

The Competitiveness of Regions in the Eastern Indonesia

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Abstract—This study aims to map the regional competitiveness and examine the influence of several factors including health, education, infrastructures, institution, and information and communication technology (ICT) on regional competitiveness, both directly and indirectly through government expenditure and private investment in the Eastern Indonesia. The data used are cross section data of 16 provinces in the Eastern Indonesia and time series data from 2010 to 2016. The standardized score was used to calculate the score of competitiveness based on four indicators: productivity, GRDP per capita, level of employment opportunities, and consumption expenditure per capita. Econometric model with simultaneous equation model was used to analyze the influence of driving factors on regional competitiveness. The driven factors that have significant effect on regional competitiveness are health, education, infrastructures and ICT. While institution factors do not yet have effective contributed to the improvement of regional competitiveness. In an effort to improve the competitiveness of regions, the importance of local governments to adopt policies that rely on improving the capacity and quality of human capital, provision of electricity infrastructure, as well as adequate information and communication networks.

Keywords—*regional competitiveness; standardized score; simultaneous equation; productivity; institution*

I. INTRODUCTION

The concept of regional competitiveness develops from the concept of competitiveness used for companies and countries. Michael Porter's thinking has a lot to color the development and application of the concept of competitiveness at the enterprise level [1]. Furthermore, the concept was developed at the country level as global competitiveness, especially through the World Economic Forum (WEF) which published the Global Competitiveness Report) and the International Institute for Management (IMD) with its annual report in the form of the World Competitiveness Yearbook. This global competitiveness index has become a measure and reference of a country's economic performance and investment climate.

Porter was the first to provide a definition of competitiveness as a result of the ability of a country to innovate to achieve and maintain the country's position over other countries in a number of key industrial sectors [1]. After Porter's initial study linking national competitiveness with

productivity, namely the ability of a nation to innovate, attention has shifted to competitiveness at the regional (regional) level. From this perspective, Porter's biggest contribution is his view of competitiveness at the micro level (company) which can be applied to regional units, be they cities, regions or countries.

Furthermore, a broader idea of the concept of competitiveness refers to the tendency to compete, to win, and to maintain a position in the market and to gain profits which in turn can consolidate commercial activities well [2]. As defined by the WEF where competitiveness is a set of institutions, policies and factors that determine the level of productivity of a country [3]. The WEF definition connects the understanding of competitiveness from the micro aspect (company level) to the macro level (country level).

The WEF view above illustrates the capacity of companies to compete, develop and produce relatively undeniable profits, but applying the same concept for a country or region can lead to much debate [4]. As criticized by Krugman that it is impossible to analogize between companies and countries because the state cannot get out of business and because competition between countries can provide benefits for both, while competition between companies in the same sector is more likely to be zero-sum the game [5].

Thus, between macro and micro levels can be found the concept of regional competitiveness. A region in a country context is not an aggregation of a company [6]. Meyer-Stamer states that: "We can determine systemically the competitiveness of a region as the ability of a region or region to generate high income and improve the livelihoods of people living in the region" [7]. Unlike the WEF definition which focuses on concepts productivity, this definition is based entirely on the benefits obtained by people living in an area. This assumes that there is a close relationship between competitiveness and prosperity. This means that competitive regions are not only related to outputs produced such as productivity, but also relate to sustainable levels of community welfare [8].

Meanwhile, Dijkstra provide a definition of regional competitiveness as the ability to offer an attractive and sustainable environment for companies and communities to

live and work [9]. In this definition, sustainability is not used in the pure sense as in the concept of environment (ecology), but in terms of the ability of the region to provide an attractive environment both in the short and long term. This means that if the regions, for example, reduce taxes in such a way that they can no longer maintain the quality of infrastructure and public services, this means that the area does not provide an attractive environment that is sustainable. This definition also includes things that benefit both the company and society, such as good institutional governance (bureaucracy), and problems where interests between companies and society may conflict, such as the issue of wages.

