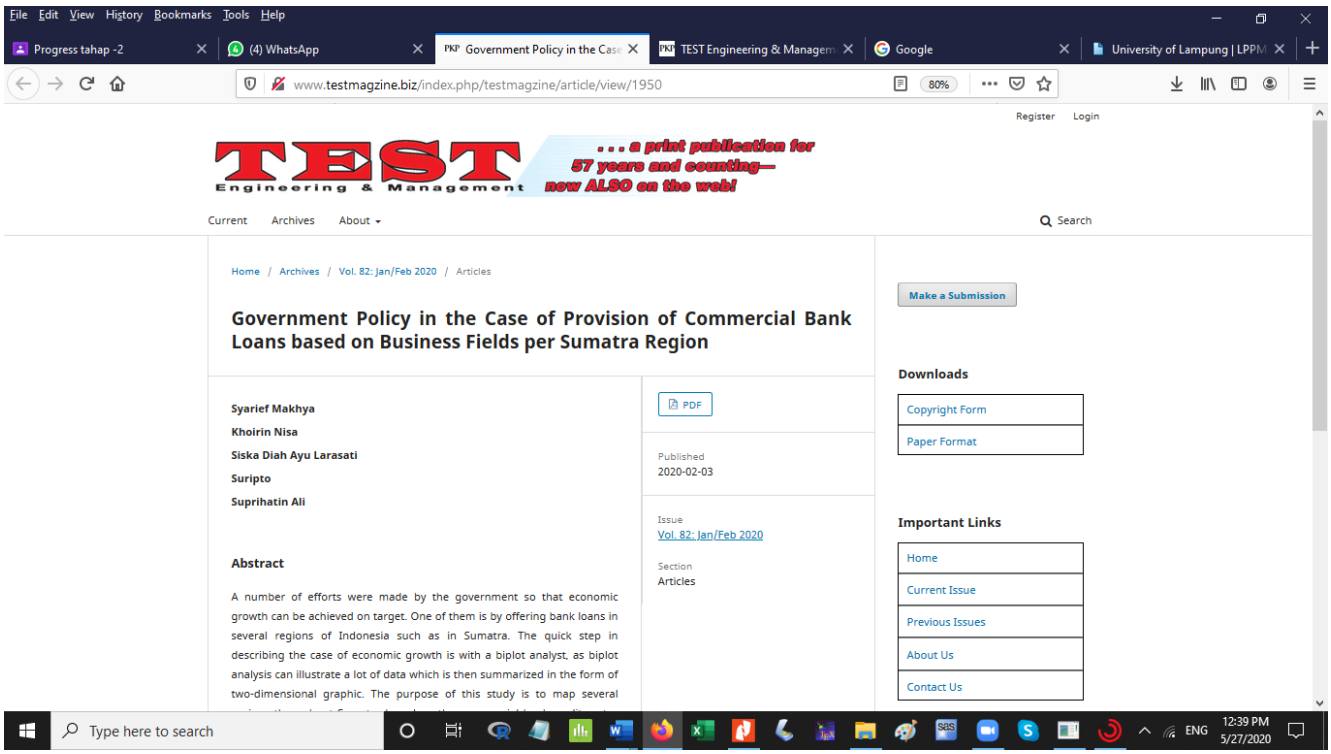
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Syarief Makhya
Khoirin Nisa
Siska Diah Ayu Larasati
Suripto
Suprihatin Ali
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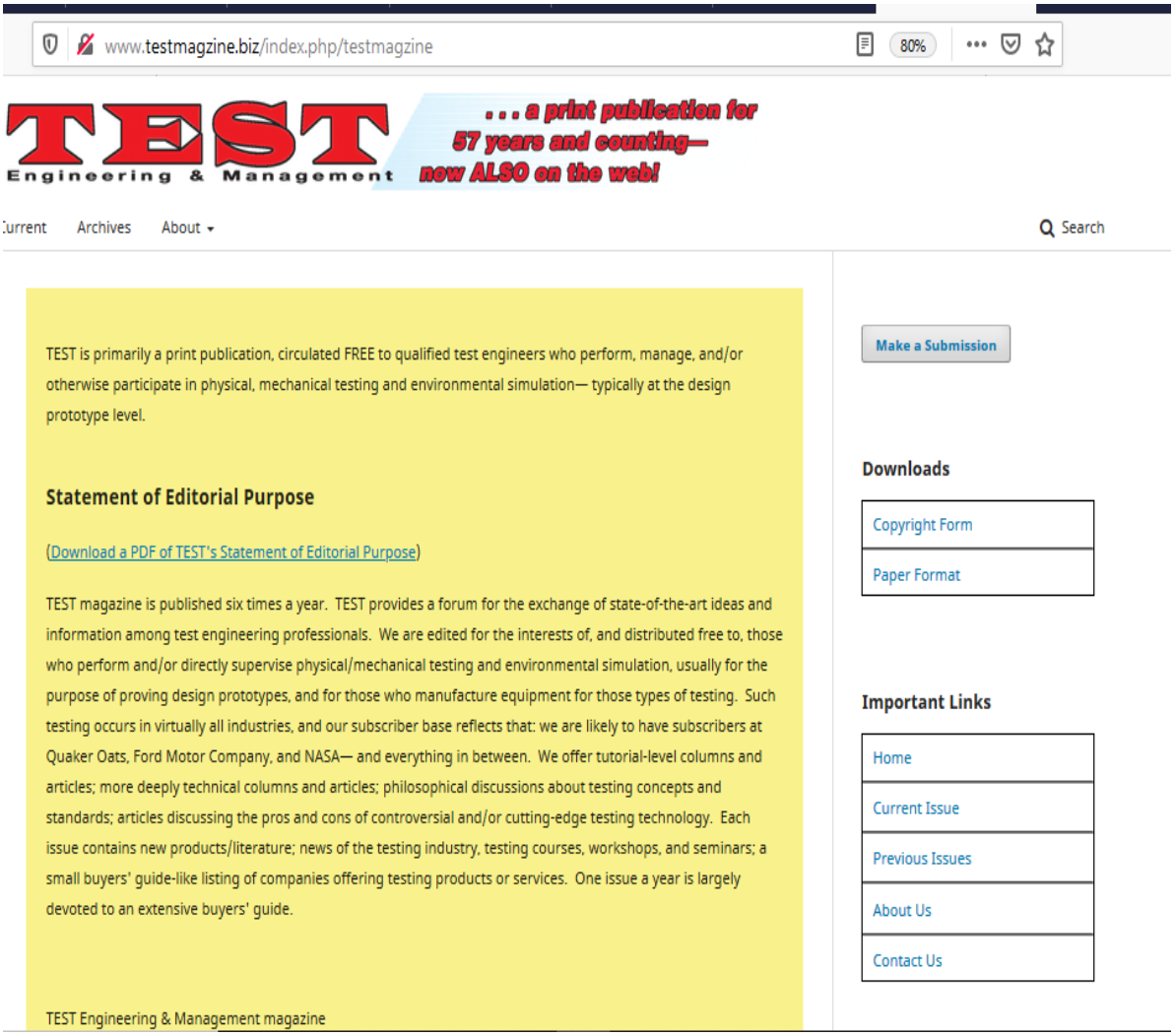
