Analysis of Vocational School Development Based on Regional Potential Using Principal Component Analysis (PCA)

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ABSTRACT

This study aims to analyze the development of Vocational High School (SMK) based on regional potential in Cimahi City, Indonesia. This study is descriptive research. This study was conducted in Cimahi City, West Java Province, Indonesia. The population and sample of this study were all the potentials of the region and the industrial fields in the City of Cimahi, West Java and the fields/programs/competencies of SMKs in the City of Cimahi. Data in this study were collected using documentation, interview and observation methods. The Principle Component Analysis (PCA) was used as the method of analyzing regional potentials using Minitab Statistical Software version 14. Based on the results of this study it was found that the development of Vocational High Schools is based on regional potential in Cimahi City and based on the analysis of Vocational Development Levels in Cimahi City by using the PCA analysis method based on indicators education such as Total Population Ages 16-18, Student Ratio per School, Student Ratio per Class, Student Ratio per Teacher, and Gross Participation Rate (GPR) in 3 (three) Districts of Cimahi City found that the lowest PCA 1 for the three districts is in South Cimahi District (-1026.02). This means that the priority location I for the development of SMK is South Cimahi District. It is then followed by Central Cimahi Subdistrict (-644.19) which becomes priority location II for the development of SMK. And Priority III is the District of North Cimahi (-435.5). With these findings, the Office of Education, especially in the area of Vocational Secondary Education in the Cimahi City, West Java, should pay attention to the development of vocational schools based on the potential of the region.

1. Introduction

BPS data released in 2019 stated that the number of unemployment at the open unemployment rate (TPT) as of February 2019 was 6.82 million people, or decreased by 50,000 compared to February 2018, which was 6.87 million people. The number of the unemployed, which is equal to 5.01% of the total workforce of 136.18 million people, is from vocational high school (VOCATIONAL SCHOOL) graduate, followed by diploma I, II, and III, then high school. Based on
2019 BPS data, the unemployment rate based on education is still held by vocational graduates, which amounts to 8.63%. Then, diploma I / II / III graduates at 6.89%, high school graduates at 6.78%, and university graduates at 6.24%. Then junior high school graduates at 5.04% and elementary school graduates at 2.65%. Unemployment in Indonesia is still a major development problem. From the above data it can be seen that the lowest unemployment rate based on education is elementary school graduates.

Meirawan, Ana, and Saripudin (2018) argue that the high unemployment rate is caused by the lack of available jobs, in addition to the inadequate quality of vocational graduates in the industrial world both in terms of knowledge, skills and attitudes. The type of expertise that graduates with the job market demand is not yet suitable due to the finding of various obstacles, one of which is the perceived constraints of problems that arise in the learning process, such as lack of competency of students, lack of support for school facilities and infrastructure. Continual improvement in the learning process must continue to be pursued. One of the steps taken to improve the quality of learning is to evaluate the learning program (Sudjani, 2016).

With the above conditions, the government policy to improve the quality of vocational school graduates to be ready to work (Mayuni & Sukerti, 2016) revealed that for the government, there should not be partial measures in helping vocational schools in improving the quality of their graduates. It seems that concrete steps are needed to regulate the business and industrial world in order to assist vocational schools in implementing joint programs in an effort to prepare a ready workforce. Preparation of rules or even laws that bind all business and industry sectors in realizing this collaboration. DUDI nationalism is built by starting from making laws and rules that bind them towards the direction of building a strong nation.

In addition, organizing of vocational schools is not built based on the potential and location of the region (Meirawan, Ana, & Saripudin, 2018), thus the location of vocational schools is not centered at one point, the location of the school must not be far from educational activities, settlements, and access to transportation to enable students to easily access it. School locations must also be supported by strategic regional conditions in the hope of supporting learning in order to produce quality graduates.

For this reason, it is important for the government to reorganize education planning in order to improve the quality of education (Enoch, 1995). Vocational planning based on regional potentials is expected to bring vocational graduates to work in cities / districts based on the potential of their respective regions. Regional potential can have more economic value if there are human resources who are able to manage it well. Improving the quality and relevance of education is a government policy in improving the quality of Indonesian human resources in line with changes in the education and business world, and professionalism in all fields including education is needed. Increasing the relevance of education is a policy aimed at making education output more oriented towards meeting the working world and the needs of the business and industrial world. Therefore, the relevance of formal and non-formal education processes needs to be directed so that students, both at the
secondary education level, especially vocational and at the tertiary level, are better prepared to enter the workforce.

Article 31 of the Indonesian 1945 Constitution concerning the national education system states that the national education system must always be developed in accordance with the needs and developments that occur at the local, national and global level. Thus, education is considered as a means of forming quality human resources, and the government needs to do comprehensive planning involving economic, population, educational and potential natural resource indicators.

Vocational education is education that prepares students to work in certain fields (National Education System Law No 20 Tahun 2003). In addition, the Vocational High School is a national education system with its main task preparing graduates to enter the workforce, filling the needs of intermediate skilled workers. Permendiknas No. 29 of 1990 Article 1 paragraph 3 states that, Vocational Education is education at a secondary level that prioritizes developing the ability of students to carry out certain types of work. For this reason, in relation to regional potential development, there needs to be harmony between regional potential development policies and increasing human resources, so that the application of policies prioritizes vocational high schools that can accommodate school-age population by developing regions and carrying out development in their respective regions.

Amalia (2018) revealed the results of research conducted in Medan that there were several factors of vocational education (VOCATIONAL SCHOOL) that could support regional development planning in Medan including: (a) the number of vocational students indicating community interest or junior high school graduates to continue their education to the VOCATIONAL SCHOOL level, (b) the number of VOCATIONAL SCHOOL units for junior high school graduates, (c) the quality of VOCATIONAL SCHOOL graduates to be able to compete in the labor market, and (d) the business / industrial world (DUDI) that accepts VOCATIONAL SCHOOL graduates in the labor market. With the above problems, this research is expected to be able to analyze the development of Vocational High Schools based on regional potential, so that graduates of Vocational High Schools can be directed to develop their respective regions.

Therefore, this research is directed to conduct a study of the development of regional-based VOCATIONAL SCHOOL potential using the Principal Component Analysis (PCA) method. PCA is to establish priority handling of matters that are more basic than the structure of the problems faced, so that the efficiency and effectiveness of problem handling can be further improved. PCA is used as an analysis of determining priorities for the development of vocational schools. With the PCA method, based on the education indicators of each sub-district used, it is possible to know the location in the sub-district where vocational schools are prioritized.
2. Methods

The research method used in this research is the qualitative description method. The qualitative approach was chosen in this study because of several considerations, including: (1) This research is an attempt to find problems related to the condition of vocational schools and how they relate to the development of vocational schools based on the development of regional potential. (2) This research is more inductive, meaning that researchers tried to find problems based on data and were open to further research. (3) This research is conducted in a reasonable situation and prioritizes qualitative data.