Furthermore, Krugman argues that there is no competition between countries, because in each country labor specialization will emerge in accordance with the comparative advantage possessed, so that all countries will be winners as indicated by the increase in living standards in these countries [10]. This view seems to illustrate that "competitiveness" refers to "head-to-head" conflict. However, the concept of competitiveness at the national or regional level is only competition in the sense that it refers to conditions that allow companies to compete in local, national and international markets [11].

Therefore, regions compete by providing the best platform to operate at high productivity levels, but this is very different from the direct competition carried out by companies. This is a zero-sum conceptualization of regional competitiveness which often raises the premise that competitiveness will give rise to the presumption of a winner and losers [8]. Therefore also in the case of regions, the level of productivity and competitiveness will not be a determining factor. On the other hand, according to Porter competition between regions can be observed as competition in the industrial sector by looking at competitive advantage and not comparative advantage as the main factors in competition [12]. In this case, what is absolutely a benchmark is the benefits obtained from the competition.

Furthermore, Camagni offers an idea of regional competitiveness, namely that regions do compete to attract companies (capital) and workers (labor) and markets, which are based more on absolute excellence than comparative advantage [13]. According to Camagni, regions can be considered as having an absolute competitive advantage when having superior technology, social capital, infrastructure and institutional assets that are external in nature but profitable for companies individually where there are no alternative price factors that will cause redistribution of activities geographically. These assets tend to cause companies in the region to provide higher productivity than expected.

According to Porter, the ability to do so depends on the productivity with which the nation's resources are used. Increasing living standards depends on the capacity of a country's companies to achieve high levels of productivity over time. Sustainable productivity growth requires that the economy must be continuously upgraded [14].

Meanwhile, Gardiner identify several sources of determinants of competitiveness, including economic structure, innovation, small business development and

workforce skills [6]. These sources affect labor productivity and the level of employment, where both of these indicators also become a measure of competitiveness to determine output in the form of gross regional domestic product (GRDP). According to him, increasing productivity, employment rates and per capita GRDP reflect regional economic performance which in turn will result in high quality of life and a high standard of living.

Various issues related to the concept and definition of competitiveness as outlined above, in this study it can be concluded that there is a fairly clear similarity of essence between regional competitiveness and national competitiveness. The similarity of the view is that the ultimate goal of efforts to improve the competitiveness of an economy is to improve welfare, namely increasing the standard of living and the quality of life of the people in the economy. Furthermore, welfare concepts and measures have a very broad meaning that can not only be represented by economic growth performance, but by many economic and non-economic indicators that influence it.

While the difference is centered on the scope of the region, where regional competitiveness covers the area (part of a country), while national competitiveness covers the country. In various discussions on national competitiveness, both explicitly and implicitly, summarized the relevance of adopting the concept of national competitiveness into the concept of regional competitiveness. However, almost all experts have the same view on what should be done in order to improve competitiveness. Therefore, this research is still possible to explore what things are the determinants of a region's competitiveness.

WEF in the publication of Global Competitiveness Report 2016-2017 reported the competitiveness of Indonesia again weakened. Indonesia's competitiveness position is ranked 41st of 138 countries surveyed. The WEF report noted that Indonesia's position fell four levels compared to last year's ranking in 37th place. This position has continued to decline since 2014 which is ranked 34th. Compared to other Asian countries, Indonesia's competitiveness remains under Singapore (2nd), Japan (8th), Hong Kong (9th), Malaysia (25th), Thailand (34th), and South Korea (26th) [15].

The decline in Indonesia's competitiveness ranking from previous years is mainly related to the quality of health services and basic education that are still relatively low, labor market efficiency is still less due to labor policy, and the low utilization of information and communication technology. While the most basic issues that get the spotlight from WEF are corruption, inefficiency of government bureaucracy and infrastructure constraints. Therefore, the weakening of Indonesia's competitiveness at global level must be systematically and critically anticipated. Reduced competitiveness will have an impact directly or indirectly on various aspects of the life of Indonesian people, especially the economic aspects. A set of systemic nationalities should be prepared in order to improve competitiveness.

