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Batik SMEs Efficiency and Entrepreneurship Role in Innovation

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Abstract:

In the long term, batik SMEs to compete in the local and global markets can not only rely on production capabilities rooted in local sources of uniqueness, but must have efficiency of economies scale for resource access and innovation. In a competitive environment, entrepreneurs in the batik industry have an important role to improve the efficiency. This study analyzed the role of entrepreneurs in the economic efficiency. This study applies production model to describe the entrepreneurs role on economic efficiency. The study was conducted by interviews to 100 Batik SMEs managers-owners in the Batik Centre in Solo, Pekalongan and Rembang. The entrepreneurs role in innovation in term of product innovation, marketing innovation, and business alliances (cooperatives). Data analysis was performed using Stochastic Frontier and Deterministic Regression Analysis. The empirical results of the technical inefficiency effects model suggest that the entrepreneurs role in product innovation, marketing innovation and business alliances are important factors affecting economic efficiency of batik SMEs. The role of entrepreneurship in marketing innovation has the highest elasticity of the production and sales of batik, and then followed by the role of entrepreneurs in new product innovation and business alliances.

Key words: entrepreneurs role, innovation, SMEs efficiency

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INTRODUCTION

Batik is a traditional hand-crafted dye-resist textile rich in intangible cultural values, passed down for generations. Batik is a technique of wax-resist dyeing applied to whole cloth, or cloth made using this technique originated from Indonesia. The development of the batik industry as one of the 14 components of the creative industries needs to be improved, given the batik market trends and prospects in the global market promising. Batik industry has contributed to the growing the national economy with an export value of 761 million USD in 2011. Besides that, amounted to 99.39 of 326 business units engaged in the batik industry is the Micro, Small and Medium Enterprises (SMEs), with absorption batik industry worker about 838 million people that are spread in various regions in Indonesia. It means that there is a large contribution from the batik industry to job opportunities and income improvement. The additional value of the batik industry is increasing every year with the average growth of 32.27% (Deperindag, 2013).

In a competitive industrial environment, entrepreneurs factors of batik industry have an important role to increase economic efficiency. Innovation is not limited to large-scale companies that generally have research and development (R & D) divisions, however small scale businesses such as Batik SMEs also require innovation activities (Karabulut, 2015; Ganzera et al., 2017; Ismail et al. , 2014; Charoenrat et al., 2013; de Jorge, and Suárez, 2011). SMEs benefit organizations flexibility in responding to environmental change, but most SMEs have lack of access and innovation capacity due to resource constraints and economies of scale (Acs et al. 2008), including in doing development of cooperation and strategic alliances (Acs et al., 2008; Ahn et al., 2015; 33-34). SMEs also have weaknesses R & D capacity leads to SMEs dependence on external knowledge (Kim and Park, 2010), but low human resource capacity also causes inefficient acquisition of external knowledge (Ahn et al., 2015; 33-34). Innovation investment becomes inefficient especially for innovation activities that require large investment, while small production capacity. Financial constraints not only limit the activity of SMEs innovation, especially for innovation activities that require large capital. The issue of capital in SMEs is also a constraint to utilize the innovation result as in the purchase of production equipment. SMEs also have weaknesses in the capacity of tsp for effective and efficient management of innovations. SMEs have constraints to recruit highly skilled workers and change organizational culture.

Its capacity in batik SMEs is needed to compete in local, domestic or global markets, for example on managing the production resources, flexibility and the ability to identify business opportunity also market potency based on product and its unique service. Although the batik SMEs has several potencies to develop, it also has several problems including limited access especially related to capital, possessing no economics scale efficiency, high cost on access and using information technology, low skill and knowledge (related to using of technology, entrepreneurship, managerial, accounting and marketing) to serve the consumers both in domestic or export market, lacking information about market opportunity, high in transaction cost (especially on infrastructure access), lack access to the quality standard (Charoenrat and Harvie, 2013; Hamdania and Wirawan, 2012; Irjayantia dan Azis, 2012).

The production process in Batik SMEs is an activity to change inputs, which are also called factors of production into outputs so that the value of the goods increases. The production function describes the technical relationship between input and output that can be produced, or a factor that shows the relationship between the level of output and the level of input use. (Mankiw: 2008). The Cobb-Douglas Production Function is one of the production functions which has the advantage of simple, economical functions in parameter estimation calculations, and often results in real expectations according to statistical tests. Consistent with marginal products that are decreasing, it is easily obtained by the estimation of economies of scale, and the contribution of relative factors.

$$Q= AK^{\alpha}L^{1-\alpha} \quad (1)$$

Where, Q represents output or production result that becomes the function from technology index (A), capital (K) and Labor (L). The α symbol is called model parameter. For the value of technology index is so called efficiency parameter.