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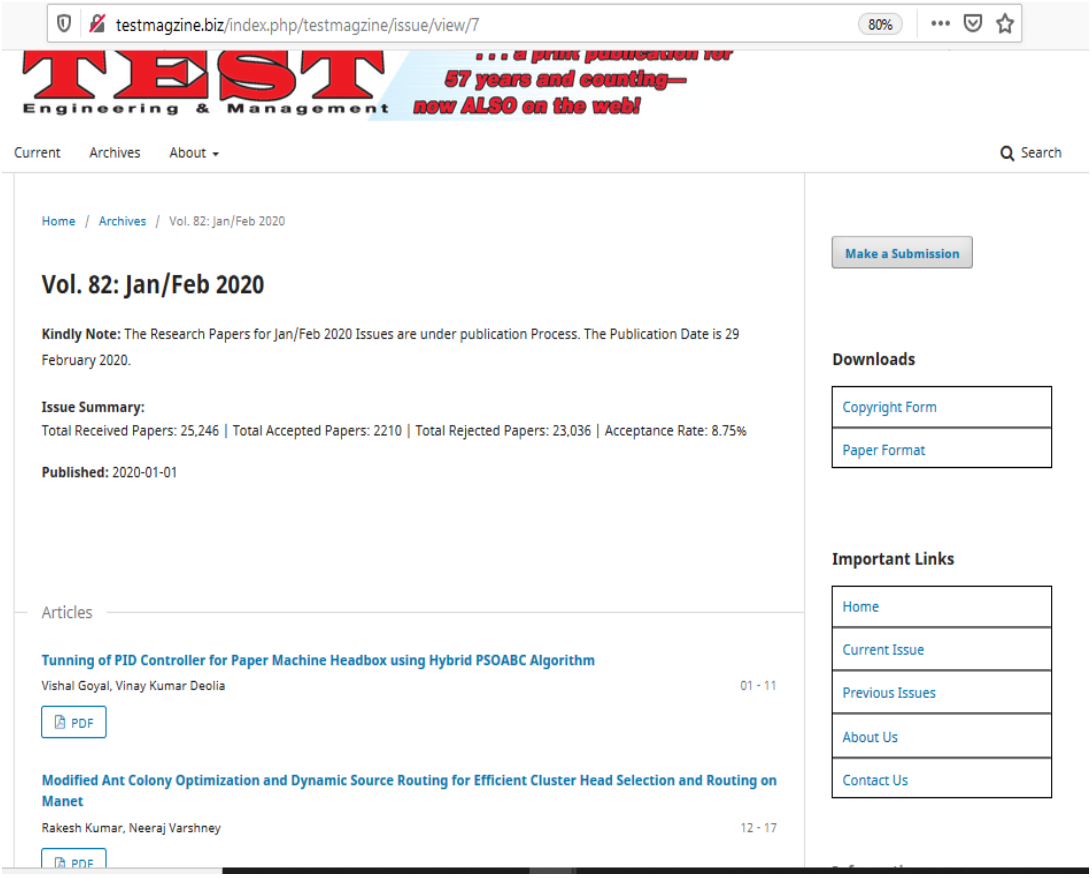
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Government policy in the case of provision of commercial bank loans based on business fields per Sumatra region

