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Study of Regional Disparities among Districts in East Java Province

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Abstract

Some evidences have emerged indicating that there are regional disparities in East Java Province and industrialization seems to give its contribution in creating regional disparities. In 2014, Manufacturing industry dominated the contribution to the GDP which was 29%, on the other hand mostly the people who worked in the agricultural sector, and so the land which mostly agricultural. This study aims to identify factors influencing the disparities in East Java Province. This statement is also strengthened by the Williamson index which showed that the regional disparities were quite high, with two districts indicated to contributing the most, Kediri and Surabaya City. By using factor analysis, this research will try to answer what factors influencing the disparities statistically, and cluster analysis is trying to figure out the disparities spatially. Then it is going to be proven that some districts agglomerated in a certain area and can implicate the disparities in East Java.

Keywords: agglomeration industries; regional disparities; unbalanced development

1. Introduction

New theories of regional development focus on human and social capital, innovation and the spatial dynamics, and demographic change to respond to the pressures from a global economy the (McCall, 2010). Development in many countries, mostly developing countries, seems failed in dealing with social problems. Todaro (1994) stated that development, besides accelerating economic growth, also deals with disparities and poverty alleviation. Balanced development of regions is one of the significant tasks of regional policies for exploiting optimally the economic, human, natural and geographic potential in order to increase the competitiveness and to improve economic situation (Svatošová, 2012). The existence of regional disparities within a country remains an important theoretical and practical issue examined in planning and in allocation of resources and funds. Uneven development has significant implications for country stability, social relations and the efficient utilization of economic resources (Goletsis & Chletsos, 2011). The reduction of social and economic disparities has become a key issue in Indonesia as a developing country. For this reason, the measurement of regional development and the identification of regional disparities has been a priority issue for many countries.

Indonesia as one of developing countries has quite high economic growth, the economic growth reached 6,2% in 2012 (Bank Indonesia, 2012). A question following that condition is whether high economic growth indicates that development already runs well. There are still 12,49% of total Indonesia population live in poverty, 6,14% unemployment. This could mean that economic growth cannot really represent the development of a country. East Java Province is an example of regions that suffering regional disparities which also has massive industrialization. According to Statistics of East Java Province, share of industry manufacturing sector in East Java reached 29,04% in 2014 which was quite high compared to other sectors. Share wholesale and retail trade sector in the second place was only 18,4%. On the other hand, industrialization happened in only certain regions and there were only 2.699.676 people, 13% of labor force, worked in industrial sector. Agricultural sector which had 7.083.252, 35% of labor force or the highest, only

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contributing 13% of East Java GDP. This condition can indicate that there might be unbalanced development in East Java. Regional economic disparities exist because of strong interest for policy-makers in local as well as national governments to increase the income of the region. However, equalization across regions, particularly in terms of per capita income or utility level, and aggregate efficiency in national economy often yield a trade-off relationship. Thus, pursuing aggregate efficiency to maximize the national GDP results in uneven development among regions, which leads to unequalization (Nakamura, 2008).

Surabaya City, Kediri City, Sidoarjo Regency, Pasuruan Regency, Mojokerto Regency and Gresik Regency are five regions that have the highest manufacturing industry sector. Spatially, these five regions are close to each other's that might indicate there are agglomeration industry in East Java Province. From the statement before, this study aims to identify factors influencing the disparities in East Java Province.

2. Methods

The research about regional disparities and industrialization has background that there is phenomenon of unbalanced development. It is represented by the GDP structure and social problems exist in East Java Province. So, this research starts from some initial hypothesizes of the existence of regional disparities in East Java Province and what variables that have significant influence to the variances/samples that will used to measure the development of each region.

That hypothesis functions as preliminary answers of the research questions. The actual answers will be resulted after analysis in this research that is the variables that have significant influence to the variances/samples and whether industrialization has role in creating the disparities in East Java Province. According to this approach, this research is classified as quantitative research.

