Relationship between GPA, Length of Study, and Competency with The Length of Time to Get A Job at The Alumni of The Faculty of Mathematics and Natural Sciences, University of Sriwijaya

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Abstract: This paper discusses the relationship between the GPA, the length of study, and the competency with the length of time to get a first job at the alumni of the Faculty of Mathematics and Natural Sciences (FMIPA), Sriwijaya University (Unsri). The data source used from the FMIPA Academic Sub Division and the results of a tracer study conducted by the CDC Unsri in graduates from 2013 to 2015. The object of study included 98 alumni. Relationships between categories of variables are expressed in the form of contingency tables. The results of a simple correspondence analysis on the relationship between the 2 variables indicate that only the GPA has a significant relationship with the study period. While, there are no relationship between each GPA, level of education, competence in the field of science, competence outside the field of science, competence in general knowledge, English language competence, and competency in using computers to a long time to get a job. Based on symmetric and asymmetric plots, the trend of relationships between categories of row and column variables can be seen.

1   INTRODUCTION

The vision and mission of Sriwijaya University are used as the main reference in the preparation of the University Strategic Plan which is useful for anticipating strategic issues, both internal and external, and to accommodate the wishes of the stakeholders. Sriwijaya University (Unsri) must always improve the quality of its education process accompanied by efforts to increase its relevance in the context of global competition.

Unsri's Career Development Center (CDC) was formed in 2013 to address the low achievement value of graduate tracking points to AIPT forms. CDC has traced alumni (tracer study) from 10 faculties at Sriwijaya University starting from the 2013 alumni (http://www.cdc.unsri.ac.id).

Tracer study is a method for obtaining feedback from alumni that is useful for improving systems and management of education, which involves the means and infrastructure of teaching and learning processes, evaluation of educational outcomes, curriculum improvement and learning systems. Tracer studies can provide in-depth information about work suitability both horizontally (between various fields of science) and vertically (between various levels of education).

The data from tracer studies results are useful to obtain important information for the development of institutions, to evaluate the relevance of institutions (hard skills, soft skills, internal / external factors, contributions, compatibility, etc.), to contribute to the accreditation process, and to provide information to students, parents, lecturers, and administrative staff (ITB Career Center Research Division, 2017).

Unsri CDC provides a tracer study service to study alumni 'early careers, as well as obtain alumni feedback for improving the learning system at Unsri and conduct evaluation / curriculum development that meets stakeholder expectations and market needs. In addition to tracer study, CDC also provides other services, including: Career Expo, soft skills training, online assessment, career training, and career counseling (http://www.cdc.unsri.ac.id).

Reference to learn various things related to career center and its services, also to study the solution to the problems of graduates (HR) and employment faced such as problems of alignment of the world of education with the world of work can be seen in Proceedings of the Indonesia Career Center Network (ICCN) Summit 2 (in Bogor, 12th - 14 September 2017) (ICCN, 2017) and Proceedings of the ICCN Summit 3 (in Surabaya, 21-23 September, 2018) (ICCN, 2018).

Interpretation of questionnaire results in descriptive statistics of data, whether in the form of numbers (percentages), graphs, or interpretations is very helpful in providing information for further analysis. The results of the analysis are very useful for the successful implementation of tracer studies. (Alifah, Adrianto and Budi, 2017) examined the relationship of educational cost sources to achievement and activeness in the 2016 ITB tracer study case, by using quantitative analysis at the univariate.

Tracer study data can be big data consisting of many objects and many variables, so to explore as much information as possible from that data, it requires the use of other analytical techniques, including multivariate analysis.

The advantages of using multivariate (compared to univariate) include the reduction of objects and variables and being able to analyze the relationships between variables simultaneously (Johnson and Wichern, 2007).

Principal Component Analysis (PCA) techniques, cluster analysis, and correspondence analysis are able to package the results of processed tracer study data in other forms. The use of this analysis technique can be used further to obtain new information (Andirasdini, Adrianto and Budi, 2017).

The Faculty of Mathematics and Natural Sciences (FMIPA) as one of the faculties at Sriwijaya University (Unsri) was established in the academic year 1988/1989. At present for the S1 program, FMIPA has 5 departments and 1 study program namely Mathematics, Physics, Chemistry, Biology, Study Program of Marine Sciences, and Department of Pharmacy. FMIPA prepares its graduates to master science more broadly, so that it is expected to be able to compete in several fields, including in the fields of industry, economics, and research.

Some researches on student achievement involve the GP and GPA students of the Mathematics Department of FMIPA Unsri are (Irmeilyana, R. Sitepu, 2010), (Irmeilyana, P.B.J. Bangun, 2013), and (Irmeilyana, S. I. Maiyanti, 2009). By using the Markov model, the *average stay time* for the class of 2001 students relatively longer in the GP 3.5 category which is for 3.03 semesters. Whereas for Mathematics students class of 2002, the *average stay time* which is relatively longer is in the category of GP < 2.0 which is for 2.08 semesters. According to (Irmeilyana, P.B.J. Bangun, 2013), based on the Markov model, the existence of a short semester (SP) can increase the GPA of a class of 2006. (Irmeilyana, S. I. Maiyanti, 2009) uses path analysis to discuss the factors that influence student performance in terms of from the characteristics of the campus environment.