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Abstract:
A number of efforts were made by the government so that economic growth can be achieved on target. One of them is by offering bank loans in several regions of Indonesia such as in Sumatra. The quick step in describing the case of economic growth is with a biplot analyst, as biplot analysis can illustrate a lot of data which is then summarized in the form of two-dimensional graphic. The purpose of this study is to map several regions throughout Sumatra based on the commercial bank credit sector until the period of January 2019, to obtain information about the similarity of the regions, variable diversity, relationships between variables, and "relative position" of a region to the variables without having to use many graphs or tables, and know the level of goodness of the biplot analysis results. This study indicates that the biplot analysis is able to provide representative information about commercial bank loans in several regions of Sumatra by 92.79%. Some important information was obtained, including the provinces of Jambi, West Sumatra, Riau, South Sumatra, and Lampung, which have the same characteristics in terms of credit based on business activities until the period of January 2019. Bank credit is mostly in the Health Services and Social Activities sector, Agriculture sector, Hunting, and Forestry, Community Services, Cultural, Entertainment and Other Individuals Sector, Education Services sector, Wholesale and Retail Trade sector, and Intermediary sector, namely in the regions of Jambi, Riau, West Sumatra, South Sumatra, Lampung and North Sumatra .

Keywords: *biplot analysis, credit, economic growth.*

I INTRODUCTION

A competition in the highly competitive business world requires a customer-oriented approach. This approach emphasizes the goods or services that are needed by the customer. The business world in carrying out business activities must meet customer needs. Thus the strategy to win the competition must be precise, especially the marketing strategy.

Before determining the right strategy, the business world must classify market based on certain categories. This is done because the market scope is very broad. After segmenting, the business world must choose the target to be served (targeting) and determine its position with its competitors. (Kotler, 1997). The crucial issue of bank lending is the determination of the right target market, so that the distributed credit is not bad. This problem can be overcome if commercial banks must extend segmentation, targeting and positioning. The market share of lending by commercial banks in the Sumatra region is very broad, so groupings must be made based on the economic sector. The results of this grouping as a reference to choose sectors that have similarities in various provinces in Sumatra and determine the positioning in various provinces in Sumatra. Thus lending by commercial banks will be right on target, meaning that banks can function well as a

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channeling of public funds and spur economic growth in Sumatra.

Increasing economic growth in the island of Sumatra is an important role for the government. One-step offered is the provision of bank credit. As such, credit growth and economic growth show a significant causal relationship. In this case, bank credit has a positive effect on economic growth and vice versa.

The purpose of this study is to map several regions throughout Sumatra based on the commercial bank credit sectors using biplot analysis to obtain information about the similarity of the regions, variable diversity, relationships between variables, and "relative position" of a region to the variables.

According to Rencher(2002) in statistical science many methods can be used to describe the relative position of several objects with several variables simultaneously. One method is to use biplot analysis as biplot analysis is an attempt to describe the data in the summary table in a two-dimensional graph. Information provided by the biplot includes objects and variables in one image. There are four important information obtained from the display of the biplot, including:

1. Proximity between observed objects, namely knowing objects that have similar characteristics with other objects. Two objects are said to have the same characteristics if described as two points with adjacent positions.
2. Variability of variables, which is seeing whether there are variables that have almost the same diversity value for each object. Short vectors represent variables that have small diversity values while variables that have large diversity values are represented by long vectors.
3. Correlation between variables, i.e. knowing how a variable influences or is influenced by other variables. Variables will be described as directed lines. Two variables that have a positive correlation value (+) are described as two lines in the same direction or forming a narrow angle (<90 °). Two variables that have negative correlation values are described as two lines in opposite directions or forming a wide angle (> 90 °). Two uncorrelated variables are described as lines with angles approaching 90 ° (right angles).
4. The value of variables in an object, which is to see the superiority of each object. An object is said to have a value above the average if the object is located in the direction of the variable vector. If the object is located opposite to the direction of the variable vector then the object is said to have a value below the average. If the object is almost in the middle, then the object is said to have a value close to the average.