3. Results and Discussion

3.1 Cimahi city overview

The city of Cimahi is geographically located between 1070 30 '30' - 1070 34 '30' BT and 60 50 '60 ' 60 56 '00' South Latitude. The total area of Cimahi City is 40.2 km2 according to Law No. 9 of 2001 with its territorial boundaries: North Side (Parongpong District, Cisarua District, and Ngamprah District West Bandung Regency), East Side (Sukasari District, Sukajadi District, Cicendo District and Andir District of Bandung City), South Side (Margasasih District Bandung, Batujajar District, West Bandung Regency, and Bandung Kulon District, Bandung City and West Side (Padalarang District, Batujajar District and Ngamprah District, West Bandung Regency).

Cimahi City is included in the area of West Java Province and includes 3 Subdistricts consisting of 15 smaller subdistricts, namely: North Cimahi Subdistrict consists of 4 smaller subdistricts, Central Cimahi Subdistrict consists of 6 smaller subdistricts and South Cimahi Subdistrict consists of 5 smaller subdistricts. Geographically this region is a basin valley that slopes to the south, with an altitude in the north ± 1,040 meters above sea level (Cipageran Village, North Cimahi District), which is the slope of Mount Burangrang and Mount Tangkuban Perahu and height in the south is around ± 685 meters above sea level (as high as Melong Village, Cimahi Selatan District) which leads to the Citarum River. The river that passes through Cimahi City is the Cimahi River, with five tributaries, namely Cibodas River, Ciputri, Cimindi, Cibeureum and Cisangkan River, while the springs found in Cimahi City are Cikuda springs and Cisintok springs.
3.1.1 Potential of agriculture, animal husbandry and fisheries of Cimahi City

City of Cimahi’s Agricultural Business is divided into several parts, which are:

- Agriculture Business by Form: a) Large Agriculture is agriculture that is organized (managed) commercially by a legal entity, b) People’s Agriculture (not incorporated), consisting of:
  - People’s Agriculture Business is an agricultural business that is organized or managed commercially by an individual business that is not notarized.
  - Agricultural Household Business is an agricultural business organized or managed by an agricultural household.
  - Agricultural Business by Sub Sector.
- Food Crop Agriculture is an agricultural business activity that produces food crop production, namely: Rice, Food Crops and Horticulture.
- Plantation Plant Agricultural Business is an agricultural activity that produces plantation production, such as rubber, coffee, tea, pepper, clove, etc. (BPS Cimahi City 2018).
In the City of Cimahi, food crops include vegetables, fruits and vegetables. Food plants consist of grains, corn, tubers and beans. Food crop data is broken down according to harvested area, yields per hectare and production. The area of paddy fields using semi-technical irrigation in 2015 was 106.42 hectares. While the area of dry land when viewed according to its use, the type of yard / land for buildings and courtyards reaches 714 hectares or 71.90 percent of the total dry land. Followed by tegal / gardens / fields / huma 279 hectares or 28.10. For rice production in 2015, decreased from 27,291.2 quintals to 7,135 quintals, rice productivity also decreased from 55.58 quintals / ha to 27.23 kwt / ha. Below table 1 and 2 shows Harvest Area and Average Production of Paddy Rice by District in 2016 and Average Crop Production by District in 2016.

Table 1. Harvested area and average production of paddy rice (According to the district of 2016)

| No. | District       | Area Planting (Ha) | Area Harvest (Ha) | Production (Kwt) | Production Average (Kwt/ Ha) |
|-----|----------------|-------------------|------------------|-----------------|-----------------------------|
| 1   | South Cimahi   | 92                | 93               | 5.776           | 62                          |
| 2   | Central Cimahi | 13                | 20               | 1300            | 65                          |
| 3   | North Cimahi   | 149               | 149              | 69              | 0.56                        |
|     |                | 254               | 262              | 7.135           | 27.23                       |

Source: BPS Cimahi City 2018 (Data processing)

Table 2. Average crop production (According to the district of 2016)

| No. | District       | Rice | Corn | Cassava | Sweet Potato | Tomato | Mustard | Banana | Rambutan |
|-----|----------------|------|------|---------|--------------|--------|---------|--------|----------|
| 1   | South Cimahi   | 62   | 2.88 | 170     | 110          | 0      | 120     | 610    | 250      |
| 2   | Central Cimahi | 65   | 3.54 | 180     | 110          | 0      | 0       | 0      | 0        |
| 3   | North Cimahi   | 0.46 | 3.45 | 160     | 110          | 20     | 120     | 37.5   | 325      |

Source: BPS Cimahi City in 2018 (Data analysis)

Cimahi farms include beef cattle, buffaloes, dairy cows, horses, sheep and goats. The most livestock raised are sheep, amounting to 13,487. While the fewest cattles are buffaloes, at 24. In addition, poultry livestock data also included poultry, broilers, laying hens and ducks. In 2015, there were 35,381 domestic poultry, 82,122 broiler, 11,719 ducks. In 2015 all types of livestock experienced a decline in population except ducks. The following table 3, Number of Livestock (Tails) by Sub-district 2016 below:
Table 3. Number of cattle (According to the district of 2016)

| No. | District       | Beef Cattle | Dairy Cows | Buffalo | Sheep | Horse | Chicken | Duck  | Goat |
|-----|----------------|-------------|------------|---------|-------|-------|---------|-------|------|
| 1   | South Cimahi   | 50          | 0          | 4       | 7657  | 460   | 11038   | 5.375 | 58   |
| 2   | Central Cimahi | 18          | 25         | 2       | 1715  | 0     | 8650    | 1.955 | 0    |
| 3   | North Cimahi   | 57          | 842        | 15      | 4.385 | 166   | 16400   | 4.623 | 104  |

Source: BPS Cimahi City 2018 (Data analysis)

Fisheries in Cimahi City consist of ponds and rice fields. In 2015 the pond is the largest fish rearing place, which is 100 percent of the total area of rearing fish (Source: BPS City of Cimahi 2018). The following table 4 shows the area of fisheries according to sub-districts in 2016 below:

Table 4. Area of fisheries (According to the district of 2016)

| No. | District     | Area         |
|-----|--------------|--------------|
|     |              | Pond (Ha)    | Paddy (Ha) |
| 1   | South Cimahi | 2,07         | 0           |
| 2   | Central Cimah| 1,54         | 0           |
| 3   | North Cimahi | 3,14         | 0           |

Source: BPS Cimahi City 2018 (Data analysis)

3.1.2 Industrial potential of Cimahi City

The biggest contribution to economic development in Cimahi City in 2014 was dominated by the manufacturing industry sector. The data source of this industrial sector was obtained from the results of an annual survey of large / medium industrial companies. In collecting industrial statistics, what is meant by large industries are companies with 100 or more workers, medium industries are have between 20 and 99 people, while small industries have between 5 and 19 people, and companies that have less workers than 5 people are called household businesses. The number of industrial companies in 2014 consisted of 63 large industries and 67 medium industries.

