Parameter: Journal of Statistics
Available at https://bestjournal.untad.ac.id/index.php/parameter
Vol. 1 No. 2 2021, 21 - 30
DOI: *https://doi.org/10.22487/27765660.2021.v1.i2.15450*
eISSN: 2776-5660

IMPLEMENTATION OF CONSTANT ELASTICITY OF SUBSTITUTION FUNCTION AND DATA ENVELOPMENT ANALYSIS: PRODUCTIVITY AND TECHNICAL EFFICIENCY OF LARGE INDUSTRY CREATIVE ECONOMY IN CRAFT SUBSECTOR INDONESIA

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ABSTRACT

Indonesia has undergone a transformation from agriculture to the manufacturing industry in 1971-1997. In the 2001-2015 period there was de-industrialization in developed countries. Likewise, Indonesia which shows a decrease in the contribution of GDP and manufacturing sector workforce to the economy. However, deindustrialization in Indonesia is premature / too fast. One of the policies to overcome this problem is with attention to the creative industry. With the existence of the creative industry, it can achieve several SDGs goals, namely the 8th goal, namely decent work and economic growth, the creative economy can increase economic growth, create jobs and increase exports (UNCTAD, 2010). However, the creative industry GDP growth that is below the RPJMN target is thought to indicate low productivity of the creative industry. According to IBS data, the craft sub-sector creative industry has a low production value. To see productivity can use technical efficiency. This study aims to evaluate the technical efficiency of creative industry in the craft sub-sector as well as to analyze the trend of variables that affect technical judgments. The method used is the CES production function and Data Envelopment Analysis. The results show that industries that have high total production factor values have a tendency to have high technical efficiency values as well. Furthermore, those arranged according to technical categories and binary logistic regression are used to determine trend variables that affect technical judgments. The technical efficiency of the craft, significantly by wages, investment status and company scale.

Keywords: *CES Production Function, Data Envelopment Analysis, Productivity, Technical Efficiency, Total Factor Productivity.*

Cite: Subhi, K. T., & Budiasih. (2021). Implementation of Constant Elasticity of Substitution Function and Data Envelopment Analysis: Productivity and Technical Efficiency of Large Industry Creative Economy in Craft Subsector Indonesia. *Parameter: Journal of Statistics, 1*(2), 21-30.

*Received: Feb 2021; Reviewed: Apr 2021; Published: Jun 2021

INTRODUCTION

The contribution of the agricultural sector in Indonesia has decreased sharply from 44.83 percent in 1971 to only 16.09 percent in 1997. On the other hand, the contribution of the manufacturing industry has increased from 8.36 percent in 1971 to 26.79 percent in in 1997 to overall GDP. Thus, it can be concluded that the industrialization process was very meaningful in Indonesia during that period. The industrialization trend in Indonesia before the crisis period did has been stopped in the post-crisis period. The economic growth conditions for the manufacturing industry changed after the Asian crisis. Deindustrialization has been detected in the post-crisis because the less role of manufacture conditions in Indonesia. The competitiveness of the manufacturing sector has decreased which began several years before the start of the crisis (Dhanani, 2000).

During 2001 to 2015, when the value of Indonesia's GDP in the agricultural sector decrease, the contribution of the manufacturing GDP also decreased from 29.05 percent to 23.45 percent in 2015. This shows that the Indonesian economy has passed the peak of the contribution of the manufacturing industry to overall GDP was 29.05 percent. Indonesia has experienced premature de-industrialization (Aswicahyono, Hill, and Narjoko 2013).

Efforts to reverse the negative trend of deindustrialization or reindustrialization have been advocated, including by the World Bank. The manufacturing industry in Indonesia is immature. The problem is the fact that Indonesia's manufacturing industry appears to have failed to move to a higher level manufacturing sector, outside of traditional resource-based and labor-based sectors. One of the policies to overcome is attention to the creative industry (Zulfan, 2016). The Indonesian government realizes that currently it cannot rely solely on industry as a source of economy. The government needs to rely on creative human resources in an economy called the creative economy.

