

Student Motivation Clustering For Choosing High School With Factors Analysis

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Abstract

This study aims to determine the factors that affect the interest of prospective students choose college YPM Sidoarjo as a place to study. As an institution of higher education is still relatively new, but STT YPM able to compete with other higher education institutions that exist Sidoarjo and surrounding region. This is evidenced by the increase in the number of students in each year as one of the indicators. This study uses data collection obtained by direct observation, interviews and questionnaires to the students of the College of YPM Sidoarjo. The sampling method using stratified random sampling technique. While the methods used for data processing and analysis, this study using factor analysis. The results showed that the factors that affect the interest of prospective students choose the College of YPM is composed of five factors, ie, factors YPM public confidence in the Organization by the eigenvalue of 8.774; education cost factor of 2438; factor of 1.798 of facilities and services, the promotion of internal factors of 1,509 and 1,133 worth of accessibility factors are a factor with the smallest eigen value.

Keywords

Electoral College, Factor Analysis, Eigenvalue, Cluster.

1. Introduction

Education is one very important thing in life. Education is also the backbone in improving human resources for the development of the nation, and raise awareness of the dangers of educational backwardness (Komarudin, Ubedilah, & Syaifudin, 2017). Since the purpose of the education is to provide a knowledge to be able to educate the nation, so that the nation's children have the expertise and skills to meet the nation's development in various fields in the future.

One way to get an education is to get lessons and teachers. The lesson is a material or materials that will be given to students with the means and methods that are owned by teachers and presented for educational purposes. While teachers are educators who have a duty to assist the students in giving a lesson. There are two kinds of education: formal and informal education. Formal education is education that can be reached through the school as elementary taken within 6 years, 3 years of junior high school, high school 3 years, and universities (S1) for 4 years.

Along with the growing number of universities or university in Sidoarjo make prospective students have many options to determine which universities they would choose. Prospective students will choose a university, which they see the maximum satisfaction for them. Therefore, it is expected that each university should be oriented to the satisfaction of students to be able to compete with other universities.

The development of adult education is increasingly meningkat.sehingga every educational institution to compete for a place in people's hearts by vying to become the institution that the public interest. So that competition occurs between educational institutions by providing community service desired. The existence of the College of YPM Sidoarjo is still very new, but proved unable to compete with universities in Sidoarjo and around. One indicator is a significant increase in the number of students each year.

The increase in the number of students of the College of YPM Sidoarjo not by accident, but rather the determinants that affect consumers or prospective students choose the College of YPM Sidoarjo as a place to continue his studies, since there are many private universities first in the region of Sidoarjo and surroundings. Seeing these conditions, researchers want to know what factors underlying the high school students choose YPM Sidoarjo. Based on the background of the above problems, formulation of research problems are factors that affect the students choose the College of YPM Sidoarjo to study.

2. Methodology

The method used in this research is the method of factor analysis (Spiegel & Stephens, 2004), (Supranto, 2004) (Supranto, 2004). As for the steps of this study are as follows:

- a. Identification of variables. Based on this study variables, can describe the picture of the issues to be observed on the object of research. Variable function as a differentiator in order to clear each item under study and also serves to illustrate the mutual connection or relationship between one variable with other variables and member image relationship is well aligned with the theory used in this case is about the factors that affect the students choose ST YPM Sidoarjo.
- b. The design tools and the data collection. Data collection techniques used in this research is observation., Questionnaires, interviews (Kotler & Keller, 2000).
- c. Determining the research instruments and the number of samples (Syed & Yona, 2003).
- d. Spread the preliminary questionnaire.
- e. To test the validity and reliability (Walpole & Myers, 1995).
- f. Perform data processing and analysis by factor analysis (Bahar, 2012).

3. Result And Discussions

YPM College is one of the Higher Education Institutions in Sidoarjo, East Java, precisely located on Jl. Ngelom Megare, Throughout, Parks - Sidoarjo. YPM High School was established by the management of the Foundation Ma'arif Education and Social Affairs (YPM) Sidoarjo which is a social organization in the coordination center Institutions of Nahdlatul Ulama (NU LPP) between 1998/1999 (Amaliah, 2017). High School YPM pick a strong

commitment to make graduates STT, STIE and STIH as professional graduates and having quality. One of indicator is the number of graduates on time (Alkaf, 2009). And to this day regular graduation ceremony was successfully held for 10 consecutive years. To support the sustainability and continuity of the high school YPM, it is necessary to study the factors that influence students to choose the high school as an institution YPM further studies (Sukardi, 2003).

