

Analysis in Productivity and Efficiency on Computer and / or Assembly in Electronic Computer and Computer Device Industries in Indonesia 2011-2015 (ISIC 26210 and 26210)

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Abstract—The current industrial revolution has driven the development of electronic goods to increase. As one of the industries prioritized by the government in the face of the industrial revolution, the electronics industry must be able to compete. In this paper discussed how the condition of the Computer Industry and Computer Assembly (26210) and the computer equipment industry (26220). The calculation results show that the efficiency level of this industry is still low, so it needs to be strived to continue to be improved. Based on data, that the decrease in labor use is followed by an increase in the amount of production. This indicates that in this type of industry, the role of labor (Human) has begun to be replaced with systems or machines. In addition, there is a positive correlation between the level of efficiency and productivity.

Keywords: Industry, efficiency, productivity

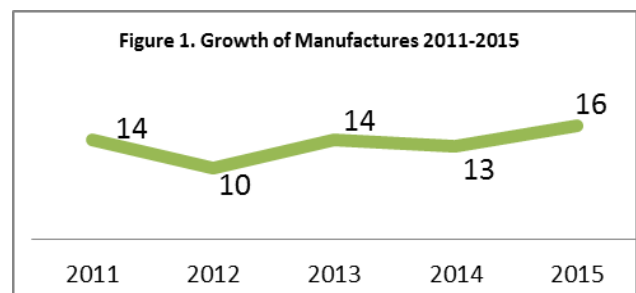
I. INTRODUCTION

Changes in technology now have a broad impact on many aspects, both in the social life of society, education, business and even industry. This distortion caused a lot to change from a community activity. This is of course encouraging growth in the industry sector more rapidly and increases in line with the need. Industrialization was first introduced massively in the era of the industrial revolution 1.0 with the creation of a steam engine that pushed the production process in the industrial sector to be even more increased. In this industrial revolution, machines have been used to replace the role of humans. In its journey, changes continue to be made through the industrial revolution to the present. We must acknowledge that this change can have a positive impact by opening up economic activities and development for the better, but we also need to realize that this progress has a negative impact.

In response to this condition, the government through the trade and industry department has prepared leading industries which are expected to be able to encourage the development of the industrial revolution faster. The industries that are the government's priority are; The food and beverage industry, Textile and clothing industry, Automotive industry, Chemical industry and Electronics industry which in aggregate contributed 60% of Indonesia's GDP and were able

to absorb more than 60% of the total workforce employed in the industrial sector. (<http://kemenperin.go.id/artikel>). But of the five industries prepared, the electronics industry has a very important role, because with the industrial revolution the demand for electronic products is very high.

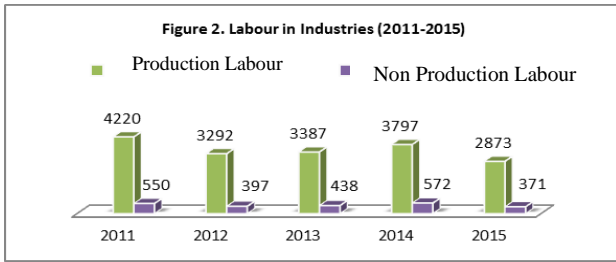
One part of the electronics industry that is expected to experience significant growth is the Computer and Computer Assembly Industry (ISIC 26210) and the computer equipment industry (ISIC 26220). However, the development of this industry did not grow significantly, this was seen by the slow growth of the number of companies from 2011-2015. If in 2011, the number of companies listed was as many as 14 companies, then within a period of four years only increased by only two companies, even had time to decrease in 2012 and 2014. Whereas supposedly, the potential that exists in this company, should be higher.



* Source: BPS, Manufacturing industrial statistic book 2011-2015

Fig. 1. Growth of Manufactures 2011-2015

The low growth of this industry causes a reduction in the absorption of labor used. If in 2011 the workforce involved in this industry amounted to 4,770 people, then in 2015 it was reduced to 3,244 people. If you see a trend of growth in the number of companies and the absorption of this workforce, the government needs to pay more attention to this industry, especially as this industry is part of the Electronics Industry that has been set to become a leading industry.