Meanwhile, the main issue of regional development in Indonesia today is the still large disparity between regions, particularly the development gap between the Western Region

of Indonesia and the Eastern Region of Indonesia. This is reflected in one of the contributions of GRDP to GDP, which for 30 years (1983-2013), the contribution of GRDP in the Western Region of Indonesia is very dominant and has never decreased from 80 percent to GDP.

Therefore, efforts are needed to improve regional competitiveness which can encourage the transformation and acceleration of development in the Eastern Indonesia Region, namely Sulawesi, Kalimantan, Maluku, Nusa Tenggara and Papua, while maintaining growth momentum in the Java-Bali and Sumatra Region.

II. METHOD

The overall data used in this study is secondary data by taking local socio-economic conditions 16 provinces in the Eastern Region of Indonesia during the period 2010 until 2016, the last year with the completeness and availability of existing data. The main source of secondary data of this study came from the Central Bureau of Statistics.

The main results of the provincial competitiveness analysis in the Eastern Region of Indonesia are the competitiveness ratings among provinces and the analysis of factors affecting regional competitiveness of provinces. There are two key formulas needed to rank and factor analysis affecting competitiveness, ie indicators that can indicate and indicate competitive levels of competitiveness and scores that can transform competing variables or indicators into competitiveness ratings area. Determination and selection of competitiveness variables is done through literature search and previous research findings.

Scoring used four indicators that are the regional competitiveness output variables, namely labor productivity, GRDP per capita, employment rate and household consumption expenditure per capita. Furthermore, the entire data of the four output variables is then transformed in such a way that it becomes "comparable". In this case the standardized score method is used which is the relative comparison to see how good the performance of a particular province compared with the average of the province as a whole. Therefore, the unit of measurement is no longer relevant. Standardized scores do not have a measurement unit because they only measure relative performance among provinces, regardless of indicator. Statistically, it measures how much the standard deviations of each province are from the average of the whole province. Thus, data standardization aims to equalize the unit of measurement of each variable, so that even if variables have different units of measurement in the beginning, the transformation makes all the variables comparable.

If a province has a zero standardized score, this means that the province's competitiveness indicator is on the average of the whole province. As for if having a negative score means the province is below average. Conversely, if it has a positive value, it means that the performance of the province's competitiveness is above the national average. The further the score is from zero, the further the performance of the provincial competitiveness of the national average. If a province has a high positive score, it means the province is

above the national average. Next, calculate the total score of provincial competitiveness score of four indicators to determine the competitiveness ranking of 16 provinces in the Eastern Region of Indonesia.

A step-by-step description of the ranking process is described below for N provinces, and M practical indicators. For the case of this study, $N = 16$, $M = 4$.

Step 1: Compute the mean value of practical indicator j ($j = 1, \dots, M$):

$$\bar{X}_j = \frac{1}{N} \sum_{i=1}^N X_{ij} \quad (1)$$

where X_{ij} represents the value that province i ($i = 1, \dots, N$) takes for practical indicator j .

Step 2: For each practical indicator j ($j = 1, \dots, M$), calculate its standard deviation (SD):

$$SD_j = \sqrt{\frac{1}{N} \sum_{i=1}^N (X_{ij} - \bar{X}_j)^2} \quad (2)$$

Step 3: Compute the standardized value of indicator (SVI) that each province i ($i = 1, \dots, N$) takes under each of the practical indicators j ($j = 1, \dots, M$):

$$SVI_{ij} = \frac{X_{ij} - \bar{X}_j}{SD_j} \quad (3)$$

Step 4: Compute the *ranked* standardized value of indicator (RSVI) that each province i ($i = 1, \dots, N$) takes under each of the practical indicators j ($j = 1, \dots, M$):

$$RSVI_{ij} = \begin{cases} -SVI_{ij}, & \text{if a lower value is better;} \\ SVI_{ij}, & \text{if a higher value is better.} \end{cases}$$

Step 5: For each of the practical indicators j ($j = 1, \dots, M$), a ranking can be obtained for provinces: Provinces with a lower value of RSVI for indicator j are ranked ahead of those with a higher value.