Thus Schumpeter's theory explains that entrepreneurs are acting as innovators to produce new combinations with innovation and create opportunities (Audretsch and Keilbach, 2007; Acs et al., 2008; Zsuzsannaa dan Hermana, 2012). When the market is static, entrepreneurial through innovation process introduces new products, production methods, markets, sources of supply, or a combination of the industry which affect the economy out of previous equilibrium. Furthermore, entrepreneurs find opportunities to meet the demand to reach a new equilibrium. Innovation is an important activity to create efficiency (Karabulut, 2015; Ganzera et al., 2017; Ismail et al., 2014; Charoenrat et al., 2013; de Jorge, dan Suárez, 2011).

The Oslo Manual for measuring innovation defines four types of innovation (OECD, 2014; Ganzera et al., 2017): product innovation, process innovation, marketing innovation and organizational innovation. Product innovation is A good or service that is new or significantly improved. This includes significant improvements in technical specifications, components and materials, software in the product, user friendliness or other functional characteristics. Process innovation is a new or significantly improved production or delivery method. This includes significant changes in techniques, equipment and/or software. Marketing innovation is A new marketing method involving significant changes in product design or packaging, product placement, product promotion or pricing. Organizational innovation is A new organizational method in business practices, workplace organization or external relations such as business alliances. Then, the innovation activity will be shown as:

$$Q_R= \phi K_R^{\beta} + A_R z \quad (2)$$

Where:

$z = L_R h,$

$K_R = g(E)K_R$

Where, Q_R represents output of innovation activity that becomes the function from capital for innovation (K_R), stock of knowledge (A_R), in relaton resource channelled in to R&D (z). Internal innovation that becomes the function from labor for innovation (L_R) and demand of innovation (h). Capital for innovation (K_R) is influenced by Capital for innovation in the previous year ($K_{R'}$) and growth (g) of entrepreneur activity (E). Quantity production of goods/services as activities for the fulfillment of human needs

is limited because the economic resources available is always limited in number.An Entrepreneur has the function of managing limited resources to produce a higher output in the fulfillment of these needs through innovation effort. In the aspect of demand, entrepreneurs have a role to increase the demand for goods and services. In the production aspect, entrepreneurship has a role to manage the resources (inputs) as low as possible to produce the highest output through the creation of added value and production efficiency. High demand for goods and services will increase production volume and revenue, but the increase in revenue is influenced by other factors. Meanwhile, production volume is influenced by the price and cost of production, as well as entrepreneurial skills in managing resources to produce higher value-added and business efficiency through innovation activity. Notation θ describes the benefits of capital for investment, while ρR describes the risk of capital (lost capital for investment activities. The capital for innovation (K_R) and stock of knowledge for innovation (A_R) have positive influence to revenues of innovation activities (π_R). Labor wage for innovation (L_R) and capital expenditure for innovation (K_R) have negative influence to revenues of innovation activities (π_R) (Audretsch dan Keilbach, 2007).

$$\pi_R = \theta K_R^{\beta} + A_R z^{g} - w_R z - \rho_R K_R \qquad (3)$$

The free market offers the incentive for competition that encourages the allocation of factors of production to the most valuable and efficient use (Lieberman & Dhawan, 2005; Chen, Delmas & Lieberman, 2015). The efficiency that will be achieved if the company can optimize the output or minimize the input. While the function of efficiency improvement, the role of entrepreneurship can be formulated as (Audretsch dan Keilbach, 2007):

$$TE = \frac{d\pi r}{d\pi k} \quad (4)$$

Where, TE = technical efficiency, dπr = efficiency profit, dπk = resources which spend to improve the efficiency such as: the use of tehnology and activities of product innovation.

In the long term, the batik SMEs cannot only rely production capabilities rooted in tradition as a source of uniqueness in the market to compete in local, domestic and global markets, but also have other advantages, such as the dynamic design and competitive, understanding quality control, understanding environmental issues such as eco-design and eco-labeling, understanding export procedures, possessing economies scale efficiency in other hand mastery on technical and other management controls such as entrepreneurial, managerial, accounting and marketing (Hamdania and Wirawan, 2012; Irjayantia dan Azis, 2012). There are so many research on batik SMEs efficiency in Indonesia. This study is the further research of previous study (Hidayat, 2012; Susanty et al. , 2015) by focusing on the entrepreneurs role in innovation on batik SMEs efficiency.