The largest number of large / medium industry companies are in the South Cimahi subdistrict, which is 95 companies (73.08%). While the least were district of North Cimahi district, with 15 companies (9.2%). Electricity both for industry and households in Cimahi City are mostly sourced from the state electricity company (PLN) and some from outside PLN. In 2015 the number of families who enjoyed electricity flow from PLN lighting sources was 200,302 families. The electricity supplied by PLN per month reached 1,248 million Kwh / VA. Clean water in Cimahi City is sourced from PDAM
Cimahi City. And every month the need for clean water averages to 245,768 m³. The volume of water channeled during 2015 was 2,949,563 m³, and the biggest consumers were in the household amounting to 2,262,902 m³ or 76.72 percent. The following table 5 below shows the data of the number of large and medium industries by district in 2016.

Table 5. Large and medium industries (According to the district of 2016)

| No. | District       | Number of Industries |
|-----|---------------|----------------------|
|     |               | Small | Medium | Large |
| 1   | South Cimahi  | 0     | 2,07   | 48    |
| 2   | Central Cimahi| 0     | 1,54   | 15    |
| 3   | North Cimahi  | 0     | 3,14   | 0     |

Source: BPS Cimahi City 2018

3.2 Findings of potential analysis of Cimahi City area

To find out the potential level of the Cimahi City area, the PDRB component of Cimahi City is used on the basis of Constant Price in 2010 According to Business Field (Million Rupiah), 2016-2017 Cimahi City and West Java, the value weighing was done using the Location Quotient (LQ) analysis method. For details on calculating LQ analysis, regional potential for GRDP, see Table 6 below:

Table 6. LQ Analysis on Cimahi City GRDP based on 2010 Constant prices according to business field (million rupiah), 2017

| Category | Description                                                                 | Cimahi City | West Java | LQ         | Criteria |
|----------|-----------------------------------------------------------------------------|-------------|-----------|------------|----------|
| A        | Agriculture, Forestry and Fisheries                                         | 33,087.96   | 99,874.97 | 0.024888   | Non Basis |
| B        | Mining and excavation                                                      | -           | 26,589.93 | 0          | Non Basis |
| C        | Processing industry                                                        | 8,272,746.66| 578,858.48| 1.073642   | Basis    |
| D        | Electricity and Gas Procurement Water Supply, Waste                          | 45,410.97   | 5,438.11  | 0.627329   | Non Basis |
| E        | Management, Waste and Recycling                                             | 9,929.54    | 1,080.96  | 0.690084   | Non Basis |
| F        | Construction                                                                | 2,318,046.31| 111,001.03| 1.568835   | Basis    |
| G        | Wholesale and retail trade, car and motorcycle repair                       | 3,166,136.83| 207,945.89| 1.14383    | Basis    |
| H        | Transportation and Warehousing                                              | 620,423.59  | 64,258.58 | 0.725336   | Non Basis |
| I        | Provision of Accommodation and Food and Drink Information and Communication | 212,942.22  | 35,285.42 | 0.453366   | Non Basis |
| J        | Financial Services and Insurance                                            | 1,063,886.57| 53,527.16 | 1.49315    | Basis    |
| K        | Real Estate                                                                 | 534,228.45  | 34,179.94 | 1.174189   | Basis    |
| L        | Company Services                                                            | 29,773.37   | 5,784.33  | 0.386685   | Non Basis |
Table 6. Cont.

| Category | Description                                      | Cimahi City | West Java | LQ       | Criteria   |
|----------|--------------------------------------------------|-------------|-----------|----------|------------|
| O        | Government Administration, Defense and Mandatory Social Security | 394,041.50  | 25,780.58 | 1.148237 | Basis      |
| P        | Educational Services                             | 617,436.23  | 37,909.72 | 1.223556 | Basis      |
| Q        | Health Services and Social Activities            | 142,634.98  | 10,537.79 | 1.016854 | Basis      |
| R,S,T,U  | Other services                                   | 257,817.33  | 28,790.56 | 0.672735 | Non Basis  |

**GROSS REGIONAL DOMESTIC PRODUCT**

|                        | 17,876,342.43 | 1,342,953.37 |
|------------------------|---------------|--------------|

Source: BPS West Java and Cimahi City in Figures 2018 (Data analysis results)

Based on table 6 above, the results of the LQ analysis found that Cimahi City has basic criteria (LQ> 1), namely in the manufacturing, construction, wholesale and retail sectors, car and motorcycle repair, information and communication, financial and insurance services, administration government, defense and mandatory social security, education services, and health services and social activities.

3.3 Field analysis, programs and vocational expertise competencies in Cimahi City

The number of VOCATIONAL SCHOOLS in Cimahi City is 24 schools with 106 skills competencies. There are 3 State Vocational Schools in Cimahi City and 21 Private Vocational Schools. While the number of High Schools in Cimahi City is 16 Schools consisting of 6 Public High Schools and 10 Private High Schools. The following table 7 shows the distribution of the number of high schools and vocational schools in the City of Cimahi.

