Factors Affecting Technical Efficiency of Textiles Community Enterprises in Chaloem Phra Kiat and Na Pho Districts, Buriram Province, Thailand

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Abstract

This study aims to study technical efficiencies and factors affecting technical efficiency of 29 textiles community enterprises in Chaloem Phra Kiat and Na Pho Districts, Buriram Province. Population of this study are three members each from 29 enterprises groups: one leader and two members, 87 people in total. Data Envelopment Analysis (DEA) performance was used to explain Input-Oriented; i.e. Machine Value, Members of Enterprise Group, Value of Main Materials and Production Cost, and Total Income being the Output under the assumption of Variable Return to Scale (VRS). Analysis of factors affecting technical efficiency of textile community enterprises was explained by Tobit Model. The result showed that 70% of the textile enterprises in Chaloem Phra Kiat and Na Pho Districts, Buriram Province currently faced technical inefficiency due to inappropriate resource allocations. Factors affecting technical efficiency are proportion of capital per labor, location, leader's experience and types of product. This study can benefit the textile community enterprises as guidelines for improving production and management for higher efficiency in future.

Keywords: Technical Efficiency, Data Envelopment Analysis (DEA), Textiles Community Enterprises, Tobit Model

Introduction

Thailand as a developing country is trying to encourage an increase in people's income. The Government of Thailand has been promoting its people to generate secondary source of income other than from agricultural source to ensure better living among the people. The Northeastern part of Thailand holds major number of populations with second rank poverty. The Northeast's population is 21.89 million people (Trade Policy and Strategy, Office of the Permanent Secretary for Public Health, 2017) with proportion of 11.4% poverty (National Statistical Office Thailand, 2018a). Most people in Northeast are doing agriculture which causing uncertain income and insufficient expenditure. Therefore, resulting in secondary occupations outside the harvest season by applying local wisdom to the production in order to create product value. Northeast is the region that serves many important types of products and services and the most important industry is textile industry. From the business and industrial census found that the establishments of textile industry are 26.2% following food industry (National Statistical Office Thailand, 2018b). In addition, purpose of textiles production of local Northeast is to preserve the culture, including traditional wisdom in the production of functional goods. Presently, there are product development such as weaving silk adapted into economical products, for example Jim Tomson silk, Pak Tong Chai silk from Nakonratchasima, Khid clothes from Udon Thani, Ta Sawang weaver group from Surin, Khonkean local weaver group, Tum Tong Silk, Volcano cotton and Red-footed sarong of Buriram.

Chaloem Phra Kiat and Na Pho Districts are major textile producers in Buriram province. The textile fabrics production started since their ancestors for household use and trades the rest. There are such identities as Volcano cotton that the enterprise groups adapted. The Volcano cotton is cotton fabric dyed in volcanic mud to make colors more outstanding. However, producers are still facing certain problems such as production, labor, marketing and cost of production. Due to present advancement in production technology which need special maintenance skills,

this also became a problem of the local enterprise groups. Numbers of members are elders with limited technology knowledge leading to lack of skilled labors in advanced production. Resulting in low production efficiency with high consumption of raw materials and costs, as well as not being able to meet production standards and consumers' needs (Nittayakamolphun, 2013), also lack of creative fashionable patterns on the natural colors and environment friendly process (Thailand Textile Institute, 2018).

This study applied several methods to find out production problems on technical efficiencies and factors affecting technical efficiency of textile community enterprises in Chaloem Phra Kiat and Na Pho Distric Buriram province such as i) Stochastic Frontier Analysis (SFA) relevant studies are Wai Kee (1979); Chitkrua (1980); Bayarsaihan, Battese, & Coelli (1998); Phisalayabut & Satchachai (2012). ii) Thick Frontier Approach (TFA), however, this is not an extensive theory. iii) Data Envelopment Analysis: DEA relevant studies are Yodsri (2008); Kapelko (2011); Nauly (2012); Vixathep & Matsunaga (2012); Untong & Kaosa-ard (2014); Nittayakamolphun & Chancharat (2014); Atthirawong & Leerojanaprapa (2016). Quick analysis is done using data inputs and outputs without defining assumptions, production functions and production unites model when using these methods. Moreover, the efficient and inefficient production units could be clearly separated from each other. However, the literature review showed that there were less interested in the efficiency of Enterprise groups but given major interest in the efficiency of Industries using financial statement as source of analysis. Moreover, most of the relationship studies on dependent variables as efficiency value are done using Tobit Model, relevant studies to Tobit Model are Vixathep & Matsunaga (2012); Nittayakamolphun & Chancharat (2014). Therefore, this study would be using Data Envelopment Analysis to find out technical efficiency value and Tobit Model to find relationship between technical efficiency and factors affecting technical efficiency.