The very first analysis conducted in this research is trying to prove whether there are regional disparities by using one common indicator, which is Williamson Index. This analysis will describe the unbalanced development of East Java Province related to the GDP (Williamson, 1965). The result will show how wide the disparities among regions in East Java Province are. The second analysis is factor analysis. In this analysis, the purpose is not to look what factor influencing to the disparities or development, but it is used as tool to find variables that are most significant to the variance of the sample. Then the variable determined will be used as variables to measure the development. The third analysis is cluster analysis. This analysis is trying to observe the disparities by grouping or clustering the districts based on the variables determined in the first analysis. By doing this analysis, the disparities can be seen spatially. Then, each group will be explained by every variable determined related to the development.

3. Result and Discussion

3.1 Regional Disparities in East Java Province

Regional disparities in an area actually can be justified by several indicators of methods. One indicator that is usually used is Williamson Index. Williamson Index tries to explain the regional disparities of certain area based on the regional income of Growth Domestic Product.

Table 1. Williamson Index Analysis of East Java 2010 - 2014

	2010	2011	2012	2013	2014
$\sum_i^n (y_i - y)^2 (f_i/n)$	643.288 $\times 10^9$	707.643 $\times 10^9$	791.916 $\times 10^9$	875.147 $\times 10^9$	984.349 $\times 10^9$
$\sqrt{\sum_i^n (y_i - y)^2 (f_i/n)}$	25.36	26.60	28.14	29.58	31.37
	3.122	1.564	1.006	2.888	4.344
V_w	0,9595	0,9541	0,9538	0,9495	0,9554

Source: Author's Analysis, 2017

Williamson Index analysis results high rate of regional disparities in East Java Province. According to Table 1 and Figure 1, in 2014, the Index was 0,9554 which was urgently high. The trend in 5 years before showed quite the same by the level reached 0,95, even there had been slightly decreasing in 2010-2014 which meant there was might be some improvement to solve the regional. disparities, but the disparities got wider again in 2014.

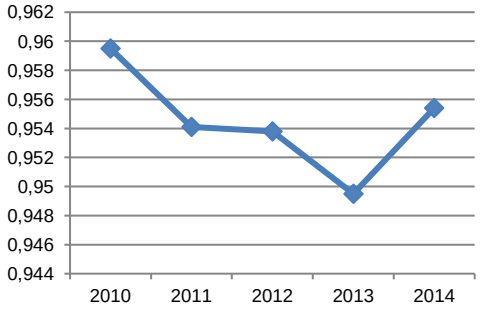

Figure 1. Williamson Index of East Java Province year 2010-2015
(Source: Author's Analysis, 2017)

This high Index might be because there are 2 districts (Surabaya and Kediri City) that have very high GDP compared to other districts. By excluding those 2 districts, the result decreased significantly. In 2014, the Williamson index was 0,553 or 0,4 points lower than including Kediri City and Surabaya. This result proved that Kediri and Surabaya obviously had big role in creating regional disparities in East Java Province.

As the manufacturing industry contributing the most in high GDP districts such as Kediri City, Gresik Regency, and Sidoarjo Regency, excluding the manufacturing should have decreased the Williamson Index. However, after conducting with excluding the manufacturing industry sector, the Williamson Index did not decrease significantly. It became 0,816 in 2014 which was only decreased 0,14 point.

3.2 Variables that Have Significant Influence to the Variance

After observing the dynamic of regional disparities in East Java Province, the next analysis is going to observe the regional disparities that happen by observing the development condition of each district by certain variables. There are 21 variables that have been identified based on literature study. These all 21 variables cannot be justified 100% as variables that has influence to the variance, so initial analysis is necessary to reduce some variables that may have insignificant influence to the variance. The method that is used to reduce the variable is factor analysis.

The SPSS calculation results that the value of KMO, and Bartlett's Test of Sphericity are enough to be continued to factor analysis, but according to the result of Measures of Sampling Adequacy (MSA) there are several variables which have values less than 0,5 and must be eliminated. Those variables are 'Number of Birth' (0,46), 'Number of hotel beds' (0,424), 'number of health center' (0,435), labor force (0,419), GDP growth (0,257), elevation (0,433), and 'Babies death per 1000 birth' (0,495), 'Population Growth' (0,470), 'area' (0,421), 'bad nutrition' (0,453). After those variables eliminated, the SPSS calculation is started once more, and the result already fulfill all requirement (KMO, Bartlett's Test of Sphericity and Measures of Sampling Adequacy (MSA)).