Table 7. Distribution of the number of high schools and vocational schools in Cimahi City in 2019

| No | District          | Vocational Schools | High Schools |
|----|-------------------|--------------------|--------------|
|    |                   | Public  Private    | Public  Private |
| 1  | South Cimahi      | 1       7          | 2       3          |
| 2  | Central Cimahi    | 0       4          | 3       4          |
| 3  | North Cimahi      | 2       10         | 1       3          |
|    | Total             | 3       21         | 6       10         |

Source: Survey and data processing from [http://dapo.dikdasmen.kemdikbud.go.id/](http://dapo.dikdasmen.kemdikbud.go.id/)

Based on survey results and data from [http://dapo.dikdasmen.kemdikbud.go.id/](http://dapo.dikdasmen.kemdikbud.go.id/) in 2019 and referring to the 2018 Vocational Spectrum, the distribution of vocational skills in Cimahi City can be seen in Table 8 below:
Table 8. Distribution of expertise areas, vocational programs and vocational expertise competencies in Cimahi City in 2019

| Field of Expertise / Expertise Program | Expertise Competence (KK) | Total | Percentage |
|----------------------------------------|---------------------------|-------|------------|
|                                        | South Cimahi | Central Cimahi | North Cimahi |       |
| 1. Technology and Engineering           |              |                 |               |       |
| a. Electrical Engineering               | 7            | 4               | 1             | 12    | 37.74% |
| b. Automotive Engineering               | 2            | 6               | 2             | 10    |       |
| c. Mechanical Engineering               | 2            | 1               | 3             | 6     |       |
| d. Electrical Engineering               | 3            | 3               | 1             | 7     |       |
| e. Industrial Instrumentation Engineering | 1        | 0               | 0             | 1     |       |
| f. Chemical Engineering                 | 0            | 0               | 4             | 4     |       |
| Total                                   | 15           | 14              | 11            | 40    |       |
| 2. Health and Social Work               |              |                 |               |       |
| a. Pharmacy                             | 1            | 0               | 2             | 3     | 4.72% |
| b. Nursing                              | 1            | 0               | 1             | 2     |       |
| Total                                   | 2            | 0               | 3             | 5     |       |
| 3. Business and Management              |              |                 |               |       |
| a. Office Management                    | 4            | 1               | 6             | 11    | 21.70%|
| b. Business and Marketing               | 1            | 0               | 4             | 5     |       |
| c. Commerce                             | 1            | 0               | 0             | 1     |       |
| d. Finance and Accounting               | 1            | 1               | 4             | 6     |       |
| Total                                   | 7            | 2               | 14            | 23    |       |
| 4. Hospitality                          |              |                 |               |       |
| a. Fashion                              | 1            | 0               | 0             | 1     |       |
| b. Hotel Accommodation                  | 0            | 1               | 0             | 1     |       |
| c. Hospitality and Tourism Services     | 0            | 0               | 2             | 2     |       |
| d. Culinary                             | 0            | 0               | 2             | 2     |       |
| Total                                   | 1            | 1               | 4             | 6     |       |
| 5. Hospitality                          |              |                 |               |       |
| a. Hospitality and Tourism Services     | 0            | 0               | 2             | 2     | 1.89% |
| Total                                   | 0            | 0               | 2             | 2     |       |
| 6. Arts and Creative Industries         |              |                 |               |       |
| a. Broadcasting and Film                | 1            | 0               | 0             | 1     |       |
| b. Arts                                 | 0            | 0               | 2             | 2     |       |
| Total                                   | 1            | 0               | 2             | 3     | 2.83% |
| 7. Informatics and Information Engineering |         |                 |               |       |
| a. Computer and Information Engineering | 10           | 2               | 13            | 25    | 25.47%|
| b. Telecommunications Engineering       | 0            | 0               | 2             | 2     |       |
| Total                                   | 0            | 2               | 15            | 22    |       |
| Total                                   | 36           | 19              | 51            | 106   |       |

Source: Survey and data processing from [http://dapo.dikdasmen.kemdikbud.go.id/](http://dapo.dikdasmen.kemdikbud.go.id/)

Based on table 8 above about the distribution of vocational expertise in Cimahi City in 2019, the most popular technology and engineering expertise was 37.74% (40 Expertise Competencies), followed by the Informatics and Information Engineering expertise at 25.47% (27 KK), Business and Management at 21.70% (23 households), Tourism at 5.66% (6 households), Health and Social Work at 4.72% (5 KK), Arts and Creative Industries at 2.83% (3 KK) and Hospitality at 1.89% (2KK).

As for the distribution of areas of expertise / program expertise / Competency Expertise based on each district in the city of Cimahi can be seen in Figure 2 below:
Figure 2. Distribution of vocational technology and engineering expertise in Cimahi City in 2019

Vocational Technology and Engineering Expertise in South Cimahi subdistricts is Electronic Engineering expertise (7 KK), in Central Cimahi subdistrict it is automotive engineering expertise (7 KK) while in North Cimahi subdistrict it is Mechanical Engineering expertise (3 KK). Vocational Information and Communication Technology Expertise in Cimahi subdistrict can be seen in Figure 3 below.

Figure 3. Distribution of expertise competencies in the field of information and communication technology expertise in Cimahi City vocational school (District)
In the picture above, the Information and Communication Technology Expertise of Vocational Schools in South Cimahi subdistricts is Computer and Information Engineering (10 KK) expertise, in the Cimahi Tengah subdistrict it is the Computer and Information Engineering (2 KK) expertise, whereas in North Cimahi subdistrict it is Telecommunications Engineering expertise (2 KK).

The Vocational Business Management Skills Field in Cimahi subdistrict can be seen in Figure 4 below:

![Vocational Business Management Skills Field](image-url)

Source: Survey and data from [http://dapo.dikdasmen.kemdikbud.go.id/](http://dapo.dikdasmen.kemdikbud.go.id/)

Figure 4. Distribution of business and management skills fields in Cimahi City vocational school (Per district)

In Figure 4 above, the Vocational Business and Management Vocational Fields in South Cimahi subdistricts is Office Management expertise (4 KK), in Cimahi Tengah subdistrict, office management and accounting and financial expertise programs have the same number of competencies, namely 1 (one), while in Cimahi Utara subdistrict it is the Office Management expertise (6 KK).

Vocational Tourism Expertise in Cimahi sub-district can be seen in Figure 5 below:
In figure 5 above, the VOCATIONAL SCHOOL Tourism Expertise Sector in South Cimahi subdistricts is Fashion Management expertise (1 KK), in Cimahi Tengah subdistrict it is Hospitality Accommodation expertise (1 KK), while in the northern Cimahi subdistrict, Hospitality and Tourism Services expertise and Culinary has the same number of competencies, namely 2 (two).

Vocational Health and Social Work Expertise in Cimahi City can be seen in Figure 6 below:

In figure 6 above, the Vocational School Health and Social Work Skills Field in the Cimahi Selatan subdistrict is Pharmacy and Nursing expertise, 1 (one) Expertise Competency, in Cimahi Tengah Subdistrict, Health and Social Work Expertise program is absent, while in the North Cimahi subdistrict, Pharmacy's most expertise program is 2 Expertise Competencies.
Field of Vocational Arts and Creative Industries in Cimahi City can be seen in figure 7 below:

![Vocational Arts and Creative Industries](image)

Source: Survey and data from [http://dapo.dikdasmen.kemdikbud.go.id/](http://dapo.dikdasmen.kemdikbud.go.id/)

Figure 7. Distribution of health and social work in Cimahi City vocational school (Per district)

In Figure 7 above, the Vocational Arts and Creative Industry Vocational Fields in the South Cimahi subdistrict is Broadcasting and Film Arts expertise program with 1 (one) Expertise Competency, in Cimahi Tengah subdistrict, Creative arts and industry expertise programs are absent, whereas in North Cimahi subdistrict, of the Fine Arts expertise program there are 2 Expertise Competencies.