This research aimed to study 1) Technical Efficiency using Data Envelopment Analysis (DEA) and 2) Tobit Model to find out factors affecting Technical Efficiency of 29 Textiles Community Enterprises in Chaloem Phra Kiat and Na Pho Districts, Buriram Province. This study benefits government sector in implementing policies to promote and support the development of textile community enterprise groups for future efficiency, including being guidelines to the textile communities to improve production management for better competency in the market.

Literature Review

Theory of Production Efficiency

Farrell (1957) classified economic efficiency performance in two types: 1) technical efficiency and 2) allocative efficiency, when technical efficiency is ratio of the production unit which produces most products or services from one set of production factors, and allocative efficiency is ratio between yield to production factors which measured as value causes the lowest cost under the output level and determined price factor. Allocation efficiency could be called as price efficiency. Performance measurement can be considered in two methods: 1) Output-Oriented Measure which is increasing output under the use of stable production factors and 2) Input-Oriented Measure which reducing production factors without reducing the amount of production (Hanhirun, 2005).

Measurement Efficiency by DEA

Referring to Farrell's (1957), Relative Efficiency Theory was applied in efficiency measurement by using Data Envelopment Analysis (DEA) which was non-parametric approach using mathematical linear program. These methods were introduced again in 1978 by Charnes, Cooper, & Rhodes (1978) who offered performance measurement model which emphasized on improving production factors (Input-Oriented) constant returns to scale

(CRS) assumption. This model was called CCR Model. However, every production unit neither had the same production size nor resulted the desired level, or dose did not yield fixed a constant return. Therefore, Banker, Charnes and Cooper had developed a model to fix the assumption result from the constant return to scale by determining variable return to scale (VRS). The model was called BCC Model. BCC Model is the performance indicator of the organization that consistent with realism rather than requiring such organizations to produce only the constant return to scale. Technical Efficiency (TE_{CRS}) measurement is done by using the CCR Model from Charnes, Cooper, & Rhodes (1978) and Pure Technical Efficiency (TE_{VRS}) measurement is done by using BCC from Banker, Charnes, & Cooper (1984). The Data Envelopment Analysis (DEA) was widely used in various institutes in order to measure performance such as school systems, hospitals, banks, government, forest care institutions, libraries, insurance companies, hotels and spa, etc. referring to the studies from Chakraborty & Mohapatra (1997); Waldo (2000); Alexander & Jaforullah (2004); Lateh et al. (2007); Suebpongsakorn (2011); Untong & Kaosa-ard (2014).

However, the above model is under CRS assumption and would be appropriate when every DMU is at the optimal scale. It means that if there is an incomplete competition, which is one reason, the production unit does not operate at the optimal scale. Therefore, a new model was developed by Banker, Charnes, & Cooper (1984) to avoid the above limitation under the assumption of Variable Returns to Scale (VRS). There must be an equation constrain adding to the assumption of VRS, i.e. $N1'\lambda \leq 1$ (convexity constraint). This could be used to measure performance values for Non-Increasing Returns Scale (NIRS). The most recent and frequently used model under the assumption VRS is as follows (Untong, 2004):

$$\begin{aligned} & Min_{\theta,\lambda}\theta, \\ \text{Subject to } & -y_i + Y\lambda \geq 0 \\ & \theta x_i + X\lambda \geq 0 \\ & N1'\lambda \leq 1 \\ & \lambda \geq 0 \end{aligned} \qquad (1)$$

Where N1 is an n×1 vector of DMU. Therefore, technical efficiency performance is used under the VRS assumption when there are Imperfect Competitive Market situations. DMU represents Increasing Returns Scale (IRS) or Decreasing Returns Scale (DRS).