^bSource: BPS, Manufacturing industrial statistic book 2011-2015

Fig. 2. Labour in Industries (2011-2015)

As one part of the electronic industry that has been prepared by the government, this industry should be able to grow and provide even greater economic activity. To find out the conditions that exist in the electronics industry, especially in the sub-computer industry and computer assembly (26210) and computer equipment industry (26220) it is necessary to analyze the conditions of the industry such as the added value generated, the level of efficiency, industrial orientation and the role of factors inputs and raw materials in creating efficiency in this industry. Based on the background explained, it is necessary to analyze the level of productivity and efficiency created in the Computer and Computer Assembly Industry (26210) and computer equipment industry (26220) and analyze how the effect efficiency to productivity in this industries.

II. LITERATURE REVIEW

A. Industry

Industry according to BPS (Central Bureau of Statistics) is a business or activity of processing raw materials or semi-finished goods into finished goods that have added value for profit. The processing industry is a branch of industry that processes raw materials to increase its added value, with the help of technology, to produce goods for human needs.

There are several types of industry criteria according to the Central Bureau of Statistics (BPS), namely: 1) Large Industries are industrial companies that have a workforce of 100 or more people. 2) Medium Industry is an industrial company that has a workforce of between 20 and 99 people. 3) Small Industry is an industrial company that has a workforce of between 5 and 19 people. 4) Micro industry is an industrial company that has a workforce of between 1 and 4 people. Small and Micro Industry (SME) as part of the manufacturing industry is an industry that creates and absorbs a large enough workforce.

B. Efficiency

Efficiency is the ability to achieve an expected result (output) at the expense of (minimal) input. An activity has been said to be efficient if the implementation of the activity has reached the target (output) with the lowest sacrifice (input), so that efficiency can be interpreted as the absence of waste [10].

Muslim (2008) states that the cause is not economically efficient due to two things; First, because it is technically inefficient and secondly because allocation is inefficient. Technically inefficient is caused by the failure to

realize maximum productivity, ie the input unit cannot produce maximum production. While allocatively inefficient because at a certain level of input and output prices, the proportion of input usage is not optimum because the Marginal Revenue Product (MRP) is not the same as the Marginal Cost (MC) of the input used. To calculate the efficiency used formulations namely:

$$Efficiency = \frac{Value\ Added}{Intermediate\ Cost} \tag{1}$$

C. Value-added

The added value created by an industry is equal to output minus input costs. Added value has a component of wages or salaries, rent, taxes, depreciation, and profits. Output variables are functions of various input quantities and qualities. The output variable is identical to the final production of finished goods or semi-finished goods. Intermediate input is a combination of raw or auxiliary materials, transportation costs, building rent, machinery, industrial and non-industrial services and tools and other goods [6].

The formulati Others Labour : added value can write as;

$$Value\ Added = Value\ of\ Output - Intermediate\ Cost \tag{2}$$

D. Labor Productivity

According to Kuncoro[8], productivity is the result achieved per labor or factor unit of production within a certain period. In general, the level of productivity is influenced by technological developments, means of production and expertise possessed by the workforce. Labor productivity is a comparison between the value of output and the amount of labor. Measurement of productivity referred to in this study is labor productivity which is a comparison between output or industrial production results with the number of workers.

$$Labour\ Productivity = \frac{Output\ Value}{Production\ Labour} \tag{3}$$

E. Correlation

By using the calculation of coefficient, we can know the relationship between productivity and efficiency. The correlation formula can be written;

$$r_{xy} = \frac{\sum xy}{\sqrt{\sum (x^2 y^2)}} \tag{4}$$

r_{xy} = Coefficient of Correlation x and y

x = $(Xi - X)$

y = $(Yi - Y)$

III. RESEARCH RESULTS AND DISCUSSION

The productivity in industry is a very important component. Many variables will be related to this productivity, such as related to cost, efficiency and competitiveness of an industry. In addition, increased productivity can encourage effective use of resources. In seeing productivity, it can be done by comparing the value of Gross Output with the amount of labor used or by comparing the value added with the amount of labor.