Biplot analysis was first introduced by Gabriel(1971). Biplot is a graphical display by overlapping row vectors representing objects and column vectors representing variables in low dimensional space (≤ 3). In previous studies, biplot analysis has been implemented in the economic field, namely the analysis of biplot in commercial banks operating in Central Java by Rifkhatussa'diyah, et al. (2014). And studies on the analysis of commercial bank loans have been done by many authors, e.g. Ahmed and Malik (2015), Ikram et al. (2016), Musau et al. (2018), Olaoye et al. (2018) and Obiageri et al. (2019).

II LITERATURE REVIEW AND STATISTICAL MODELING

Over the past decade, the Indonesian economy has experienced rapid growth, due in part to the agricultural sector which expanded at an average annual rate of 4.6%. A substantial portion of the country's agricultural output was produced in East Java. In 1981-1985, the East Java contributed 20% of rice, 43% of corn, 47% of soybeans, 28% of cassava and 63% of sugarcane produced in Indonesia. This development was stimulated by the Indonesian government which provided a large budget for rural development programs,

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including substantial credit subsidies. Due to declining government revenues and tight budgets, agricultural development funds are now more scarce, thus making efforts to boost agricultural production by increasing the volume of cheap credit more difficult than before. However, reallocating agricultural credit among farm groups and improving small farms' access to subsidized credit may have a significant impact on bringing the rural poor into the mainstream of agricultural development(Onal, et al.,1995). The distribution of Business Credit Program (BCP) for 2017 reached IDR 96.7 trillion, an increase of 2.4% from the distribution of BCP in 2016 which reached IDR 94.4 trillion. Central Java Province was ranked first in the Province with the most BCP disbursement of IDR 16.9 trillion, followed by East Java Province with disbursement of IDR 16.3 trillion, while the third position was West Java Province at IDR 12.4 trillion. For outside Java, the highest BCP distribution in South Sulawesi Province was Rp. 5.8 trillion and North Sumatra Province was Rp. 4.3 trillion. The distribution of BCP for the Riau Islands Province for 2017 reached Rp 564 billion(Coordinating Minister for Economic Affairs, 2018). Small, low-income farmers usually have access only to high-interest, non-institutional credit, while medium and large farmers have been the main recipients of the subsidized institutional credit. National surveys show that 35 55% of small farmers cultivating less than 0.5 ha (73% of allrespondents) still need access to institutional credit programs to fund their farm activities (Center for Agro Economic Research (CAER), 1988). These farms operate about 34% of the total agricultural land, yet they receive only 20% of institutional credits (Onal, et al.,1995).The People's Business Credit Program (BCP) is a priority program in supporting credit / financing policies for the Micro, Small and Medium Enterprises sector. In 2015, "Achieving the Target of Rp. 20 trillion of People's Business Credit Distribution" became one of the targets of the Deputy for Macroeconomic and Financial Coordination. The target was fulfilled by the amount of distribution as of 31 December 2015 amounting to Rp.22.75 trillion (113.75%). This amount was achieved in four months of BCP distribution by 3 State-Owned Enterprises (SOE) Banks. The bank with the highest BCP channeling performance is Bank BRI with a distribution of Rp. 16.2 trillion (Coordinating Minister for Economic Affairs, 2015). The benefits of the BCP program are to increase and expand entrepreneurial access of all productive business sectors to bank financing, encourage economic growth, and enhance the competitiveness. The total distribution of BCP in 2007-2014 amounted to Rp.178.85 trillion with anNon Performing Loan (NPL) of 3.3%. The workforce that was successfully absorbed from the BCP program was 20,344,639. According to Herlianto (2018), an increase in demand for bank credit, either consumption, working capital, or investment will encourage purchasing power, business enthusiasm, and additional investment, especially direct investment. This activity can ultimately create a multiplier effect, including the establishment of new factories, employment, and demand for raw materials, increased production, increased purchasing power, increased tax payments, and others. This cycle leads to economic growth. Furthermore, economic growth will encourage new investment. New investment will stimulate demand for new credit, encourage consumption, purchasing power, and so on. The multiplier effect process is what gives the continued effect on economic growth, both at the regional and national levels. The loans provided by commercial banks in the Sumatra region based on business fields are broken down into 18 economic sectors including agriculture, fisheries, mining, manufacturing, electricity, construction, and others. If the loans borrowed by the people of Sumatra are used as they should, then there will obviously be economic growth in the region[1-19].