The aggregate score for each indicator, in turn, is given an equivalent weighting of 25% of the overall Provincial Competitiveness Index. Identical weights are assigned to each indicator as they represent equivalent significance to the computation of the Index. This method is repeated and applied consistently across all the provinces to ensure precision of the rankings. Mathematically, this can be illustrated as follows:

$$\text{Provincial Competitiveness Index} = \begin{cases} 25\%(\text{productivity}) \\ + \\ 25\%(\text{GRDP per capita}) \\ + \\ 25\%(\text{employment rate}) \\ + \\ 25\%(\text{household consumption expenditure per capita}) \end{cases}$$

The result of the overall calculation of the competitiveness score of the province is used to compare the competitiveness performance of each province in Indonesia, in addition to this competitiveness score is also used as the dependent variable in the empirical model.

The model used to analyze the factors that affect the competitiveness of regions in the Eastern Region of Indonesia using simultaneous equation model. Health, education, infrastructure, and information and communication technology (ICT) factors in this study are the input variables on regional competitiveness. Simultaneous equation in this research can be seen in the following functional equation:

$$\text{Ln}Y_1 = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + \alpha_3 \text{Ln}X_3 + \alpha_4 X_4 + \alpha_5 X_5 + \mu_3 \quad (4)$$

$$\text{Ln}Y_2 = \alpha_0 + \alpha_1 \text{Ln}Y_1 + \alpha_2 X_1 + \alpha_3 X_2 + \alpha_4 \text{Ln}X_3 + \alpha_5 X_4 + \alpha_6 X_5 + \mu_2 \quad (5)$$

$$Y_3 = \alpha_0 + \alpha_1 \text{Ln}Y_1 + \alpha_2 \text{Ln}Y_2 + \alpha_3 X_1 + \alpha_4 X_2 + \alpha_5 \text{Ln}X_3 + \alpha_6 X_4 + \alpha_7 X_5 + \mu_1 \quad (6)$$

where, Y_3 is score of provincial competitiveness, measured in index (score); Y_2 is private investment, measured in rupiah; Y_1 is government expenditure, measured in rupiah; X_1 is Life Expectancy, measured in years.; X_2 is percentage of workforce who have completed formal education of senior high school to university, measured in percent; X_3 is infrastructure is expressed by the consumption of electric energy per capita, measured in kWh; X_4 is Indonesian Democracy Index, measured on a scale of 0 –100; X_5 is ICT Index, measured on a scale of 0 - 10; α_0 , α_1 and α_2 are constants; $\alpha_1, \dots, \alpha_n, \alpha_1 \dots, \alpha_n$, and $\alpha_1 \dots, \alpha_n$, are each as parameters to be estimated; μ_1 , μ_2 , and μ_3 is random error terms.

III. RESULTS AND DISCUSSION

The results of calculation of competitiveness score will provide a portrait of provincial competitiveness profile in the Eastern Region of Indonesia as a whole. These results indicate the relative position of a province against other provinces by taking into account all the supporting factors it has and how far the province is able to realize the potential of these factors. The ranking of provincial competitiveness in the Eastern Indonesia as a whole 2010-2016 is shown by Table 1.

The overall portrait of regional competitiveness in provinces in the Eastern Region of Indonesia is a representation of the performance of its forming indicators, which also apply to these indicators, so that the higher the competitiveness at the provincial level, some of the effects of other indicators are low, then the provincial competitiveness continues that. As mentioned earlier, the indicators of regional competitiveness in this study are output indicators consisting of labor productivity, GRDP per capita, employment rate, and household consumption expenditure per capita.

As shown by Table 1, East Kalimantan Province is the region with the highest competitiveness ranking during the period 2015 to 2016. The province of East Kalimantan is one of the second largest provinces after Papua, has potential resources abundant nature. The main results of the province are mining products such as oil, natural gas and coal. Other sectors that are currently developing are agriculture, tourism and the processing industry. Natural resources and their products are mostly exported abroad, so this province is the main foreign

exchange earner for the country, especially from the mining and forestry sectors. The main factors forming the competitiveness of East Kalimantan Province are labor productivity, per capita income and per capita consumption expenditure.