Based on the results of questionnaires and interviews conducted, obtained 27 variables that affect the prospective student or students choose YPM Sidoarjo High School as a place of study as shown in the table 1. Based on the table 1 the results obtained from the 30 respondents who filled out questionnaires early stages of the 27 variables, there are two variables declared invalid because the value of r count is smaller than r table that has been determined to be 0.361. The variables that are their friends, friends or relatives in the College of YPM and mileage College YPM closer to home. Both variables are then removed or not included into the factor analysis.

While the reliability of the test results to the 27 initial variables is equal to 0.917 which means that the instrument has a high reliability level for a total value of $r >$ of 0.60. Then the instrument can be used for measurement and subsequent data collection. Thus, the variables will be analyzed amount to 25 with a sample of 150 respondents. The next step is to analyze the factors.

Model analysis of factors:

$$X_1 = B_{i1} F_{i1} + B_{i2} F_{i2} + B_{i3} F_{i3} + \dots + B_{ij} F_{ij} + \dots + B_{im} F_{im} + V_i \mu_i$$

Based on the results of the questionnaire data processing, obtained the correlation matrix as shown in the table 2.

Table 1. Variables affecting choosing ST YPM Sidoarjo

No	Variable
1	Derived from school / vocational school under the auspices of YPM
2	Recommendation friends or friends
3	adannya of friends, friends or relatives in YPM
4	Distance ST YPM close of the house
5	ST YPM strategic location
6	the presence of public transport to reach the ST YPM
7	Building ST YPM comfortable and enjoyable
8	school fees cost
9	school fees can be paid
10	Availability of scholarships from various agencies
11	ST YPM give discounts for alumnus SMA / SMK YPM
12	ST YPM gave free the semester fee to alumnus of SMA / SMK YPM
13	teachers professional
14	the presence of religious education in ST YPM
15	educational institutions that shelter LP Ma'arif
16	ST YPM has good quality and quality
17	the existence of trust to educational institutions YPM
18	ST YPM succeed print-quality graduates
19	Scored ST YPM students based on faith and piety
20	ST YPM has the vision and mission good
21	ST YPM has many courses (majors)
22	ST YPM provides opportunities college while working
23	The existence of employment opportunities for graduates both within YPM or companies that cooperate with YPM
24	The existence of class hours an afternoon or evening of
25	support facilities were fulfilled

No	Variable
26	Status ST YPM accredited
27	programs offered ST YPM very attractive

Table 2. Correlation Matrix

	x1	x2	x3	x4	x5	x6	x7	x...	x25
x1	1,000								
x2	0,402	1,000							
x3	0,032	0,143	1,000						
x4	0,218	0,062	0,438	1,000					
x5	0,183	0,160	0,235	0,378	1,000				
x6	0,104	0,090	0,280	0,202	0,382	1,000			
x7	0,171	0,077	0,267	0,234	0,345	0,794	1,000		
x8	0,130	0,347	0,203	0,168	0,395	0,322	0,192		
x9	0,542	0,338	0,285	0,495	0,352	0,282	0,306		
x10	0,544	0,403	0,150	0,390	0,383	0,224	0,304		
x11	0,221	0,305	0,216	0,285	0,489	0,392	0,340		
x...	
x25	0,230	0,234	0,127	0,126	0,426	0,368	0,388	...	1,000

The next step is to test the KMO and Barlett's test.

1. Test Barlett's test, the value obtained at 1971.3 with significant value was $0.000 < 0.05$. It shows the correlation between variables and means that the 25 variables such research can be analyzed further.
2. Test Kaiser-Mayer-Olkin (KMO), the value obtained is 0.861 where the figure is greater than 0.5, which means that the data is good for the analyzed factors and samples taken is sufficient. So that there are variables that can be processed further.
3. Test Measure of sampling adequacy (MSA) is performed to measure correlation degree between variables, which to determine whether a variable worth or not worth be included in the next process. To show the results of test can be shown on table 3.

Table 3. KMO and Barlett's test

Kaiser-Meyer Olkin Measure of sampling Adequacy	0,861
Barlett's test of Sphericity Approx Chi-Square	1.971,3
Degree Freedom	300
Signifikan level	0,000

The data must be tested with adequacy test to know if datas can use for the research, the result is shown on table 4.