(Irmeilyana, R. Sania, A. Desiani, 2017) used cluster analysis to analyze the characteristics of the GPA and GP of subject groups and interest groups in the Department of Mathematics. The majority of students from the Department of Mathematics FMIPA Unsri, class of 2011 have a GPA and GP for each subject group (MK) and interest group (KBM) which is relatively close to average. Students who are interested in KBM Statistics tend to have high GPA scores. The GPA correlates very strongly with the GP of the Mandatory MK Group and the GP of the KBM Statistics, as well as the GP of the Basic MK Group. The quality score of the Mandatory MK group which consists of 80 credits is very decisive for the GPA of graduates. Whereas the GP value of the other 3 KBMs tends not to correlate with the GPA. This can be due to the number of MK in the KBM that is taken is very small.

Based on (Bangun, P.B.J., Irmeilyana, 2011), by using correspondence analysis (simple and multiple), it can be concluded that the GPA and the duration of the thesis are significantly related to the length of study at class of 2001 and 2002 students in Department of Mathematics FMIPA Unsri. Students with a short study period (≤ 8 semesters) have high GPA (i. e. 3.00 - 3.50).

The previous researches did not examine the effect (relationship) of GPA, length of study, and competence with the length of time of getting a job and the level of education of alumni. The object of the study was only the Mathematics Department students of Mathematics and Natural Sciences Faculty.

The purpose of this study was to analyze the relationship between the length of study, academic achievement (GPA), and the competencies of the alumni of the Faculty of Mathematics and Natural Sciences (FMIPA Unsri) on their level of education and the length of time they got a job. The method used is correspondence analysis. The data used are some of the attributes of the questionnaire resulting

from the tracer study conducted by CDC Unsri for FMIPA graduates from 2013 to 2015. In this study, the first type of alumni's work and salary were not considered.

2   RESEARCH METHODS

This research is a case study. The data used are secondary data from the CDC Unsri in the form of partial data from the 2013 to 2015 tracer study questionnaire on FMIPA alumni. Based on CDC data (http//:cdc.unsri.ac.id) there are 19 variables (or in this case known as attributes) that exist in forms. In this study used 7 attributes taken from the CDC forms and 2 attributes obtained from the Academic Subdivision of FMIPA.

The steps in this research are:

1. Collecting study period and GPA data from FMIPA alumni who graduated from 2013 to 2015.
2. Conduct descriptive statistics from the study period and GPA data in Step 1 of the alumni data for each department/study program and the entire alumni.
3. Calculate the correlation between study period variables and GPA based on the results of Step 1.
4. Collecting data on the results of the tracer study questionnaire on alumni of the Faculty of Mathematics and Natural Sciences graduates from 2013 to 2015.
   Tracer study data analyzed includes time to get a job, level of education, level of alumni competence in the field of science, competencies outside the field of science, general knowledge competencies, English language competencies, and competencies in the field of computers.
5. Divide each variable in Step 1 and Step 4 into the following categories:
5.1 Study Period, is changed to the following data categories:
   Category 1: ≤ 4 years; denoted as M1
   Category 2: 4 to 5 years; denoted as M2
   Category 3: ≥ 5 years; denotated as M3.
5.2. Student Achievement Index (GPA) is divided into data categories based on the Unsri handbook, namely:
Category 1: 2.00–2.75 (*Cukup Memuaskan*); notated as G-1
Category 2: 2.76–3.00 (*Memuaskan*); notated as G-2
Category 3: 3.01-3.50 (*Sangat Memuaskan*); notated as G-3
Category 4: 3.51-4.00 (*Cumlaude*); notated as G-4
5.3. Length time of got to a job has 3 categories, namely:

Category 1: < 3 months after Graduation; denoted as W1
Category 2: 3-6 months; denoted as W2
Category 3: ≥ 6 months; denoted as W3
5.4. Competency Level: Field of Science (notated by ComSF), Outside of Field of Science (notated by CO), General Knowledge (notated by Kn), English (notated by E), and computer competence (notated by C).
   Each of those competencies divided into 5 categories, namely:
   Category 1: Very Low; Category 2: Low; Category 3: Medium; Category 4: Height; Category 5: Very High
5.5. Education level, has 3 categories, namely:
   Category 1: Higher; notated as Level-1
   Category 2: Same; notated as Level-2
   Category 3: Lower; notated as Level-2
6. Conduct simple correspondence analysis on the relationship between row variable categories and column variable categories. The relationship between column and row variables analyzed are:
6.1 GPA with study period (length of study)
6.2 GPA with time to get a job.
6.3 Study period with time to get a job.
6.4 Level of education with time to get a job.
6.5 Competence in the field of science with time to get a job.
6.6 Competence outside the field of science with time to get a job.
6.7 General knowledge competency with time to get a job.
6.8 Competence in English with time to get a job.
6.9 Competence in the field of computers with time to get a job.
Step 2 and Step 6 are done with the help of Minitab software version 18.
7. Interpretation of the results of Step 6.
8. Arrange a conclusion.