RESEARCH METHODS

This research was conducted at the batik SMEs in Central Java, Indonesia. The place selection is due to the potential for innovation and product development of the batik industry in Central Java as the data of Disperindag -Industry and Trade Provincial Agency (2013). The industries have developed in the recent years, especially in some areas of the centers of batik, so it is relevant to be

studied. Based on data from this agency, the number of the batik industries in the year of 2013 are 538 businesses, consisting of 55 major industries, 221 medium scale industries and 262 small-scale industries.

The study was conducted involving 100 respondents, entrepreneurial SMEs in Central Java Batik Sentra in Surakarta, Pekalongan, and District Apex (Lasem). Surakarta is one of the centers of batik industries in Central Java. The Surakarta batik is batik that develops in the Surakarta palace. The development of batik in the palace is influenced by the Javanese Hindu culture, has a motif with geometric shapes, the ornamental variety is symbolic. Pekalongan Batik and Lasem Batik are coastal batik that develop and are influenced by Islamic and Chinese culture. The development of this batik is influenced by Islamic culture and China, has a motif with a non-geometric shape and its ornament is natural.

The results of the questionnaire are tabulated and analyzed to determine the accuracy of existing research models. The samples are determined by the techniques of purposive and proportional random sampling. The variables of exogenous variables include the labor costs, materials costs and fixed costs, meanwhile the endogenous variables include production and revenue efficiency of batik SMEs. Data processing is performed by analyzing the role of entrepreneurship to the efficiency of revenue batik using deterministic statistical

Table 1. Variable and Measurement

Variable	Code	Measurement	Scala
Labor Cost	X1	The average amount of labor costs per month (Rp) is the result of multiplication between wages and the number of workers	Continues
Material Cost	X2	The average amount of raw material costs per month (Rp) is the result of multiplication between the price of raw materials and the amount of raw material	Continues
Fix Cost	X3	Costs incurred remain the company without being affected by the amount of production	Continues
Revenue	Y	Average sales volume multiplied by price in one month (Rp)	Continues
Technical Efficiency	ET	Comparison of production volumes to production resources (x)	Ratio
Price Efficiency	EH	Comparison of Selling Prices of products per unit to production factor price (x)	Ratio
Economic Efficiency	EE	Multiplication of Technical Efficiency and Price Efficiency (x)	Ratio
Product innovation	D1	Having R & D or utilizing a Research & Development Center facilitated by the Government or access to designers, enginer or environmental experts. (Yes = 1, not = 0)	Dummy
business alliance	D2	Business Group involvement or partnership in vertical alliances (Yes = 1, No = 0)	Dummy
Marketing innovation	D3	Make use of consultations with Business Centers that are facilitated by the Government or active in trade actors (Yes = 1, no = 0)	Dummy

frontier with statistical technique to estimate frontier (Charoenrat et al., 2013; Ismail et al., 2014)) and regression to determine the effect of role entrepreneurship in innovation.

This study applies production model; that is a general model that able to describe the role of resource on the production function. The challenge of such traditional approach is conceptually the production function to spend expense encountered by an effective company that occupies the best practical method within. Most companies are not fully efficient in capitalizing the resource inputs. Therefore, the related companies posit below the average industries. The advancement of econometric by Suharno, Susilowati & Firmansyah (2017) results the model development of stochastic frontier production capable to identify the production axis and company relative position.

$$Y = f(L, K)\ TE\ (\varepsilon) \quad (5)$$

Where, Production is defined as value-added (Y) with the function from labor (L) and capital (K), TE = technical efficiency, the function of efficiency increasement (competitive advantage). ε = error variable. The formula (5) can be written in the natural logarithm in empiric model before include entrepreneur role as in the following.

$$LnYi = \beta_0 + \beta_1 LnLi + \beta_2 LnKi + \varepsilon i \quad (6)$$

Where: Yi = value-added firm i, Li = Labor firm i, Kt = capital firm i, εi = error variable. In the Function of Production Cost in natural logarithm, can be written as follows.

$$LnY = \alpha_0 + \alpha_1 LnX1 + \alpha_2 LnX2 + \alpha_3 LnX3 + vi - ui \quad (7)$$