The creative economy according to the Central Bureau of Statistics is a manifestation of sustainable development with creativity in an economic climate that is competitive and has reserves of renewable resources and can process well without relying on limited natural resources as the main asset if it is carried out by planning creative activities. Creative economy is very important to be developed in Indonesia because according to UNCTAD (2010) in Murti (2019), creative economy is a concept based on creative aspects that has the potential to generate economic growth and development. The creative economy is capable of (1) increasing income, creating jobs and increasing exports by involving social aspects, cultural diversity and human resource development, (2) having economic, cultural and social aspects so that it is able to interact with intellectual property and tourism technologies, (3) knowledge-based economic activity, (4) has a creative industry at its heart.

Even though the creative industry has been used as an alternative income, from 2010 to 2015 the economic growth of the creative industry has actually decreased in line with the national economic slowdown. Therefore, the Creative Economy Agency was formed as the government's hope in intervening in the growth of the creative industry. The Creative Economy Agency has a long-term development plan to boost the growth of the creative industry.

The Creative Economy Agency has a target that needs to be achieved by 2019, namely the value of GDP growth for the creative industry is 6.75 percent and in 2016 the creative industry GDP growth is targeted at 5.21 percent so that it becomes the mainstay of Indonesia's economic growth. However, the creative industry has not been able to achieve this target because the realization of the GDP growth value of the creative industry is below the target. Initially, in 2014 the creative industry GDP growth was 5.19 percent then decreased to 4.41 percent in 2015 and 4.95 percent in 2016. This is of course a problem because the value of creative industry GDP growth should be 5.21 percent.

Currently, there are 5 creative economy sub-sectors in the manufacturing industry, namely crafts, culinary, fashion and publishing and music. One of the sub-sectors in the creative industry that has contributed to the creative industry is the craft sub-sector. According to the 2015 Manufacturing Industry Survey, the craft sub-sector has the highest number of industries, namely 42 percent of all creative industries. However, this industry only absorbs 32 percent of the workforce, but also produces high production values, namely 43 percent of the total production value of the creative industry.

With the decline in the GDP growth of the creative economy and the low contribution to the production value of the craft sub-sector, researchers suspect that the craft sub-sector industry has low productivity and total production factors. Productivity can be seen using technical efficiency, which shows a company's ability to produce. Then, the total factor of production shows the quality of the inputs used by creative industry companies in the craft sub-sector.

Currently, research related to the creative economy is mostly focused on mapping the creative industry in a region. This is because the creative economy consists of several sectors, each of which has a different leading sector. In addition, the research focuses on the analysis of creative industry development policies. This research focuses on large creative industries and the craft sub-sector in all provinces in Indonesia. The variables used include the number of goods produced, the number of inputs used and the characteristics of the medium-large creative industry. This study will calculate the value of technical efficiency using Data Envelopment Analysis (DEA) and Total Factor Productivity (TFP) using the Constant Elasticity of Substitution (CES) production function approach. The CES production function is able to provide an assessment of substitution between inputs and find capacity utilization in the demand for these inputs.

MATERIALS AND METHODS

This section contains data sources, research variables, sampling techniques, data collection methods, and detailed data analysis methods.

Production theory is the way company, in a certain technological level, are able to combine various kinds of production factors to produce a certain number of products in the most efficient manner. The production function states the relationship between the maximum output that can be obtained by using a certain number of production factors (Iksan Semaoen and Siti Mariyatul, 2011). In this production process, goods or services have added value or use. This kind of relationship exists in a production function.

Soekartawi (1990) states that the production function is a physical relationship between the variables described (Y) and the variables that explain (X). The quantitative relationship between input and production is known as the production function, while the analysis and estimation of this relationship is called the production function analysis. According to Iksan Semaoen and Siti Mariyatul (2011), the production function can be systematically written as follows:

$$Y = f(X_1, X_2, X_3, \dots \dots . X_n) \tag{1}$$

where $X_1, X_2, X_3, \dots \dots . X_n$ are the inputs used in the production process.