Communalities show how much a variable can explain the factor created. The values are between 0 – 1, the closer to 1, the bigger a variable explains the factor. Based on Table 2, there is not one variable has extraction value less than 0,5. It means that all variable is able to explain the factor created.

Table 2. Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6,905	53,115	53,115	6,905	53,115	53,115	5,846	44,971	44,971
2	2,109	16,220	69,335	2,109	16,220	69,335	3,084	23,726	68,697
3	1,129	8,682	78,017	1,129	8,682	78,017	1,212	9,321	78,017
4	,952	7,321	85,338						
5	,475	3,654	88,992						
6	,457	3,515	92,508						
7	,350	2,693	95,201						
8	,232	1,786	96,987						
9	,149	1,147	98,134						
10	,116	,892	99,026						
11	,094	,726	99,753						
12	,023	,175	99,927						
13	,009	,073	100,000						

Extraction Method: Principal Component Analysis.
Source: Author's Analysis, 2017

Table 'component' column shows there are 13 components can represent variables. In 'initial eigenvalues' column, variant that can be explained by factor 1 is 6,905×100% = 53,115. Factor 2 is 2,109 × 100% = 16,220. Factor 3 is 1,129 × 100% = 8,682. As the eigenvalues set up is 1, so the total values collected are more than 1 which is component 1, 2, 3. It means that there are 3 factors created.

After the factor created, the next step is determining the variables which classified in factor 1, 2, or 3. The result of variables grouped into the factors shown in table rotated component matrix (Table 3).

Table 3. Rotated Component Matrix(a)

	Component		
	1	2	3
PopDens	,939	,266	,027
SCLBSC	,927	,231	,008
SCLSCN	,923	,260	-,003
CRIME	,906	,158	-,019
TRADE	,864	-,297	,034
Hostpl	,764	,291	,215
Agri	-,675	-,575	-,084
Povrt	-,603	-,332	-,486
INDTR	-,080	,914	,118
GDPCAP	,226	,828	,064
UNEMP	,362	,685	,001

Table 3 Continued

	Component		
	1	2	3
GDPGr	,183	,280	,731
LabFor	-,242	-,430	,606

Extraction Method: Principal Component Analysis.
Source: Author's Analysis, 2017

According to Table 3, Factor 1 consists of six variables, they are Population density, number of school at basic level, number of school at secondary level, level of crime, share of Wholesale and Retail Trade, and number of hospital. Just as mentioned in Table 2, Factor 1 can explain 53,115% of the total variance. That means this factor is the most influencing factor to variance of districts in East Java Province. Factor 2 consists of three variables, they are Share of manufacturing industry, GDP per capita, and unemployment rate. This factor, as mentioned in the previous table, is the second most influencing to variance of districts in East Java Province. The factor can explain 16,22% of the variance. Factor 3 consists of GDP Growth and Labour force which can explain 8,682%.

3.3 The Development in Every Districts in East Java Province Based of Variables Determined

Cluster Analysis is an analysis used to identify groups of entities that have similar characteristics. In this case, cluster analysis is used to group the districts in East Java Province based on the characteristics (variables) determined. As the previous analysis resulted, there are eleven variables that are grouped into 3 groups (factors). It means that in every group there are variables with have different characteristics among those 3 groups. Hence, the cluster analysis should be conducted 3 times with different variables, but considering the significant level of each group in influencing the variance, the cluster analysis is going to be conducted by using 2 groups of variables.

The first clustering, there are 6 variables that are used in the analysis which are consisted in the group/factor 1. The variables are Population density, number of school at basic level, number of school at secondary level, level of crime, share of Wholesale and Retail Trade, and number of hospital.