Where: X1 = Labor Cost, X2 = Material Cost, X3= Fix Cost. Stochastic frontier production function was being introduced by Aigner et al., (1977) pointed out that the components of the specific error term (εi) which εi = vi - ui. Where, ui is explainable error variable such as entrepreneurs activities, whereas vi is unexplainable error variable. The issue of in-efficiency basically arises from the assumption that economic actors maximize profits. Furthermore, deviations from the optimal point (efficient) is the difference between actual income and income prediction that is influenced by the role of entrepreneur. An entrepreneur's role analysis of production efficiency can be illustrated by the following equation.

$$Y' - Y = \alpha + \beta_1 D1 + \beta_2 D2 + \beta_3 D3 + vi \quad (8)$$

Where: Y' - Y = In-efficiency Income, D1 = entrepreneurship role in product innovation, D2 = entrepreneurship role in business alliance, D3= entrepreneurship role in marketing, α = constant, β = regression coefficient, vi = unexplainable error variable.

The concept of efficiency refers to the writings of Farrell (1957) in Coelli et al., (2005) uses the efficient unit isoquant to measure economic efficiency (EE), and to decompose this measurement into efficiency technical (ET) and allocative efficiency (AE) (EE = ET x AE). ET is defined as the ability of the firm to produce maximum output from the use of a set (bundle) input, while AE reflected firm ability to use input to optimal portion at a certain level and price. In Farrell's framework, These concepts are illustrated in Figure 1, where point P represents an inefficient firm and the distance QP is the amount by which all inputs could be reduced (proportionally) without lowering output to achieve the technically efficient level of production (point Q). Thus, the ET measurement is equal to the ratio oQ/oP. Similarly, AE is equivalent to the ratio oR/oQ

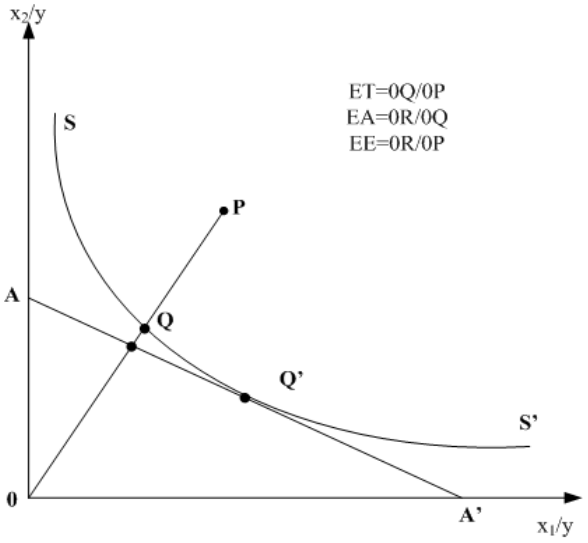

Figure 1. Technical (ET), allocative (EA) and economic efficiency (EE)
Source: Coelli et al. (2005)

RESULTS AND DISCUSSION

Profile of Respondens

Batik SMEs in Surakarta, Pekalongan and Lasem are family companies, which are Small and Medium Enterprises (SMEs). Most of the manager-owner of Batik SMEs who have over 50 years of age are 45%. The number of manager-owner of Batik SMEs aged 41-50 years as much as 29%, 31-40 years as much as 22%. The number of manager-owner of Batik SMEs who have under 30 years of age is generally new business actors (4%) (Table 2).

Most of the manager-owner of Batik SMEs who have formal education level in high school (46 %), followed by Diploma or Bachelor (28 %), middle school (20 %), elementary and non-primary education level (6%). In terms of gender, managers-owners are more women (63%), while men (37%). Some business operators get business management training such as from the local government and from banks (63%).

The most market target carried out by batik business owners is in the marketing areas local, local and Domestic (Solo, Yogyakarta, Surabaya, Jakarta, Bandung, Bali), each of which is equal to 33 %, Batik SMEs with target market only local is 18 %. Batik SMEs with main target market export is 15 %. The area of overseas marketing itself is to Malaysia, Singapore, Thailand, India, Italy, France, Middle East.

Table 2. Profile of Respondens

No.		Percent (%) (N=100)
1	Age	
	<30 years	4
	31-40 years	22
	41 - 50 Years	29
	> 50 years	45
	Total	100
2	Education	
	Elementary School, Not Completed Elementary School	6
	Middle School	20
	High School	46
	Diploma, Bachelor	28
	Total	100
3	Business Owner Gender	
	Woman 63	63
	Man	37
	Total	100
4	Training	
	Yes	63
	No.	37
	Total	100
5.	Types of products	
	Stamp Batik and Writing batik	73
	Writing batik	27
	Total	100
6.	Marketing area	
	Local	19
	Domestik	33
	Local and Domestic	33
	Local, Domestic and export	15
	Total	100

