

Sales Transaction Result Analysis for Increase Prediction of Income

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Abstract

The use of data that has long been stored in the information system can be used to find out information that supports decision-making activities. One of them is sales transaction data. During this time, the case of sales transaction data is rarely analyzed to be taken into consideration when making a decision, for an example analyzing transaction data. Analysis of predictions in transactions should analyze inflation factors that affect income. Inflation will result in an increase in the price of basic necessities which can also cause entrepreneurs to tend to increase the price of products to be sold. Therefore, this research focuses on analyzing sales transaction data at a restaurant. Where the data used is data that has been stored for 3 years in the period 2015-2017. The purpose of this study was to determine the quality comparison of sales transaction predictions between years by observing inflation based on changes in selling prices. The prediction shows that 3 main menus, namely chicken noodles, dumpling crackers, and hot / ice tea have an average of around 70%. The results of the study revealed that the prediction of goods sold with actual data in the following year was quite significant and predictions of income were not affected by inflation of staple goods based on a comparison between prices.

Keywords: Transaction, Prediction, Inflation

Abstrak

Penggunaan data yang telah lama tersimpan di dalam sistem informasi dapat dimanfaatkan untuk mengetahui sebuah informasi yang menunjang kegiatan pengambilan keputusan. Salah satunya adalah data transaksi penjualan. Selama ini, kasus data transaksi penjualan jarang sekali dianalisa untuk dijadikan bahan pertimbangan saat mengambil sebuah keputusan, misalnya melakukan analisa pada data transaksi. Analisa prediksi pada transaksi seharusnya menganalisa faktor inflasi yang mempengaruhi penghasilan. Inflasi akan mengakibatkan peningkatan harga kebutuhan pokok yang juga dapat mengakibatkan pengusaha cenderung menaikkan harga produk yang akan dijual. Oleh karena itu, penelitian ini fokus untuk menganalisa data transaksi penjualan pada sebuah restoran. Dimana data yang digunakan adalah data yang telah tersimpan selama 3 tahun dalam kurun waktu 2015-2017. Tujuan penelitian ini adalah untuk mengetahui perbandingan kualitas prediksi transaksi penjualan antar tahun dengan memperhatikan inflasi berdasarkan perubahan harga jual. Prediksi menunjukkan bahwa 3 menu utama yaitu mie ayam, krupuk pangsit dan teh panas/es memiliki rata-rata berada dikisaran 70%. Hasil penelitian diketahui bahwa prediksi barang yang terjual dengan data sebenarnya di tahun berikutnya cukup signifikan dan prediksi penghasilan tidak terpengaruh adanya inflasi bahan pokok berdasarkan perbandingan antar harga.

Kata kunci: Transaksi, Prediksi, Inflasi

1. INTRODUCTION

Every nation wants the development or progress in various aspects of life in a sustainable way. These developments can be achieved through development efforts in the economic field. The implementation of appropriate macroeconomic policies will have a positive impact on economic activity and further increase economic growth.

At a time when the economy is growing very rapidly, it will usually lead to price increases. The occurrence of uncontrolled price increases will penetrate every goods and services needs of society that will cause inflation [1]. When the inflation is

happened, the level of prosperity of most of people will decline. Inflation will also lead long-term economic development prospects to be worse. Furthermore, productive investment will decrease, exports will fall and imports will increase. Consequently, it can slow economic growth [2].

Advance in information technology is expected to be an effective predictor of information processing [3]. The use of data that have stored for long in the information system can be utilized to know information that supports decision-making activities [4]. One of them is sales transaction data. During this time, the case of sales transaction data is rarely

analyzed to be taken into consideration when taking a decision, such as analyzing the transaction data. The prediction analysis of the transaction should analyze the inflation factors that affect earnings [5].

Prediction is the beginning of a decision-making process. Before making a prediction, what must be known first is what the goal that will be achieved in decision making. Prediction is the thinking of a quantity, such as demand for one or more products in the period to come. In production activities, predictions are made to determine the amount of demand for a product and this is the first step of the production planning and control process. In the prediction, it is set what kind of product (what), how many (how many), and when it is needed (when).

