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Quantitative Method for Predicting the Number of New Students in Private Colleges (Case Study on XYZ University)

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Abstract---*Forecasting the number of new students there is a certain period for private universities is very important to predict the resource requirements of these private universities. Accurate forecasting will increase the effectiveness and efficiency of business in private tertiary institutions. Quantitative forecasting methods are forecasting methods that are commonly used by various organizations including private tertiary institutions. This study tries to predict the number of new students at private universities in a certain period by using three quantitative methods, namely: the four-monthly moving average method with weighting, the exponential refinement method, and the trend analysis method and then assess which method is the best (accurate) in predicting the number of new students. This research was conducted at one of the best private tertiary institutions in Indonesia which kept its original identity a secret and was given the identity in this study as XYZ University. The research conducted was a qualitative study using secondary data, namely actual new student data for 5 years (2015 to 2019). The results showed that the exponential refinement method was better used in predicting new student data for a certain period than the moving average method with weighting as well as the trend analysis method. Forecasting results using exponential refinement methods before use, of course, must first consider factors, situations, and other assumptions in the predicted period.*

Keywords---*Quantitative Method, Forecasting, New Student, Privat University.*

I. INTRODUCTION

Competition among private tertiary institutions is very tight. Many university leaders are targeting their institutions to gain more and more new students from time to time. The target in the form of new students is basically important for higher education institutions, however the leader must be wise in determining the target. Targets that are too high or unrealistic will make related elements depressed or frustrated because of how much effort they have, they will still not be able to reach the desired target or in other words they are pursuing something that is impossible to achieve. Conversely, a target that is too low will make employees not display the ability or the maximum potential and the opportunities that exist outside of the achievement of new students will not be utilized.

Basically, accuracy in determining targets is determined by many things, one of which is the ability to study past events and project them (predict them) to the present or future or commonly known as forecasting (Heizer., Render., & Munson, 2017) . Forecasting using past data (historical data) usually uses quantitative methods and some quantitative forecasting methods that are often used are the moving average method with weighting, exponential refinement methods, and trend analysis (Fahmi, 2014; Heizer., Render., & Munson , 2017).

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II. METHOD

The research conducted is a type of qualitative research. The research method used in this research is descriptive qualitative or exploratory descriptive (Sugiyono, 2008). Because this research is a case study, the population or unit of analysis is a sample of the population (Arikunto, 2006), which is the data of W students of private tertiary institutions during the last 5 years, 2015 to 2019. As a limitation of the problem, the new student data is only New student data from undergraduate study programs (Professional and Masters level or equivalent are not included in the data analysis). Research data is secondary data obtained directly from XYZ University.

III. LITERATURE REVIEW

III.I. Forecasting(Concept, Definition, and Media)

Forecasting is an art or event to predict future events. Forecasting consists of qualitative forecasting and quantitative forecasting (Krajewski & Ritzman, 1996; Heizer., Render., & Munson, 2017). Qualitative forecasting uses intuition, experience, and value systems to make decisions. Quantitative forecasting uses historical data (past) to predict future events or conditions Heizer., Render. & Munson, 2017; Jacobs & Chase, 2018). Quantitative forecasting methods are basically considered tested and convincing used in business forecasting, therefore the forecasting used in this study is quantitative forecasting methods. Quantitative forecasting methods that are common and easy for business organizations to use are: moving average weighting methods, exponential refinement methods, and trend analysis (Heizer & Render, 2011).

1. *Wighted Moving Average Method*

   The moving average method (by weighting) is basically using some historical data (more than one data or historical period) to predict the future, where the historical period closest to the predicted period will gain a greater weight than the weighting of the historical period afterwards (Heizer & Render, 2011). The formula for calculating this method is:

$$\textit{Weighted Moving Average} = \frac{\sum \textit{(Demand for periode n)(Demand in periode n)}}{\sum \textit{Weighted}}$$

2. *Eksponensial Smoothing Method*

The exponential refinement method basically assumes that the difference between forecasting past periods and actual past periods can be used as a basis for predicting the current or next period (Heizer & Render, 2011). The formula of this method is:

$$F_t = FT_{t-1} + \alpha\,(A_{t-1} - F_{t-1})$$

Which is :

F_t = New Forecasting
F_{t-1} = Forecasting Before
α = Smoothing Constanta
At_{-1} = Actual Demand of Periode Before

3. *Trend Analysis Method*

This forecasting method matches the historical data trend's line to then project it into the future to make medium-term and long-term predictions (Heizer & Render, 2011). The formula of this method is:

$$y = a + bx$$

Which is :

y = predicted variable counted
a = intersection of the x-axis
b = the regression slope
x = independen variable (*time*)