Soekartawi (2002) defines the Cobb-Douglas production function as a function that involves two or more variables, namely the dependent variable (Y) and the independent variable (X). The general form of the Cobb-Douglas production function is:

$$q = Ak^{\alpha} l^{\beta} \tag{2}$$

where q is the total output produced by the company. A state the technology which can also be expressed by the efficiency parameter which has a value of more than zero, where k and l are capital and labor, respectively. And α and β are model parameters in the production function.

The Cobb Douglas function is a function that is used generally in economics. However, this function requires a strong assumption that the elasticity of the substitution must be one. Due to this strict assumption, Arrow, Chenery, Minhas and Solow (1961) developed a function, namely the production function Constant Elasticity of Substitution (CES) as a general model of the Cobb-Douglas function which allows all non-negative constant values of the elasticity of substitution. This function has become popular in programming models but is rarely used in econometric analysis. The CES function has a degree of homogeneity equal to one which means constant return to scale (CRS). Then, increasing and decreasing the input in the CES production function does not change the substitution value. The CES function is mathematically formulated as follows:

$$y = \gamma\left(\delta x_1^{-\rho} + (1-\delta) x_2^{-\rho}\right)^{\frac{-\mu}{\rho}} \tag{3}$$

where y is the quantity of output, x_1 and x_2 are the quantity of inputs. Then γ, δ, ρ and μ are parameters. $\gamma \in [0, \infty)$ is the productivity or parameter which represents technology. $\delta \in [0,1]$ is the optimal distribution parameter of the input. $\rho \in [-1,0) \cup (0, \infty)$ is the constant elasticity of the substitution where $\sigma = 1/(1+\rho)$, and μ is the scale of return.

Moelyono (1993) states that productivity is an individual's desire to improve his quality of life by working which refers to efficiency and effectiveness. Productivity can be divided into two, namely partial productivity and multi-factor productivity. In contrast to partial productivity, multi-factor productivity is the ratio between output and input factors totaling more than one. This multi-factor productivity is the basic approach of calculating the Total Factor Productivity (TFP). TFP is the rate of technological development. TFP can also be explained as a quality factor that uses existing resources optimally to produce more output from each input unit, so it can be said that the part of the output that cannot be explained by the input. With the TFP, the production factors can be allocated effectively and efficiently and industrial output can still increase without using an increase in the number of inputs. This indicates the need to improve the quality that is better than the resources that have been used.

According to Coelli (2005), efficiency is a measure of a firm in its use of inputs. The efficiency used by Coelli is technical efficiency and allocative efficiency combined into economic efficiency. Technical efficiency is a combination of the capacity and ability of a company to produce maximum output levels from the number of inputs and technology. Coelli (2005) explains that there are two approaches to technical efficiency, namely the input and output approach.

Data Envelopment Analysis (DEA) was introduced by Charnes, Cooper and Rhodes with the mathematical programming technique of the Decision Making Unit (DMU) relative to similar DMUs where all of these units are at or below their frontier efficiency curve. To date there are two models in the DEA. First, the CCR model, which was first developed by Charnes, Cooper and Rhodes in 1978. This model assumes a Constant Return to Scale (CRS). Second, the BBC model, developed by Banker, Charnes and Cooper, which assumes a Variable Return to Scale (VRS). The CCR model on the DEA with input orientation is written as follows:

$$\begin{aligned} & min_{\theta,\lambda}\theta, \\ & st \qquad -\boldsymbol{q_i} + \boldsymbol{Q\lambda} \geq \boldsymbol{0}, \\ & \theta \boldsymbol{x_i} - \boldsymbol{X\lambda} \geq \boldsymbol{0}, \\ & \boldsymbol{\lambda} \geq \boldsymbol{0} \end{aligned} \tag{4}$$

This research covers the creative industry which consists of the craft sub-sector that was sampled in the 2015 Annual Manufacturing Industry Survey. The industry categories selected are based on the 5-digit KBLI of the creative economy. This study uses data consisting of variables including input and output as well as input characteristics used in the creative industry production process. The variables used as output are goods produced in a year. The variables used as input are machinery, labor, electricity, fuel and lubricants and wages. The variables that characterize the characteristics of the creative industry used are wages, company scale, overtime pay, social benefits and insurance, research costs and human resource improvement, bonus / employee gifts, imports of raw materials and exports.