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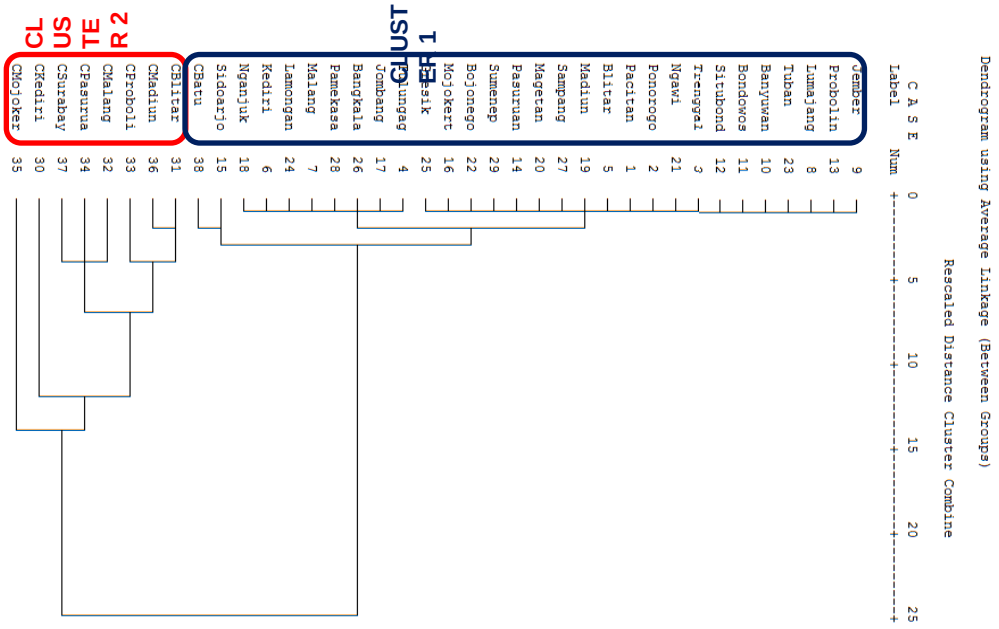

Figure 2. Dendrogram of Clustering 1
(Source: Author's Analysis, 2017)

According to the dendrogram diagram, Figure 2, by considering the distance among clusters, the number of clusters used is 2 clusters. By seeing the members of each cluster, generally can be inferred that

the two clusters can be divided into urban – non- urban areas. Members of cluster 2, which are Blitar City, Madiun City, Probolinggo City, Malang City, Pasuruan City, Surabaya City, Kediri City, and Mojokerto City, are districts in East Java Province which has the least agricultural activity. According to the GDP in agricultural sector, obviously these districts have the lowest production in this sector compared to other districts.

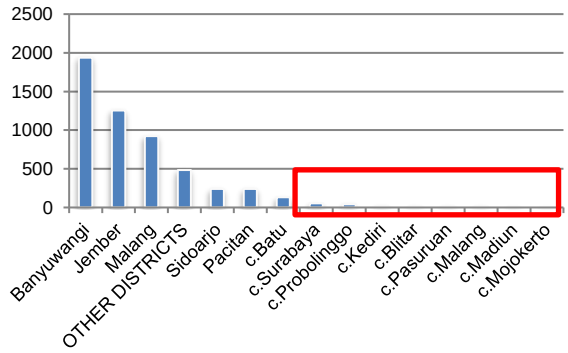

Figure 3. GDP of Agricultural Sector in Districts by 2014
(Source: Author's Analysis, 2017)

On the other hand, districts in cluster 1 have quite big GDP in sector of Agriculture, Forestry and Fishing. Batu City, which has the lowest GDP in sector of Agriculture, Forestry and Fishing, had Rp 1.323.799.000.000 (Figure 3). It is more than twice of Surabaya which had Rp 522.264.000.000. According to this condition, cluster 2 can be characterized as urban area and cluster 1 can be characterized as non-urban area.

As urban areas, the Cluster 2 indeed had higher population density compared to Cluster 1 as non-urban. Surabaya which is capital of East Java Province is the densest region, with over eight thousand people live in every 1 Km2. This is quite far if it is compared to Bayuwangi which only has over 270 people live in each kilometer square. Cluster 2 of course has better public facilities compared to Cluster 1. According to variables that are used in creating those clusters, cluster 2 has better condition than cluster 1 in education facilities (number of schools) and health facilities (hospital). The significant unbalanced can be seen if we compare the lowest district in cluster 1 to the highest in cluster 2. Banyuwangi, pacitan and Situbondo Regency had only 1 – 3 school at the basic level in every 10 Km2. On the other hand, Mojokerto City, Surabaya, and Blitar City had 19 – 36 schools.