Tobit Model

Tobit Model is suitable with continuous variable values but there may be missing value around the rear curve due to measurement or observation inability, resulting in variables = 0, or variables may have any positive values. This model was introduced by Tobin (1958), and this regression model was named Censored Regression Model. Later, it was changed by Goldberger (1964) as Tobit model due to the similarity with Tobin's Probit Model (Wiboonpongse, 2006). The following is the equation under Tobit model (Greene, 2002).

$$y_i^* = x_i'\beta + u_i, \; u_i \sim \mathrm{N}(0,\sigma^2) \qquad (2)$$

Where y_i^* is dependent variable

x_i' is a vector of independent variable

β is the coefficient of independent variable

$u_i \sim \mathrm{N}(0,\sigma^2)$ is white noise with a normal distribution of zero mean and variance σ^2

However, the obtained coefficients could explain only direction of the relationship, but cannot explain the impact of changes in x_i. Therefore, to explain the influence x_i on y_i, it is essential to find Marginal Effect value as shown in Equation 3.

$$\frac{\partial E(y_i)}{\partial x_{ik}} = \beta_k \Phi\left(\frac{x_i'\beta}{\sigma}\right) \quad (3)$$

From the above equation, Marginal Effect results from changes of x_{ik} on y_i is the coefficient value β multiplied by probability y_i in positive value. If sample probability is equal to 1, then value of the Marginal Effect is equal to β_k (Greene, 2002).

Related Research

The previous studies of production efficiency were mostly done by using Cobb-Douglas function and apply models to the study such as Stochastic Frontier Approach (SFA) model and Data Envelopment Analysis (DEA) model. The initial study of production technique was done by econometrics with Ordinary Least Squares (OLS) model to estimate production efficiency using Cobb-Douglas function. While DEA model requires only inputs and outputs of the sample operations and does not need to define economic models, this was the limitations of SFA (Untong, 2004). The result could be summarized in Table 1.

Table 1 Relevant Research to the Study

Authors	Period	Observations	Country	Estimation Technique
Wai Kee (1979)	1976	22	Hong Kong	SFA
Chitkrua (1980)	1979	40	Thailand	SFA
Noiphant (2008)	1996-1998	63	Thailand	Probit Model
Yodsri (2008)	2006	334	Thailand	DEA (VRS) and OLS
Kapelko (2011)	1996-2001	66	Span	DEA (VRS)
Phisalayabut and Satchachai (2012)	1989-1998	Manufacturing Industries	Thailand	SFA
Vixathep and Matsunaga (2012)	2007	457	Vietnam	DEA (CRS), OLS and Tobit Model
Nauly (2012)	1980-2009	118	Indonesia	DEA (VRS) and OLS
Nittayakamolphun and Chancharat (2014)	2009-2011	47	Thailand	DEA (VRS) and Tobit Model
Atthirawong and Leerojanaprapa (2016)	2015	316	Thailand	DEA (VRS)

Variable Definition

Variable for DEA Model

From the efficiency study using DEA model of Yodsri (2008); Kapelko (2011); Vixathep & Matsunaga (2012); Nauly (2012); Nittayakamolphun & Chancharat (2014); Atthirawong & Leerojanaprapa (2016), variables could be defined as follows: input four factors are Machines Value (X_1), consisted of machines and materials; labors are considered as Members of Enterprise Groups (X_2); silk and cotton are Value of Main Materials (X_3); fabric dyeing colors and other raw materials are Production Costs (X_4) and output factor is Total Income (Y). Hence, Machines Value; Value of Main Materials and Production Costs are considered as capital.

Variable for Tobit Model

Some of the variables are used to analyze factors affecting technical performance are in the form of Natural Logarithm to reduce data variables and econometric problems. This is due to the difference value of data which consist of year of establishment as Natural Logarithm (lnAge), number of years in operation as Natural Logarithm square $(lnAge)^2$, experience of leader in the enterprise group as Natural Logarithm (lnExp) and capital per labor as Natural Logarithm (lnKL). Dummy Variables represents data of the OTOP register numbers, product types, business size and location of the enterprise groups. Value is equal to 1 when there are registered OTOP numbers, the enterprise groups produce more than one product types, having more than 50 members (Large scale) or they are from Na Pho District groups. Value is equal to 0 when there are no registered OTOP numbers, enterprise groups produce one product type, having less than 50 members (small scale) or they are from Chaloem Phra Kiat District.