Table 4: Value of MSA every variable on anti image matrix

variable	Value Measure of Sampling Adequacy	Value Minimum Standards
origin X1 = School SMA / SMK YPM	0,817	0,5
X2 =Endorsements / companions	0,792	0,5
X3 = ST YPM strategic location and easily accessible	0,875	0,5
X4 =Presence of transportation facilities	0,829	0,5
X5 = Building a comfortable and pleasant ST YPM	0,892	0,5
X6 =cost of education cost	0,756	0,5
X7 = cost of education can be paid	0,746	0,5
X8 = A scholarship program in ST YPM	0,890	0,5
X9 =discounts for alumni SMA / SMK YPM	0,801	0,5
X10 = Free of charge half alumnum SMA / SMK YPM	0,821	0,5
X11 = Lecturer / faculty professional	0,920	0,5

variable	Value Measure of Sampling Adequacy	Value Minimum Standards
X12 =ST YPM provide religious education	0,870	0,5
X13 =Housed under LP Ma'arif	0,832	0,5
X14 =and the quality of a good quality	0,915	0,5
X15 =Kepercayaan kepada YPM institutions	0,877	0,5
X16 = Print quality graduates who are competent and	0,903	0,5
X17 =based student Prints IMTAK	0,908	0,5
X18 =the vision and mission are both	0,939	0,5
x19 = Great selection of courses / majors	0,912	0,5
X20 = opportunity college while working	0,793	0,5
X21 =job opportunities for graduates	0,897	0,5
X22 =Hours lecture afternoon / evening	0,752	0,5
X23 =adequate support facilities	0,862	0,5
X24 =accredited status ST YPM	0,908	0,5
X25 = the programs in ST YPM attract	0,898	0,5

Factor analysis method (extraction process) in this study of extraction used is Principal Component Analysis (PCA) as it aims to determine the number of factors extracted as little as possible but to absorb most of the information contained in all variable original. So that the extraction process produced the method of Principal Component Analysis (PCA) of 25 variables that can more details seen in the following table 5.

Table 5: Value Extraction

Variable	Initial	Extraction
origin X1 = School SMA / SMK YPM	1,000	0,730
X2 = Endorsements / companions	1,000	0,469
X3 = Location ST YPM is located within easy reach	1,000	0,516
X4 = Presence of transportation facilities	1,000	0,653
X5 = Building ST YPM comfortable and pleasant	1,000	0,672
X6 = cost of education cost	1,000	0,723
X7 = The tuition fees can be paid	1,000	0,732
X8 = A scholarship program in ST YPM	1,000	0,586
X9 = discounts for alumni SMA / SMK YPM	1,000	0,812
X10 = Free of charge half an alumnus of SMA / SMK YPM	1,000	0,777
X11 = lecturer / faculty professional	1,000	0,679
X12 = ST YPM provide religious education	1,000	0,584
X13 = Housed under LP Ma 'wise	1,000	0,639
X14 = Quality and good quality	1,000	0,616
X15 =Trust to YPM agency	1,000	0,620
X16 = Print graduates who are competent and b erkualitas	1,000	0,598
x17 = Prints students based IMTAK	1,000	0,551
x18 = Vision and mission are both	1,000	0,668
x19 = Great selection of courses / majors	1,000	0,411
X20 = Opportunity college while working	1,000	0,678
X21 = Job opportunities for graduates	1,000	0,607
X22 = Hours lecture afternoon / evening	1,000	0,618
X23 =adequate supporting facilities	1,000	0,469
X24 = Statusaccredited ST YPM	1,000	0,631
X25 = Program-program in ST YPM attract	1,000	0,614

Determining of factors amount is to determine the number of factors used and the calculation of eigen values, is shown on table 6.

Table 6. Eigen value, variance percentage and variance cumulative percentage of five factors formed

Faktor	Eigen Values	% of Variance	Cumulatif %
1	8,774	35,098	
2	2,438	9,752	44,850
3	1,798	7,191	52,040
4	1,509	6,036	58,076
5	1,133	4,534	62,610

The scree plot shows a plot of eigenvalue as a function of many factors, from the results of the calculations can be shown on figure 1 below.

