

ANALYSIS OF EFFICIENCY OF PRODUCTION AT SMALL EMBROIDERY INDUSTRY IN REGENCY OF KUDUS

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Abstract

This research aimed at analyzing factors influencing embroidery production and its efficiency at small embroidery industry in Kudus. A total respondent of this research was 108 taken using multi-stages sampling technique. In addition, 10 keypersons determined by purposive sampling were taken from competent stakeholders in embroidery business. Technical efficiency analysis by using stochastic Frontier Production Function was done to know the small embroidery industry whether it is efficient or not. The research findings showed that factors influencing the production of small embroidery industries in Kudus Regency consist of labor, raw materials, auxiliary materials, electricity, machinery and equipment, and they all have a positive and significant effect on the production of small embroidery industry. While the results of the calculation of production efficiency showed that the level of technical efficiency of small embroidery industry doers in the research area is not efficient with an average value of less than 1 (0.9538).

Keywords: *efficiency, production, industry, small, embroidery, Kudus*

1. INTRODUCTION

The growth of big and medium industry in Indonesia is very fast since the 1970s. It is faster than the the growth of small and household Industry which is relatively stagnant. Nevertheless, it has played an important role in providing vocation, increasing the number of companies, and sustaining household income. This industry is also able to absorb the majority of labor in manufacturing companies in Indonesia (Mudrajad Kuncoro, 2007). This is in line with I Wayan Dipta (2009) stating

that Micro, Small and Medium Industries are recognized as having an important and strategic role in national development. It is not solely the large number and spreads throughout the archipelago, but its existence is also meaningful in economic growth, the absorption of labor and the distribution of goods and services throughout the country. In addition, when Indonesia experiences a monetary crisis that has an impact on multidimensional crises, these industries have been recognized as safety valves. Because it is they who exist and move the Indonesian economy.

Tabel 1. Numer of Labour of Micro, Small and Medium Industires in Indonesia in 2008-2009
Source : Biro Perencanaan Kementerian Koperasi dan UMKM RI, 2009

No	Business Scale	2008		2009		Growth	
		Sum (Person)	%	Sum (Unit)	%	Sum (Person)	%

1	Micro Industry	87.810.366	90.73	90.012.694	91.0	2.202.328	2.51
2	Small Industry	3.519.843	3.64	3.521.073	3	1.230	0.03
3	Medium Industry	2.694.069	2.78	2.677.565	3.56	-16.504	-0.61
4	Big Industry	2.756.205	2.85	2.674.671	2.71	81.534	-2.96
					2.70		

Table 1 shows the contribution of micro industries in terms of employment absorption in 2009 which reached 91.03% of total Indonesian labour, small industry was 3.56%, and medium industry was 2.71%. Small and Micro Industries in this era experienced positive growth compared to those in 2008, those are 2.51%, 0.03%. While Medium and Big Industries contribute labor 2.677.565 people and 2.674.671 with negative growth of -0.61% and -2.96%. Besides having a big role to the economy, the existence of UMKM also still has problems like efficiency. This is in line with Diaz and Sanchez (2008) stating that small and medium industries in Spain are not more efficient than big scale manufacturing industries.

Economic activity in Kudus Regency is mostly industrial sector and UMKM

which is a potential asset. To strengthen a populist-based economy. Some efforts to empower Small and Medium Enterprises are a strategic step that must be supported from all parties because it has a very high socioeconomic impact (Dinas Perindustrian, Koperasi dan UMKM Kab. Kudus, 2009). Embroidery is a kind of handicraft made from yarn, to be used as clothing material that has high artistic value. The development of era requires the craftsmen to use embroidery machines to make the work easier and faster. However, not a few craftsmen who still maintain the manual techniques that produce more qualified embroidery fabric. ([Http://www.promojateng-pemprovjateng.com/detail.php?id=793](http://www.promojateng-pemprovjateng.com/detail.php?id=793)). In Kudus embroidery is a hereditary heritage, most of them still use simple embroidery techniques learned from generation to generation.