Methods and Materials

Sample Size Population

This study uses data from the survey of textile enterprise groups in Chaloem Phra Kiat and Na Pho Districts, Buriram Province. Data collection was done by interviewing 87 people from 29 groups, one leader and two members from each group. Numbers of the enterprise groups were 11 groups from Chaloem Phra Kiat District and 18 groups from Na Pho District, who were the main textiles producers and low-income groups due to low product value with small quantities of products.

Table 2 Textiles Community Enterprises

Districts	Name List	Address
Chaloem Phra Kiat	Housewives Association Village No. 1, Thawon Fabricated Silk and Srithong Silk	Village No. 1 Thawon Sub-District
	Silkworm Farming and Dyeing Community and Kanya Silk	Village No. 11 Thawon Sub-District
	Silk and Cotton Products Village No. 1, Women Development Community	Village No. 1 Chareon Suk Sub-District
	Pa Rang Village, Silk Weaving Community and Sai-Beau Village	Village No. 8, 12 and Chareon Suk Sub-District
	Non-Chareon Cotton	Village No. 5 Yai-Yam Wattana Chareon Suk Sub-District
Na Pho	Nongseang Village, Muang Noi Village, Song Deang Village, Hua Khua Village, Sawang Village and Nong Tea Village	Village No. 1, 4, 5, 6, 8 and 9 Si-Sawang Sub-District
	Tung Boe Village, Non Takro Village and Non Sa-At Village	Village No. 2, 12 and 13 Ban Ku Sub-District
	Don-Kok Village, Hue Fai Village and Silk Product by Nu Jen Thongbai	Village No. 4, 5 and 7 Don-Kok Sub-District
	Koke Woe Village, Nong Wa-Noi, and Silkworm Farming	Village No. 5, 6 and 12 Na Pho Sub-District
	Wallika Shop, Pho Wattana Village and Silke Craft Center by Na Pho District	Village 13 Na Pho Sub-District

Source: Provincial Community Development Department Office of Buriram (2018)

Statistic and Research Tool

Research tool used for this study was semi-structured interviews. Questions used in the interview were structured by referring the related theories and researches. Data collation was done in two parts in order to be confirmed with the research's aims: 1) general information of textile community enterprise groups and 2) production and financial information of the textile community enterprise groups. Data analysis was done by using descriptive statistics consisted of Average, Standard Deviation and Coefficient of Variation. Also, including the analysis on relationship between factors affecting technical efficiency using Tobit Model. Content validity and measurement method of research tools were checked by four experts from both quantitative and qualitative approaches. Testing of research tools was done with 10 samples from textile community enterprise members from Ban Dan, Buriram Province.

Data Envelopment Analysis and Empirical Model

From Farrell's DEA model (1957) measuring Relative Efficiency, this model was used to analyze Input-Oriented under Variable Return to Scale (VRS) assumption with the Imperfectly Competitive Market condition when the manufacturers do not produce full production capacity and due to economic slowdown. Therefore, manufacturers focus on reducing production costs rather than producing as many products as possible. Pure Technical Efficiency was used to measure the production efficiency of the textile community enterprise groups under VRS condition to explain production scale expansion of textile enterprise groups. The result showed the textile community enterprises with highest production efficiency or pure technical efficiency (PTE = 1). The result also showed a range of effective textile community enterprises with high return on size. According to the DEA principle, input factors and output factors were used to create Production Frontier or Efficiency Frontier lines. The connections between communities were in Linear Combination form. Textile community enterprise groups on the Frontier line were 100% efficient, or value was equal to 1 in the use of existing production factors in order to produce existing products or production capacity that existed in the opposite way. Textile community enterprise groups not on the Frontier line were inefficient, less than 100% or value was less than 1. The model was shown in Equation 4, according to Banker, Charnes, & Cooper (1984) in equation model. The acquired Technical Efficiency value was applied to find out relationship between factors affecting technical efficiency with Tobit Model.