3   RESULT AND DISCUSSION

The data used in this study are secondary data from CDC Unsri. Variables of data are length time to get a job (in months), level of education, competence in the field of science, competencies outside the field of science, general knowledge competencies, English language competencies, and computer competencies. While the GPA and length of study variables were obtained from the Academic Subdivision of FMIPA.

The object used was the alumni of the FMIPA who graduated from 2013 to 2015. The CDC noted

that there were 140 data respondents who filled out the data forms of the alumni of the FMIPA Unsri. This paper only uses 98 respondents who complete the tracer study questionnaire. Respondents consisted of 19 Mathematics alumni respondents, 24 Physics alumni respondents, 19 Biology alumni respondents, 19 Chemistry alumni respondents, 15 Marine Science alumni respondents, and 2 Pharmacy alumni respondents.

Based on graduation data from 2013 to 2015, there were 959 FMIPA alumni, consisting of 168 alumni of the Department of Mathematics, 154 alumni of the Department of Physics, 199 alumni of the Department of Biology, 183 alumni of the Department of Chemistry, 131 alumni of the Study Program of Marine Science, and 124 alumni of the Department of Pharmacy. The average study period and GPA, as well as the correlation between the study period with the GPA of all alumni who graduated in 2013 to 2015 for each department / study program can be seen in Table 1.

Table 1: Study Period and GPA of 959 alumni

No	Department/Study Program	Study period (in years)		GPA		Correlation of study period and GPA
		Mean	StDev	Mean	StDev	
1	Mathematics	4.8	0.9	3.04	0.3	-0.697
2	Physics	4.3	0.7	3.14	0.25	-0.577
3	Biology	4.1	0.6	3.27	0.21	-0.526
4	Chemistry	4.5	0.8	3.07	0.22	-0.568
5	Marine Sciences	5.6	0.8	3.16	0.23	-0.603
6	Pharmacy	4.6	0.6	3.12	0.27	-0.784
All of Dept./Study Program		4.62	0.87	3.13	0.26	-0.557
Average		4.65		3.13		

Based on Table 1, Biology Department alumni have the lowest average study period and the highest average GPA compared to other study programs. Marine Science Study Program has the highest average study period. Department of Mathematics has the lowest average GPA. The lowest standard deviation value of the two variables occurs in the Department of Biology, and the highest standard deviation in the Department of Mathematics.

The correlation between the study period and the GPA in each department / study program is negative (high and medium). This shows that the higher the GPA alumni, the smaller the study period, and vice versa.

The average study period for alumni is 4.65 years and the average GPA is 3.13. If all alumni data is combined, the study period will be 4.62 years, the average GPA is 3.13, and the correlation between the study period and the GPA is -0.557.

Descriptive statistics of the study period and GPA of alumni of each department / study program can be seen in Table 2 and histograms of Figure 1 to Figure 6.

Based on Table 2, the maximum study period for each department / study program is 7 years, except for the Physics Department at 6.9 years. While the minimum period of study occurs in the Physics alumni of 3 years. The period of study in other department is 3.5 to 3.8 years. The maximum GPA from each department ranges from 3.78 to 3.88, while the minimum value ranges from 2.33 to 2.57. The largest range of study periods and GPA occurred in the Mathematics Department alumni data. Q1, Q3, and median values from the largest study period also occur in the Department of Mathematics alumni data, conversely the GPA variable in this department has the smallest values.

Table 2: Descriptive Statistics of Study Period and GPA

Dept./Study Program	Variable	Total Count	Mean	StDev	Minimum	Q1	Median	Q3	Maximum
Mathematics	MS (M1)	168	4.8292	0.8759	3.5000	4.2000	4.8000	5.3000	7.0000
	GPA (M2)	168	3.0355	0.3003	2.3300	2.8100	3.0150	3.2075	3.8000
Physics	MS (F1)	154	4.3338	0.6868	3.0000	3.9000	4.2000	4.5000	6.9000
	GPA (F2)	154	3.1448	0.2458	2.4800	3.0100	3.1700	3.3000	3.8800
Biology	MS (B1)	199	4.1176	0.6034	3.7000	3.8000	4.0000	4.0000	7.0000
	GPA (B2)	199	3.2662	0.2112	2.5700	3.1400	3.2700	3.4000	3.8600
Chemistry	MS (K1)	183	4.5060	0.8169	3.5000	4.0000	4.3000	4.7000	7.0000
	GPA (K2)	183	3.0711	0.2160	2.5100	2.9000	3.0500	3.2000	3.7800
Marine Sci.	MS (I1)	131	5.6290	0.7920	4.1000	5.0000	5.5000	6.3000	7.0000
	GPA2 (I2)	131	3.1610	0.2276	2.5500	3.0300	3.1700	3.3200	3.8000
Pharmacy	MS (T1)	124	4.6435	0.6124	3.5000	4.2250	4.5000	5.0000	6.1000
	GPA (T2)	124	3.1166	0.2722	2.6000	2.8600	3.0950	3.3275	3.7700

