

CHAPTER 3 RESEARCH METHODOLOGY

Here are the steps to do the research.

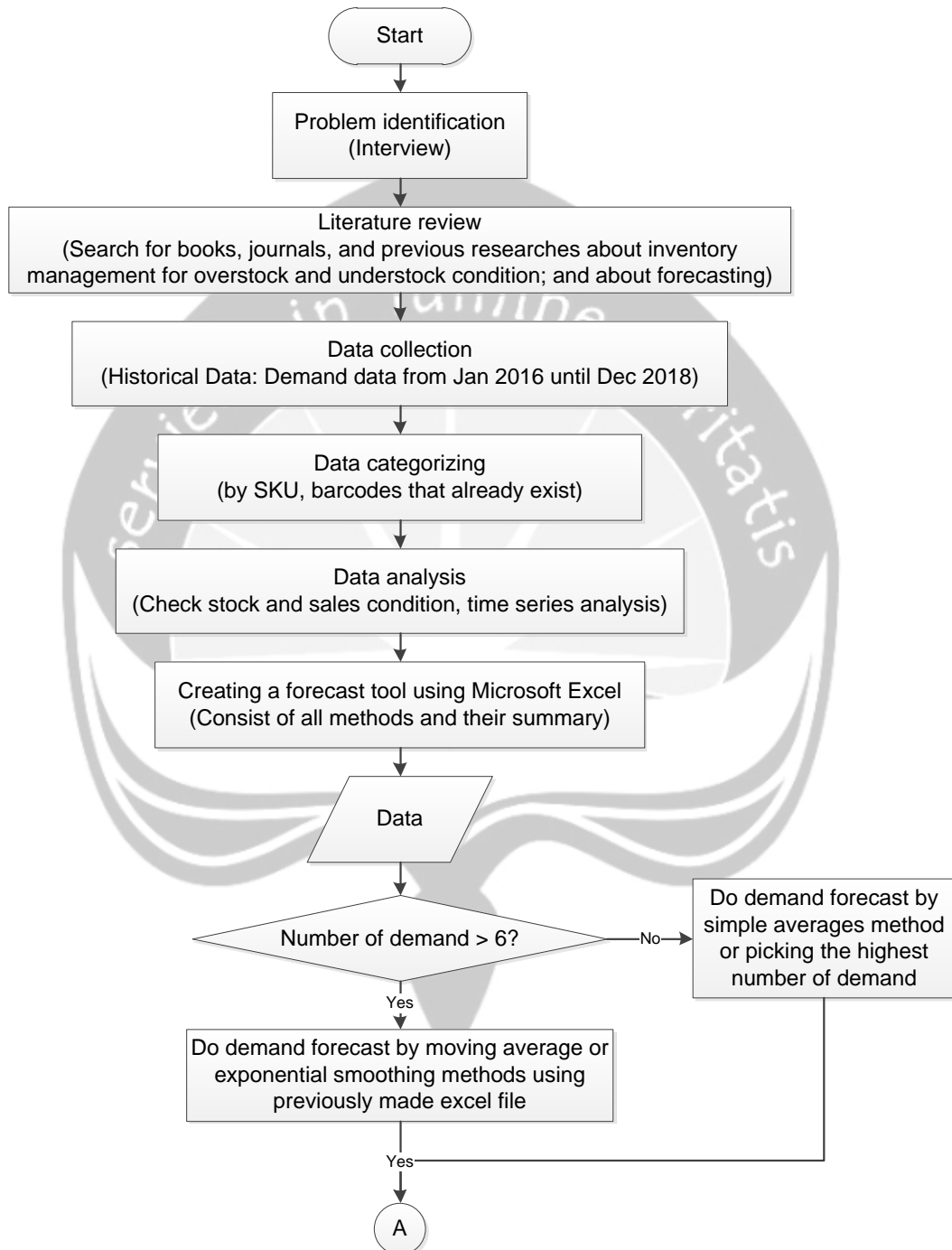


Figure 3.1 Research Methodology

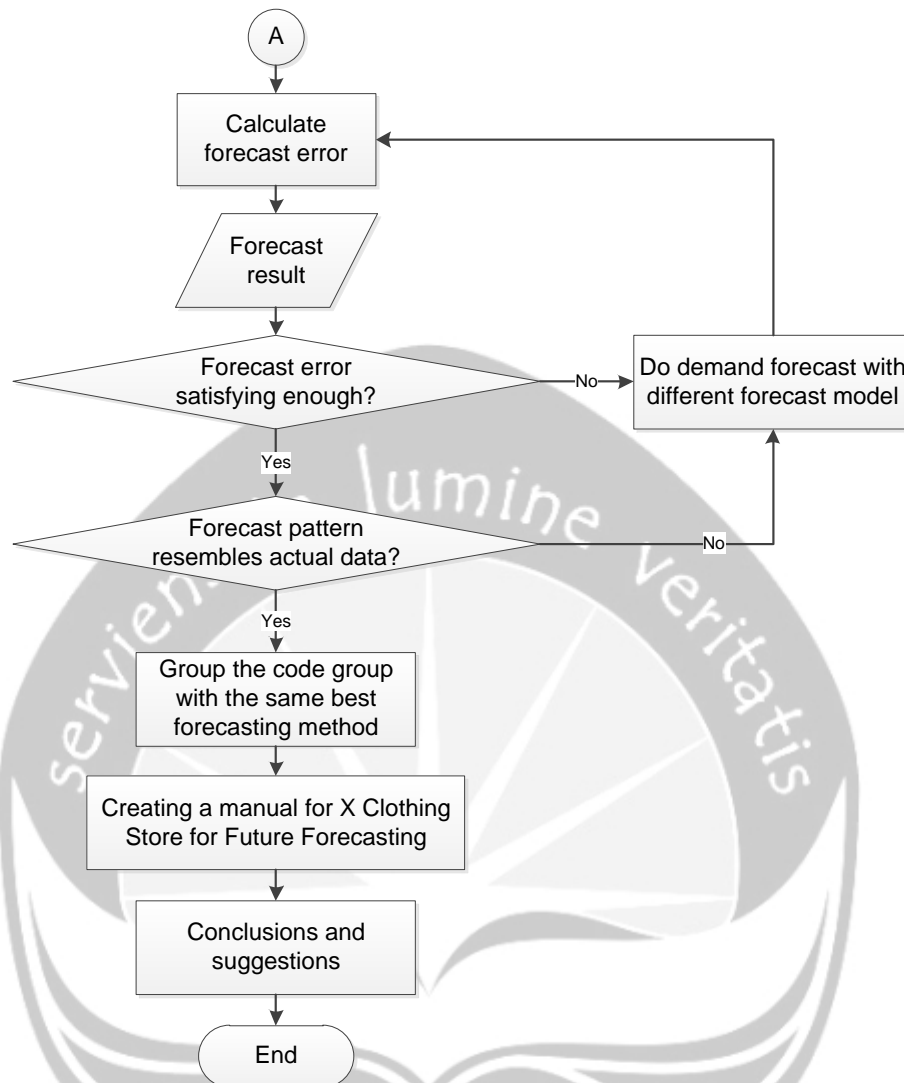


Figure 3.1 Continuation

3.1. Problem Identification

Problem identification was done by interviewing the owner about the condition of the store and asking in detail about it. The cause of the problem and the effect of the problem need to be clearly determined. From the interview, it is known that CV. Perdana Mandiri's owned clothing store sometimes experiences an increase in debt because they order too many products that did not have good sales which results in overstock. Sometimes, they also experience stockouts on products that have good sales. The increase of debt could not be verified with the constraint of undisclosed costs given by the company while the overstock and understock condition were verified in data analysis process

3.2. Literature Review

Literature review was done by searching for books, past journals, past articles and related researches about inventory management and forecasting in general and in retail. This was done to have more knowledge about how to solve the problem. Theories were also read and studied to understand the basics better. After reading several articles and researches, the method of data analysis that would be used was decided. It is time series analysis with time series forecasting method.

3.3. Data Collection

Data collected was a historical secondary data. A request for sales and stock data of the store was asked to the owner. The data received was from January 2016 until December 2018. The data was then used as the input for demand forecasting and to calculate forecast errors.

3.4. Data Categorizing

CV. Perdana Mandiri has thousands of stock keeping units (SKU). To analyze and forecast the data, these products need to be categorized. X clothing store put the same first code from the whole SKU for the same type of product, so the product categorizing was based on the original SKU codes from X clothing store.

3.5. Data Analysis

In data analysis, the number of sales and the number of stocks were checked to see which several products have the most overstock or understock. Time series plots were made to see if the data have trend components, seasonal components, cyclical components, or irregular components. To do data analysis, Microsoft Excel was utilized.