Tobit Model was used to show relationships between factors affecting technical efficiency of the textile community enterprise group in Chaloem Phra Kiat and Na Pho Districts, Buriram Province, as follows.

$$TE_i = \alpha_0 + \alpha_1 \ln Age_i + \alpha_2 (\ln Age_i)^2 + \alpha_3 \ln Exp_i + \alpha_4 \ln KL_i + \alpha_5 OTOP_i + \alpha_6 Type_i + \alpha_7 Size_i + \alpha_8 Areas_i + u_i \quad (4)$$

From the above equation, the coefficient explains only a result of change in factors affecting probability of technical efficiency that textile community enterprise group will have. Therefore, in order to analyze factors influencing possibility on technical efficiency of the textile community enterprise groups the Marginal Effect of each factors must be defined. Hence equation (4) can be defined as,

$$TE_i = \beta_1 \ln Age_i + \beta_2 (\ln Age_i)^2 + \beta_3 \ln Exp_i + \beta_4 \ln KL_i + \beta_5 OTOP_i + \beta_6 Type_i + \beta_7 Size_i + \beta_8 Areas_i + \varepsilon_i \quad (5)$$

When TE_i is efficiency value obtained from the performance measurement by DEA method and ε_i is error value and β_k (k = 1, 2,..., 8) is Marginal Effect value. Variables used in factors affecting technical efficiency analysis of textile community enterprise group are referred to in the variable for Tobit Model.

Results

The results of the study were separated into two parts: 1) from the study of technical efficiency of the textile community enterprises and 2) from the study of factors affecting technical efficiency of 29 textile community enterprises groups in Chaloem Phra Kiat and Na Pho Districts, Buriram Province. Identification of which was 11 textile community enterprises groups from Chaloem Phra Kiat District and 18 textile community enterprises groups from Na Pho District. Analysis was done by the interview with one leader and two members from each group, and the results are as follow.

Efficiency Performance

Technical performance result of textile community enterprise groups in Chaloem Phra Kiat and Na Pho Districts, Buriram Province with DEA approach showed that 29 textile community enterprise groups acquired average technical performance at 0.494. There are two enterprise groups with technical efficiency performance of 6.90% and highest technical performance value at 1.00. The lowest technical performance value is at 0.047. (Table 3)

Table 3 Descriptive Statistics of the Data Used in the Analysis

Variable	Obs.	Average	S.D.	Max	Min	C.V.
Income (Thousand Baht)	29	619.690	734.864	3,000.000	84.000	1.186
Machines Value (Thousand Baht)	29	351.379	244.258	1,000.000	10.000	0.695
Labour (Persons)	29	45.000	46.000	250.000	5.000	1.020
Value of Primary Raw Material (Thousand Baht)	29	457.306	549.620	2,663.265	28.909	1.202
Production Costs (Thousand Baht)	29	287.487	159.453	758.380	66.080	0.555
Technical Efficiency Score	29	0.494	0.252	1.000	0.047	0.510
Age (Years)	29	10.276	7.275	35.000	3.000	0.708
Experience of Group Leader (Years)	29	15.103	7.771	35.000	5.000	0.514

Note: SD represents standard deviation; CV stands for coefficient of variation and Obs. for observations

From Table 3, the descriptive analysis showed that the average income of 29 textile community enterprise groups was THB 619,690, the average machine value was THB 351,380, the average number of members was 45 people, the average value of primary raw material was THB 457,310 and the average production cost was THB 287,490. Moreover, the average age (year of establishment) and average experience of leader in the enterprise group were 10 and 15 years, respectively.

The average value of Pure Technical Efficiency (PTE) of textile enterprise group was at 0.706 and 0.654 respectively. Two and four enterprise groups with pure technical efficiency performance was 18.18 and 22.22 respectively (Table 4).

Table 4 Return on Production Size of Textile Community Enterprise Groups in Chaloem Phra Kiat and Na Pho Districts, Buriram Province with Pure Technical Efficiency (PTE)

Districts	Obs.	PTE		Return to scale		
		Average	S.D.	DRS	CRS	IRS
Chaloem Phra Kiat	11	0.706	0.214	-	1	1
Na Pho	18	0.654	0.214	1	1	2

From Table 4, when considering pure technical efficiency, there was one textile enterprise group in each District with Constant Return to Scale (CRS), and one or two textile enterprise groups with Increasing Return to Scale (IRS) per District, respectively. There was only one textile enterprise group from Na Pho District with Decreasing Return to Scale (DRS). However, nine textile enterprise groups from Chaloem Phra Kiat District and 14 textile enterprise groups from Na Pho Districts were inefficient of pure technical performance and need production improvement.

Determinants of Technical Efficiency

According to factors affecting technical efficiency of textile community enterprises in Chaloem Phra Kiat and Na Pho Districts, Buriram Province with Tobit Model (equation 4), the results showed that all factors affect technical efficiency of 29 textile community enterprise groups at 55.36% (Table 5).