To answer the research objectives, descriptive and inferential analysis methods were used. Descriptive analysis in the form of figures and tables using Microsoft Excel. Descriptive analysis is used to determine the profile of the creative industry in the craft sub-sector in Indonesia in 2015. This section also describes the stages to obtain efficiency values using Data Envelopment Analysis with the CRS application. The program used to obtain the efficiency value is DEAP 2.1.

According to Paul Samuelson (2009), every economy has resources in the form of limited production factors. Because of this scarcity, firms have to make choices in economic inputs and outputs. Output is a variety of useful goods or services resulting from the production process, both consumed and used for further production. Another form of input is the factor of production. According to Paul Samuelson and William Nordhaus (2009), production factors consist of several categories, namely natural resources and energy, labor and capital.

Inference analysis in this study aims to analyze the productivity of the creative industry in the craft sub-sector in Indonesia by using TFP values and technical efficiency to measure productivity.

Data Envelopment Analysis is used to obtain technical efficiency values. In this research, the input variables are labor, engine, electric power and fuel. While the output variable is goods produced by creative industries. The method used is CCR with the assumption of Constant Return to Scale (CRS) with the input approach. The DEA CRS model with input orientation in the craft sub-sector at i-th company is as follows:

$$\begin{aligned} & min_{\theta,\lambda}\theta, \\ & st \qquad -q_i + (q_1\lambda_1 + q_2\lambda_2 + \cdots\cdots\cdots + q_{2916}\lambda_{2916}) \geq 0, \\ & \theta x_{1i} - (x_{11}\lambda_1 + x_{12}\lambda_2 + \cdots\cdots\cdots + x_{1\,2916}\lambda_{2916}) \geq 0, \\ & \theta x_{2i} - (x_{21}\lambda_1 + x_{22}\lambda_2 + \cdots\cdots\cdots + x_{2\,2916}\lambda_{2916}) \geq 0, \end{aligned} \tag{5}$$

$$\theta x_{3i} - (x_{31}\lambda_1 + x_{32}\lambda_2 + \cdots\cdots\cdots\cdots + x_{3\,2916}\lambda_{2916}) \geq 0,$$
$$\theta x_{4i} - (x_{41}\lambda_1 + x_{42}\lambda_2 + \cdots\cdots\cdots\cdots + x_{4\,2916}\lambda_{2916}) \geq 0,$$
$$\lambda \geq 0,$$

where= $(\lambda_1, \lambda_2, \lambda_3, \cdots\cdots\cdots, \lambda_{2916})$

with

- $\boldsymbol{q}_i$: the ith output value of the creative industry in the craft sub-sector of the i th DMU looking for efficiency
- $\boldsymbol{x_i}$: the value of the input of the creative industry in the craft sub-sector
- $\boldsymbol{Q}$ **:** vector of input of all creative industries in the craft sub-sector
- $\boldsymbol{\lambda}$ **:** vector $Ix1$ of constant
- θ : the efficiency score of creative i $(\theta \leq 1)$
- $\boldsymbol{X}$ **:** vector of output of all creative industries in the craft sub-sector

Furthermore, TFP is estimated using the nested CES production function using the following four inputs:

$$y = \gamma\left[\delta(\delta_1 K^{-\rho 1} + (1-\delta_1)L^{-\rho 1})^{\frac{\rho}{\rho 1}} + (1-\delta)(\delta_2 T^{-\rho 2} + (1-\delta_2)B^{-\rho 2})^{\rho/\rho_2}\right]^{-\frac{\mu}{\rho}} \quad (6)$$