TABLE I. PRODUCTIVITY LEVEL OF INDUSTRY 2011-2015

Year	Industrial Code	Total of Labour	Value of Gross Output (000)	Productivity	Growth (%)
2011	26210	3713	599.047.830	161.338	-
	26220	1057	356.980.799	337.730	-
2012	26210	3689	503.222.389	136.412	-15,45
	26220	-	402.502.468	-	-
2013	26210	3337	2.054.104.670	615.554	351,25
	26220	488	507.098.304	1.039.136	-
2014	26210	3741	2.648.112.281	707.862	15,00
	26220	628	197.851.298	315.050	-69,68
2015	26210	2087	4.701.973.221	2.252.982	218,28
	26220	1157	233.752.346	202.033	-35,87

^cSource: Manufacturing industrial statistic book 2011-2015, BPS

In a production process, productivity calculation becomes very important, this is because the company must be able to ensure that it is in a high productivity condition. One way to increase productivity is to increase production while still using the same input factors. Speaking related to productivity in an industry, then we can see several aspects created, including; (1) An increase in production occurs by utilizing the same input factors; (2) The amount of production is at the same level but less input factors are used; and (3) The amount of production increases, but the resources used are reduced.

According to Timpe (1999), there are several characteristics of labor that have good productivity, namely; First, Having qualifications that are in line with work needs; Second, workers must have sufficient work motivation in carrying out the tasks or work that is charged; Third, Have a good orientation (Positive) and Fourth, a worker must have a mature nature.

The calculation results obtained indicate that the productivity created in this industry is still relatively varied from year to year. If in 2011 the productivity created was 161,338, then this condition has decreased the following year. But in 2013 it increased again to 615,554 and continued to increase in the following years. If it is noted that the level of productivity has increased, but the amount of labor used has decreased. This is made possible by several things, including; During this time the level of use of labor is still not optimal, meaning that the ability of labor has not been fully utilized. In addition, this condition is also possible because the role of humans has begun to be replaced in the production process, so that the need for labor is reduced.

This condition has an impact on the added value created in this industry. Based on the calculation results, it can be seen that the growth of value added, especially in the Manufacture Computer Device (26210) has decreased. The low of value added created will certainly have implications for the use of input factors that have not been maximized. Besides that, the factors that can cause the low value added of this industry are the defersification of the product created

and the association of this type of industry with other industries. From the data obtained, in 2013 there were only 5 types of industrial products. meanwhile in the following years, namely 2014 and 2015, the number of types of products it produced was only 4 types. This causes the value of production to be relatively low which has an impact on the value of output from the industry, while the value of costs is relatively fixed.

TABLE II. VALUE ADDED OF INDUSTRY 2011-2015

Year	Industrial Code	Total Value of Gross Output	Intermediate Cost	Value Added	Change (%)
2011	26210	599.047.830	64.264.922	534.782.908	
	26220	356.980.799	47.700.218	309.280.581	
Total		956.028.629	111.965.140	844.063.489	
2012	26210	503.222.389	19.901.996	483.320.393	(9.62)
	26220	402.502.468	-	402.502.468	30.14
Total		905.724.857	19.901.996	885.822.861	4.95
2013	26210	2.054.104.670	159.150.906	1.894.953.764	292.07
	26220	507.098.304	380.839.945	126.158.359	(68.66)
Total		2.561.202.974	540.090.851	2.021.112.123	128.16
2014	26210	2.648.112.281	369.992.552	2.278.119.729	20.22
	26220	197.851.298	121.597.675	76.253.623	(39.56)
Total		2.845.963.579	491.590.227	2.354.373.352	16.49
2015	26210	4.701.973.221	914.896.191	3.787.077.030	66.24
	26220	233.752.346	136.137.633	97.614.713	28.01
Total		4.935.725.567	1.051.033.824	3.884.691.743	65.00

^dSource: BPS, Manufacturing industrial statistic book 2011-2015

The results of calculations using data from the Central Statistics Agency (BPS) in the manufacturing industrial statistics book 2011-2015 produced that the added value created in this industry has fluctuated. This may be due to an increase in middle cost allocation, but not followed by an increase in the Value of Gross Output. The highest increase in 2012-2013 reached more than 292%. As a result, the level of efficiency created by this industry has fluctuated too and getting to low.

The next effect is the creation of a low level of efficiency in this type of industry. Efficiency can be interpreted as the ability to use factors of production as much as possible to obtain the desired results (Spencer, 1978). The level of efficiency according to Hasibuan [5] is related to economic cost factors, if an industry experiences a high economic cost value, it causes the industry to be inefficient which will ultimately affect, among others, the ability of labor productivity and others.