Table 5 Factors Affecting the Technical Efficiency of the Textile Community Enterprise Groups

Variable	Coefficient	Standard Error	P-Value
Constant	1.350**	0.637	0.040
lnAge	-1.048	0.611	0.536
$lnAge^2$	0.115	0.071	0.107
lnExp	0.201**	0.098	0.038
lnKL	-0.145*	0.081	0.083
OTOP	-0.025	0.104	0.813
Type	0.268*	0.143	0.075
Size	-0.034	0.111	0.759
Areas	-0.160**	0.070	0.025
Pseudo R^2	**0.5536**	**Log likelihood**	**-3.6028**

Note: * and ** Denote Significance at the 10% and 5% Level, Respectively

In Table 5, when considering factors: years of establishment (lnAge), OTOP register number and size of textile enterprise groups did not affect technical performance, but resulted in the opposite direction to technical performance. The $(lnAge)^2$ did not affect technical performance. The proportion of capital per labor and location of community enterprise were factors affecting technical performance in the opposite direction. The type of product affected technical performance in the same direction.

However, the coefficient calculation explains only relationship direction between technical efficiency and factors affecting them. It does not explain impact of each factor affecting technical performance of textile community enterprise groups. Therefore, the analysis of impact factors is needed using Marginal Effect calculation (Table 6).

Table 6 Marginal Effect Value of Factors Affecting the Technical Efficiency of the Textile Community Enterprise Groups

Variable	Marginal Effect	Standard Error	P-Value
lnAge	-1.047	0.610	0.534
$lnAge^2$	0.115	0.071	0.103
lnExp	0.209**	0.098	0.032
lnKL	-0.144*	0.081	0.076
OTOP	-0.025	0.104	0.811
Type	0.268*	0.143	0.061
Size	-0.034	0.111	0.756
Areas	-0.160**	0.070	0.022

Note: * and ** Denote Significance at the 10% and 5% Level, Respectively

In Table 6, the factors affecting technical efficiency in the opposite directions were capital per labor (lnKL) and location of community textile enterprise groups (Areas) with Marginal Effect value at -0.144 and -0.16 respectively. To dilate, an increase in capital per labor (lnKL) leading to a decrease of technical performance equaled to Marginal Effect value at 0.10 statistical significance and a decrease in technical performance equaled to Marginal Effect value at 0.05 statistical significance, if the enterprise groups were located in Na Pho District.

The factors affecting technical performance resulted in the same direction include leaders' experiences (lnExp) and product types (Type) with Marginal Effect at 0.209 and 0.268 respectively. An increase in leaders' experience leading to increase in Marginal Effect value was at 0.05 statistical significance. The textile enterprise group with more than one product types leading to increase in technical efficiency value was at 0.10 statistical significance.

Discussion

Referring to the aims of this research, it was meant to i) study Technical Efficiency using Data Envelopment Analysis (DEA) and ii) apply Tobit Model to find out factors affecting Technical Efficiency of 29 Textiles Community Enterprises in Chaloem Phra Kiat and Na Pho Districts, Buriram Province. The result of the relative efficiency study by Farrell (1957) under the Input-Oriented analysis of variable return to scale (VRS) assumption by Banker, Charnes, and Cooper (1984) showed that 70% of community textile enterprises in Chaloem Phra Kiat and Na Pho Districts, Buriram Province are inefficient in Technical Performance and Pure Technical Performance. The result is consistent to Chitkrua (1980) in that Thailand's textile industries are lacking in technical production efficiency, and Wai Kee (1979) in that Hong Kong's textile industries are also inefficient. The result of this study was also consistent to several research studies such as Yodsri (2008); Phisalayabut & Satchachai (2012); Vixathep & Matsunaga (2012); Nauly (2012); Nittayakamolphun & Chancharat (2014); Atthirawong & Leerojanaprapa (2016). That is, the majority of textile industry enterprises are less efficient in technical efficiency due to poor management of factors of production and lack in application of technology in production process, including lack of financial capital and knowledge about products and marketing. This results in obsolete production technological efficiency of community textile enterprise groups. Also, as Kapelko (2011) concludes, small and medium-sized textile industries in Spain are efficient due to heavy investment on production technology.