III.II. Research Thinking Faramework

Based on the introduction, methods, and literature review discussed above, the framework of the research conducted is illustrated in the figure below:

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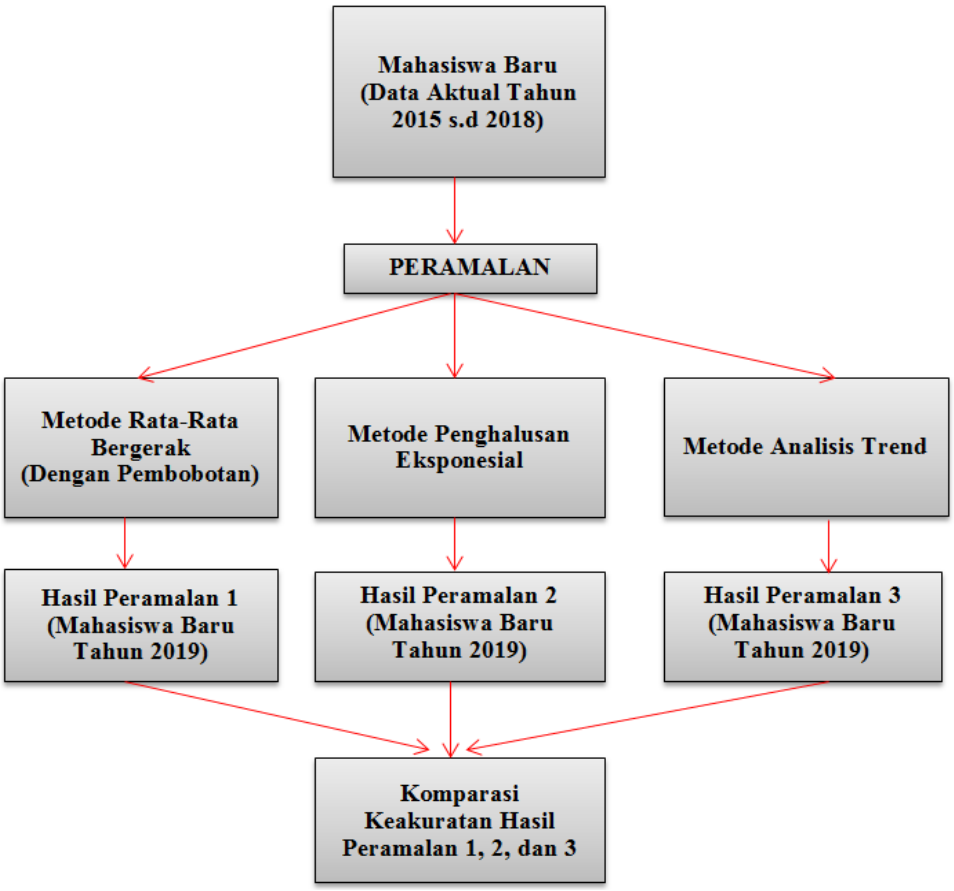

Figure 1: *Research Thinking Framework*

Referring to Figure 1. above, it can be explained that this study intends to forecast the number of new students in 2019 using the 3 methods as described above. Historical new student data for 4 years (2015 to 2018) is used as the basis for forecasting new students in 2019. Forecasting results for each method are compared with the actual results of new students in 2019 and then concluded which method is the most accurate or best for predicted the number of new students of XYZ University.

IV. DISCUSSION

IV.I. New Student Forecasting of XYZ University Year 2019 (Wighted Moving Average Method)

Forecasting results of XYZ University new students using the quarterly moving average method with weighting are presented in the table below:

Table 1:*New Students Forecasting Year 2019.*
(*Weighted Moving Average Method*)

Year	New Students (People)		
	Actual	Forecasting	Difference
TA.2015/2016	1569		
TA.2016/2017	1245		
TA.2017/2018	1213		
TA.2018/2019	1337		
TA.2019/2020	1466	1280	186

Source: Data Processed (2019).

From the Table 1 above can be seen that forecasting with a three-month moving average method with weighting produces new student forecasting data for 1280 people for 2019. The actual data for new students in 2019 is as

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many as 1466 people thus forecasting misses by 186 people.

IV.II. New Student Forecasting of XYZ University Year 2019 (Eksponential Smoothing Method)

Forecasting results of XYZ University new students using the exponential refinement method are presented in the table below:

Table 2:*New Students Forecasting Year 2019.*
(*Eksponensial Smoothing Method*)

Year	New Students (People)		
	Actual	**Forecasting**	**Difference**
TA.2015/2016	1569		
TA.2016/2017	1245		
TA.2017/2018	1213		
TA.2018/2019	1337		
TA.2019/2020	**1466**	**1294**	**172**

Source: Data Processed (2019).