Furthermore, the position of competitiveness in the region of Sulawesi Island occupies the position of competitiveness of diverse regions. South Sulawesi Province as the largest province in Sulawesi ranked 7th in 2016. The other provinces are ranked 5th and 6th respectively for Central Sulawesi and Southeast Sulawesi Provinces. Meanwhile, three provinces of North Sulawesi, West Sulawesi and Gorontalo are ranked the top ten lowest. West Sulawesi which in 2015 was ranked 9th down four levels in the year 2016 that is at the 13th rank. While the province of North Sulawesi which in 2015 was ranked 13th of 16 provinces, in 2016 increased to the 9th position in 2016.

TABLE I. OVERALL COMPETITIVENESS RANKING, IN THE EASTERN REGION OF INDONESIA PROVINCES, 2015-2016

Province	2016		2015	
	Rank	Score	Rank	Score
Kalimantan Timur	1	1.7575	1	2.7366
Papua	2	0.4452	3	0.3384
Papua Barat	3	0.3562	2	0.6009
Kalimantan Tengah	4	0.2215	4	0.3109
Sulawesi Tengah	5	0.0889	6	0.0971
Sulawesi Tenggara	6	0.0816	10	-0.2377
Sulawesi Selatan	7	0.0033	7	-0.0777
Kalimantan Selatan	8	-0.0005	5	0.2312
Sulawesi Utara	9	-0.1296	13	-0.4064
Kalimantan Barat	10	-0.1385	8	-0.1190
Gorontalo	11	-0.1495	11	-0.3046
Maluku Utara	12	-0.3081	12	-0.3278
Sulawesi Barat	13	-0.3682	9	-0.2188
Nusa Tenggara Barat	14	-0.4146	14	-0.5021
Nusa Tenggara Timur	15	-0.7022	15	-0.5750
Maluku	16	-0.7430	16	-0.8552

Furthermore, Table 1 also shows that the five provinces in Eastern Indonesia which have the lowest competitiveness rank are West Nusa Tenggara, East Nusa Tenggara, Maluku, North Maluku and West Kalimantan Provinces. The main factors of the low competitiveness of this region are indicators of labor productivity, per capita income, and employment rates.

Based on the mapping of provincial competitiveness rankings in the Eastern Region of Indonesia in 2015-2016, the regions that occupy the top positions are dominated by resource-rich areas such as: East Kalimantan Province. Papua and West Papua Provinces.

Furthermore, based on simultaneous linear regression analysis using equations (4), (5), and (6), the results of the estimation coefficient are obtained as shown in Table 2.

The direct effect of health factors on regional competitiveness shows an insignificant effect. This means that any change in Life Expectancy Rate will not affect changes in regional competitiveness. This result is not in accordance with the initial hypothesis that the degree of health directly affects positively and significantly to the performance of regional

competitiveness. This result is also inconsistent with the findings of Bloom and Canning study which states that there is a strong correlation between good health levels and high economic growth. Statistically it is estimated that any increase of Life Expectancy at birth will increase economic growth, if other growth factors remain [16].

The direct effect of educational factors on regional competitiveness shows a significant and positive influence. This means that any increase in the number of educated workers will increase the competitiveness of the region. This means that the better the quality of labor education will be the higher the productivity of the region. This result is in accordance with the views of Huggins and Izushi which states that the educational aspect is a factor driving the increasing quality of human capital through the transfer of knowledge as the main capital of the economy which in turn fosters sustainable economic growth [17]. The high level of education of the workforce will be able to influence the dynamics of changes or the quality of socio-economic life of the population of a region which in turn increases the competitiveness of the area.