Vocational Hospitality Expertise in Cimahi City can be seen in Figure 8 below:

![Vocational Hospitality](image)

Source: Survey and data from [http://dapo.dikdasmen.kemdikbud.go.id/](http://dapo.dikdasmen.kemdikbud.go.id/)

Figure 8. Distribution of health and social work in Cimahi City vocational school (Per district)

In figure 8 above, the Vocational Hospitality Expertise Sector in South and Central Cimahi Districts are absent, while in the North Cimahi subdistrict, the Hospitality and Tourism Services expertise program has 2 Expertise Competencies.
3.4 Analysis of vocational study program with industrial availability per district in Cimahi City

3.4.1 Vocational study program with industrial availability in South Cimahi District

South Cimahi District has an area of 16.2199 km² consisting of 5 villages. The local potential of South Cimahi District is the availability of supporting facilities for agricultural activities in the form of agricultural production kiosks, rice barns and rice mills. In South Cimahi District, there are both traditional and modern markets. Nevertheless, the existence of economic facilities in the form of stalls and shops is spread in each subdistrict, even to the level of RW and RT. This can be seen in table 9 below (Source: BPS South Cimahi in 2018):

Table 9. Number of vocational schools and industries in South Cimahi district based on 2018 data

| No | NPSN    | Vocational School Name | Public/Private | Competency                                                                 | Availability of the Business World and industry |
|----|---------|-------------------------|----------------|----------------------------------------------------------------------------|-----------------------------------------------|
|    | 20224083| VOCATIONAL SCHOOL WIRAP | Private        | Software Engineering, Audio Video Engineering, Motorcycle Engineering and Business, Light Vehicle Engineering, Industrial Mechanical Maintenance Techniques, Mechanical Engineering Multimedia | 2 Non-permanent market, 40 Supermarkets, 40 Restaurants / stalls, 12 Shopping, 1 Hotel, 6 Commercial Banks, 3 BPR, 28 Non KUD, 257 Small Industries, 19 Medium Industries, 124 Large industries, 421 Home Industries |
| 1  | 20271621| VOCATIONAL SCHOOL PASUNDAN 2 | Private        | Software Engineering, Office Automation and Governance, Online Business and Marketing, Office Automation and Governance, Computer and Network Engineering, Marketing, Software Engineering | |
|    | 20224134| VOCATIONAL SCHOOL MOHAMAD TOHA | Private        | Computer and Network Engineering, Marketing, Software Engineering, Industrial Electronic Engineering, Engineering | |
| 3  | 20224103| VOCATIONAL SCHOOL TI PEMBANGUNAN | Private        | Computer and Network Engineering, Mechatronics Engineering, Refrigeration and Air Conditioning Techniques | |
Based on table 9 above, Vocational Schools in South Cimahi District only have 8 public and private schools. Based on the results of a survey that has been done, it can be stated that the potential for the development of Vocational Schools in South Cimahi subdistrict based on local potential and industry readiness is the schools with the expertise in Engineering, considering the considerable industrial potential.

In addition, the area of business and management expertise has the potential to be developed, because the potential of supermarkets and financial institutions is quite adequate.
Figure 9. Distribution of vocational expertise programs in South Cimahi District

3.4.2 Vocational study program with industrial availability in Central Cimahi District

Central Cimahi Subdistrict has an area of 10.11 km², consisting of 6 villages. The most jobs in Central Cimahi are in other fields at 41.48%, and the least in agriculture which is 0.75%. As shown in table 10 below.

Table 10. Number of working age population by village and employment sector in Central Cimahi District

| Labor Sector       | Number of Workers | Percentage |
|--------------------|-------------------|------------|
| Agriculture        | 279               | 0.75%      |
| Trading            | 2918              | 7.80%      |
| Services           | 1836              | 4.91%      |
| Army/Police        | 5508              | 14.73%     |
| Construction       | 8799              | 23.53%     |
| Industry / Craft   | 2539              | 6.79%      |
| Others             | 15511             | 41.48%     |
| **Total**          | **37390**         |            |

Source: BPS Central Cimahi 2018

The number of Vocational Schools in Central Cimahi District is 4 private schools with 4 expertise programs, namely: Technology and Engineering, Information and Technology Engineering, Business and Management of Automotive Engineering for Light Vehicles and Tourism
Table 11. Number of vocational schools and industries in Central Cimahi District

| No | NPSN      | Vocational School Name                  | Public/Private | Expertise Program                        | Competency                                      | DuDI Availability |
|----|-----------|-----------------------------------------|----------------|------------------------------------------|------------------------------------------------|-------------------|
| 1  | 20224132  | VOCATIONAL SCHOOL PASUNDAN PUTRA        | Private        | Finance and Accounting , Office Management | Accounting and Financial Institutions Office Automation and Governance | 2 Permanent Markets |
|    |           |                                         |                | Hospitality Accommodation , Automotive Engineering | Hospitality Motorcycle Engineering and Business | 54 Supermarkets |
|    |           |                                         |                | Electrical Engineering , Electricity Engineering | Industrial Electronic Engineering Electricity Utilization Installation Technique | 42 Restaurants |
|    |           |                                         |                | Office Management , Hospitality Accommodation , Automotive Engineering Computer and Information Engineering | | 868 Shops |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Computer and Information Engineering | | 4 Hotels / villas |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Computer and Information Engineering | | 505 Dorms |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Computer and Information Engineering | | 522 Rental houses |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Computer and Information Engineering | | 26 Financial institutions |
| 2  | 20224131  | VOCATIONAL SCHOOL PGRI 3 CIMAHI         | Private        | Electricity Engineering , Automotive Engineering Computer and Information Engineering | Electric Power Installation Engineering Light Vehicle Automotive Engineering Computer and Information Engineering | |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Computer and Information Engineering | | |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Computer and Information Engineering | | |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Computer and Information Engineering | | |
| 3  | 20224128  | VOCATIONAL SCHOOL PUSDIKHUBAD           | Private        | Electrical Engineering , Automotive Engineering Electronic Engineering Automotive Engineering Mechanical Engineering | Industrial Electronic Engineering Light Vehicle Automotive Engineering Computer and Information Engineering | |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Mechanical Engineering | | |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Mechanical Engineering | | |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Mechanical Engineering | | |
| 4  | 20224127  | VOCATIONAL SCHOOL KARYA BHAKTI PUSDIKPAL | Private        | Automotive Engineering , Electrical Engineering Automotive Engineering Mechanical Engineering | Automotive Engineering Mechanical Engineering | |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Mechanical Engineering | | |
|    |           |                                         |                | Automotive Engineering , Electrical Engineering Automotive Engineering Mechanical Engineering | | |