The calculation results obtained in this study indicate that the level of efficiency created is relatively decreased in 2011 and 2012 from 0.274 to 0.041. But in 2013, the level of efficiency created increased significantly. However, in the following years it experienced a decline.

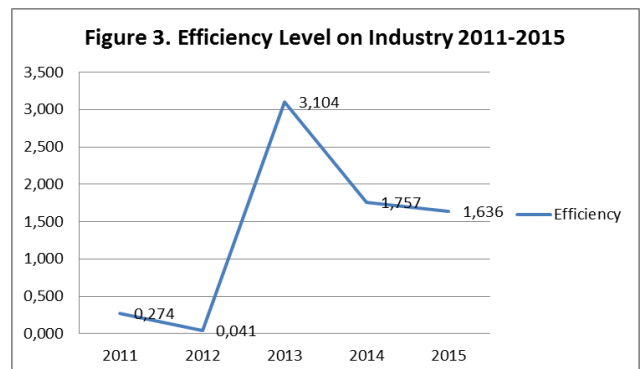


Fig. 3. Efficiency Level on Industry 2011-2015

One of the factor that causing this condition is an increase in the intermediate cost portion which is not portion. in the long run, this condition is certainly not good, because the high cost of production is not followed by increasing on amount of productions.

Year	Industrial Code	Intermediate Cost (000)	Growth (%)	Value Added (000)	Growth (%)	Cost Of Labour	Intermediate Cost Efficiency	Labour Efficiency
2011	26210	64.264.922	-	534.782.908	-	218.309.137	0,120	0,408
	26220	47.700.218	-	309.280.581	-	87.077.148	0,154	0,282
Total		111.965.140		844.063.489			0,274	0,690
2012	26210	19.901.996	(69,03)	483.320.393	(9,62)	93.306.910	0,041	0,193
	26220	-	(100,00)	402.502.468	30,14	-	-	0,000
Total		19.901.996		885.822.861			0,041	0,193
2013	26210	159.150.906	699,67	1.894.953.764	292,07	66.273.255	0,084	0,035
	26220	380.939.945	-	126.158.359	(68,66)	36.521.132	3,020	0,289
Total		540.090.851		2.021.112.123			3,104	0,324
2014	26210	369.992.552	132,48	2.278.119.729	20,22	208.952.833	0,162	0,092
	26220	121.597.675	(68,08)	76.253.623	(39,56)	15.072.002	1,595	0,198
Total		491.590.227		2.354.373.352			1,757	0,289
2015	26210	914.896.191	147,27	3.787.077.030	66,24	17.601.696	0,242	0,005
	26220	196.137.633	11,96	97.614.713	28,01	48.281.751	1,395	0,495
Total		1.051.033.824		3.884.691.743			1,636	0,499

TABLE III. EFFICIENCY ON INTERMEDIATE COST and LABOUR COST, 2011-2015

*Source: BPS, Manufacturing industrial statistic book 2011-2015

Based on the calculation results obtained correlation values between Productivity and efficeincy variables produce positive values. This indicates that if there is an increasing in efficiency, it will increase the productivity of the industry concerned.

TABLE IV. CORRELATIONS

Tabel 4. Correlations			
		Ln_Productivity	Ln_Efficiency
Ln_Productivity	Pearson Correlation	1	,632
	Sig: (2-Tailed)		,015
	N	9	9
Ln_Efficiency	Pearson Correlation	,632	1
	Sig: (2-Tailed)	,015	
	N	9	9

Correlation is Significant at the 0,05 level (2-tailed)

V. CONCLUSION

Based on the results of research and discussion in the previous section, it can be concluded that the level of productivity growth in The Computer and Computer Assembly Industries (26210) and The computer Industries (26220) is still not optimal and tends to fluctuate in growth. its implies to low efficiency in this type of industry. In this reseach we can find the condition that there is a conditon that decreasing in amoun of labour follow by increasing in total production. Its mean that, during the production activity, the level of use of labor is still not optimum, meaning that the ability of labor has not been fully utilized. In addition, this condition is also possible because the role of humans has begun to be replaced by mechine or technologies in the production process, so the labor needs is reduced.

followed by a significant increase in the value added

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