CHAPTER III

RESEARCH METHODOLOGY

3.1 Research objective

Object of this study is to identify the raw material based on material requirement planning method for creating Standard Operational Procedure to supplier.

3.2 Data Source

The data source is something that can provide information on the data. This type of data is divided into two, they are primary data and secondary data.

1. Primary data

   Primary data were obtained from historical data and lead time that are developed to obtain the information of the last production. The historical data and lead time are assessed by the data from manager at Couvee coffee. This assessment is proposed to result the historical to fulfill the steps in forecasting.

2. Secondary data

   Secondary data were obtained from journal, book as literature and Couvee's data to support this research.

3.3 Data collecting

Data that are collected in this study are related to forecasting and material requirement planning methods of data collection are as follows:

1. Historical data, the method that researcher collected to calculate the forecasting coffee beans in Couvee coffee, lead time to get average time for the flow of one product unit throughout the process including the waiting time between sub-processes.

2. The Literature Study is a data collection that is derived by collecting sources from journal, article, book and website that related to forecasting and analitical neural network. In this study, the researcher provides information sources in a description and data sources in the references.

3.4. Moving Avarage

Forecasting method used in this study uses the moving average method because the sales data that occurred is not fluctuating or on the other word, data do not have seasonal factors. Moving average method applies the data that are being observed and data before observation.

$$MA_m = \frac{\sum_{i=1}^{m} D_{t-i}}{m}$$

Where:

MA_m	= Moving average periods
$\sum_{i=1}^{m} D_{t-i}$	= Total demand value periods
m	= Moving periods

In determining the best forecasting method, it is necessary to conduct an evaluation analysis of the results of the forecasting using several approaches:

A. Mean Absolut Deviation

MAD

$$\frac{\sum_{t=1}^{m}|A_t - F_t|}{m}$$

B. Mean Square Error

MSE

$$\frac{\sum_{t=1}^{m}(A_t - F_t)^2}{m}$$

Where:

m   = Moving periods

A_t = Demand forecast for period t

F_t = Number of period requests t

3.5.   Linear Regression

The line equation that approaches linear data forms is:

$$Y'(t) = a + b(t)$$

The constants of A and b are determined from the raw data based on the least square criterion. Where a and b can be calculated by the following formula:

$$b = n \sum_{i=1}^{n} tY(t) - \sum_{i=1}^{n} Y(t) \sum_{i=1}^{n} tb$$

4.

5.

$$a = \frac{\sum_{i=1}^{n} Y(t) - b \sum_{i=1}^{n} t}{n}$$

Where: t = time

Y(t) = Demand Period

3.6.   Data Processing

3.6.1. Material Requirement Planning

Material Requirement Planning is a method for determining what, when and how many components and materials are needed to meet the needs of a production plan.

1. Lead Time

Lead time is the time period needed since the MRP suggested an order until the ordered item is ready for use.

2. On Hand

    On hand is an initial inventory that shows the quantity of items that are physically in the warehouse.

3. Lot Size

    Lot size is an order quantity of the item.

4. Gross Requirement

    Gross requirement is a gross request from an item obtained from production planning.

5. Schedule Receipts

    Schedule of arrival of goods ordered in period t

6. Project on Hand

    Project on hand is a record of the items' number that existed in the initial period obtained from inventory records.

    (Planned order release + on hand inventory + schedule receipt – gross requirement)

7. Net Requirement

    Net requirement is the net requirement needed in period t.

    (Net requirement – schedule receipts – on hand inventory before – planned order receipts)

8. Planned Order Receipts

    Planned order receipts is the quantity of orders planned to be received in that period.

9. Planned Order Release

Planned order release is the quantity of plan orders placed or issued within a certain period so that the ordered items will be available when needed.