Biplot

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The original definition of the biplot should perhaps now be referred to as the linear biplot, since the biplot concept has been recently enriched in the form of non-linear and generalized biplots (Gower & Harding, 1988; Gower, 1991). Graphical methods for understanding and interpreting multivariate data are another form of statistical data analysis; for example, in univariate data, a histogram of a quantitative variable or a bar chart of the categories of a discrete variable. Biplots can be viewed as the multivariate analogue of scatterplots, where samples/ cases are plotted as points relative To two variables. With biplots, the multivariate distribution of asset of variables can be approximated in a low dimensional space (Gower and Hand,1996). It was proposed by Gabriel(1971), biplots can be used as a means of providing a graphical representation and interpretation of a variety of multivariate analysis problems. While scatter plots can be used as a means of visualizing the association between two numerical variables, biplots have been used in a many varieties of multivariate analysis, such as in politics, economic and many social sciences and much has been much written on their construction and interpretation. These biplots are usually have more informative than their corresponding numerical summaries—for a pair of quantitative variables, for example, a correlation is a very coarse summary of the data whereas a simple scatterplot of bivariate data tells the whole story about the data. However, but there is some limitation of graphical representations to display all the data in large tables at the same time, where many variables are interacting with one another (Greenacre, 2012). While a simple scatterplot of two variables has two perpendicular axes, conventionally dubbed the horizontal x-axis and vertical y-axis, biplots have as many axes as there are variables, and these can take any orientation in the display. The basic idea of the biplot is very simple, and like all simple solutions to complex problems it is both powerful and very useful. The biplot makes information in a table of data become transparent, revealing the main structures in the data in a methodological way, for example patterns of correlations between variables or similarities between the observations (Greenacre, 2012). Compositional data consist of vectors of positive values summing to a unit, or in general to some fixed constant for all vectors(Aitchison, 1986). Such data are arise in many disciplines, e.g. in sociology, business, politic and psychology as time budgets,i.e. parts of a time period allocated to various activities, in politics as proportions of the electorate voting for different political parties and ingenetics as frequencies of genetic groups within populations. The biplot (Gabriel, 1971) is a method which has been regularly applied to visualize the row sand columns of many different kinds of data matrices. A biplot is a graphical display of the rows and columns of a rectangular n × p data matrix X, where the rows are often individuals or other sample units and the columns are variables. In almost all applications, biplot analysis starts with performing some transformation on X, depending on the nature of the data, to obtain a transformed matrix Z which is the matrix that is actually displayed (Aitchison and Greenacre, 2002; Aitchison,1986; Gabriel, 1971). As a late 2010 contribution to this topic of biplots, Michael Greenacre's , Gower provide an introductory, non-technical and easy to read description of biplots to a variety of popular statistical techniques. Greenacre is better known for his influence in correspondence analysis, and more recently biplots (Greenacre, 1993; Gower et al, 2011). Gower & Digby (1981) point out the close relationship between this form of biplot and classical principal components analysis and Gower & Harding (1988) discuss generalizations of biplot. The concept of biplot in this study will be applied commercial bank loans based on business fields per Sumatra region. Data of commercial bank credit loans to the third parties in Sumatrawere obtained from websiteofthe

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Indonesian Financial Services Authority. The objects in this study are several regions in Sumatra that receive credit with variables consisting of 18 economic sectors provided by commercial banks. The biplot analysis was performed using SAS 9.4.

Statistical Modeling

Biplot analysis was developed on the basis of *Singular Value Decomposition* (SVD). Suppose n**X**p* is a data matrix with *n* objects and *p* variables, and***X**** is corrected to the average value so that the obtained matrix is ***X***.

$$\mathbf{X} = \mathbf{X^*} - \frac{1}{n}(\mathbf{1X^*}) \qquad (1)$$

with**1** being the matrix dimension of n x nare all valuable elements 1. Covariance matrix (**S**) of the matrix **X** is

$$\mathbf{S} = \frac{1}{n-1}\boldsymbol{X}'\boldsymbol{X} \qquad (2)$$

while the correlation matrix (**R** = [r_{ij}]) of the matrix **X** is

$$\mathbf{R} = \mathbf{D}^{-1/2}\mathbf{S}\mathbf{D}^{-1/2} \qquad (3)$$

with$\mathbf{D}^{-1/2} = diag\left[\frac{1}{\sqrt{S_{11}}}, \frac{1}{\sqrt{S_{22}}}, \ldots, \frac{1}{\sqrt{S_{pp}}}\right]$ is a diagonal matrix.