From the Table 2 above can be seen that forecasting with the exponential refinement method produces forecasting data for 1294 new students for 2019. The actual data for new students in 2019 is as many as 1466 people thus missing forecasting by 172 people.

IV.III. New Student Forecasting of XYZ University Year 2019 (Trend Analysis Method)

Forecasting results of XYZ University new students using the trend analysis method are presented in the table below:

Table 3:*New Students Forecasting Year 2019.*
(*Trend Analysis Method*)

Year	New Students (People)		
	Actual	**Forecasting**	**Difference**
TA.2015/2016	1569		
TA.2016/2017	1245		
TA.2017/2018	1213		
TA.2018/2019	1337		
TA.2019/2020	1466	1159	307

Source: Data Processed (2019)

From the Table. 3 above can be seen that forecasting using the trend analysis method produces forecasting data for 1159 new students for 2019. The actual data for 2019 new students is 1466people thus missing forecasting by 307 people.

IV.IV. Perbandingan Keakuratan Metode Peramalan

Based on forecasting using each method then compared to each other, the following is presented a comparison of the accuracy of the results of forecasting new students for 2019 namely:

Tabel 4:*New Students Forecasting Year 2019*
(*Comparison Between Three Method*)

Year	New Students (People)						
	Actual	**Metode Rata-Rata Bergerak**		**Metode Penghalusan Eksponensial**		**Metode Anlisis Tren**	
		Peramalan	**Selisih**	**Peramalan**	**Selisih**	**Peramalan**	**Selisih**
TA.2015/2016	1569						
TA.2016/2017	1245						
TA.2017/2018	1213						
TA.2018/2019	1337						
TA.2019/2020	1466	1280	186	1294	172	1159	307

Source: Data Processed (2019)

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Based on Table 4. it can be seen that the lowest difference between forecasting data and actual data for new students in 2019 is to use the exponential refinement method, thus the exponential refinement method is the best method for predicting the number of new students for XYZ University.

V. CONCLUSION

The four-monthly moving average method with weighting, exponential refinement methods, and trend analysis are quantitative forecasting methods that are feasible to apply to private universities in Bandung to predict or predict the number of new students in a given year. Among the three methods, the exponential refinement method is the best forecasting method because it produces the smallest difference between forecasting data and the actual data of the number of new students in a particular year (in this case the 2019 new student data).In subsequent studies the results of forecasting with exponential refinement methods can be compared and / or combined with other methods such as correlation analysis and regression analysis so that the forecasting results obtained will be even better. The results of forecasting with exponential refinement are of course only as the initial basis for determining the forecasting of new students for a certain year in a given year. Factors, situations, and other assumptions that are likely to occur in the future (during the forecasting period) must also be considered.

REFERENCES

[1] Arikunto, S. (2006). Prosedur penelitian: Suatu pendekatan praktik. Jakarta: PT. Rineka Cipta.
[2] Fahmi, I. (2014). *Manajemen produksi dan operasi*. Bandung: Penerbit Alfabeta.
[3] Heizer, J & Render, B. (2011). *Manajemen operasi (Buku 1 edisi 9 terjemahan)*. Jakarta: Salemba Empat:
[4] Heizer, J., Render, B., Monson, C. (2017). *Principle of operations management: sutainability and supply chain management*. Edinburgh Gate: Pearson Education Limited.
[5] Jacobs, F. R & Chase, R. B. (2018). *Operations and supply chain management*. New York: McGraw Hill Education.
[6] Krajewski, L. J & Ritzman, L. R. (1996). *Operations management: strategy and analysis*. Addison: Wesley Publishing Company, Inc.
[7] Sugiyono. (2008). *Metode penelitian bisnis: pendekatan kuantitatif, kualitatif, danR & D(Cetakan Ke-11)*. Bandung: Alfabeta.
[8] Ali, S.M., Burhanuddin, M.A., Ghani, M.K.A. Electronic readiness assessment framework for healthcare institutions in Iraq: A pilot study(2018) International Journal of Pharmaceutical Research, 10 (4), pp. 540-547. https://www.scopus.com/inward/record.uri?eid=2-s2.0-85062664922&doi=10.31838%2fijpr%2f2018.10.04.107&partnerID=40&md5=618b74119acde67d2e2e1d68f2433c05
[9] Manoj kumar sarangi,sasmita padhi (2015) colon targeted drug delivery system-an approach for treating colonic ailments. Journal of Critical Reviews, 2 (4), 12-18.
[10] Prateek Kanade, Deepali Gupta, Mahesh Radhakrishnan, Visakh Prabhakar. "Role of Serotonin Type-1A/B (Hydroxytryptamine) Receptors in Depression Revisited." Systematic Reviews in Pharmacy 4.1 (2013), 7-13. Print. doi:10.4103/0975-8453.135831

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