Table 2. Data of Development of Small Embroidery Industry of Kudus In 2008-2009

Uraian	2008	2009	Pertumbuhan (%)
Business Unit (Unit)	419	412	-1,67
Labour (Orang)	2.425	2.425	0
Value of Investment (Rp.Jt)	11.808,308	3.089,50	-73,8
Value of Production (Rp.Jt)	70.583,53	69.464,03	-1,58

Source : Dinas Perindustrian, Koperasi dan UMKM Kab. Kudus, 2009

The data in Table 2 shows the negative growth of the small embroidery industry on the number of business units, labor, investment value and production value. Growth of business units decreased by -1.67%, employment grew by 0%. While the value of investment decreased by -73.8%, and the value of production decreased by -1.58%.

Meanwhile, based on the results of Focus Group Discussion (FGD) there are obstacles faced by small entrepreneurs of Kudus embroidery that is raw materials, capital and marketing. Raw material is very important for the sustainability of embroidery business. Embroidery raw material obtained by businessmen is relatively expensive. This condition indicates that raw materials are imported

from Bandung, while they are not able to buy directly in Bandung. So they buy raw materials in Kudus which means that there is an additional distribution chain, so it increases the cost of raw material and is more expensive.

2. LITERATURE REVIEW

2.1. Theory of Production

Production theory describes the connection between the factors of production and the level of production created. The theory of production can be expressed in the form of a production function. Production function is the relationship between the number of inputs used to make goods with the number of goods. (Mankiw, 2006). Meanwhile Nicholson (1999) states the relationship between these inputs and outputs can be formulated by a production function, which in mathematical form can be written:

$$Q=f(K,T,M,\dots)$$

Q=Output produced for certain period

K=Capital

T=Labour

M=Material

Spots sign (...) shows the ability to use other input.

2.2. Efficiency

Samuelson and Nordhaus (2003) argue that an economy is efficient when it provides its customers with the most desirable set of goods and services, with certain resources and technologies of the economy. According to Soekartawi (2003) efficiency is defined as the effort to use the smallest input to get the maximum production. Such a situation will occur if the production process makes an effort if the value of the marginal product for an input is equal to the input ($P = \text{Price}$). According to

Based on the description explained above, aimed at analyzing factors influencing embroidery production and its efficiency at small embroidery industry in Kudus.

Komaruddin (1986) in general, the increase in efficiency is due to:

1. Use of modern management
2. The use of non-human sources or animal
3. Mechanisms that are self-adjusting
4. Use of standardized parts of tools and can be exchanged one another.
5. Leaving out complex production processes and replacing them with repetitive work and production
6. Specializing tasks and division of labor and authority.

According to Farrell, technical efficiency is associated with a company's ability to produce frontier whose position lies in the isoquant line (Kolawole and Ojo, 2007). Meanwhile, According to Soekartawi (2003) frontier production function is a production function used to measure how the actual production function of the frontier position is. The stochastic frontier model of the Cobb-Douglas production function can be written as follows (Ajibefun, 2008):

$$Y_i = f(X_i; \beta) \exp(V_i - U_i), \quad i = 1, 2, \dots, n,$$

Y_i is the firm output, X_i is the number of variable inputs, β is the production coefficient, V_i is the random error associated with factors outside the control of the firm. And is the measure of inefficiency. This model is likely that Y_i 's production is determined above the stochastic quantity, $f(X_i; \beta) \exp V_i$ by therefore termed stochastic frontier. Random error V_i is assumed to be independently and identically distributed as $N(0, \sigma^2)$ random independent variable U_i , which is assumed to be

cutting the distribution of $N(0, \sigma^2)$. Error term $\varepsilon_i = \exp(V_i - U_i)$, is an error term consisting of V_i with two langkat, while U_i is a single langkat. There are different assumptions about both.

2.3. Small and Medium Industry

According to Law no. 20 of 2008 concerning Micro, Small and Medium Enterprises, that small-scale enterprises are stand-alone productive economic enterprises, carried out by individuals or business entities that are not subsidiaries or non-owned subsidiaries owned, controlled or part of either directly or indirectly directly from a medium-sized or large-scale business that meets the criteria of the small-scaled business referred to in this law. Small Business Criteria are as follows:

- 2.3.1. Has a net worth of more than Rp. 50,000,000.00 (fifty million rupiah) up to a maximum of Rp. 500,000,000.00 (five hundred million rupiah) excluding land and building of business premises; or
- 2.3.2. Has annual sales of more than Rp. 300,000,000.00 (three hundred million rupiah) up to a maximum of Rp. 2.500.000.000, 00 (two billion five hundred million rupiah).