3.6. Creating A Forecast Tool using Microsoft Excel

A forecast tool is made to make it easier to choose which forecasting method best suits every code group. The forecast tool has five sheets. The first sheet is for naïve method, the second sheet is for moving average method, the third sheet is for exponential smoothing method, the fourth sheet is for the summary of all methods including their calculated forecast errors, and the last sheet is for custom forecast if the forecast results for a code group has a large forecast error, a low

forecast error but with highly biased forecast values, and/or when the forecast result does not have a similar pattern with the actual data.

3.7. Do Demand Forecast

Demand forecast was done by using the forecast tool previously made. All SKU were forecasted except for several SKU which items were not sold anymore, items that were not actively sold and restocked, new items that X clothing store started selling at the end of 2018, and special priced items which had various types of products. SKU code groups with number of sales of less than six were calculated by simple average method and it had no forecast error calculated. The amount lesser than six was chosen because it is what X clothing store considered as low number of sales.

3.8. Grouping Code Group with The Same Best Forecasting Method

After all code groups were forecasted, the code groups were categorized based on the best forecasting method to be used on them. The data was summarized in lists and tables.

3.9. Creating a Manual for X Clothing Store for Future forecasting

This is a guide on how to use the forecast tool and about how in the future the data patterns can change. Forecasting model should be adjusted after a certain period of time or when there is a pattern change. The best forecasting method mentioned previously can change based on the changes in the clothing store, either from internal or external factors.

3.10. Conclusions and Suggestions

In this part, the summary of the problems and its solutions are stated. Suggestions for further research are also stated as ideas to improve this research.