Table 3.1 of Horizontal display of MRP

Lot Size :					
Lead Time :	Time Periods (weeks)				
On Hand :	1	2	3	4	5
Gross Requirement					
Schedule Receipts					
Projected on Hand					
Net Requirement					
Planned Order					
Receipts					

3.7. Flow chart

The research diagram is used to solve problem. Research diagram explains the steps of conducting research from the beginning until final result. The research diagram can be seen in figure 3.2, as follows:

1. Start
2. Problem Identification
3. Literature Review
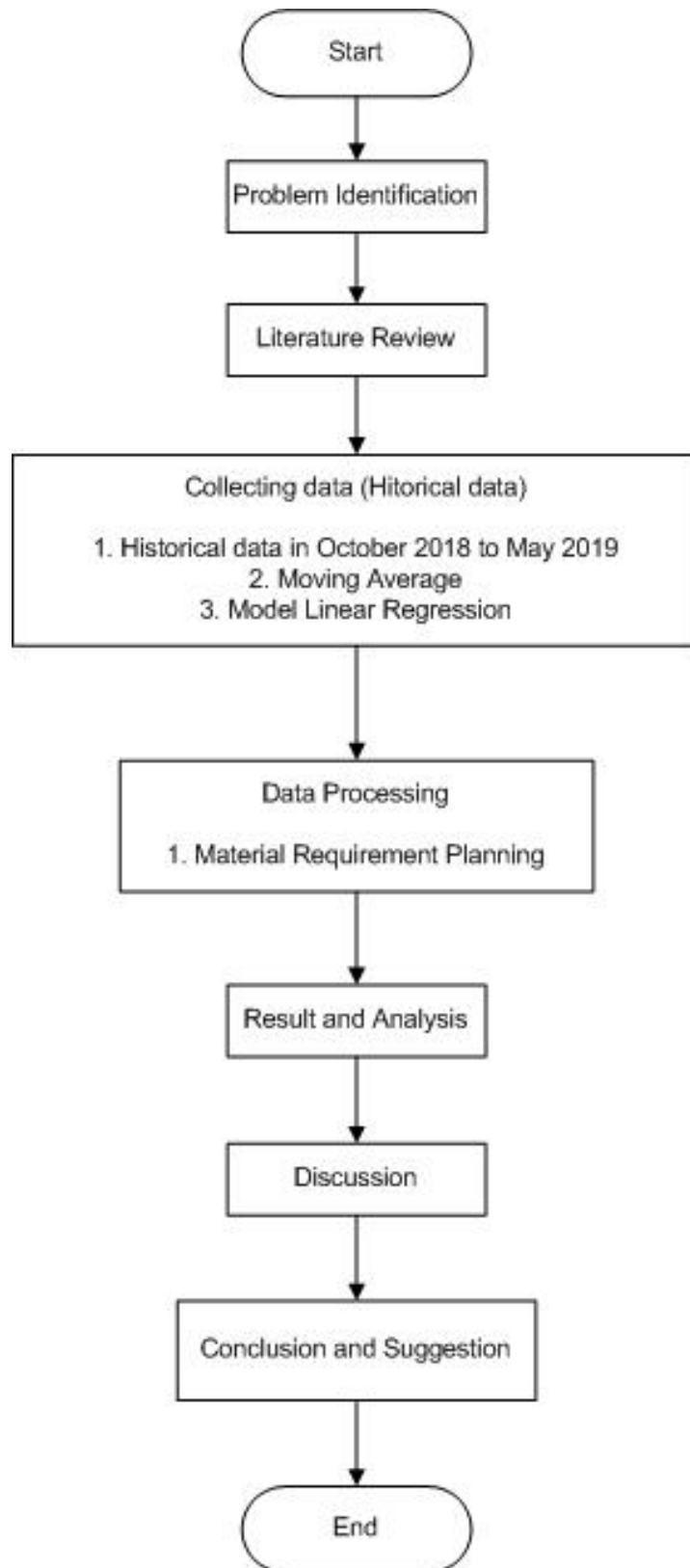4. Collecting Data
5. Data Processing
6. Result and Analysis
7. Discussion
8. Conclusion
9. End

Figure 3.1 Flowchart Process of Research