Suppose the matrix ${}_n\boldsymbol{X}_p=[x_1, x_2, \ldots, x_n]'$ then the *Euclidean* distance defined between the object *i* and *j* is $d_E(x_1,x_2) = \sqrt{(x_1 - x_2)'(x_1 - x_2)}$ and the Mahalanobis distance between objects *i* and *j* is $d_M(x_1, x_2) = \sqrt{(x_1 - x_2)'S^{-1}(x_1 - x_2)}$. A matrix **X** with rank *r* (where *r* = min {n, p}) can always be decomposed using the Singular Value Decomposition (SVD) which is expressed as follows:

$$\boldsymbol{{}_nX_p} = \mathbf{{}_nU_rL_r}\boldsymbol{A_p'} \qquad (4)$$

(Aitchison & Greenacre, 2002) where **U** and **A** are column orthonormal matrices , so $\boldsymbol{U'U} = \boldsymbol{A'A} = \mathbf{I_r}$. Matrix **A** is a matrix whose columns consist of eigen vectors $\mathbf{a_i}$ corresponding to the eigenvalues λ_i of matrix $\boldsymbol{X'X}$. Matrix **U** is a matrix whose columns are eigenvectors corresponding to the eigenvalues of matrix $\boldsymbol{XX'}$,ie:]

$$\mathbf{U} = \left[\frac{Xa_1}{\sqrt{\lambda_1}}, \frac{Xa_2}{\sqrt{\lambda_2}}, \ldots, \frac{Xa_r}{\sqrt{\lambda_r}}\right] \qquad (5)$$

while**L** = diag $(\sqrt{\lambda_1}, \sqrt{\lambda_2}, \ldots \sqrt{\lambda_r})$, where $\lambda_1 \geq \lambda_2 \geq \ldots \geq \lambda_r > 0$ and λ_i are called the singular values of the matrix $\boldsymbol{X'X}$ and $\boldsymbol{XX'}$. Suppose that **A** is an order matrix $n \times n$, vectors $\boldsymbol{x} \in R^n$ and $\boldsymbol{x} \neq 0$ are called eigenvectors if there are real numbers λ called eigenvalue, so that they satisfy the equation:

$$\boldsymbol{Ax} = \lambda\boldsymbol{x} \ (6)$$

From the above statement, we can find the requirements for eigenvalues and eigenvectors. The eigenvalue λ is a real number, which means it can be zero, negative and positive. While eigenvector$\boldsymbol{x}$ is a member of $R^n$to ***A*** and$\boldsymbol{x}$ is not a zero vector (Leon, 2001). In Jollife (2010), Equation (4) can be broken down into[20-26]:

$$\mathbf{X} = \mathbf{UL^{\alpha}L^{1-\alpha}}\boldsymbol{A'} \qquad (7)$$

By defining $\mathbf{G} = \mathbf{UL^{\alpha}} = [g_1, g_2, \ldots g_n]'$ and $\mathbf{H} = \mathbf{AL^{1-\alpha}} = [h_1, h_2, \ldots h_p]$ 'for $\alpha \in [0, 1]$, then Equation (7) becomes:

$$\mathbf{X} = \mathbf{G}\boldsymbol{H'} \qquad (8)$$

Thus each (*i*,*j*)th elements of the matrix **X** can be expressed as follows, $\mathbf{X_{ij}} = \mathbf{g_i h_j}$. Vector $\mathbf{g_i}$ explain object *to-i*matrix **X**, and vector $\mathbf{h_j}$ explaining variable to-*j* matrix **X**.

Taking certain α has implications for biplot interpretation.

a. If α = 0, then **G**=**U** and $\boldsymbol{H'} = \mathbf{L}\boldsymbol{A'}$, as a result:

$$\mathbf{X'X} = (\mathbf{GH'})(\mathbf{GH'})$$
$$= \mathbf{HG'GH'}$$
$$= \mathbf{HU'UH'} = \mathbf{HH'} \qquad (9)$$

is obtained:

- $\mathbf{h_i h_j} = (n-1)s_{ij}$, where s_{ij} is the covariance variables *to-i* and *to*-j.
- $||\mathbf{h_i}|| = \sqrt{n-1}\mathbf{s_i}$, where $\mathbf{s_i} = \sqrt{s_{ii}}$, illustrates the diversity of variables*i*.
- The correlation between variables is *i* and *j* explained by the cosine of the angle between $\mathbf{h_i}$ and $\mathbf{h_j}$ (e.g. θ), i.e.

$$\cos(\theta) = \frac{hi'hj}{||hi||||hj||} = \frac{Sij}{\sqrt{Sii}\sqrt{Sjj}}$$

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$$= \mathbf{r}_{ij} \qquad (10)$$