2.4. Embroidery

The embroidery process begins with the preparation of fabric to be embroidered. Fabrics are cut to the desired shape and size. Fabrics ready for embroidery are patterned. The pattern is sewn on the fabric to be embroidered. The next job is embroidering according to the pattern already installed. Once finished embroidery, done perforation on the embroidery with solder. After the perforation process is complete, the pattern is released from the embroidery and embroidery results are made by cutting the remnants of the yarn (Public Relations Bureau of Central Java

Province, 2009). According to Hery Suhersono (2009) embroidery tool consists of tools and embroidery materials. The tools include machine, ram / ring / dish, scissors and needle. While the material consists of fabric, yarn, paper, stationery, karbondan tape measure.

3. RESEARCH METHOD

3.1. Source and Type of Data

Sources and types of data used in this study are primary data and secondary data. Primary data was obtained through interviews directly from respondents using questionnaires. Secondary data is supporting data in this research obtained from institutions / agencies involved in this research. Institutions / agencies include the Office of Industry of Central Java Province, Department of Industry, Cooperatives and SMEs Kudus District, Central Java BPS and Kudus District BPS.

3.2. Population and Sample

The number of small industry of embroidery craft in Kabupaten Kudus is based on data from Department of Industry, Cooperative and UMKM of Kudus Regency amounting to 412 business units. Therefore, the study population is 412 business units.

Meanwhile, the sample selection is done by Multistages Sampling method which combines two or more sampling techniques (Zikmund, 1994). The steps in this research are as follows: 1) determining the embroidery industry, in this research take small embroidery industry in Regency of Kudus with total population 412. 2) determine the center of embroidery industry, Sentra craft embroidery in Kudus District taken is Gebog because more dominant than other sub-districts. 3) Determine the dominant center in District Gebog, from the data obtained, the most dominant center of

Sentra Padurenan and Sentra Karang Malang. Given the number of population in the center is 108, while the method to calculate the efficiency used is the frontier which requires N samples more than 100, so this research takes the research area of Desa Padurenan and Karangmalang Village because both of these villages have the number of the dominant.

3.3. Method of Collecting Data

Data collection in this study was conducted by interview and documentation described as follows:

3.3.1. Interview

Interview or interview is a form of verbal communication so a kind of conversation that aims to obtain information (Nasution, 2007). The interview technique was conducted with the help of the questionnaire guidelines. This interview was conducted to get answers to this research question which includes the number of inputs used for production, and the amount of production.

3.3.2. Documentation

Documentation is obtained by collecting data related to the research. The data is obtained from related institutions / institutions, print media and internet. In this study, the documentation is used to accommodate the background and to know the condition of the research area that is the number of business units, labor, and investment value of KUKM, the distribution of small industry, and the government regulation on KUKM.

3.4. Analysis Technique

This research uses Stochastic Frontier Production Function (Ajibefun, 2008; Major, 2008; Lin and Ma, 2006; Bhundari and Maiti, 2007; Yang and Chen, 2009) as pre requisite.

The use of production function Stochastic Frontier Production Function, used to measure the level of efficiency.

This production function has been applied in the industrial sector as has been done by Ajibefun (2008); Major, (2008); Lin and Ma, (2006); Bhundari and Maiti, (2007); Yang and Chen, (2009). Mathematically the input-output relationship of embroidery business is as follows:

$$\text{Ln}Y = \beta_0 + \beta_1 \text{Ln}X_1 + \beta_2 \text{Ln}X_2 + \beta_3 \text{Ln}X_3 + \beta_4 \text{Ln}X_4 + \beta_5 \text{Ln}X_5 + \beta_6 \text{Ln}X_6 + \varepsilon_i$$

Where β_0 is an estimated parameter, X_1 = labor, X_2 = raw material, X_3 = helper, X_4 = power, X_5 = machine, X_6 = equipment, $\varepsilon_i = v_i - u_i$. The error u_i is considered negative and rises because of the normal distribution cut with the zero average and the positive σ_u^2 variant, this indicates the technical efficiency of production. It can be said that the error v_i is assumed to have a normal distribution with a mean of zero and a positive σ_u^2 variable that describes the measurement error relating to factors beyond the controls contained in the production process. (Richmont, 1974, Aigner et al., 1977; Battese and Corra, 1977; Colli 1995 in Kolawole and Ojo, 2007). Furthermore, the analysis is to identify the effect of different factors. The value of technical efficiency can be known through processing data with frontier (version 4.1c). Justification of its efficiency value (Viswanathan et al., 2001; Coelli et al., 1998):

1. If the value of technical efficiency is equal to one ($= 1$), then the use of input in the business is efficient.
2. If the technical efficient value is not equal to one ($\neq 1$), then the use of input is inefficient.

