods components, damage to operational trucks, and operational trucks that do not meet requirements.

Problems that occur in the distribution of PT. Wicaksana Overseas International caused delays in the delivery of goods from PT. Wicaksana Overseas International to consumers, which in this case are distributors. In the case faced by this company, it is related to the distribution channels used so that units/products can reach customers on time and target.

The evaluation of forecasting success is based on error indicators: MSE (Mean Square Error), MAPE (Mean Absolute Percent Error), and TS (Tracking Signal). well, then the expected service level will not be realized (Lewis, 1982). Service level is a concept in assessing consumer satisfaction for orders that are on time and according to the number of orders. Service level is influenced by average inventory factors, safety stock, and the number of incoming goods. Apart from calculating the service level, you can also calculate the optimum inventory level that will get the maximum service level (Ali et al., 2017; Heizer & Render, 2016; Satmoko et al., 2020; Sisca et al., 2020).

2. LITERATURE STUDY

Distribution

Distribution is the activity of moving products from the source to the final consumer using distribution channels at the right time. (Assauri, 2016). The meaning of distribution is the activity of distributing or sending goods and services so that they reach the final consumer. Based on the definition above, it can be concluded that distribution is the activity of distributing goods and services from producers to consumers. The distribution business model describes the content, structure, and governance of distribution transactions designed so that they can create value through the exploitation of distribution business opportunities (Kotler, 2005; Kotler & Armstrong, 2018).

A distribution business model is a story that explains how a distribution company operates. A distribution business model is said to be good if it can answer Peter Drucker's marketing theory regarding who are the customers of the product being distributed.; What is the distribution of customer ratings?; What is the quality of the distribution company's products and services? The basic question for distribution company owners is how can they achieve profit margins from the distribution business (Djaharuddin, 2017; Suwarno, 2016).

Then the question is how can a company provide value to customers with the costs incurred in the distribution business.   The distribution business model consists of four interrelated elements, including the customer value proposition, profit formula, main resources, and key strategy processes for success (Ambekar & Kapoor, 2019; Count et al., 2019; Rahman et al., 2020).

Forecasting

Forecasting is the process of estimating several needs in the future which include needs in terms of quantity, quality, time, and location needed to meet the demand for goods or services. According to Heizer and Render (2009:162), forecasting is the art and science of estimating future events. This can be done by taking historical data and projecting it into the future with some form of mathematical model. Apart from that, it could also be a subjective intuitive prediction. It can also be done using a combination of mathematical models adapted to the good judgment of a manager.

Based on the time horizon, forecasting can be divided into three types (Prawirosentono, 2001; Satmoko et al., 2020; Sisca et al., 2020), namely:

a. Long-term forecasting, that is, covering a period greater than 18 months. For example, forecasting is required for capital investment, facility planning, and planning for R&D activities.

b. Medium-term forecasting, which covers a period of between 3 to 18 months. For example, forecasting for sales planning, production planning, and temporary workforce planning.

c. Short-term forecasting, namely covering less than 3 months. For example, forecasting about planning material purchases, work scheduling, and employee assignmentsTypes of Forecasting

In determining and using forecasting results, companies, and decision-makers must understand and consider the following forecasting characteristics (Lewis, 1982):

a. Forecasts are always wrong. Always be flexible and don't be surprised

b. Long-term forecasting is generally more inaccurate. Use large time intervals.

c. Aggregate forecasting is more accurate. Do this on item groups.

d. Forecasting is more accurate if applied to the near future. Use short deadlines and/or lead times.

e. The latest data is generally more reliable. Focus on the latest data

f. The further the company is from consumers, the greater the distortion of the information received and the more inaccurate the forecasting results. Use data from the point closest to the consumer.

g. Forecasting is carried out on independent items, determining the amount of demand for the constituent elements (dependent items) following the amount of demand for the final product Forecasting Characteristics.

Intrinsic forecasting methods are forecasting methods that make future projections based only on historical data from the product being predicted. The intrinsic method is very suitable if an efficient and low-cost forecasting method is needed.

The extrinsic method uses information on external factors in forecasting. Information on external factors can come from outside the company, such as gross national income, minimum wage, number of homes sold, or number of vehicles. Information on external factors can also come from within the company, such as price, promotional budget, or number of sales personnel.