- If **X has the** power of p, then $(\mathbf{x}_i-\mathbf{x}_j)\,'\mathbf{S}^{-1}(\mathbf{x}_i-\mathbf{x}_j) = (n-1)\,(\mathbf{g}_i-\mathbf{g}_j)'\,(\mathbf{g}_i-\mathbf{g}_j)$ means, the square of the Mahalanobis distance between $\mathbf{x}_i$ and $\mathbf{x}_j$ are proportional to the square of Euclid's distance between $\mathbf{g}_i$ and $\mathbf{g}_j$. **S** is the covariance matrix of X.

b. If $\alpha = 1$, then **G**=**UL** and $\mathbf{H}'=\mathbf{A}'$, as a result:

$$\mathbf{XX}' = \mathbf{(GH}')\,\mathbf{(GH}')' = \mathbf{GH}'\mathbf{HG}' = \mathbf{GA}'\mathbf{AG}' = \mathbf{GG}' \qquad (11)$$

means

$(\mathbf{x}_i-\mathbf{x}_j)'\,(\mathbf{x}_i-\mathbf{x}_j) = (\mathbf{g}_i-\mathbf{g}_j)\,'(\mathbf{g}_i-\mathbf{g}_j)$ or the square of the Euclid distance between $\mathbf{x}_i$ and $\mathbf{x}_j$ will be equal to the square Euclid's distance between $\mathbf{g}_i$ and $\mathbf{g}_j$.

Gabriel (1971) proposed the size of the **X** matrix approach with a biplot in the form:

$$\rho^2 = \frac{\lambda_1 + \lambda_2}{\sum_{k=1}^{r} \lambda_k} \qquad (12)$$

where, $\lambda_1$is the first largest eigenvalue, λ_2 is the second largest eigenvalue, and λ_k is the eigenvalue to-*k* where *k* = 1, 2, ..., r. If ρ^2 approaches a value of one or 100%, the biplot provides a better representation of the actual data information.

According to Gabriel (2002), biplot not only as an approach to data matrix **X** by using matrix **GH**', but also the result of multiplying **HH'** as an approximation of the matrix **X'X** associated with the variant-covariance and correlation between variables, and matrix **GG'** as an approach for **XX**' relating to the size of the similarity between objects. Next Gabriel proposed a measure of the suitability of a biplot (*Goodness of Fit of Biplot*) as a measure of the approach in the following form.

1. Data Conformity

$$\mathrm{GF}(\mathbf{X},\mathbf{G}\boldsymbol{H}') = \frac{tr^2(X'GH')}{tr(X'X)tr(HG'GH')}$$

2. Conformity Variable

$$\mathrm{GF}(\mathbf{X'X},\mathbf{HH'}) = \frac{tr^2(X'XHH')}{tr(X'XX'X)tr(HH'HH')}$$

3. Suitability Objects

$$\mathrm{GF}(\mathbf{XX'GG'}) = \frac{tr^2(XX'GG')}{tr(XX'XX')tr(GG'GG')}$$

with tr (**X**) is called the *trace* of **X** or the number of diagonal elements from **X** so that it can be written tr (**X**) = $\sum_{i=1}^{n} x_{ii}$ (Leon, 2001).

III RESULTS AND DISCUSSION

The results of the biplot analysis illustrate the characteristics of the object (Region) against the variable vector (Economic Sector). Theoutput of the biplot analysis results isshown in Figure 1.

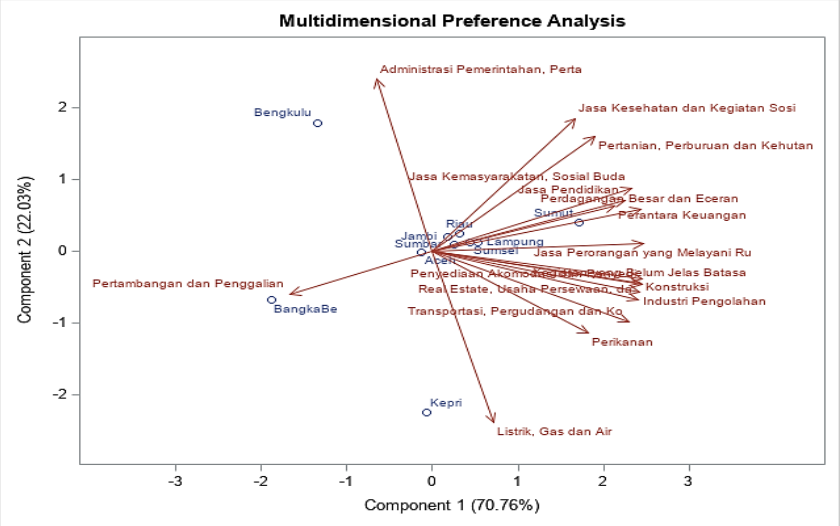

Fig.1. Biplot Charts of Loans Based on Business Fields in Several Regions in Sumatra

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The main thing in conducting biplot analysis is to look at the good measure of the biplot in advance to see how much information will be obtained using the analysis. In Figure 1. it can be explained that the variation in component 1 was 70.76% and component 2 was 22.03%. Then the cumulative diversity of original data that can be explained by the two components is equal to 92.79%. Because the percentage is more than 70%, in other words, it has provided representative biplot information about commercial bank loans in several regions of Sumatra.Next will be explained or interpretation of Figure 1. As follows:

Proximity between Objects

This information can be used as a guide to find out objects that have similar characteristics with other objects. The object in question is the region in Sumatra. This can be seen from the many regions that have adjacent positions in the biplot graph [27-29].