Source: Survey on batik SMEs 2017(processed)

There are not only one type of product, but various types of batik that can be produced. The batik products produced are stamp batik and combination batik (a mixture of stamp batik and Writing batik). From table 2 it is known that many types of batik products produced by batik entrepreneurs are type of combination batik products (a mixture of stamped batik and drawing) (73 %) but in the type of Writing batik a total of 27% %. The Writing batik is the most expensive batik. This batik is handmade. Writing batik can be distinguished from printing batik and stamp batik based on the appearance of the pattern. Writing batik has an unequal pattern between one pattern and another. This pattern is not as neat as the pattern possessed by the pattern of printing batik and stamp batik. Even so, it gives a characteristic to batik. So that there is no equal between one batik and the other batik. The price of stamp batik ranges from Rp. 25,000 - Rp. 40,000, while Writing batik is the cheapest Rp. 300,000 to millions of rupiah.

Business actors in running their business are not fully running smoothly. These business actors experience obstacles or obstacles including direct market access (16%) and capital which is the main obstacle for business actors (69%). The low access to capital is still a classic reason for constraints to business development. Usually capital can be assessed from the assets owned by business people to run their business both initial capital and working capital. The initial capital includes, among other things, industrial equipment and equipment, generally undertaken by business actors through various means. The working capital in the form of money is usually self-employed by businesses by saving, debt to friends or family.

The role of Batik SME business manager-owners is very dominant in managing business both in supervising production, marketing and decision making. Generally small industries have simple organizational characteristics, there are no guidelines, do not have standard operating procedures, do not have standard marketing guidelines. Most businesses are managed by individuals who are both owners and managers of companies, and utilize the workforce from their families and close relatives.

Efficiency of Batik SMEs

Table 3 shows independent variable which consists of labor cost (X1), material cost (X2) and fixed cost (X3), and its elastic production is more than 1 (1,081). It means that in increasing the return to scale condition, seen from coefficient value, those variables have positive values.

Table 3. Estimation Result of Frontier Stochastic Analysis

	Revenue	
	β	**ρ**
(*Constant*)	0,141	0,833
LnX_1	0,723	0,000
LnX_2	0,223	0,000
LnX_3	0,135	0,028
R^2	0,716	
F hitung (p-)	84,017 (0,000)	

Source: Survey on batik SMEs 2017(processed)

Classical assumption tests (Table 3) include normality, autocorrelation, multi-collinearity tests and heteroscedasticity tests performed on linear models. The classical assumption test is compared between the cost equation model without including entrepreneurial factors. Data Normality Testing is done to find out whether the research data is normally distributed or not. Normality Test Data is performed using the

Kolmogorov-Smirnov Z test on residuals (Unstandardized Residual). Calculation results obtained Kolmogorov-Smirnov Z value = 1,315 (p-value = 0,063> 0,05) (Table 4) shows normal distributed data for cost function before including entrepreneurial factors.

Autocorrelation test is used to test the correlation of data. To test the presence or absence of autocorrelation residual testing was used with the statistical run-test approach. Run test is used to test whether there is a high correlation between residuals. If there is no correlation between residuals, it is said that residuals are random or random. Run test is used to see whether residual data occurs randomly or not (systematic). If the p-value is <0.05 (5%), then the residual is not random, if the p-value is> 0.05 (5%), then the residual is random. The significance value of run-test (p-value) = 0.841 (> 0.05) shows that residual is random or shows no autocorrelation in residual data.

Multicollinearity testing of data was conducted to test the correlation between independent variables. Multicollinearity test is done using the Variance Inflation Factor (VIF) value. The model is declared free of multicollinearity interference if it has a VIF value below 10 or tolerance above 0.1. Table 4 gives all VIF values below 10 or tolerance values above 0.1, so that it can be concluded that the linear regression model does not occur multicollinearity.

The heterokedastic test is to find out whether the data has the same variance. The results of testing heterokesdasticity using the park method found no significant beta parameters on the regression of exogenous variable labor costs (X1), material costs (X2) and fixed costs (X3) on Unstandardized Residual, so that the data meets the assumption of Heterocestasticity or data is homogeneous. Significance value of t-test (p-value)> 0.05 for all exogenous variables so that the model meets the assumption of data homogeneity. The results of the Classical Regression Assumption test show that the data model has fulfilled the assumptions of data normality, multicollinearity and homogeneity and the assumption of autocorrelation so that it can be used for analysis.