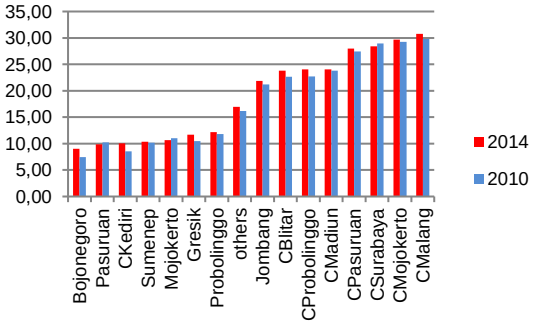

Figure 4. Share of Whole Sales and Retail Trade of Clustering 1 by 2014
(Source: Author Analysis, 2017)

Quite similar condition also happened in health facilities. As urban area, cluster 2 that has better facilities and also has high population density had high percentage of share of wholesale and retail trade compared to cluster 1 (Figure 4). Surabaya and Malang City are the highest with share more than 25%, on the other hand, Bojonegoro and Sumenen only 0,1%. This is also characteristic of urban area.

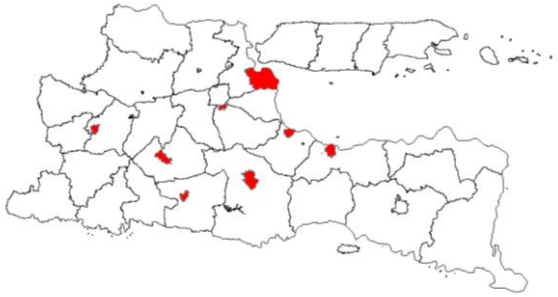

Figure 5. Distribution of Cluster 2 (Urban) 2014
(Source: Author's Analysis, 2017)

Figure 5 shows that cluster 2 which are urban area are not concentrated in certain area. These urban areas which are not concentrated in one area, have role in balancing development by attracting resources such as human resources or economic activities so that the activities are not just concentrated in one area (Dawkins, 2003). But, these urban have not really balanced the development.
This first cluster analysis might show the clusters based on characteristics of urban-nonurban. On the other hand, these 8 regions that consisted in Cluster 2 as Urban could become the out-layer of the data (districts) inputted which has significant different characteristics that could significantly influence the result of cluster analysis. In order to make better clusters in next cluster analysis, these districts would be excluded to see the more reasonable result.

In the second clustering, there are only 3 variables that are used which are consisted in the group/factor 2. The variables are GDP Percapita, share of manufacturing industry sector, and unemployment. In the cluster membership table explains of the members of every cluster created. To choose how many cluster used can be seen from the dendrogram.

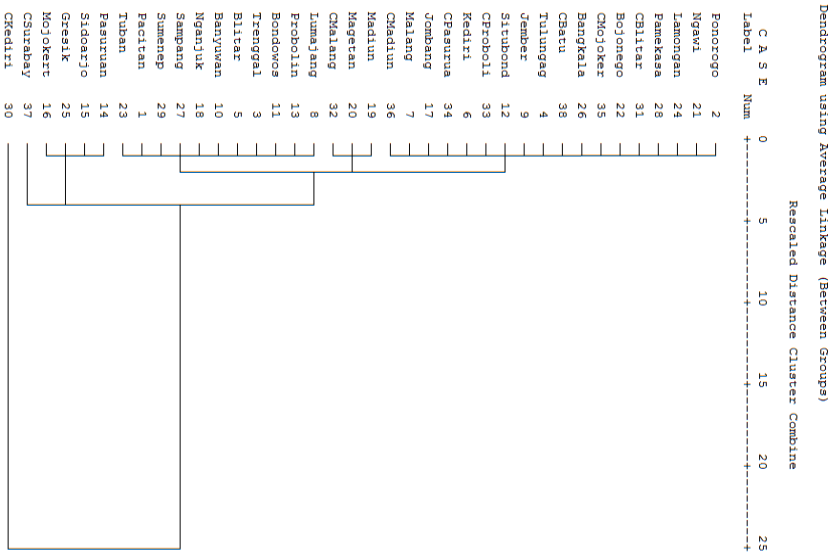

Figure 6. Dendrogram of Clustering 2
(Source: Author's Analysis, 2017)

According to the dendrogram above (Figure 6), the number of cluster will be used is 3 clusters. It is considering the characteristics of each cluster. Generally, as the variables used are GDP Percapita, share of manufacturing industry, and Unemployment, the main difference characteristics that divided those three clusters are those variables.