The importance of decision making in large data sets is the starting point for the emergence of new branches of science to overcome the issue of information utilization, important patterns, and interesting information from large amounts of data [6]. Utilization of information can be done in various ways in accordance with the information needs to be known [7]. In the case of this study, Utilization of transaction data can be extracted from various information including the type of goods purchased, the amount of goods purchased, and the effect of price increases on the sale of goods. Sales transaction is one of the activities always done in the sales information system. This transaction process stores various data that is very important in order to know various information, including commonly known that the amount of sales, the amount of financial data, and stock of goods. Less attention in the sales transaction data is the relationship between price increases that occur due to a factor. For example inflation causes business owners to raise product prices [8].

2. MATERIALS AND METHODS

Sales is an activity aimed at finding, influencing, and instructing buyers to adapt their needs to the products offered and enter into agreements on prices that are beneficial to both parties. The main purpose of business owners is to serve the needs of consumers [9].

Decision theory explains that the subject is not the only deciding underlying a final choice. In some studies, there are several different ways to make a decision. The emphasis lies in the lack of (mathematically) technical aspects of decision theory. Decision is a relationship of choosing some conscious solution as a strategy to solve a problem [10]. Decision-making is directly influenced by several major disciplines, some behaviors, and some scientific traits. An understanding of some decision-making variables can affect an individual's ability to make decisions and provide support. Decision-making is the process of choosing between alternative actions to achieve goals or objectives [6]. Stages in making decisions, among them are [6]:

1. Intelligence Phase

This stage is the process of tracking and detecting the scope of the problem and the problem recognition process. The data already obtained will be processed and tested in order to identify the problem.

2. Design Phase

This stage is a process of development and search for alternative actions / solutions that can be taken into consideration. This stage is a representation of the simplified real event, so it takes the validation and verification process to determine the accuracy of the model in researching the existing problems.

3. Choice Phase

At this stage the selection of various alternative solutions is raised at the planning stage so that the individual can determine a choice by considering the criteria based on the objectives that will be achieved.

4. Implementation Phase

At this stage. The application of the system design that has been made at the planning stage is carried out as well as the implementation of alternative actions that have been selected at the stage of selection. The stages mentioned above can be a very influential factor on decision-making activities to solve a problem appropriately.

Trend moment method is a method that can be used to do forecast. Trend moment method is the development of simple regression based on functional or causal relationship between one independent variable with one dependent variable. In this moment trend method, there is a combination of statistical analysis in the form of trend analysis and moment method [11]. Application of trend moment method can be done by using historical data from one variable. Trend is a movement that tends to rise or fall in the long run based on the average change over time and the value is quite flat or smooth (smooth). Periodic data trends can take the form of a steadily increasing and declining trend. Strengths that can influence trends are population change, price, technology, and productivity. The formula used [11]:

$$Y = a + b X \quad (1)$$

Information:

Y = Trend value

a = Constant number

b = Slope

X = Time index (starting from 0,1,2,3...n)

$$\sum y = a.n + b. \sum x \quad (2)$$

$$\sum xy = a. \sum x + b. \sum x^2 \quad (3)$$

$$APE = \text{abs} ((r-p)/r) 100\% \quad (4)$$

Information:

Abs = Absolute value

r = Real value

p = Predicted value

$$\text{Accuracy} = 100 - APE \quad \dots (5)$$

In making sales prediction using trend moment method and using formula (1) can be done with the following steps:

1. Calculating total sales data (yi)
2. Determining the parameter value (yi), where (xi) is the time index starting from one

3. Determine the value (xy) and (xi_2). This step needs to be done in order to know the value of "a" and "b" which will be used in trend moment equation.
4. Determining the value of xy where x is the time index and y is the monthly sales history data.
5. The next step is to determine the value (xi_2), the time index value squared.
6. The result of calculating values (yi), (xi), ($yi xi$) and (xi_2)
7. Determining the values of "a" and "b" by means of elimination using the formulas (1), (2), and (3), then searched values "a" and "b".
8. Accuracy calculation results using the formula (4) [12].

3. RESULTS AND DISCUSSION

This research uses Trend Moment statistic model. The exposure of research stages that have been done as follows:

1. Intelligence Phase

The search is based on an explanation of the background of the problem. The author wants to know the relationship between price increases with the transactions made. The study used sales transaction history data from 2 places. Processed data are between 2015 to 2017. The data obtained is in the form of a comma-separated values (CSV) file. List of food menu that became the object of research are 17 menus consisting of 10 types of food and 7 types of beverages. The list of foods is analyzed based on the results of sales transactions.