4. RESULT AND DISCUSSION

4.1. Efficiency

The result of technical efficiency analysis using Stochastic Frontier Production Function shows that the production of small embroidery industry

is not efficient yet. This can be seen in detail in Table 3 From the table it can be seen that all the parameters in the production function of small embroidery industry frontier in Kudus Regency showed positive and significant value.

This means that the independent variables consisting of labor, raw materials, auxiliary materials, electricity, machinery and equipment show that it is in accordance with the theory.

Tabel 3 Result of Estimation of Frontier Production Function

No	Variable	Coefficient	Std. Error	t-Ratio
1	Constanta	2,7903	0,2687	2,7080***
2	LnX1 (Labour)	2,9319	0,3485	8,4119***
3	LnX2 (Material)	0,8107	0,6656	12,1795***
4	LnX3 (Supporting Material)	3,8008	0,1331	2,8550***
5	LnX4 (Electricity)	3,8522	0,2039	18,8915***
6	LnX5 (Machine)	1,5359	0,7155	2,1464**
7	LnX6 (Equipments)	0,8821	0,1948	4,5272***
8	Mean TE	0.9538		
9	N	108		

Explanation : *** reallity of belief rate of 99%

** reallity of blief rate of 95%

TE = Technical Efficiency

Source : Primary Source ,2011

Based on Table 3 shows that the regression coefficient for labor input is 2.93. This indicates that if the use of labor input plus 1% of workers, it will result in increased output of embroidery production of 2.93%. This worker has a very big role to the production, this is because the embroidery industry still uses a simple machine so that the role of workers is still relatively large.

Raw material input has a regression coefficient of 0.81. This indicates that if the use of raw material input added by 1%, it will result in increased output of embroidery production by 0,81%. This raw material needs to be maintained ketersediaanya, if the raw material stagnant then the production of embroidery will also falter.

The regression coefficient for the auxiliary input is 3.80. This means that if the use of auxiliary inputs is increased by 1%, then production will increase by 3.80%. The input of the auxiliary material in the manufacture of embroidery is the yarn, this component will affect the quality of the embroidery.

The use of yarn tailored to the embroidery to be produced, if the production of embroidery with good quality, then the yarn to be used will be a good quality yarn, if will produce low quality embroidery products will use yarn with less good quality at low prices.

The electric variable has a regression coefficient value of 3.85. This means if there is an increase in output of 1%, then there will be an increase in output of 3.85%. Electricity used to run embroidery machine for the production of embroidery.

The machine has a regression coefficient value of 1.53. This shows that if there is additional 1% of machine use, then there will be an increase of production by 1.53%. The more machines used to produce, the more production output can be produced. Small business actors embroidery has not used computerized embroidery machine that is done computerized through the process of programming (digitizing process) design first. Embroidery machine used the same as ordinary

sewing machine, there is only a surplus on the needle prick more freely.

Variable regression equipment coefficient was 0.88. This indicates that if there is addition of appliance use as much as 1% hence there will increase output 0,88%. equipment has an important role in making embroidery. Equipment used for the business of embroidery, namely scissors to perforate material, ram embroidery as a cloth to stretch linen stretching and not shrink, and measuring instruments. Equipment owned by small embroidery industry entrepreneurs are not all used in accordance with the amount it has, it can be said the use of equipment has not been maximized.

The average technical efficiency value is 0.9538, this means that the embroidery entrepreneur in the research area is inefficient in performing production process activities, so it is still possible to be improved. This shows that the production process of small embroidery industry is still possible to be improved.

5. CONCLUSION

The results show a new area of production theory, efficiency, and empowerment strategies for small embroidery industries. Of all embroidery production inputs consisting of labor, raw materials, auxiliary materials, electricity, machinery, and equipment, all have a positive and significant effect. Based on the results of technical efficiency analysis, it can be concluded that the embroidery business in the research area has not been operating efficiently. This is indicated by an average of technical efficiency rate of 0.9863. So there is still a chance to increase the production of embroidery with increased efficiency.

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