Where y is the amount of output, K, L, T, B are the quantity of input from capital, labor, electricity and fuel and lubricants, respectively. Then γ, δ, ρ and μ are parameters. $\gamma \in [0, \infty)$ is the productivity or parameter which represents technology. $\delta[0,1]$ is the optimal distribution parameter of the input. $\rho \in [-1,0) \cup (0, \infty)$ is the constant elasticity of the substitution where $\sigma = 1/(1+\rho)$, and μ is the scale of return. The value of γ in the equation above shows productivity which is the value of Total Factor Produvtivity (TFP). Or if it is written in the following equation:

$$\gamma = \frac{y}{\left[\delta(\delta_1 K^{-\rho 1}+(1-\delta_1)L^{-\rho 1})^{\rho/\rho 1}+(1-\delta)(\delta_2 T^{-\rho 2}+(1-\delta_2)B^{-\rho 2})^{\rho/\rho_2}\right]^{-\frac{\mu}{\rho}}} \quad (7)$$

Binary logistic regression is used to determine the factors that influence the trends in the technical efficiency of creative industries. In this study, technical efficiency is categorized into two. Because the number of industries that have high efficiency is very low, this study combines high technical efficiency and medium efficiency according to BPS. Therefore, the classification in this study: 1. Low efficiency, namely Technical efficiency ≤ 0.5 and 2. High efficiency, namely Technical efficiency > 0.5. The variables used are as follows:

Table 1. The Variables Used in The Binary Logistic Regression Equation

Variable	**Symbol**	**Data Type**	**Descryption**	**Category**
Technical Efficiency		Categorical	Less Efficient	0
			Efficient	1
Wage	Wage	Numeric		
Numeric Bonuses / prizes	Bonus	Numeric		
Imported Numeric Raw Materials	Import	Numeric		
Investment status Category	Investment	Category	Non-Facility	0
			Facilities *	1
Medium Category	Scale	Category	Medium	0
			Large *	1

With wage variables in million units, bonuses / gifts in million, imports of raw materials as a percentage for each subsector.Based on the table above, the binary logistic regression equation can be formed as follows:

$$\hat{g}(x) = \hat{\beta}_0 + \hat{\beta}_1\, Wage + \hat{\beta}_2 bonus + \hat{\beta}_3 import + \hat{\beta}_4 investment + \hat{\beta}_5 scale \quad (8)$$

RESULTS AND DISCUSSION

1. Technical Efficiency of Creative Industry in Craft Subsector

Based on the results of the 2015 Annual Manufacturing Survey, there were 3727 creative industries in the craft sub-sector. However, in this study only 2916 industries were used. This is because as many as 811 creative industries in the craft sub-sector have an input that has an extreme value and has a value of 0. This condition disturbs the results of the calculation of efficiency and the total factor of production in the CES function so that the industry is excluded from the process of calculating efficiency.

The calculation of efficiency in this study uses an input-oriented approach with the DEA CCR method with the following calculation results:

Table 2. Descriptive Statistics of Technical Efficiency Values of the Craft Sub-Sector

No.	Characteristics	Value
1.	Number of Industries	1509
2.	Percentage of industries with high efficiency or > 0.5 (percent)	19,15
3.	Percentage of industries with low efficiency or ≤ 0.5 (percent)	80,85

Source: Annual Manufacturing Industry Survey, 2015 (processed)

Based on table 2, as many as 2916 creative industries in the craft sub-sector analyzed, only 9.60 percent of the craft sub-sector industry has a high efficiency category and as much as 90.40 percent of the industry has a low efficiency category. Then, from 9.60 percent of the industries that have high efficiency, there are 25 industries that have efficiency equal to 1 and are used as efficient industry benchmarks. Based on the small percentage of industries with high efficiency, there is a dominance of industries with relatively low efficiency values. This is thought to be the cause of the lack of production of the creative industry in the craft sub sector, resulting in low growth in production value.

2. CES Production Functions of Creative Industry in Crafts Subsector

The following is the output of the CES production function for the creative industry in the craft sub-sector using 4 inputs: capital (K), labor (L), electricity (T) and fuel (B) with the R studio application. The values of $\sigma_{(K,L)}$ and dan $\sigma_{(T,B)}$) indicate elasticity.