Table 4. Classical assumption

	Estmation
Normality Distribution	
Z-test	1,315
Z-test (ρ)	0,063
Autocoleration test	
run-test	0,201
run-test (ρ)	0,841
Multicolinierity test (Tolerance,VIF)	
LnX_1	0,661 (1,512)
LnX_2	0.676 (1.480)
LnX_3	0.609 (1.643)
Heterocedastisity (*sig. t-test*) endogen= $error^2$	
LnX_1	0,213
LnX_2	0,424
LnX_3	0,172

Source: Survey on batik SMEs 2017(processed)

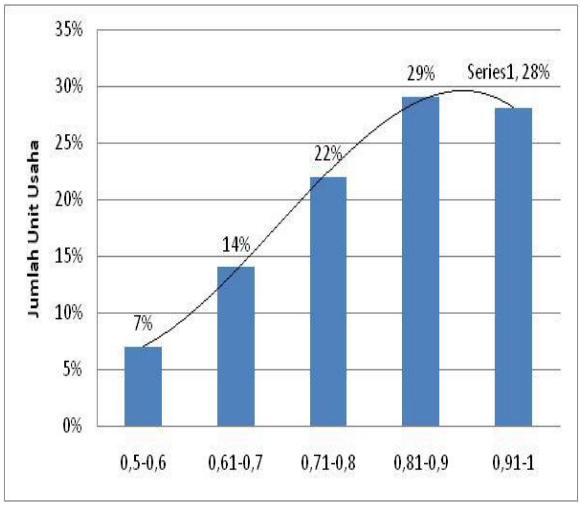

Figure 2. Distribution of technical efficiency of Batik SMEs
Source: Survey on batik SMEs 2017(processed)

In Figure 2. presented the distribution of batik SMEs according to the level of technical efficiency achieved by entrepreneurs individually. The figure shows that of all sample batik entrepreneurs studied, the proportion of entrepreneurs whose technical efficiency level approached the frontier (the level of technical efficiency approached 1.0) was 28 %, while at the interval of efficiency rates between 0.801-0.9 % is 29 %. Entrepreneurs with a level of technical efficiency between 0.701-0.8 % as many as 22 %, the level of technical efficiency between 0.601-0.7 % as many as 14 % and the level of technical efficiency between 0.50-0.6 %.

Price efficiency (allocation) is a situation when the Net Profit Margin (NPM) is equal to the production factor price which is concerned, or the way in which entrepreneurs are able to maximize profits. In the discussion of price efficiency (allocation), this will result from three possible outcomes: (1) if the value of the efficiency is greater than 1, the maximum efficiency will not be achieved. Thus, the use of factors of production should be increased in order to achieve an efficient condition. (2) If the value of efficiency is smaller than 1, it will lead to inefficient business activities of batik. Therefore, production factors used should be reduced. (3) If the efficiency values are equal to 1, the business of batik has reached levels that are run efficiently and obtain maximum profit. In this case, the value of the marginal product (NPM) is obtained from the coefficient of each variable multiplied by the average of the total revenue and divided by the average cost of each of these variables.

Therefore, the calculation of the analytical calculation of price efficiency (allocation) is operational costs for activities of batik SMEs in units of Rp. Including the earned income, you will know the amount of price efficiency in batik SMEs.

Table 4. Number of Average Cost and Batik SMEs Revenue

Items	Average (Rp/Month)	Coefficient
Revenue (Y)	27,736,900	-
Labor Cost (X1)	9,154,000	0,723
Material Cost (X2)	5,534,780	0,223
Fix Cost (X3)	1,806,200	0,135
Return to scale		1,081

Source: Survey on batik SMEs 2017(processed)

The calculation of the price efficiency will be as follows :

NPM Labor Cost

$$NPM = \frac{(0{,}723) * (27{,}736{,}900)}{9{,}154{,}000}$$

$$= \quad 2{,}191$$

The result of the calculation of the price efficiency for the use of production factors of Labor Cost is 2.191. The results of these calculations indicate that the use of production factors in the price of capital is not efficient, because the results of the calculations show numbers greater than 1. Therefore, we need additional capital inputs in order to achieve efficiency.