2. Design Phase

At this stage the researcher performs the solution search process using systematic decision-making process model [6]. The model used to sort the data used is sales history data. The purpose of data management is to generate stable predictions. A stable prediction is the comparison between the predicted results and the real data caused by inflation which is not too much different. The data taken to make predictions is data with the growth rate that can be suppressed even though the price inflation of basic goods rose. The measurement phase is done by comparing the real price with the prediction price every year. Measurement is using the APE formula [13] [14] [15].

3. Choice Phase

Sales transaction data is divided into several data based on transaction year. Transaction data is divided into 3 sections, namely in 2015 consisting of 12 months, 2016 consisting of 12 months, and year 2017 consisting of 9 months. The amount of sales data can be seen in table 1.

Table 1 is the overall data of sales transactions derived from 17 menus that exist on the object of research. Based on sales transaction data contained in table 1 it is known that 2016 data (average sales) is the year that has the most sales done. In 2016 the total

number of menus sold for 360,524 and the average menu sales amounted to 30,023.6.

Table 1. Sales Transaction

Year of Transaction	The Amount of Goods	Average
2015	323.195	26.932,9
2016	360.524	30.023,6
2017	250.206	27.800,6

4. Implementation Phase

The final analysis is presented in Figure 1 which is the result of the average total sales and average earnings forecast based on the price difference. Most predictions are predicted in 2 years (2016-2017) prediction analysis. Similarity can be seen in the highest predictive result 3 main menus of mie ayam (chicken noodles), kerupuk pangsit (dumpling crackers) and hot tea / ice. Although there are similarities in predictions but there is a decrease in prediction in 2017. The results of the comparison of product numbers in 2016 and 2017 with predictions of income at three price classifications (old prices, new prices, average prices) are not too different.

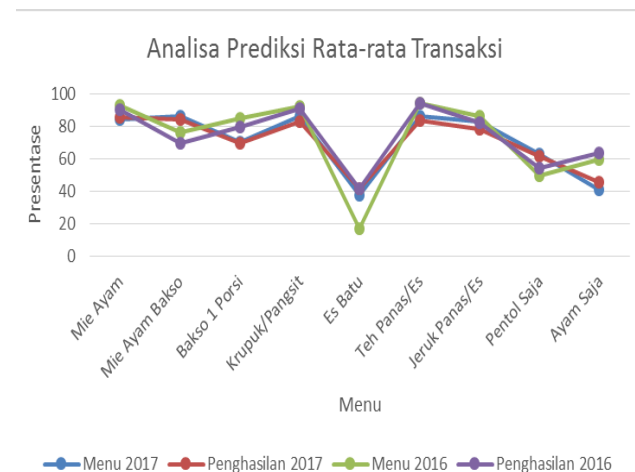


Figure 1. Analysis of Transaction averages prediction

The prediction done by using trend moment method yielded a fairly accurate prediction with price comparison analysis which is not too significant. Trend method analysis is presented in Figure 1. There are some menus that have low predictions namely; ice cubes, pentol (meat ball), and chickens. Prediction is due to the third menu is an additional menu. The result of the analysis obtained is that the price increase which is not significantly affects the income changes earned. The analysis model of this study differs from several other studies with the overall year comparison model [16] [17], this predictive study was conducted on an inter-year comparison, expected to get more accurate results with regard to less stable price inflation.

The occurrence of inflation affects the decreasing purchasing power of society [18]. The

impacts may be prevented by business owners by always maintaining price stability so they do not raise prices only on some menus that have a pretty good prediction in the range of 70%. This prediction is useful to show better analysis results with good accuracy rather than simply following price increases based on inflation on some basic needs [19] [20]. It is expected that future price determination is not only based on inflation but the data of the analysis exposure in this study is also considered so that it is expected that the number of visitors to restaurant will increase and the sales income can be increased more [21] [22].

4. CONCLUSION

Price increases that are not so significant affect the changes in income earned. The occurrence of inflation affects the decrease of people's purchasing power. The impacts may be prevented by business owners by always maintaining price stability so that they do not simply raise prices on some menus that merely have a pretty good prediction in the range of 70%. It is expected that future price determination is not only based on inflation but the data of analysis exposure in this research is also considered so that the expected number of restaurant visitors increase and sales income can be much more increase.

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