Source: survey and data from [http://dapo.dikdasmen.kemdikbud.go.id/](http://dapo.dikdasmen.kemdikbud.go.id/)
Based on table 11 above showing the survey results that have been carried out, it can be stated that the most local potential in Central Cimahi Subdistrict is the shopping complexes, thus that the development of vocational schools in the field of business and management expertise has a pretty good chance. Whereas Technology and Engineering expertise programs needs a little consideration, as the industry potential is small. The following is presented in Figure 10, showing the number of Expertise Programs and expertise competencies in Vocational Schools in Central Cimahi District:

![Figure 10. Distribution of vocational expertise in Middle Cimahi District in 2019](image1)

![Figure 11. Distribution of vocational expertise competencies in Middle Cimahi District in 2019](image2)

3.4.3 Vocational study program with industrial availability in North Cimahi District

North Cimahi District has an area of 13.3 km², consisting of 4 villages namely Pasir Kaliki, Citeureup, Cibabat and Cipageran. The local potential possessed by this subdistrict is industry, rice and secondary crops. Agricultural potential is quite good because the soil in North Cimahi District is fertile and easy to plant. The most jobs were in agriculture namely 41.65%, trade 12.41%, services
11.12% and industry 5.99% and other jobs at 28.83%. The most potential of the business world is 82 food and beverage processing, 56 woven industries, 7 wood industries, 4 restaurants and 9 food stalls. Green tea is the most prominent processing product in Sindangkerta.

The number of Vocational Schools in North Cimahi District is 12 private / public schools. There are 7 Vocational Expertise Fields located in North Cimahi District namely Technology and Engineering, Information and Technology Engineering, Business and Management, Tourism, Health and Social Work, Arts and Creative Industries, and Hospitality.

Table 12. Number of vocational schools and industries in North Cimahi District

| NO | NPSN       | Vocational School Name | Public/Private | Expertise Field | Expertise Program | Expertise Competency | DuDi Availability |
|----|------------|------------------------|----------------|-----------------|-------------------|----------------------|-------------------|
| 1  | 20228011   | VOCATIONAL SCHOOL KESEHATAN BHAKTI KENCANA | Private | Technology and Engineering Health and Social Work | Chemical Engineering | Laboratory Testing Analysis | 11 Agricultural Production Facilities |
|    |            |                        |                |                 | Nursing            | Nursing Assistant    | 14 Cooperatives    |
|    |            |                        |                |                 | Pharmacy           | Clinical and Community Pharmacy Chemical Analysis | 156 Small Industries / Household Crafts, such as; leather, wood, cloth / weaving, food |
|    |            |                        |                |                 | Chemical Engineering | Chemical Industry | 104 Others        |
|    |            |                        |                |                 | Art                | Animation            | 2 Shops            |
|    |            |                        |                |                 | Chemical Engineering | Chemical Industry | 1 Permanent / Semi Permanent Market |
|    |            |                        |                |                 | Computer and Information Engineering Computing and Information Engineering | Multimedia | 6 Minimarkets |
|    |            |                        |                |                 | Electrical Engineering | Software Engineering | 456 Grocery Stores |
|    |            |                        |                |                 | Mechanical Engineering | Mechatronics Engineering | 3 Restaurants |
|    |            |                        |                |                 | Computer and Information Engineering | Mechanical Engineering | 25 Food Stalls |
|    |            |                        |                |                 | Computer and Information Engineering | Computer and Network Engineering | |
| 2  | 20238571   | VOCATIONAL SCHOOL PUBLIC 2 CIMAHI | Public | Technology and Engineering Information Engineering Technology and Engineering Information Engineering Technology and Engineering Information Engineering Technology and Engineering Information Engineering | Chemical Engineering | Laboratory Testing Analysis | 11 Agricultural Production Facilities |
|    |            |                        |                |                 | Computer and Information Engineering | Nursing Assistant | 14 Cooperatives |
|    |            |                        |                |                 | Electrical Engineering | Clinical and Community Pharmacy Chemical Analysis | 156 Small Industries / Household Crafts, such as; leather, wood, cloth / weaving, food |
|    |            |                        |                |                 | Mechanical Engineering | Chemical Industry | 104 Others |
|    |            |                        |                |                 | Computer and Information Engineering | Animation | 2 Shops |
|    |            |                        |                |                 | Computer and Information Engineering | Chemical Industry | 1 Permanent / Semi Permanent Market |
|    |            |                        |                |                 | Electrical Engineering | Multimedia | 6 Minimarkets |
|    |            |                        |                |                 | Mechanical Engineering | Software Engineering | 456 Grocery Stores |
|    |            |                        |                |                 | Computer and Information Engineering | Mechatronics Engineering | 3 Restaurants |
|    |            |                        |                |                 | Computer and Information Engineering | Mechanical Engineering | 25 Food Stalls |
|    |            |                        |                |                 | Computer and Network Engineering | Computer and Network Engineering | |
| NO | NPSN   | Vocational School Name                        | Public/Private | Expertise Field                      | Expertise Program | Expertise Competency                                      | DuDi Availability |
|----|--------|-----------------------------------------------|----------------|-------------------------------------|-------------------|----------------------------------------------------------|-------------------|
| 4  | 20268261 | VOCATIONAL SCHOOL TIGARUDA NUSANTARA          | Private        | Arts and Creative Industries         | Art               | Animation                                                | 11 Agricultural Production Facilities |
|    |        |                                               |                | Informatics and Information Engineering | Computer and Information Engineering | Multimedia                                                 | 14 Cooperatives |
|    |        |                                               |                | Business and Management              | Office Management  | Office Automation and Governance                          | 156 Small Industries | Household Crafts, such as; leather, wood, cloth / weaving, food |
|    |        |                                               |                | Informatics and Information Engineering | Computer and Information Engineering | Software Engineering                                       | 104 Others       |
|    |        |                                               |                | Business and Management              | Finance and Accounting |                                                             | 2 Shops          |
|    |        |                                               |                | Informatics and Information Engineering | Business and Marketing |                                                             | 1 Permanent / Semi Permanent |
|    |        |                                               |                | Technology and Engineering           | Pharmacy           |                                                             | Market            |
|    |        |                                               |                | Technology and Engineering           | Office Management  | Software Engineering                                       | 6 Minimarkets     |
|    |        |                                               |                | Mechanical Engineering               | Computer and Information Engineering |                                                             | 456 Grocery      |
|    |        |                                               |                | Mechanical Engineering               | Automotive Engineering | Light Vehicle Automotive Engineering | 3 Restaurants |
|    |        |                                               |                |                                      | Mechanical Engineering | Mechanical Engineering | 25 Food Stalls |
| 5  | 20224129 | VOCATIONAL SCHOOL PGRI 2 CIMAHI               | Private        | Health and Social Work               | Pharmacy           | Accountability and Financial Institutions Online Business | 1 Permanent / Semi Permanent |
|    |        |                                               |                | Business and Management              | Office Management  | Marketing and Community Pharmacy Office Automation and Governance | Market | 6 Minimarkets |
|    |        |                                               |                | Informatics and Information Engineering | Computer and Information Engineering |                                                             | 456 Grocery | Stores |
|    |        |                                               |                | Technology and Engineering           | Automotive Engineering | Light Vehicle Automotive Engineering | 3 Restaurants | 25 Food Stalls |
|    |        |                                               |                | Mechanical Engineering               | Mechanical Engineering | Mechanical Engineering | Hospitality Accommodation |
| 6  | 20224102 | VOCATIONAL SCHOOL TUTWURI HANDAYANI           | Private        | Hospitality                          | Hospitality and Tourism Services | Hospitality and Tourism Services | Light Vehicle Automotive Engineering |
| 7  | 20224126 | VOCATIONAL SCHOOL SANGKURIANG 2              | Private        | Hospitality                          | Hospitality and Tourism Services | Hospitality and Tourism Services | Hospitality Accommodation |
|    |        |                                               |                |                                     | Hospitality         | Hospitality                                               | Hospitality |
| NO | NPSN      | Vocational School Name                     | Public/ Private | Expertise Field | Expertise Program | Expertise Competency | DuDi Availability |
|----|-----------|--------------------------------------------|-----------------|-----------------|-------------------|----------------------|-------------------|
| 8  | 20224125  | VOCATIONAL SCHOOL SANGKURIANG 1            | Private         | Business and Management | Finance and Accounting | Accounting and Financial Institutions Online Business and Marketing Office Automation and Governance | 11 Agricultural Production Facilities 14 Cooperatives 156 Small Industries / Household Crafts, such as: leather, wood, cloth / weaving, food 104 Others 2 Shops 1 Permanent / Semi Permanent Market 6 Minimarks 456 Grocery Stores 3 Restaurants 25 Food Stalls |
| 9  | 20224135  | VOCATIONAL SCHOOL PUBLIC 3 CIMAH 1         | Public          | Business and Management | Hospitality Services Hospitality and Tourism Services Culinary Computer and Information Engineering | Hospitality Accommodation Catering | Multimedia Office Automation and Governance Hospitality Culinary Arts Accounting and Financial Institutions Online Business and Marketing Office Automation and Governance Software Engineering |
| 10 | 20224130  | VOCATIONAL SCHOOL PGRI 1 CIMAH 1           | Private         | Business and Management | Business and Marketing | Business and Marketing | Office Management | Professional Development Office Automation and Governance Software Engineering |
| 11 | 20224133  | VOCATIONAL SCHOOL PASUNDAN 1               | Private         | Business and Management | Office Management | Computer and Information Engineering | Accounting and Financial Institutions Online Business and Marketing Office Automation and Governance Computer and Network Engineering |
Table 12. Cont.