NPM fixed material cost

$$NPM = \frac{(0{,}135) * (27{,}736{,}900)}{5{,}534{,}780}$$

$$= 1{,}118$$

The results of the calculation of the efficiency of the use of production factors prices for raw materials is 1,118. These results indicate that the use of input raw material remains cost inefficient because the calculation results showed that the efficiency of the price is greater than 1. Thus, it is necessary to increase the input of raw

materials in order to achieve the level of efficiency.

$$NPM \text{ Fixed cost}$$

$$NPM = \frac{(0{,}723) * (27{,}736{,}900)}{1{,}806{,}200}$$

$$= 2{,}073$$

The result of the calculation of the price efficiency for the use of fixed cost factor is 2.073. This number indicates that the use of fixed costs of production factors has not been efficient in price because the price of efficiency calculation results show that numbers are greater than 1. Therefore, it is necessary to input additional fixed costs in order to achieve the level of efficiency.

After calculating the NPM every production factors, the total of price efficiency (PE) is as follows:

$$PE = \frac{NPM_1 + NPM_2 + NPM_3}{3}$$

$$PE = 1{,}794$$

The number of price efficiency (allocation) on batik SMEs is 1,794 or > 1, the batik SMEs is efficient in the price.

Return to scale is a situation where output increases as a response to the proportional increase of all inputs. It is well known in the Cobb-Douglas function that the coefficient of each independent variable on the dependent variable is the elasticity. Based on Table 4, it shows return to scale of SMEs batik through the summation of each independent variable.

$$\text{Return to scale} = \beta_1 + \beta_2 + \beta_3$$
$$= 0{,}723 + 0{,}223 + 0{,}135$$
$$= 1{,}081$$

The value of *return to scale* on batik SMEs is 1,081. *Returns to scale* is obtained from the addition of elasticity coefficients for each independent variable in the study. This suggests that the batik SMEs are at *Increasing returns to scale* (IRS). It means that the proportion of additional factors of production will result a greater proportion of additional production.

Entrepreneur Role

In the revenue efficiency function (Table 5), the test results obtained value of determination coefficient (R2) obtained, is 0.161 or 16.1%, it reflects that the exogenous variables of product innovation (D1), business alliance (D2) and marketing innovation D3) able to explain variation of change that is increase or decrease in endogen variable (revenue efficiency) equal to 16,1%, while the rest that is, equal to 83,9% influenced by other variables not involved in this research model. Simultaneous simulation test with goodness of fit (F-test), obtained F count (F-test) equal to 6,127 (p-value = 0,001) show fit model with data.

Table 5. Determinant Regression Result of Entrepreneur Role on Efficiency

	Economic Efficiency (EE)	
	β	**ρ**
(*Constant*)	-0,119	0,001
D1	0,117	0,028
D2	0,096	0,017
D3	0,090	0,022
R^2	0,161	
F hitung (p-)	6,127 (0,001)	

Source: Survey on batik SMEs 2017(processed)

The influence of product innovation (D1) on the Batik SMEs revenue efficiency (E) has the value of t count 2,236 (p-value = 0,028 <5%), so it is concluded that product innovation variable (D1) have positive influence to revenue efficiency to rise above the industry average. A positive t-test indicates a directional relationship means

that increasing product innovation (D1) will increase the value of revenue efficiency (E) above the industry average and the decline of product innovation (D1) has an effect on decreasing the value of revenue efficiency (E) below industry average. The value of regression coefficient of variable of entrepreneurship role in product innovation (D1) is 0,117, meaning that entrepreneur active in product innovation has 11,7% revenue efficiency higher than industry average.

The influence of business alliance (D2) on the Batik SMEs revenue efficiency (E) has t value 2,435 (p-value = 0,017 <5%), thus concluded that business alliance variables (D2) has a positive influence on the revenue efficiency (E) to increase above the industry average. A positive t-test indicates a directional relationship means that an increasing business alliance (D2) will increase the revenue efficiency (E) above the industry average and business alliance decrease (D2) has an effect on decreasing the value of batik sales deviation (E) below industry average. The value of the regression coefficient variable of an entrepreneurial role in business alliance (D1) is 0,096, meaning that the active entrepreneur in product innovation has 9.6% higher revenue efficiency than the industry average.

The influence of marketing innovation (D3) on the Batik SMEs revenue efficiency (E) has t value 2,336 (p-value = 0,022 <5%), (D3) has a positive influence on the revenue efficiency (E) to increase above the industry average. A positive t-test indicates a directional relationship means that increasing marketing innovation (D3) will increase the revenue efficiency (E) above the industry average and the decrease of marketing innovation (D3) has an effect on decreasing revenue efficiency (E) under industry average. Variable of entrepreneur role in marketing innovation (D3) has regression coefficient = 0,090 means that entrepreneur active in marketing have 9% higher revenue efficiency than industry average.