Inventory

The meaning of inventory in accounting is goods owned by a company, whether in the form of a retail or wholesale business, and these goods have been purchased to own and are in a condition ready to be sold. Meanwhile, for manufacturing companies, inventory is divided into 3 categories, namely raw materials, work in process, and finished goods (Rangkuti, 2007; Vikaliana et al., 2020)

The definition of inventory is goods owned or stored in a company consisting of finished products, products in process, raw materials, auxiliary materials, consumable materials, spare parts, and others. Uncertainty in inventory problems can originate from several factors, including demand, lead time, costs, and supply (Fattahi et al., 2017; Govindan et al., 2017; Nasrabadi & Mirzazadeh, 2016).

The Role of Safety Stock (Safety Stock)

Safety stock is inventory that is used to anticipate uncertainty in demand and lead time. Safety stock is also called buffer stock. If the number of requests and lead time are uncertain, when placing an order with a supplier and waiting for the order to arrive, there is a possibility that the inventory will be used up before the order arrives (Nasrabadi & Mirzazadeh, 2016; Rangkuti, 2007).

Safety socks are needed because it is difficult to obtain truly accurate demand forecasting results. The function of safety stock is to anticipate two things (Rangkuti, 2007; Vikaliana et al., 2020), namely:

a. Actual demand exceeds demand obtained from forecasting.

b. Delivery of goods ordered from suppliers is experiencing delays

Sales

Sales according to the Big Indonesian Dictionary is the process, method, and act of selling. Selling is giving something to another person (buyer) to obtain payment or receive money. There is another element, namely influence. In the English dictionary, Merriam Webster, sell in a business-related sense means, "to give up (property) to another for something of value (such as money)" (Amandin et al., 2021; KOtler, 2019; Kotler & Amstrong, 2012; Rahman et al., 2020).

As a paradigm, sales is different from marketing. Sales emphasize sales orientation, while marketing emphasizes orientation on market segment satisfaction. Sales rely on methods of persuasion and influence to achieve goals, while oriented marketing emphasizes adjusting products, prices, locations, and promotions to consumer demands and needs. Sales assume the consumer is passive, the seller is active in the offering. Marketing assumes consumers actively solve their problems and actively meet their needs. If the goods suit their needs, consumers will be interested in buying them (Indriani, 2018; Swastha, 2009).

3. METHOD

Data collection technique

The data collection techniques that researchers used in this research are (Djamba & Neuman, 2002; Yin, 2008):

1. Interview

    Research is carried out by collecting data directly in the field or the company that is the object of research. Data collection was carried out using observation, interviews, and documentation studies. Interviews were conducted with employees of PT. Wicaksana Overseas International as many as 5 people to find out their views on what forecasting methods are appropriate to implement in companies to increase sales at modern trade outlets.

2. Observation Techniques

    Observation is a data collection technique by observing or reviewing carefully and directly in the field to find out the conditions that occur or prove the truth of a research design. The types of observation are based on their implementation, namely participant observation is observation where the researcher is directly involved in observation activities in the field.

3. Documentation

    Creswell (2012:3) differentiates documents into two groups: public documents (e.g. legislation, manuscripts, decisions or regulations of an agency, papers, newspapers) and private documents (e.g. diaries or letters). In this research, researchers will collect and discuss data in the form of documents related to the analysis of inventory forecasting methods in increasing sales of modern trade outlets at PT. Wicaksana Overseas International Tbk.

4. Literature Study

    This research was carried out by collecting information and looking for books that were relevant to the study being discussed.

Determination of Informants

The informants in this research are:

1. The first informant is the General Manager of Sales & Marketing, Mr. Ronni Henri

2. The second informant is Senior Manager Planning & Reporting Mr. Ponco Ridwan

3. The third informant is the Assistant Manager for Demand Planning, Sister Saras Nurani Putri

4. The fourth informant is the Assistant General Manager of Key Account Management, Mr. Kenny Sungkono

5. The fifth informant is the Sales Operations Manager of Modern Trade, Mr. Martin Dwi Santosa

In this research, the author only focuses on 3 error calculation methods, namely MAD, MSE, and MAPE. To analyze data on the inventory calculation method used by the company.