| NO | NPSN     | Vocational School Name            | Public/Private | Expertise Field | Expertise Program | Expertise Competency | DuDi Availability |
|----|----------|-----------------------------------|----------------|-----------------|-------------------|----------------------|-------------------|
| 12 | 20224104 | VOCATIONAL SCHOOL TARUNA MANDIRI | Private        | Technology and Engineering | Electricity Engineering | Electricity Utilization Installation Technique | Multimedia |

Table 13. Number of vocational skills / competency programs of vocational expertise and availability of industrial and business world in North Cimahi District

| Field of Expertise / Expertise Program | Number of Expertise Competencies | DuDi Availability |
|----------------------------------------|----------------------------------|--------------------|
| Technology and Engineering             |                                  |                    |
| Electronic Engineering                 | 1                                |                    |
| Automotive Engineering                 | 2                                |                    |
| Mechanical Engineering                 | 3                                |                    |
| Electricity Engineering                | 1                                |                    |
| Chemical Engineering                   | 4                                |                    |
| Total                                  | 11                               |                    |
| Health and Social Work                 |                                  |                    |
| Pharmacy                               | 2                                | 11 Agricultural Production Facilities |
| Nursing                                | 1                                | 14 Cooperatives    |
| Total                                  | 3                                | 156 Small Industries / Household Crafts, such as; leather, wood, cloth / weaving, food |
| Business and Management                |                                  |                    |
| Office Management                      | 6                                | 104 Others         |
| Business and Marketing                 | 4                                |                    |
| Finance and Accounting                 | 4                                |                    |
| Total                                  | 14                               |                    |
| Tourism                                |                                  |                    |
| Hospitality dan Tourism Services        | 2                                |                    |
| Culinary                               | 2                                |                    |
| Total                                  | 4                                |                    |
| Hospitality                            |                                  |                    |
| Hospitality dan Tourism Services        | 2                                |                    |
| Total                                  | 2                                |                    |
| Arts and Creative Industries           |                                  |                    |
| Art                                    | 2                                |                    |
| Total                                  | 2                                |                    |
| Informatics and Information Engineering|                                  |                    |
| Computer and Information Engineering   | 13                               |                    |
| Telecommunication Engineering          | 2                                |                    |
| Total                                  | 15                               |                    |


From table 13 above, based on local potential and industry readiness, North Cimahi Subdistrict’s the field of business and management expertise has a great opportunity to be developed. While hospitality expertise competencies are not yet needed in Vocational Schools, because North Cimahi Subdistrict does not yet have hotel facilities. In addition, the potential expertise programs developed is arts and creative industry expertise, because the potential of the home industry is quite adequate.