The results of the study found that the role of entrepreneur in product innovation such as through design development, cooperation with designer and quality management have a positive influence on the efficiency of batik business. Increasing the role of entrepreneurs in product innovation will increase the value of batik sales and vice versa decrease the role of entrepreneurs in product innovation has an influence on the decline in the value of batik sales. Similarly, the role of entrepreneurs in business alliances such as through partnerships with large industries or through cooperatives and marketing innovations such as through participation in trade shows and marketing through the internet have a positive influence on the value of batik sales. Increasing the role of entrepreneurs in business alliances and marketing innovations will increase the value of batik sales and vice versa the decline of entrepreneurial role in business and marketing alliances has an influence on the decline in the value of batik sales.

These results indicate that in the long term, batik SMEs can not only rely on the ability of production that burns on tradition as a source of uniqueness to compete in local, domestic and global markets, but SMEs batik must also have a dynamic and competitive design, understand environmental issues such as eco-design and eco-labeling, understand export procedures, have economies of scale efficiency in addition to technical and other management such as entrepreneurship, managerial, accounting

and marketing (Hamdania and Wirawan, 2012; Irjayantia dan Azis, 2012). The capacity of SMEs can not only be achieved through training and mentoring programs that have been done by the government, state-owned enterprises/enterprises and private companies, but should be more integrated in the wider business network. Cooperation of batik SMEs in business groups, cooperatives (in clusters) need to be improved to facilitate access to information, finance and infrastructure provision (Acs et al. 2008).

The result of this research is still consistent with some previous research as done by Harvie (2004) who found out the innovation problem at SMEs that is because economical scale efficiency, has relatively high cost in accessing and utilizing information technology, lack of skill in technology utilization, market, have high transaction costs arising in accessing infrastructure, limitations in achieving quality standards, lack of skills and knowledge in handling customers in both domestic and export markets.

As a micro and small business, Batik SMEs in general does not have a special division that is tasked to conduct market research to monitor and analyze the factors that affect consumer needs and preferences. In general, SMEs Batik understand their customers in the long term, customer needs are observed and assessed through the development of products and services consistently. Small-scale businesses have basically understood their customers only for their limited market coverage. Small companies follow some form of customer philosophy themselves and are informal in contrast to large-scale companies.

Regression test results can also be obtained the result that the role of entrepreneurs have a positive and significant impact on production efficiency and income. In this case, small industries that are more intensive in activities in product innovation, business alliances and marketing innovations have a tendency to have production efficiency and income above the industry average. This is consistent with previous research (Karabulut, 2015; Ganzera et al., 2017; Ismail et al., 2014; Charoenrat et al., 2013; de Jorge, dan Suárez, 2011). who found an association of the role of entrepreneurial behavior toward performance. Innovation behavior and entrepreneurial business alliances help companies to increase their resources and market differentials, these strategies are needed to deliver superior performance against competitors.

The results also find the role of entrepreneurs in business alliance affect the efficiency of production and income of batik SMEs. Small business scale, business management by managers and business owners who on average has low education will be difficult to compete. Other models can be developed that SMEs in business groups can work together to employ an internal agent (consisting of staff, such as marketing, product development, quality control) or external agents on a periodical contract basis (such as in waste management agencies, designers in product development and marketing) that make SMEs in the business group have a higher competitive position in the long run.

CONCLUSION

The role of entrepreneurs in product innovation, marketing innovation and business alliances has a positive influence on the Batik SMEs revenue efficiency. The role of entrepreneurs in marketing innovation

has the highest elasticity to the production and sales of batik SMEs followed by the role of entrepreneur in business alliance and product innovation. The role of entrepreneurs is important especially in price and economic efficiency.

The implication of this research is that batik SMEs to compete in local, domestic and global market can not only rely on the production capability that burns traditionally as a source of local uniqueness, capital subsidy, access market aid, and short term training, but in long term must have economies of scale efficiency, have competent resource quality in their field, independent and have strong brand in local and global market. On the other hand, economies of scale make SMEs inefficient for technology adoption, infrastructure access, brand building, professional pay (such as managers, accountants, designers, research and development), making it a long-term competitive obstacle. SMEs must overcome the constraints of economic-scale efficiency with cooperatives / business groups in both clusters and business networks, build vertical alliances in related business groups, or hire agents either through resource acquisition and contract-based. The development of SMEs CENTER is a show room of batik SMEs products to enhance the role of batik entrepreneurs in market access, product design innovation, quality, environmental impact and capital assistance. Local governments can provide incentives and coaching systems to spur the development of new business actors for market access, technology and business incubator development, and support for partnership development among small businesses.

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