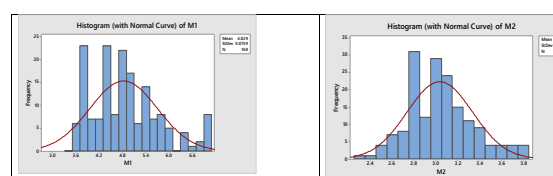Note: MS: Study Period (Length of Study)

Figure 1: Histogram of study period and GPA in Mathematics Dept.

Based on Figure 1, the majority of Mathematics alumni have study period ranges from 3.7 to 5.5 years.
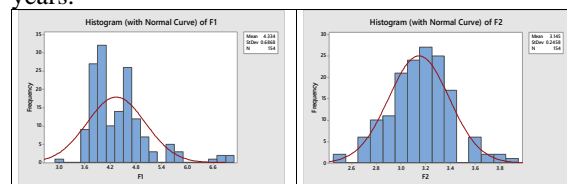

Figure 2: Histogram of study period and GPA in Physics Dept.

Based on Figure 2, the majority of Physics alumni have study period ranges from 3.8 to 4.4 years.

Based on Figure 3, the majority of Biology alumni have study period ranges from 3.75 to 4 years.
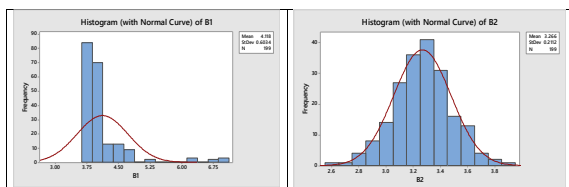

Figure 3: Histogram of study period and GPA in Biology

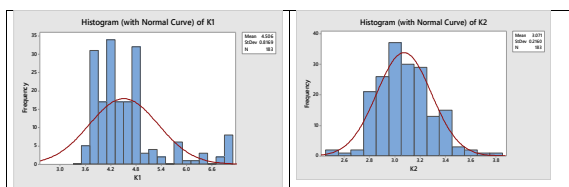Based on Figure 2 and Figure 3, Physics and Biology alumni have GPA ranges from 3 to 3.4.

Figure 4: Histogram of study period and GPA in Chemistry Dept.

Based on Figure 4, the majority of Chemistry alumni have study period ranges from 3.8 to 4.8 years.
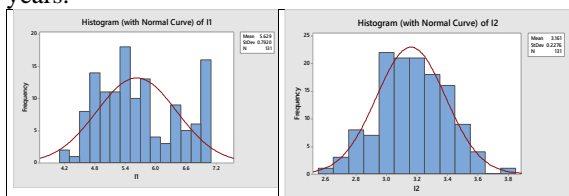

Figure 5: Histogram of study period and GPA in Marine Sience Study Program.

Based on Figure 5, the study period of Marine Science is more various, majority ranges from 4.6 to 7 years.

Generally based on Figure 1 to Figure 6, the variables in the alumni data of each department / study program do not follow the normal distribution. Alumni of Mathematics and Marine Sciences who graduated 7 years more than alumni of other majors. The GPA variable from alumni data of each department / study program tends to follow the normal distribution, especially in Biology data.
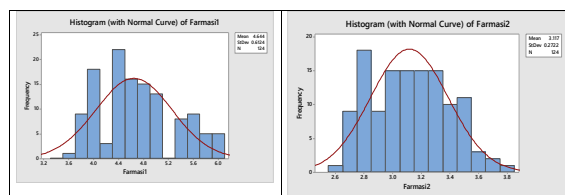

Figure 6: Histogram of study period and GPA in Pharmacy Dept.

Table 3 below shows the variable values of 98 respondents who filled out the questionnaire from CDC Unsri.

Table 3: Variable values of 98 respondents before all variables are categorized

No	Name	Length Study (M_)	GPA (G-_)	Time to get job (W_)	Edu. Level (Level-)	Competence in				
						CompSF_	CO_	Kn_	English (E_)	Comp. (C-_)
1	M. Herpi	3.8	3.5	2	2	4	3	3	4	4
2	Nike MM	4.2	3.47	2	2	4	4	5	3	5
3	Andri M	3.6	3.3	3	2	3	3	4	4	5
4	Merry PS	3.6	3.59	6	2	5	5	5	5	5
.										
.										
.										
98	Juni SP	3.8	3.04	5	2	3	3	3	3	3
	Average	4.52	3.19	3.7						
	StDev.	0.87	0.23							

Based on Table 3, the average study period of the respondents was 4.52 years, with a standard deviation of 0.87. While the average respondent's GPA is 3.19 with a standard deviation of 0.23. The average time to get a first job is 3.7 months.