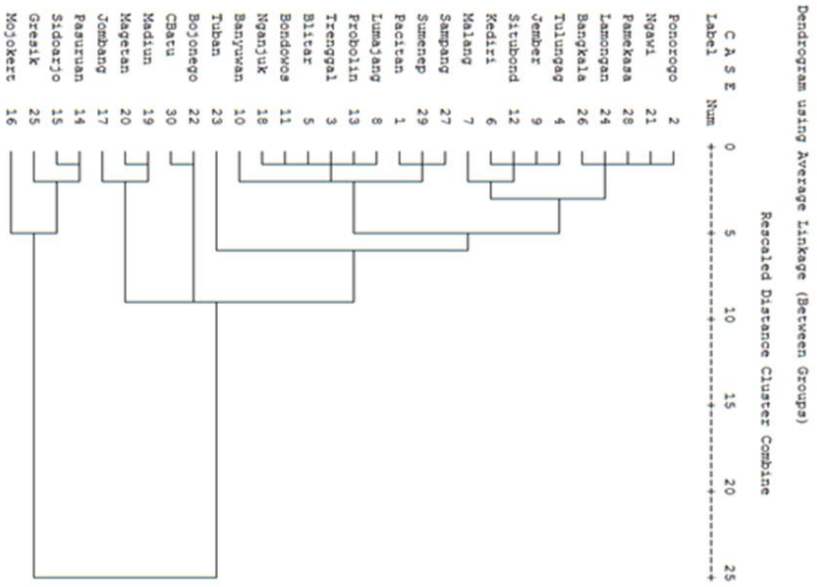

Figure 7. Dendrogram of Clustering 2 Excluding the 8 Districts
(Source: Author's Analysis, 2017)

In previous analysis, the 8 districts (all cities except Batu City) then are excluded. By excluding the 8 districts, the distance or the unbalance is more clearly shown by the dendrogram diagram (Figure 7).

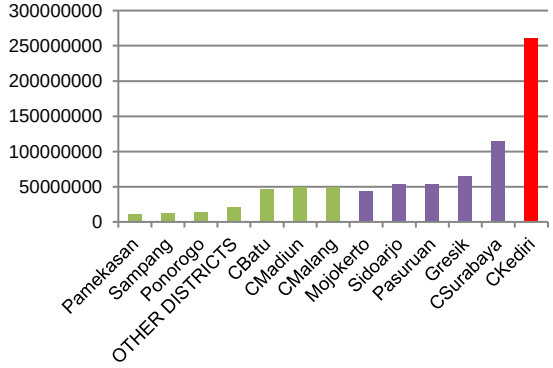

Figure 8. GDP Percapita of Clustering 2 by 2014
(Source: Author's Analysis, 2017)

GDP Percapita of each district shows that there are significant differences among districts. Kediri City, as the only district in cluster 3, has the highest GDP Percapita which is more than twice of the Surabaya City which is the second highest. In 2014, Kediri reached until Rp 260.516.028,- for GDP per capita (Figure 8). The number of population might have role in creating it considering that Kediri City only has 280.004 peoples live in its area. In cluster 2, there are Surabaya City, Gresik, Pasuruan, Sidoarjo, and Mojokerto which are included into top 6 the highest GDP Percapita in East Java Province.

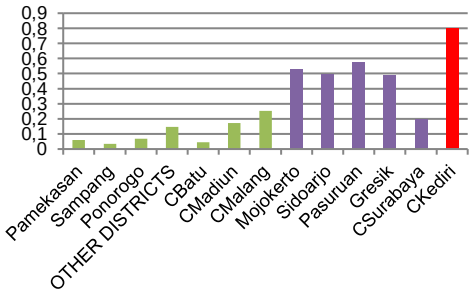

Figure 9. Unemployment of Clustering 2 by 2014
(Source: Author's Analysis, 2017)

The second variable used in this clustering is share of manufacturing industry to GDP (Figure 9). According to previous analysis, share of manufacturing industry is the second highest the variable that influencing the variance that consisted into group/factor 2. According to the Figure 10 clearly explains that cluster 3 (Kediri City) has the highest share of manufacturing industry, and followed by cluster 2. Based on this, industrial sector is a sector that contributing the most significant to create high GDP per capita of a district.