Based on Figure1. shows there is only one group for objects that have the same characteristics as the others; Jambi, West Sumatra, Riau, South Sumatra, and Lampung. If from the available biplot charts are divided into four quadrants, Jambi, West Sumatra, Riau, South Sumatra, and Lampung are in Quadrant I position. While it is also seen that for Aceh it is located very close to one group, only if it is considered more careful then Aceh is in the position of Quadrant III. Therefore, that is the reason for Aceh not to be included in one regional group that has the same characteristics. Although North Sumatra is an object in Quadrant I, it is located far between Jambi, West Sumatra, Riau, South Sumatra and Lampung, so North Sumatra is an area that does not have the same characteristics in terms of this credit. For Bengkulu, Bangka Belitung, and Riau Islands do not have the same characteristics in terms of credit.

Variability of Variables

Based on Figure1. information is obtained that the Government Administration, Defense and Mandatory Social Security sectors as well as the Electricity, Gas and Water sectors have a great diversity for each region in Sumatra until the January 2019 period which is described as a long vector line. As for the Mining and Excavation sector, it has the smallest diversity. Then for other sectors have relatively the same diversity.

Relationships between Variables

Positive relationships are described as two vector lines that form an angle of less than 90^o. Viewed from Figure1, each sector in the position of Quadrant I and Quadrant IV has a positive relationship. As in the Health Services and Social Activities sector it has a positive relationship with the Agriculture, Hunting and Forestry sectors. This means that if the number of bank loans in the Health Services and Social Activities sector increases, the bank loans in the Agriculture, Hunting and Forestry sectors also increase. And so on for other sectors that have a positive relationship with described as two vector lines that form an angle of less than 90^o .

However, it is inversely related to the Health Services and Social Activities sector with the Mining and Excavation sector. Both have a negative relationship meaning that if the number of bank loans in the sectorHealth Services and Social Activities increases, it does not mean that the number of bank loans in the Mining and Excavation sectorwill also increase. Negative relationships between variables are described as two vector lines that form an angle of more than 90^o.

Whereas for the Electricity, Gas, and Water sectors with the Wholesale and Retail Trade sector and for the Government Administration, Defense and Mandatory Social Security sectors with the Financial Intermediary sector they are not related to each other which in this case is illustrated by

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two vector lines forming an angle of 90^o.

Variable Value of an Object

Based on Figure 1, information was also obtained that Jambi, Riau, West Sumatra, South Sumatra, Lampung and North Sumatra are the regional groups that tend to obtain the most bank credit in the Health Services and Social Activities sector, the Agriculture, Hunting and Forestry, the Community Services sector, Cultural Issues, Entertainment, and Other Individuals, the Education Services sector, the Wholesale and Retail Trade sector, and the Financial Intermediary sector.

Meanwhile, Bangka Belitung is an area that tends to get the most bank credit in the Mining and Excavation sector. Riau Islands tends to obtain bank credit in the Electricity, Gas and Water sectors. While Bengkulu tends to obtain bank credit in the Government Administration, Defense and Mandatory Social Security sectors.

IV CONCLUSION

Based on the results and discussion, the following conclusions are obtained:

1. The results of biplot analysis that have been conducted can provide a value of 92.79% biplot, which means it has provided representative biplot information about commercial bank credit in several regions of Sumatra.
2. The Jambi, West Sumatra, Riau, South Sumatra and Lampung regions have the same characteristics in terms of credit based on business fields until the period of January 2019.
3. The largest diversity of variables is in the Government Administration, Defense and Obligatory Social Security and the Electricity, Gas and Water sectors. While the smallest variable diversity is in the Mining and Excavation sector.
4. The strongest positive correlation was in the Education Services sector with the Wholesale and Retail Trade sectors, seen in the biplot chart of the two sector variable vectors having a sharp angle close to 0^0.
5. Bank loans are mostly in the Health Services and Social Activities sector, the Agriculture, Hunting and Forestry sectors, the Community Services sector, Cultural Issues, Entertainment, and Other Individuals, the Education Services sector, the Wholesale and Retail Trade sector, and the Intermediary sector, which are found in the regions Jambi, Riau, West Sumatra, South Sumatra, Lampung and North Sumatra.

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