If the average study period and the average GPA of all alumni are compared with respondents who fill in the tracer study questionnaire, then the respondent has a shorter study period and a higher GPA of all alumni in 2013-2015. Next, each variable is divided into categories. The study period is divided into 3 categories, GPA is divided into 4 categories, and so on. The data in Table 3, are grouped according to variable values, so they become Table 4.

Relationship between two variables was expressed by contingency table as in Table 5 to Table 16. A contingency table contains frequency that can express the relationship between the categories of two variables. Then, two way contingency table is used to explore data by using simple correspondence analysis.

Table 4: Variable values of 98 respondents after all variables are categorized

No	Name	Length Study (M_)	GPA (G-_)	Time to get job (W_)	Edu. Level (Level-)	Competence in				
						CompSF_	CO_	Kn_	English (E_)	Comp. (C-_)
1	M. Herpi	1	3	1	2	4	3	3	4	4
2	Nike MM	2	3	1	2	4	4	5	3	5
3	Andri M	1	3	2	2	3	3	4	4	5
4	Merry PS	1	4	3	2	5	5	5	5	5
.										
.										
.										
98	Juni SP	1	3	2	2	3	3	3	3	3

3.1 Relationship between GPA and Study Period

Correspondence analysis based on Table 5 will result Table 6 by using software Minitab 18.

Table 5: Contingency table of GPA and study period

Categories		Study period			Total
		M1	M2	M3	
GPA	G-1	0	1	1	2
	G-2	1	10	5	16
	G-3	37	19	14	70
	G-4	8	2	0	10
	Total	46	32	20	98

Table 6: Results of correspondence analysis of GPA and study period

Axis	Inertia	Proportion	Cumulative
1	0.1814	0.9382	0.9382
2	0.0119	0.0618	1.0000
Total	0.1934		

Based on Table 6, inertia values are $\lambda_1^2 = 0.1814$ and $\lambda_2^2 = 0.0119$, so the total inertia value is $\lambda_1^2 + \lambda_2^2 = 0.1934$. The contribution of information provided by the 2-dimensional plot is 100%, so that by only presenting row and column profiles in the two-dimensional Euclid space, the information can be represented at 100%. Value $\chi^2_{count} = 98 \times 0.1934 = 18.9532$.

Then the value χ^2_{count} is compared with the value χ^2_{table} and the results show that $\chi^2_{count} > \chi^2_{table\,(0.05;6)} = 12.592$ so that with a 95% confidence level it can be stated that there is a relationship or influence of the GPA on the study period.

The plot of the relationship between the GPA and the study period variables categories can be seen in Figure 7.

Based on the χ^2 test and location of the row points and column points that tend to cluster to the center shows that there is relationship between GPA and study period. Based on Figure 7, GPA categories G-4 and G-3 (GPA > 3.00) have lowest study period (M1; i. e. ≤ 4 years). On the contrary, if GPA is lower, than study period will be longer. The points that are adjacent and are in the same quadrant are G-2 with M2, and also G-1 with M3.
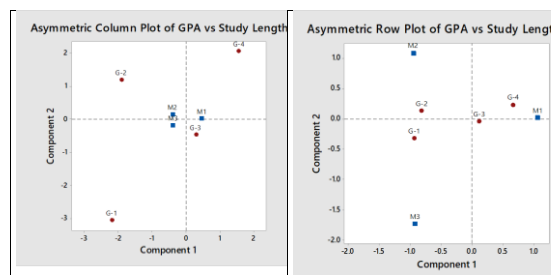

Figure 7: Plot of GPA and study period

Next, by the same way, that analysis is also done in the other relationship of two categorical variables.

3.2 Relationship GPA and Time to Get A Job

Table 7: Contingency table of GPA and time to get a job

Categories		Time to get a job			Total
		W1	W2	W3	
GPA	G-1	2	0	0	2
	G-2	5	8	3	16
	G-3	27	30	13	70
	G-4	4	2	4	10
	Total	38	40	20	98

If Table 7 is converted to Table 8, than correspondence analysis will result $\chi^2_{count} = 98 \times 0.0338 = 3.3124$. If χ^2_{count} is compared by $\chi^2_{table\,(0.05;4)}$, than it will be obtained $\chi^2_{count} < \chi^2_{table\,(0.05;4)} = 9.488$, so that with a 95% confidence level it can be stated that there is no relationship or influence of the GPA on the length time to get a job.

Table 8: The conversion of contingency table in Table 7

Categories		Time to get a job			Total
		W1	W2	W3	
GPA	G-2	7	8	3	18
	G-3	27	30	13	70
	G-4	4	2	4	10
	Total	40	40	20	98

The plot of the relationship between the GPA and length of time to get a job can be seen in Figure 8.