3.5 Analysis of vocational development in Cimahi City based on Principal Component Analysis (PCA)

Analysis of the level of vocational development in Cimahi City was carried out using the PCA calculation method. Educational indicators used as the basis for PCA calculation were Total Population Age 16-18 (X1), Student Ratio per School (X2), Student Ratio per Class (X3), Student Ratio per Teacher (X4), and Rough Participation Rate (APK / X5), which can be seen in the following table 14:

| SWP | District             | Total Students | Population Age 16-18 (X1) | Student Ratio Per School (X2) | Student Ratio Per Class (X3) | Student Ratio Per Teacher (X4) | APK / X5 | Ratio of High School / Vocational School |
|-----|----------------------|----------------|---------------------------|-----------------------------|-----------------------------|--------------------------------|----------|----------------------------------------|
| 1   | South Cimahi         | 6375           | 14258                     | 796,88                      | 25,71                       | 24,24                          | 44,71    | 5 / 8                                  |
| 2   | Central Cimahi       | 1927           | 8824                      | 481,75                      | 22,67                       | 24,09                          | 21,84    | 7 / 4                                  |
| 3   | North Cimahi         | 11203          | 9363                      | 933,58                      | 32,19                       | 22,45                          | 119,65   | 4 / 12                                 |
|     | Total                | 19505          | 32445                     | 2212,21                     | 80,57                       | 70,78                          | 186,20   | 16 / 24                                |

Source: survey and data from [http://dapo.dikdasmen.kemdikbud.go.id/](http://dapo.dikdasmen.kemdikbud.go.id/)

Based on the indicators of educational equality, the lowest percentage of APK obtained for secondary education is in the Central Cimahi District, which is 21.84%.

One of the benefits of Principal Component Analysis (PCA) is to set priorities for handling things that are more basic than the structure of the problems faced, so that the efficiency and effectiveness of problem handling can be further improved (Dermoredjo & Noekman, 2009; Dermoredjo 2017). PCA was used as an analysis to determine the priority of Vocational Development with the PCA method, based on the education indicators of each district used, it was possible to know the location in which Vocational School was prioritized, determining priority points by looking at the smallest score of PCA 1 (Dermoredjo & Noekman, 2009). The results of PCA 1 calculations using the Minitab Statistical Software version 14 can be seen in table 15 below:
Table 15. PCA score 1 for each district

| SWP | District          | Total Students | Population Age 16-18 (X1) | Student Ratio Per Class (X3) | APK (X5) | Ratio of High Schools / Vocational Schools | Informati on |
|-----|-------------------|----------------|-----------------------------|-----------------------------|-----------|------------------------------------------|--------------|
| 1   | South Cimahi      | 6375           | 14258                       | 796.88                      | 25.71     | 24.24                                    | 44.71        |
| 2   | Central Cimahi    | 1927           | 8824                        | 481.75                      | 22.67     | 24.09                                    | 21.84        |
| 3   | North Cimahi      | 11203          | 9363                        | 933.58                      | 32.19     | 22.45                                    | 119.65       |
|     | Total             | 19505          | 32445                       | 2212.21                     | 80.57     | 70.78                                    | 186.20       |

Based on table 15 above, the education indicators, the lowest PCA 1 score obtained for the three districts is in the District of South Cimahi (-1026.02). This means that the priority location for the development of VOCATIONAL SCHOOL is South Cimahi District. Then followed by Central Cimahi Subdistrict (-644.19) became priority location II for the development of VOCATIONAL SCHOOL. And Priority III is the District of North Cimahi (-435.5).

Eigenvalue values for the five components can be seen in Figure 12 below. The factoring process is stopped at components with eigenvalue value below 1 (0.0000). Eigenvalue is the value of the main component variant (Principal Component, PC).

**Figure 12. Eigenvalue (MINITAB output)**

In Figure 12 above, the Eigenvalue (Output) values shows the eigenvalues for the first (PC1) and second (PC2) main components as 3.6980 and 1.3020. Eigenvalue of the two main components represents 74.0% and 26.0% of all variability’s. When accumulated, the two main components represent 100% of the total variability. This means that if the five variables are reduced to 2 variables, then both variables can already explain 100% of the total variability. Next the score for the PCA component can be seen in the component matrix in Figure 13 below:

**Figure 13. Matrix component**
In Figure 13 above, the score for the component formed can be calculated by looking at the coefficient values for each variable. For PC1 component with an eigenvalue, the score can be calculated as follows:

$$PC1 = -0.099 \text{ population aged 16-18 years} + 0.455 \text{ School} + 0.519 \text{ Class} - 0.494 \text{ Teacher} + 0.520 \text{ APK}$$

The second component (PC2) has an eigenvalue of 1.3020 and can explain 26.0 percent diversity. Together with the first component (PC1), both represent 100 percent of total diversity. Scores for PC2 are calculated as follows:

$$PC2 = -0.860 \text{ Population age 16-18} - 0.425 \text{ School} - 0.067 \text{ Class} - 0.273 \text{ Teacher} + 0.014 \text{ APK}$$

Determination of the number of components to be used is very subjective. In this case, the two components of PC1 and PC2 that represent 100 percent of total diversity can be judged to be sufficient to capture the data structure, even using only the first component is sufficient to capture the data structure by looking at the criteria for an eigenvalue value greater than 1. Other components having a small proportion of diversity can be considered insignificant. This can be seen in Figure 14 below.

From the scree plot, it can be seen that eigenvalue above 1 is only 2. This proves that only two factors can be formed.
In Figure 15 above, it can be seen in the score plot that eigenvalue which above 0.0 have 2 components. This proves that only two factors can be formed, namely PC1 and PCA2.

4. Conclusion

Regional potentials in Cimahi City are mostly industrial areas, prominent economic potentials are office potential, home industry/craft, creative industry, and food/beverage processing. The main finding of this study is that there are still gaps between vocational school vocational expertise programs in Cimahi City that are not in accordance with the availability of industry in each district. Findings from the results of the Location Quotient (LQ) analysis show that the potential of the Cimahi City area that has basic criteria (LQ>1) are the processing industry, construction, wholesale and retail trade, car and bicycle repairs, Information and Communication, Financial Services and Insurance, Government Administration, Mandatory Defense and Social Security, Educational Services, and Health Services and Social Activities. This means that the development of vocational schools can be directed at the field / program / competency of expertise in accordance with the potential of the area above. The findings based on Principle Component Analysis (PCA) show that the development of CMS in Cimahi City that becomes priority I is that Vocational Schools in Cimahi Selatan subdistrict are to obtain a PCA score of -1026.02. then followed by Central Cimahi District (-644.19), which became priority location II, and North Cimahi District (-435.5) as Priority III.

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