Table 3. The Estimation Results of CES Production Function Parameters for Craft Sub-Sector in 2015

Parameter	Estimate	Error Standard	t-statistics	***P value***
(1)	(2)	(3)	(4)	(5)
γ	1,234	0,010	121,116	0,000
α_1	-0,075	0,034	-2,186	0,028
α_2	0,625	0,033	18,825	0,000
α	0,462	0,019	24,164	0,000
ρ_1	0,292	0,232	1,262	0,206
ρ_2	-0,531	0,200	-2,658	0,007
ρ	0,604	0,111	5,397	0,000
μ	0,367	0,007	47,076	0,000
R^2_{adj}: 0,5532				
Substitution Elasticity				
$\sigma_{(K,L)}$	0,773	0,138	5,572	0,000
$\sigma_{(T,B)}$	2,135	0,912	2,340	0,019
$\sigma_{(KL,TB)}$	0,623	0,043	14,326	0,000

Source: output R (processed)

All elasticities are significant and positive both between capital and labor and between electricity and fuel. A significant technical elasticity implies that the input factor has technical substitution. The elasticity value of less than 1 in the craft sub-sector is in accordance with research conducted by Tsurumi (1970) who used the CES function for the manufacturing industry in Canada. He found that the value of the elasticity of substitution in the craft manufacturing industry has an elasticity of less than 1. Low elasticity indicates that substitution is difficult between capital and labor in the craft sub-sector.

In the craft sub-sector, the value of the elasticity of substitution between capital and labor is 0.77. This figure means that to increase the workforce by 1 percent, it is necessary to reduce capital by 0.77 percent. In other words, a 1 percent reduction in capital can increase the workforce by 1.29 percent. Therefore, an increase in the ratio of expenditure for capital used to expenditure on labor (K / L) results in smaller changes in the ratio between the amount of capital used to the amount of labor (K / L) compared to the ratio between the amount of labor and the amount of capital. used (L / K).

The low level of substitution between capital and labor in the craft sub-sector indicates that the opportunity to increase capital as a substitute factor for reducing the number of workers is very low. In other words, it is difficult to compensate for the reduction in labor used by simply increasing the quantity of capital.

If the value of the elasticity of substitution is between the interval 0 and ∞, if the value is smaller, it means that the ability to replace each other between the input of capital and labor will be smaller If the increase in prices or production costs is caused by an increase in the amount of labor it will be difficult to replace it with the use of capital. This is because the output of the creative industry in the craft sub-sector will not be affected by an increase in one of the inputs. In conditions of elasticity less than 1, the industry tends to keep one input use on the other hand reducing the other input with a relatively small change. This condition shows that the creative industry in the craft sub-sector is labor intensive.

Then the elasticity value between fuel and electric power $\sigma_{(T,B)}$ has the largest estimated value. The elasticity value in the craft sub-sector is 2.13 which is more than 1. This indicates that energy substitution can be done easily. This is in accordance with research conducted by Lilia Karnizova (2014) which has a large elasticity value in energy used by industry in Canada. The high elasticity of substitution between electric power with fuel and lubricants (T / B) in the craft sub-sector indicates that an increase in the ratio of expenditure on electricity usage to expenditure on fuel and lubricants causes a larger change in the ratio between total electricity usage. to fuel and lubricants (T / B) compared to the ratio between the amount of fuel and lubricants to the amount of electric power (B / T).

Increasing the use of one input can have a major impact on the output of the creative industry in the craft sub-sector. This shows that the creative industry sub-sector of crafts uses electricity more than fuel and lubricants.

R^2 in the craft sub-sector 0.469 means that about 46.9 percent of the variation in the production output of the creative industry in the craft sub-sector can be explained by variables: labor, capital, electricity and fuel. So that the higher the value of R^2, the more appropriate the model will fit the data. Meanwhile, the rest is explained by other variables outside the model. The return to scale μ to the creative industry input in the craft sub-sector is 0.938 and significant at the 5 percent level, indicating that there is a scale of return decreasing to scale. That is, the addition of the input used results in a smaller increase in output.

3. ***Total Factor Productivity*** **and the Efficiency of The Creative Industry in the Craft Subsector**

Table 4 shows the creative industry in the craft sub-sector based on the total factor productivity value category and the technical efficiency category. Column three row one shows industries that have low technical efficiency and the category of total factor productivity is low as much as 52.1 percent, indicating that other than industries having low efficiency, it has low input quality. However, in column four row one there are industries that have a low efficiency category with a high total factor productivity category of 47.9 percent. This industry is an industry that has good quality input but is not efficient.