Based on the χ^2 test and location of the row points and column points that tend to cluster to the center shows that there is no relationship between GPA and time to get a job. Based on Figure 8, there is a tendency of G-4 adjacent to W3. G-2 and G-3 are adjacent to W2. These can be interpreted that alumni with high GPA tend to get jobs in longer time. This can be made possible if alumni are very selective in obtaining employment.
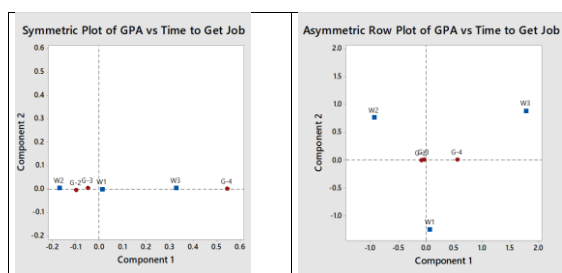
Figure 8: Plot of GPA and time to get a job

3.3 Relationship between Study Period and Time to Get A Job

Table 9: Contingency table between study period and time to get work

Categories		Time to get work			Total
		W1	W2	W3	
Length of Study	M1	17	17	12	46
	M2	12	13	7	32
	M3	9	10	1	20
	Total	38	40	20	98

Correspondence analysis results with a value $\chi^2{}_{count}$ = 98 × 0.04 = 3.92. The results show that $\chi^2{}_{count} < \chi^2{}_{table\,(0.05;4)}$ = 9.488, so with a 95% confidence level it can be stated that there is no relationship or effect of the study period on the length of time to get a job.

The plot of the relationship between the categorical variables of the study period and the time to get work can be seen in Figure 9.
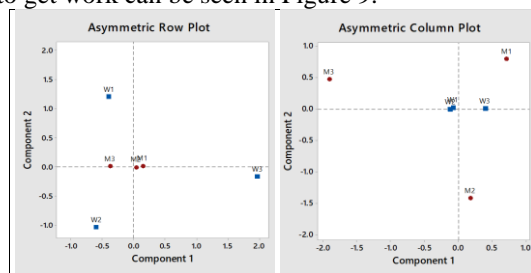

Figure 9: Plot of study period and time to get a job

Based on χ^2 test and asymmetric plot indicate that there is no relationship between the study period and the time to get a job. Based on Figure 9, there is no clear trend toward relationships between categories of variables.

3.4 Relationship of Education Level with Time to Get A Job

Table 10: Contingency table between education level and time to get a job

Categories		Time to get work			Total
		W1	W2	W3	
Level	Level-1	12	10	5	27
	Level-2	24	27	13	64
	Level-3	2	3	2	7
	Total	38	40	20	98

Correspondence analysis results a value $\chi^2{}_{count}$ = 98 × 0.0086 = 0.8428. The results show that $\chi^2{}_{count} < \chi^2{}_{table\,(0.05;4)}$ = 9.488 so with a 95% confidence level it can be stated that there is no relationship or effect of education level on the length of time to get a job. The plot of the relationship between the education level variable categories and time to get work can be seen in Figure 10.
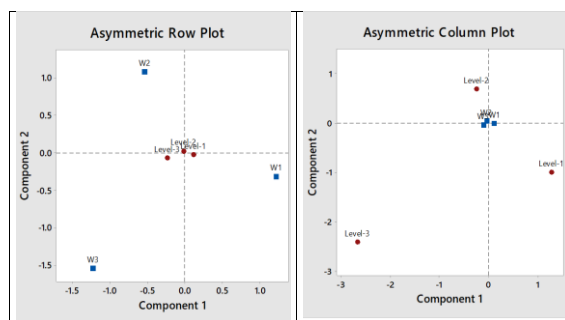

Figure 10: Plot of education level and time to get a job

Based on χ^2 test and asymmetric plot, there is no relationship between education level and time to get a job. Based on Figure 10, there is no clear relationship between categories of variables. Level-1 and W1 are the closest and lie in the same quadrant. This can be interpreted as alumni who have the highest education tend to get job in shorter time.

3.5 Relationship of Competence in The Field of Science to Time to Get A Job

Correspondence analysis results with a value of $\chi^2{}_{count}$ = 98 × 0.0202 = 1.9796, so that obtained $\chi^2{}_{count} < \chi^2{}_{table\,(0.05;4)}$ = 9.488. This can be

interpreted that with a 95% confidence level, there is no relationship or influence of competence in the field of science on the length of time to get a job.