MAD (Mean Absolute Deviation)

$$MAD = \frac{1}{n}\sum_{t=1}^{n} |Y_t - \hat{Y}_t|$$

Yt = actual value in t period
Yt'= forecast value in t period

MSE (Mean Squared Error)

$$MSE = \frac{\sum_{t=1}^{n}(At - Ft)^2}{n}$$

At= Demand Actual Value
Ft= Forecasting Results Value
N= Number of Data

MAPE (Mean Absolute Persentage Error)

$$MAPE = \frac{1}{n}\sum_{t=1}^{n} \frac{|Y_t - \hat{Y}_t|}{Y_t}$$

Yt = actual value in t period
Yt'= forecast value in t period

4. RESULTS AND DISCUSSION

In terms of inventory forecasting methods, there are many models of calculation methods, but according to Mr. Ponco Ridwan Senior Manager of Planning and reporting, and also according to Sister Saras Nurani Putri assistant manager of demand planning, the method used by the company currently is using the Weighted Moving Average (WMA) method where carry out inventory forecasting calculations using some of the latest data by giving different weights. This is based on whether the influence of newer data is greater than older data on future conditions.

Results

PT Inventory Forecasting Method. Wicaksana Overseas International Tbk

Table 4. Current Inventory Forecasting Calculations

Month year	Material	Forecast(cardboard)	Sales Order (carboard)	F.A	FB
October 2021	BBN 42gr	42	10	25%	75%
November 2021	BBN 42gr	37	35	93%	7%
December 2021	BBN 42gr	23	5	20%	80%

Source: Data from the demand planning team's forecast calculations for 42gr BBN items in the Jakarta area

Table 5. Sales Results from October to December 2021

Month	Net Sales
October 2021	IDR 24,000,000
November 2021	IDR 74,000,000
December 2021	IDR 17,000,000

Source: Data from the modern outlet sales team in Jakarta

There are several obstacles experienced by companies in terms of inventory for sales, namely:

a. Goods Production

Often constraints in the production of goods are one of the factors that become an obstacle in meeting the availability of goods to be sold. Raw material problems are the cause in terms of goods production. Especially for goods that are imported, this production problem affects the supply of goods because it takes quite a long time to get the goods in stock. Of course, this will also have a big influence on the number of sales

b. Sales Promotion Plan or Promo Plan

Often colleagues or clients do not communicate back to the demand planning team, sales team, and PT marketing team. Wicaksana that there will be ongoing promotional activities. This will affect the fulfillment of sales requests during the promotional period. Because the existing stock of goods cannot meet demand.

c. Warehouse Capacity

The small size of the warehouse while the demand for a large inventory of goods is quite an influential obstacle. Because it cannot be forced with limited capacity while demand for goods exceeds existing capacity

d. Financial

Financial problems are also one of the obstacles for distribution companies in terms of procuring inventory. Distributors have to place orders first with clients or colleagues to fulfill goods supplies, but on the other hand, modern outlets have not yet made payments for the orders they make. Of course, this will disrupt the company's cash flow, which is the lifeblood of a distribution company. Based on interviews conducted by the author, the following are the efforts

What is done to overcome the obstacles experienced by the company:

a. Check with clients or colleagues how long it will take for product production problems to be resolved. In this way, the demand planning team can calculate the estimated demand for goods during the limited production period for these goods, so that sales fulfillment for these goods can proceed according to plan.

b. Carry out good coordination between clients or colleagues and the company's internal teams, namely the sales team, marketing team, and demand planning team. To synchronize the promotion that will run with the amount of inventory needed to match it. Minimize missed communications with clients regarding sales promotions that will be carried out.

c. In terms of warehouse capacity efforts to store goods inventory, the company has expanded its warehouse area to the Jakarta area and its surroundings. Of course, this capacity will continue to be increased, considering that the business of the company PT. Wicaksana Overseas International is growing. The more colleagues you add, the more inventory storage capacity you will need.

d. Financial efforts also play an important role for the company. In this case, the company continues to make improvements, such as billing outlets for payment for goods that have been purchased according to payment deadlines. So that the company's cash flow becomes smooth

Based on the results of further evaluation, the company currently uses the Weighted Moving Average (WMA) method in calculating inventory forecasting. By using this WMA method, it is quite effective in meeting sales demand both in normal conditions and in conditions of many sales promotions.