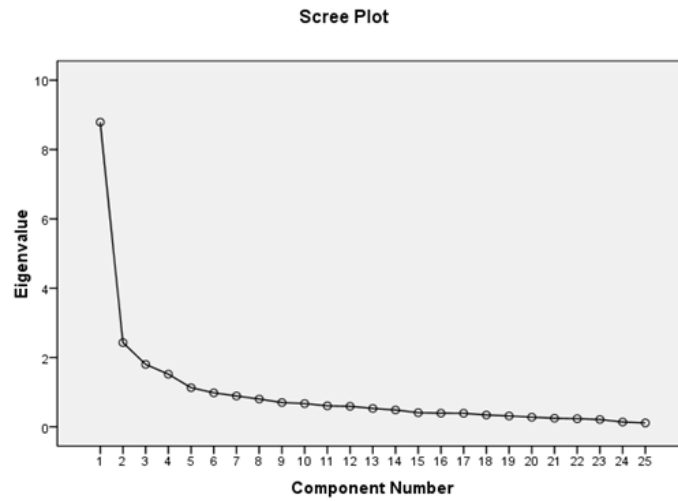


Figure 1. Graph of the eigenvalue versus component number

based on the scree plot it can be seen that the curve starts to slope at the sixth component, it can be concluded that 5 new factors have been formed from 25 variables.

4. Conclusions

Based on the analysis and discussion it can be concluded that the factors which determines the student chose the College of YPM Sidoarjo as a place to continue the study consisted of 25 variabel contained in the 5 factors that represent them, these factors are:

1. The trust factor to the Institute of YPM Sidoarjo trust in which there are variables to the Institute of YPM, variable shelter under Ma'arif Education Institutions, variable printing graduates who are competent and qualified, variable employment opportunities for graduates, variable printing based IMTAK students, variable quality and good qualities and variables good vision and mission.
2. The cost factor education consisted of college while working opportunity variable, the variable cost of education can be paid in installments, the variable cost of education costs, variable hours of lectures afternoon / evening, there are many variables elective courses / majors and variables of adequate support facilities.
3. Factor services and facilities which consist of variable lecturer / faculty professional, variable building ST YPM comfortable and enjoyable, variable the scholarship program in ST YPM, variable ST YPM provide religious education, variable accredited status, variable programs in ST YPM interesting.
4. Internal factors campaign consisting of variable home school high school / vocational YPM, free variable costs alumnus half SMA / SMK YPM, variable discounts to alumni SMA / SMK YPM, variables friend or friends recommendation.
5. Accessibility factor consists of variable presence of transport facilities and variable ST YPM strategic location and easily accessible.

References

- Alkaf, H. N. (2009). *Metodologi Penelitian Pendidikan*. Ciputat: Islamic Research Publishing.
- Amaliah, R. P. (2017). *Destination Branding Wisata Belanja Kabupaten Sidoarjo*.
- Bahar, S. H. (2012). Analisis Faktor-Faktor Yang Mempengaruhi Konsumen Dalam Keputusan Pembelian Motor Scuter Matic Yamaha Pada Pt. Suracojaya Abadi Motor Makassar. *Universitas Hasanuddin Makassar*.
- Komarudin, K., Ubedilah, U., & Syaifudin, S. (2017). The Development of Nationality Education Model for CrossCultural Youth. *ADRI International Journal Of Social Science Education*, 1(1), 8–15.
- Kotler, P., & Keller, K. L. (2000). *Market management. Translated by Abdolreza Rezaeenejad, (1st Ed.)* Tehran: *Nashr-e-Fara Publications*.
- Spiegel, M. R., & Stephens, L. J. (2004). *Statistik Edisi ke-3*, Diterjemahkan oleh W. Kastawan Dan I. Harmein, Erlangga, Jakarta.
- Sukardi, P. D. (2003). *Metodologi Penelitian Pendidikan*. Jakarta: Bumi Aksara.
- Supranto, J. (2004). *Analisis Multivariat Arti dan Interpretasi*. Rineka Cipta, Jakarta.
- Syed, U., & Yona, G. (2003). *Using A Mixture Of Probabilistic Decision Trees For Direct Prediction Of Protein Function*. In *Proceedings of the seventh annual international conference on Research in computational molecular biology* (pp. 289–300).
- Walpole, R. E., & Myers, R. H. (1995). *Ilmu peluang dan Statistika untuk Insinyur dan Ilmuwan*. Bandung: ITB.

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