Table 11: Contingency table between time to get work with competence in the field of science

Categories		CompSF-			Total
		3	4	5	
Time to get Job	W1	8	24	5	37
	W2	15	22	5	42
	W3	6	11	2	19
	Total	29	57	12	98

The plot of the relationship between the categorical variables of competency in the field of science with time to get a job can be seen in Figure 11.
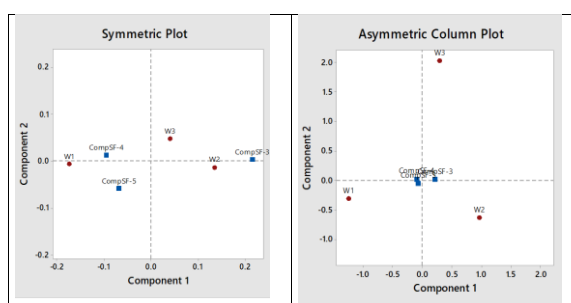

Figure 11: Plot of time to get work with competence in the field of science

Based on Figure 11, there is no clear trend toward relationships between categories of variables. Row and column points tend to cluster with point center. Alumni with moderate science competencies (CompSF-3) tend to get work for 3 to 6 months (W2).

3.6 Relationship of Competence Outside The Field of Science to Time to Get A Job

Table 12: Contingency table between time to get work with competency outside the field of science

Categories		Comp. outside field of science				Total
		CO-2	CO-3	CO-4	CO-5	
Time to get Job	W1	1	23	13	2	39
	W2	1	12	22	4	39
	W3	1	7	10	2	20
	Total	3	42	45	8	98

Correspondence analysis results with a value of $\chi^2_{count} = 98 \times 0.0753 = 7.3794$, so obtained $\chi^2_{count} < \chi^2_{table\,(0.05;6)} = 12.592$. This can be interpreted that with a 95% confidence level, there is no

relationship or influence of competence outside the field of science on the length of time to get a job.

If the variable categories in Table 12 are converted (CO-2 combined with CO-3) it will produce $\chi^2_{count} = 98 \times 0.0679 = 6.6542$, so that it is obtained $\chi^2_{count} < \chi^2_{table\,(0.05;4)} = 9.488$. So the test results state there is no relationship between the two variables.

The plot of the relationship between the categorical variables of competency outside the field of science with time to get work can be seen in Figure 12.
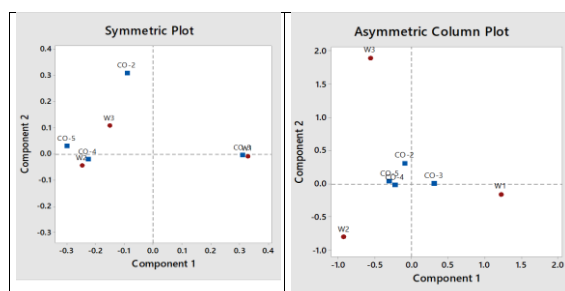

Figure 12: Plot of time to get work with competence outside the field of science

Based on symmetric plot in Figure 12, row dan column points do not spread to all quadrant. CO-3 is adjacent to W1. CO-4 is adjacent to W2. Alumni with moderate outside the field of science competencies (CO-3) tend to get work < 3 months (W1). While, the alumni have higher competencies tend to get work for 3 to 6 months (W2).

3.7 Relationship of Competence in General Knowledge and Time to Get A Job

Table 11: Contingency table between time to get work with competence in general knowledge

Categories		General knowledge			Total
		Kn-3	Kn-4	Kn-5	
Time to get Job	W1	19	12	7	38
	W2	16	16	8	40
	W3	7	8	5	20
	Total	42	36	20	98

Correspondence analysis results with a value of $\chi^2_{count} = 98 \times 0.0158 = 1.5484$, so it is obtained $\chi^2_{count} < \chi^2_{table\,(0.05;4)} = 9.488$. This can be interpreted that with a 95% confidence level, there is no relationship or influence of competence in general knowledge on the length of time to get a job.

The plot of the relationship between the categorical variables of competency in general knowledge with time to get work can be seen in Figure 13.
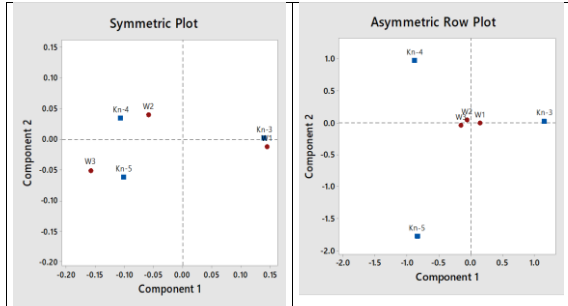

Figure 13: Plot of time to get work with competence in general knowledge

Based on Figure 13, Kn-3 is relatively close to W1. Kn-4 is adjacent to W2. Alumni with moderate general knowledge competencies (Kn-3) tend to get work < 3 months. While alumni with high competence tend to get work for 3 to 6 months (W2).