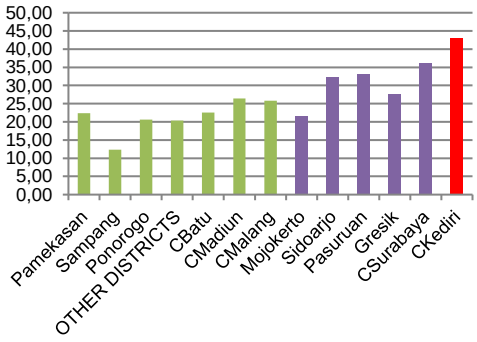

Figure 10. Share of Manufacturing Industry of Clustering 2 2014
(Source: Author's Analysis, 2017)

Even Kediri City has the highest GDP per capita and so does the cluster 2, they are still not able to solve the unemployment issue. Kediri City is acknowledged as the highest unemployment ratio compared to other districts. On the other hand, cluster 1 which does not really rely on industrial sector, seems to have less unemployment ratio rather than Kediri and cluster 2. There might be attraction from industrial sector that attract people to come to industrial districts that might create unemployment. According to the population growth, Sidoarjo and Gresik regency had the highest growth in 2014 (1,2%) compared to other districts, but this can be 100% ensured because this population growth does not only consist of migration but also birth.

Figure 11. Clusters Distribution of Clustering 2 2014
(Source: Author's Analysis, 2017)

Figure 11 shows that cluster 2 which consists of Surabaya, Gresik, Sidoarjo, Pasuruan, and Mojokerto are concentrated in one area. It answers the theory that says industries are mostly located in certain area that are called growth pole. By concentrating in a certain area, some advantages are expected to get more benefits (Dawkins, 2003). Kediri City is quite like an anomaly. It is because of the area of Kediri City which is really small and there is an existence of big industry which is Gudang Garam cigarette. The existence of Surabaya as the capital of East Java Province and also as the second biggest city in Indonesia can be one attraction to make many industries concentrated surrounding it. As a capital of province, Surabaya offers many facilities and infrastructure that supports the industrial activities and other activities related to it, such as settlement and trading. The fact that industrial activities rely on transportation infrastructure is the second reason why the industrial activities seem to concentrate to the area near the outside area close to the ocean. Tanjung Perak is the second busiest harbor in Indonesia that is located in Surabaya.

4. Conclusion

Williamson index result showed quite serious issue related to regional disparities in East Java Province. Initial indication that based on general phenomenon that happened in East Java Province that is high GDP (second highest) and mostly contributed from industrial sector, but on the other hand most of the people work in agricultural seems to be true to indicate that there is regional disparities happening in East Java

Province, this condition is strengthened by other issues like poverty and employment which are quite high in East Java Province. Williamson index of East Java Province by using data in 2014 in 0,96 in scale 0-1. This is of course very high which means that East Java Province really suffers high regional disparities. The existence of Kediri Districts and Surabaya that have high GDP per capita and far distance to other districts is one factor in resulting the high Williamson index.

Analysis factor then conducted to find out what other variables that statically have influence to the variance of districts in East Java Province. The variables determined deeply explain the regional disparities rather than only using GDP variable. 22 variables had been tested and resulted 11 variables that have significant influence to variance. These variables were grouped into 3 factor that each group has its own characteristic and different significant influence level. The third group of variables were not used to further analysis because have small significant. Because of these groups of variables have different characteristics, the cluster analysis was held twice.

The variables in group 1 that consist of population density, educational facilities, health facility, share of wholesale and retail trade and crime ratio has the highest significant level, clustered the district into 2 clusters. These clusters, however, considering the condition of each district according to the variables, can be differed by the characteristics urban and non-urban. Cluster 2 which consists of districts with their urban characteristics are not clustered in certain area, but spread out of East Java area. This should be able to balance the development so that the disparities do not happened significantly (Dawkins, 2003). But after the second clustering, by using GDP per capita, share of manufacturing industry, and unemployment, these urban seem to fail in balancing the disparities. Industrialization are concentrated in certain area, surrounding East Java capital, Surabaya and further pushed the development to be more concentrated to the place.

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