Table 4. Distribution of Creative Industry in Craft Subsector based on Efficiency Technical and TFP

No	Technical Efficiency Category	Total Factor Production Category	
		Low or TFP <Median (percent)	High or TFP> Median (percent)
1.	Low (ET ≤ 0.5)	52,1	47,9
2.	Tinggi (ET > 0,5)	0,0	100,0

Source: Annual Manufacturing Industry Survey, 2015 (processed)

Furthermore, column four row 2 shows that all industries that have high efficiency, namely 100 percent have a high total factor productivity category. This shows that the craft sub-sector is capable of making input more efficient where the quality of the input is also good.

Based on the above explanation, all sub-sector creative industries that have high technical efficiency values also have high total factor productivity values. Meanwhile, the creative industries that have a low technical efficiency category, some have a low total factor productivity category and some others have a high total factor productivity category. There is a difference in the distribution of the total production factors of the creative industry according to the technical efficiency category. Creative industries that already have high technical efficiency values will also have high total factor production values.

4. Factors Affecting the Technical Efficiency of the Craft Subsector Industry

This section will explain the effect of the explanatory variables on the technical efficiency of the creative industry in the craft sub-sector in 2015 using binary logistic regression analysis. The parameter significance testing is as follows:

a. Simultaneous Test

Simultaneous test is carried out using the likelihood ratio test, namely the G test statistic. This test is carried out to see the effect of explanatory variables simultaneously or simultaneously on the technical efficiency of the craft sub-sector creative industry. The simultaneous test results are as follows:

Table 5. Omnibus Test for the Coefficient of The Craft Subsector Model

Step 1	***Chi-square***	***Degree of Freedom***	***P-value***
Step	89,194	5	0,000
Block	89,194	5	0,000
Model	89,194	5	0,000

Source: Annual Manufacturing Industry Survey, 2015 (processed)

The chi-square value in the table with α of five percent and degree of five is 11.07. Then the chi-square value from the calculation results is 89.194 which is greater than the chi-square table value and the p-value is less than 5 percent. This shows *Ho* refusal, which means that with a five percent significance level there is at least one explanatory variable that has an influence on the technical efficiency of the craft sub-sector creative industry.

b. Goodness of Fit Test

This test is carried out to determine the suitability of the model formed in explaining the technical efficiency of the creative industry in the craft sub-sector. The test used uses the Hosmer Lemeshow Test with the results as in table 5. Table 5 shows that the Chi-Square value of 13.857 is less than the Chi-Square table value with degrees of freedom 8 which is 15.507 and the p-value is more than 5 percent, which means that it fails to reject Ho. This shows that the model is fit and with a significance level of 5 percent the model formed is appropriate in explaining the technical efficiency of the craft sub-sector creative industry.

Table 6. Hosmer and Lemeshow Test Craft Subsector

Step	**Chi-square**	**Degree of Freedom**	**P-value**
1	13,857	8	0,086

Source: Annual Manufacturing Industry Survey, 2015 (processed)

c. Partial test

After the simultaneous test is carried out, then the partial test is carried out. Partial test is used to see the relationship of each variable to the technical efficiency of the creative industry in the craft sub-sector. The test used is the Wald test. The test results are as follows:

Table 7. The Estimation Results of the Model, Wald Test, The Craft Sub-Sector Odds Ratio

Variabel	**Regression Coefficient ($\widehat{\beta}$)**	**Wald Statistics**	***Degree of Freedom***	***P-Value***	**Exp ($\widehat{\beta}$)**
Wage	0,614	41,232	1	0,000	1,848
Bonus/ priza	0,038	1,792	1	0,181	1,039
Percentage of Imports	0,000	0,012	1	0,914	1,000
Investment Status	0,747	12,104	1	0,001	2,112
Company Scale	0,768	11,192	1	0,001	2,155
Constant	-4,689	421,588	1	0,000	0,009

Source: Annual Manufacturing Industry Survey, 2015 (processed)

Based on table 7, the explanatory variable has a significant effect on the technical efficiency of the creative industry in the craft sub-sector if the Wald test result has a p-value of less than 5 percent. There are 3 explanatory variables that influence the technical efficiency of the creative industry in the craft sub-sector, namely investment status, company scale and wages.