TABLE II. THE ESTIMATE RESULTS

Directions of Effect			Estimate	t-Statistic	Prob.
X ₁	--->	y ₁	0.068*	2.800	0.005
X ₂	--->	y ₁	-0.002	-0.384	0.701
X ₃	--->	y ₁	0.152	1.579	0.114
X ₄	--->	y ₁	-0.013	-1.620	0.105
X ₅	--->	y ₁	0.086	1.245	0.213
X ₁	--->	y ₂	0.076*	2.100	0.036
X ₂	--->	y ₂	0.038*	5.014	0.000
X ₃	--->	y ₂	0.392*	2.767	0.006
X ₄	--->	y ₂	-0.016	-1.391	0.164
X ₅	--->	y ₂	0.386*	3.804	0.000
y ₁	--->	y ₂	1.464*	15.157	0.000
X ₁	--->	y ₃	0.015	0.917	0.359
X ₂	--->	y ₃	0.013*	3.628	0.000
X ₃	--->	y ₃	-0.064	-1.000	0.317
X ₄	--->	y ₃	-0.003	-0.574	0.566
X ₅	--->	y ₃	0.331*	7.139	0.000
y ₁	--->	y ₃	-0.076	-1.256	0.209
y ₂	--->	y ₃	0.073*	2.491	0.013

*)Significant at at 5% level

$R^2Y_1 = 0.462$; $R^2Y_2 = 0.743$ $R^2Y_3 = 0.531$

As shown by Table 2, the direct effect of infrastructure on regionals competitiveness shows insignificant and negative effects. However, the consumption of electric energy per capita indirectly affects regionals competitiveness through private investment in a positive and significant way. This means any increase in electricity consumption will increase private investment. Increased private investment will then increase the competitiveness of the region. This result is in accordance with the findings of Prasetyo study which states that infrastructure in the form of availability of electric energy infrastructure has a positive and significant impact on economic growth in the Eastern Region of Indonesia [18]. This increase in economic growth will then increase the

income of the population and wider employment opportunities, which in turn will improve the performance of regionals competitiveness.

The results show that the institutional factors represented by the Indonesian Democracy Index (IDI) have no significant effect on regionals competitiveness in the Eastern Indonesia either directly or through government spending and private investment. This indicates that democratic conditions in the Eastern Indonesia reflecting the dynamics of democratic development in the Eastern Indonesia have not been effective in promoting economic growth both locally and nationally. This result is inconsistent with Rowen's [19], Sen [20], and Barro [21] views that there is a positive relationship between economic development and freedom (democracy). Democracy can stimulate economic growth, because democracy is able to motivate people to work and invest that will drive economic growth. On the other hand, the results of the study favor Lipset's [22] and Bhagwati [23] views that countries with a democratic system will be vulnerable to social conflicts and uncertainties that negatively impact investment and economic growth. Therefore, economic growth is a prerequisite for the opening of opportunities for democratization in the future. This result is in line with the view of Alhumami which states that the democratic system in Indonesia does not contribute to economic growth because it is hindered by the practice of gradual and continuous corruption so as not to create a conducive climate for business activities, investment, as well as the exchange and traffic of domestic and foreign capital [24].

The effect of ICT on regional competitiveness shows a significant and positive influence both directly and through government spending and private investment. This indicates that the influence of ICT on the competitiveness of regions can be seen from its contribution to inputs of production factors such as investment and employment absorption. In addition, ICT also serves as a driving force for competitiveness through increased productivity of sectors utilizing or using ICT products and services. These results are consistent with the views of Cirera stating that ICTs can facilitate productivity growth by utilizing production factors more efficiently and facilitating the adoption of other technologies [25].

IV. CONCLUSION

Regions with high competitiveness are generally dominated by provinces with economic base that are sourced from natural resource wealth. While provinces that have low real competitive position are generally regions with economic base that relies on primary sector (especially agriculture). Meanwhile, the driven factors that have significant effect on regional competitiveness are health, education, infrastructures and ICT. While institution factors do not yet have effective contributed to the improvement of regional competitiveness. In an effort to improve the competitiveness of regions, the importance of local governments to adopt policies that rely on improving the capacity and quality of human capital, provision of electricity infrastructure, as well as adequate information and communication networks.

ACKNOWLEDGEMENT

Thanks for comments and suggestions from reviewers and audiences of The 2nd International Conference on Banking, Accounting, Management, and Economics (ICOBAME) 2018.

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