The factors affecting technical efficiency of Chaloem Phra Kiat and Na Pho Districts, Buriram Province are proportion of capital per labor, location, leader's experience and types of product. This conclusion is consistent to

the study in Vietnam by Vixathep & Matsunaga (2012) which found that proportion of capital per labor, scale size, location of the industry and numbers export affect all technical performances. The result is also matched with Nittayakamolphun & Chancharat (2014)'s research that factors affecting technical performance of small and medium sized textile industry in Northeastern Thailand were current ratio, debt on equity ratio, debt to total assets ratio, return on asset (ROA) and business location, as well as that of Noiphant (2008) which concluded in the same direction. However, Nauly (2012) explained that the import competition causes manufacturers to develop and improve efficiently, although the import competition affects technical performance and scale efficiency of textile enterprise groups at a slightest. According to the free trade policy to promote trade and production, other measures should be taken by government such as introducing effective production methods, promoting skilled workers and encouragingbetter use of raw materials for better production. Moreover, discussions on other factors such as years of establishment and business size are consistent to Vixathep & Matsunaga (2012), Yodsri (2008), and Nittayakamolphun & Chancharat (2014).

From the discussion on factors that affect technical efficiency of the textile community enterprise group, especially on location, Chaloem Phra Kiat District possess interesting identity called Volcano cotton due to their locational advantage around the extinct volcano. Therefore, there is possible to increase technical efficiency of Chaloem Phra Kiat District. Nevertheless, it is necessary to point out that the community is facing drawbacks such as lack of skilled labors, high cost of production and lack of distribution channels. Moreover, current members' situation is consisted of elderly with performance less than six working hours per day. This affects production quality and long production time. In addition, lacking successors is one of important issues due to labors' negligible on textile production importance. Another facing issue of textile community enterprises is lack of experts in textile chemistry. The dyeing process, especially natural dye process, also requires a lot of processes and skills. Moreover, the cost of raw material becomes a major factor to high cost of production followed by transportation cost. Additionally, textile community enterprise groups are facing development problems on product diversity and style to meet customers' preferences. Also, 60% of member of textile enterprise groups are still producing and distributing products among themselves. Therefore, regarding distribution channels, Packaging and Branding could still be a solid problem.

Conclusion and Suggestions

The result of this study benefits decision making of textile community enterprise groups in developing and managing factors of production. The essential factors to technical efficiency of the textile community enterprise groups are capital and labors factors. The numbers of textile community enterprise groups are facing high cost of production with lack of skilled labors leading to decrease in future profits.

The profits diminishing in textile community enterprises are due to high cost of production and lack of skilled labors. The current textile market situation is highly competitive leading to a loss in profit margin, likely affecting future growth of community enterprises. This current situation not only exists in Chaloem Phra Kiat and Na Pho Districts, but also appears in other community enterprises in Buriram Province such as Phutthaisong, Lamplaimas and Huai Rat Districts that face the very same situation. Therefore, it is essential that textile community enterprises must improve and develop standard quality products to differentiate from their competitors in the market. The support from related departments to encourage a channel of distributions and marketing are essential. Also, enterprises themselves should be able to develop methods of production in order to reduce cost of production and

increase quality, as well as to create their own competency in cost, quality and marketing skills in order to be more efficient and create sustainable competition.

Nonetheless, this study only focused on applying Data Envelopment Analysis to find out the efficiency of the Textile Enterprise group in Chaloem Phra Kiat and Na Pho Districts. The data used in the study were typically from 29 Textile Enterprises in Chaloem Phra Kiat and Na Pho Districts that obtain low income due to low-priced textile products and small production quantity. These data could not be referred to other Textile Community from different districts. The Cross Section type of data was used in the Technical Efficiency analysis only, although the Efficiency values did not vary over time. This study, therefore, could not truly cover efficiency analysis in every aspect, especially Cost Efficiency and Economic Efficiency, including other factors affecting technical such as export and real estate investment. Accordingly, the future study should apply different methods such as Stochastic Frontier Analysis to analyze in many aspects of Technical Efficiency of Enterprise groups or to analyze the whole textile industry along with the study of other factors that would impact textile industry, including Economic conditions, Social interest and politics condition, domestically and internationally. The result of this study could benefit government sectors, especially the Provincial Community Development Department in Buriram Province and stakeholders to estimate government's expenditure in the development process for the Textile Community Enterprise groups to be more competent both in the standardization and market competition.

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