The binary logistic regression equation that explains the technical efficiency of the creative industry in the craft sub-sector in 2015 is as follows:

$$g(\hat{Y}) = -4{,}689 + 0{,}614\, wage * + 0{,}038\, bonus + 0{,}000\, import - 0{,}747\, modal^{*} + 0{,}768\, scale^{*} \quad (9)$$

(*)shows a significant variable at α valued at 5 percent

The logistic regression equation above can be seen to see the tendency of each explanatory variable that has an influence on the technical efficiency of the craft sub-sector creative industry. To see the trend, it can be seen with the odds ratio obtained by calculating Exp ($\hat{\beta}$).

Based on equation (9), the variable that has an influence on the technical efficiency of the creative industry in the craft sub-sector is wages. The coefficient value of the wage variable in the logistic regression equation is 0.614. A positive number means that industries with a one million rupiah increase in wages have a greater chance of having high technical efficiency. Based on table 7, the odds ratio is 1.848, which means that the creative industry in the craft sub-sector which has an increase in wages of one million rupiah for workers has a tendency of 1,848 to have high technical efficiency.

Furthermore, the bonus variable has a positive coefficient of 0.038. This shows that the bonus / reward variable has a positive effect on the technical efficiency of the craft subsector negative industry. The odds ratio is 1.039. This value indicates that the creative industry in the craft sub-sector which adds a bonus / gift of one million rupiah to its workers has a tendency of 1.039 times to have high technical efficiency. However, the bonus / reward variable is not significant, so that it has little effect on the technical efficiency of the creative industry in the craft sub-sector. This is consistent with the descriptive analysis that according to Indonesian creative economy agency, the craft sub-sector creative industry is an industry that is resistant to the world economy so it does not require bonuses / prizes.

Furthermore, the variable percentage of imports of raw materials does not have a significant effect on the technical efficiency of the creative industry in the craft sub-sector. Based on the partial test, the investment status variable has an influence on the technical efficiency of the craft sub-sector creative industry. The variable coefficient value obtained is 0.747 using the facilitated investment status as a reference. This shows that the creative industry in the craft sub-sector which has a facilitated investment status has a tendency to have high technical efficiency by 2.112 times compared to industries with a non-facilitated investment status. Import variables do not have a significant effect because based on descriptive analysis only a few industries import raw materials, while the raw materials for the craft sub-sector are dominated by local raw materials.

Apart from the investment status variable, the variable affecting the technical efficiency of the creative industry in the craft sub-sector is the scale of the company. The company scale variable has a coefficient value of 0.768, which means that the company scale has a positive influence on the technical efficiency of the craft sub-sector creative industry in producing. The odds ratio value of 2.155 shows that the tendency of the craft sub-sector creative industry which has a large-scale company to have high technical efficiency is 2.155 times greater than that of an industry with a low company scale assuming constant variables.

On the other hand, the constant coefficient value has meaning when all explanatory variables have zero values. Based on table 7, the constant value is -4.689, so the odds ratio obtained is 0.009. This figure shows that the opportunities for the creative industry in the craft sub-sector with no increase in wages of one million rupiah, no increase in bonuses / prizes of one million rupiah and not increasing the percentage of imported raw materials by 1 percent, the status of non-facility investment and medium-scale company amounting to 0.009 to have high efficiency.

CONCLUSION

1. The creative industry in the craft sub-sector has low technical efficiency, so it has a low productivity category as well. Therefore, the low productivity of the creative industry in the craft sub-sector is unable to support the creative industry in achieving the creative industry GDP growth target that has been determined in the RPJMN. Then, the productivity of the creative industry in each subsector is influenced by different factors.
2. Then in the craft sub-sector, the level of industrial productivity is influenced by the average wage of production workers, the scale of the company and the status of investment.

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