3.8 Relationship between English Competence and Time to Get A Job

Table 14: Contingency table between time to get work and competence in English

Categories		Comp. in English					Total
		E1	E2	E3	E4	E5	
Time to get Job	W1	0	2	14	22	0	38
	W2	1	3	11	22	3	40
	W3	0	1	7	11	1	20
	Total	1	6	32	55	4	98

If Table 14 is converted into Table 15, the correspondence analysis results obtained with a value $\chi^2_{count} = 98 \times 0.0143 = 1.4014$. The results show that $\chi^2_{count} < \chi^2_{table\ (0.05;4)} = 9.488$ so that with a 95% confidence level it can be stated that there is no relationship or influence of English language competence to the length of time to get a job.

Table 15: Contingency table conversion from Table 14

Categories		Comp. in English			Total
		E1	E2	E3	
Time to get Job	W1	2	14	22	38
	W2	4	11	25	40
	W3	1	7	12	20
	Total	7	32	59	98

Plot relations between categorical variables of competency in English and the length of time to get a job can be seen in Figure 14.

Based on the test χ^2 and the location of the rows and column points that tends not to spread to 4 quadrants, it can indicate that there is no relationship between English-language competence and time to get a job. Based on Figure 14, E2 is adjacent to the W2 and E3 is adjacent to W1. It can be interpreted that alumni whose English skills are low tend to get job in longer time. So vice versa.
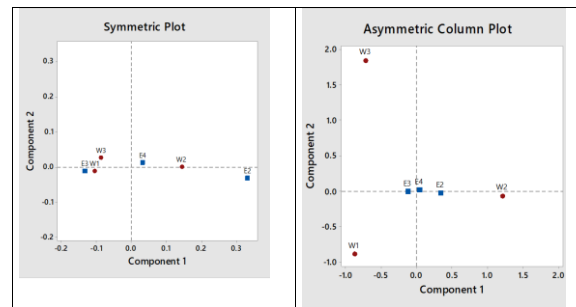

Figure 14: Plot of competence in English

3.9 Relationship between Competence in The Field of Computing and Time to Get A Job

Table 16: Contingency table between time to get a job and Competence in Computing

Categories		Comp. in Computing			Total
		C-3	C-4	C-5	
Time to get Job	W1	6	18	14	38
	W2	7	13	20	40
	W3	2	10	8	20
	Total	15	41	42	98

The results of correspondence analysis on Table 16 obtained value $\chi^2_{count} = 98 \times 0.0282 = 2.7636 < \chi^2_{tabel\ (0.05;4)} = 9.488$ so that with a 95% confidence level 95%, it can be stated that there is no relationship or influence of competence on the computer and the length of time to get a job.

Plot relations between the categorical variables of competency on the computer and time got work can be seen in Figure 15.

Based on Figure 15, C5 has tendency adjacent to the W2, C4 adjacent to W1. It can be interpreted that alumni whose ability to use computers very high tend to get a job for 3 to 6 months. While the alumni whose computer skills are high tend to get a job less than 3 months.
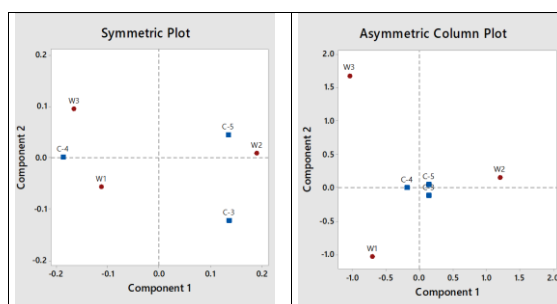
Figure 15: Plot of relations between competence on a computer with time to get a job

The contribution of information provided by the 2-dimensional plots in Figure 8 until Figure 15 is 100%.

Based on discussion above, there is only a significant relationship between the GPA and the study period. The length of time to get a job do not depend on GPA, level of education, and competence on FMIPA alumni.

4 CONCLUSIONS

Based on the results and discussion, it can be concluded that the FMIPA alumni who filled the CDC questionnaire had a shorter study period and a higher GPA than all alumni in 2013 to 2015. The simple correspondence analysis resulted in a 2-dimensional plot that could represent 100% information. There is only a significant relationship between the GPA and the study period. While, there are no relationship between each GPA, level of education, competence in the field of science, competence outside the field of science, competence in general knowledge, English language competence, and competency in using computers to a length of time to get a job.

Symmetric and asymmetric plots show that alumni whose GPAs are greater than 3.5 tend to get jobs more than 6 months. Alumni with the highest education level tend to get jobs faster. Alumni with moderate science competencies (CompSF-3) tend to get work for 3 to 6 months (W2). Alumni with moderate outside competency (CO-3) tend to get job less than 3 months. Whereas alumni with high competence outside the field of science, tend to get work for 3 to 6 months (W2). Alumni with moderate general knowledge competencies (Kn-3) tend to get work < 3 months. While alumni with high general knowledge competence, tend to get work for 3 to 6 months (W2). Alumni with low English ability tend to get jobs in longer time. Vice versa. Alumni with high computer skills tend to get jobs less than 3 months.

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