Table 6. MAPE Mode Forecasting Accuracy & Bias

Month year	Material	Forecast (cardboard)	Sales Orders (cardboard)	F.A	FB	Remark
October 2021	BBN 42gr	10	9	90%	10%	Optimistic
November 2021	BBN 42gr	10	10	100%	0%	Accurate
December 2021	BBN 42gr	10	11	90%	-10%	Pessimistic

Source: Demand planning team forecasting calculation data

However, for the example case of forecasting the 42gr BBN item, there are 2 types of results, namely pessimistic & optimistic. This forecast uses MAPE mode. The calculation results are optimistic because the percentage bias (FB) is still at 10% whereas the sales order figure is still below the forecast figure. The calculation results are accurate because the bias percentage (FB) is 0%, where the sales order number is by the forecast calculation. Meanwhile, the calculation results are pessimistic because the percentage bias (FB) is -10%, where the sales order number is greater than the forecasting number so it cannot be fulfilled 100%.

It is said to be optimistic if the calculation percentage is >0% to 99%, accurate if the calculation percentage is exactly 100%, and it is said to be pessimistic if the percentage is <0%.

Table 7. MSE Mode Forecasting Accuracy

Month year	Material	Forecast (cardboard)	Sales Orders (cardboard)	Error	Error Square
October 2021	BBN 42gr	10	9	-1	1
November 2021	BBN 42gr	10	10	0	0
December 2021	BBN 42gr	10	11	1	1
			Summary		2
			MAP		1

Source: calculation using the MSE formula

Meanwhile, if you use MSE mode, the squared error result is 1. A low Mean Squared Error value or a mean squared error value close to zero is an indicator that the forecasting results are by the actual data and can be used for forecasting calculations in the future period. However, for the calculations in the table above, the squared error result is 1, which means that this data is not correct if you use the MSE method.

Table 8. MAD Mode Calculation

Month year	Material	Forecast (cardboard)	Sales Orders (cardboard)	Difference Absolute
October 2021	BBN 42gr	10	9	-1
November 2021	BBN 42gr	10	10	0
December 2021	BBN 42gr	10	11	1

Source: calculation using the MAD formula

Table 9. Tracking Signal Calculation

Month	Material	Forecast (F)	Actual (A)	Difference= A-F	RFSE Cumulative	Absolute Error	Cumulative Absolute	MAD	Tracking Signals
Oct 2021	BBN 42gr	10	9	-1	-1	1	1	1	-1.00
Nov 2021	BBN 42gr	10	10	0	-1	0	1	0.5	-2.00
Dec 2021	BBN 42gr	10	11	1	0	1	2	0.7	0.00

Source: calculations using the tracking signal formula

From this calculation data, it is obtained that the tracking signal value moves from 0 to -2.00 and this value does not exceed the maximum limit (plus or minus 4). So this method can be used for forecasting.

Discussion

The most appropriate method used by PT. Wicaksana in inventory forecasting is use the MAPE method rather than using the MSE method. If using the MAD method, the tracking signal value does not exceed the maximum limit value (plus or minus 4), then this method can also be used for forecasting. This results inline with the previous research (Saptaria, 2017; Sjurahudin & Vikaliana, 2022; Wardah & Iskandar, 2017).

Based on interviews conducted by the author, the following are the efforts by the company to overcome the obstacles experienced by the company:

1. Check with clients or colleagues how long it will take for product production problems to be resolved. The importance of integration in the production process means that the placement of production resources can integrate all production factors (Baroto, 2006; Lanza et al., 2015).

2. Carry out good coordination between clients or colleagues and the company's internal teams, namely the sales team, marketing team, and demand planning team. Good planning will provide direction and guidance for carrying out activities over a certain period of time. Planning and then coordination is a tool for controlling when planning has been implemented towards achieving performance (Ghiani et al., 2004; Gryna et al., 2007; Kotler, 1994).

3. In terms of warehouse capacity efforts to store goods inventory, the company has expanded its warehouse area to the Jakarta area and its surroundings. The more colleagues you add, the more inventory storage capacity you will need.

4. Financial efforts also play an important role for the company. Financial management, companies can monitor how much business income and operational costs are as a basis for making wiser short-term and long-term financial decisions. (Made, 2011; Marilena & Alina, 2015)

5. CONCLUSION

The Based on the research results and discussion above, it can be concluded that the forecasting method used by the company uses the Weighted Moving Average (WMA) method in calculating inventory forecasting. This method is sufficient to prevent inventory shortages. To meet sales demand both in normal conditions and in conditions of many sales promotions. Where the number of goods fulfilled under normal conditions is 85% and if there are lots of promotions it is 75%

The most appropriate method used by PT. Wicaksana in inventory forecasting, use the MAPE method rather than using the MSE method. If using the MAD method, the tracking signal value does not exceed the maximum limit value (plus or minus 4), then this method can also be used for forecasting.

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