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MEASURING INEFFICIENCY IN THE RUBBER MANUFACTURING INDUSTRY

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ABSTRACT

Malaysia is the fifth largest producer of natural rubber in the world after Thailand, Indonesia, Vietnam and China as well as producing rubber products exported to more than 190 countries worldwide. However, the slowdown in growth of major importers such as China, the European Union and the United States and the perception of stock surplus as output exceeds demand led to fluctuating rubber production performance over the period 2010 to 2016. Hence, this article aims at examining the level of technical efficiency (TE) and to analyze the determinants of the inefficiencies of the rubber manufacturing industry. The analysis was conducted using the latest 145 firms' data obtained from the Department of Statistics Malaysia (DOS) and using the Stochastic Frontier Analysis (SFA) method. The results showed that the overall TE level was high while the determinants such as the capital-labor ratio, wage rate and firm size had a negative and significant impact that could reduce industrial technical efficiencies. The policy implication is that the rubber manufacturing industry needs to focus on high technological production investment, increase employee motivation through wage increment and create more strategic cooperation with international industry.

JEL Classifications: D24, L60

Key words: Technical efficiency, Technical inefficiency, Rubber industry, Firms, Stochastic Frontier Analysis

1. INTRODUCTION

The rubber industry also plays an important role in contributing to the country's economic development. The high contribution of this industry affects the landscape and the pattern of growth of the Malaysian economy (Rafain, Zaimah, and Mohd, 2012). Malaysia is the world's eighth largest rubber consumer in 2016. Malaysia is also the fifth largest producer of natural rubber in the world, after Thailand, Indonesia, Vietnam and China. The increase in exports was contributed by non-latex rubber products. Exports of rubber products from Malaysia surpassed RM18 billion in 2016, registering a positive annual growth of 0.9 percent. Malaysian rubber products are now exported to more than 190 countries around the world (MREPC, 2017). United States, Germany and Japan remain the largest market for Malaysian rubber products, accounting for 40 percent of Malaysia's total rubber exports. Other important markets for Malaysian rubber products include China, UK, Australia and Brazil (MREPC, 2017).

However, the price uncertainty in the rubber industry in the global market has caused a negative impact not only on the economy but also on smallholders. Based on the Report of the Malaysian Rubber Export Promotion Council (MREPC) in 2017 shows a rubber production fluctuation during the period 2010 to 2016. The worst decline has occurred in 2014 at 784 million tonnes compared to 927.8 million tonnes in 2013. In fact, the rubber industry is also facing a challenging situation when natural rubber is forced to compete with synthetic rubber. In addition, rubber production faces constraints from price fluctuation as well as uncertain weather conditions which impede procurement activities (Rafain et al., 2012). In addition, low natural rubber prices are attributed to factors such as low crude oil prices, economic slowdown in major importers, i.e. China, the European Union and the United States, as well as the perception of stock surplus as output exceeds demand, adds pressure to the rubber manufacturing industry (Malaysian Rubber Board, 2015).

This situation demonstrates that the technical efficiency (TE) of the rubber manufacturing industry needs to be enhanced so that the industry continues to be relevant in the marketplace and can address the ongoing challenges. Although the economy has transformed the output pattern of the sector toward higher value added and subsequently increased the overall factor productivity (Ismail, Sulaiman, and Fahmy-Abdullah,2017), the situation will not benefit if the industry is unwilling to increase TE's level as a result of economic openness and trade liberalization (Adhikari, 2011). The rubber industry should be more competitive and have high TEs because it can compete not only at the local level but also internationally despite the negative global factors affecting the industry.

Most of the previous research related to the rubber industry in Malaysia is less favorable compared to other industries and most studies only talk about rubber manufacturing methods for better products including Tekasakul et al. (2017), Pittayavinai, Thanawan, and Amornsakchai (2017) and Dejchanchaiwong et al. (2017). Furthermore, studies on determinants of inefficiency are not taken into account for the true value of TEs. In addition, data used is industry-level data while level data are more significant and appropriate in obtaining TE's result. According to Fahmy-Abdullah et al. (2017), firm~~s~~-level data is more appropriate to estimate the factors of technical inefficiency in an industry. In fact, Tingley, Pascoe, and Coglan (2005) emphasized budgeting by using firm data as individuals is better as further analysis on factors affecting the level of budgeting can be studied. Hence, studies using data at the firm's level taking into account the technical inefficiency factors, the TE value and the resulting productivity are more significant and accurate.

Based on these problems and study gaps existed in this industry, this current study aims at investigating the extent of the efficiency and determinants of the inefficiency of the rubber manufacturing industry in Malaysia using the latest data sources[1]. This study is very important as it is in line with the national targets to develop the rubber manufacturing industry as one of the competitive industries not only locally but also globally based on current performance. This study involves two analyses. The first analysis determines the level of technical efficiency, and the second analysis identifies the determinants of technical inefficiency among the firms studied. The second section of this article reviews previous studies. The third section discusses the research methodology, data sources, and model specification. The fourth section analyzes the results of the survey, and the fifth section provides conclusion and the implications of this study.

2. LITERATURE REVIEW

Technical efficiency (TE) refers to the maximum output using the minimum input. It differs from the allocative efficiency which provides minimum input to maximize profits (Ismail and Jajri, 2008). Optimal production levels are often associated with using resources (inputs) such as skilled workers who demonstrate efficiency. According to Shahar et al. (2015), the meaning of technical efficiency exists when more output is produced using optimum input. An increase in productivity to produce output needs combination of quality workers with skilled and optimum production. This study focuses on the ability of the rubber industry in transforming input into output and not the output itself. Many previous studies have measured TE, especially in the agricultural sector including the rubber manufacturing industry. Most of the research was focused on the plantation sector such as Karunarathna and Wilson (2017), which studied 723 farms in Sri Lanka. Study by Kittilertpaisan, Kittilertpaisan, and Khatiwat (2016) showed rubber TE value of 0.69 percent in Changwat Sakon Nakhon, Thailand. Their inefficiency model revealed that education, training, gender and age of smallholding rubber farmer were found to have significant effect on rubber farmers' efficiency.

Giroh and Adebayo (2009) analyzed the technical efficiency of rubber tapping technique using the Stochastic Frontier Analysis (SFA) method in Nigeria showing that the average TE level for rubber tappers was 0.72 percent. Their study also shows that the TE level for practical and poor rubber tappers is 0.38 per cent and 0.99 per cent respectively. Another study in Nigeria done by Itam et al. (2015) revealed that the education, training, gender, and age of small rubber farm farmers in rubber agriculture had a positive and statistically significant impact. Study of Son, Coelli, and Fleming (1993) in Vietnam found that average technical efficiency was 0.59 per cent using the SFA method. According to the study, 39 percent of farms have a TE index below the minimum score, while 40 percent reach TE levels above average but less than 0.8 percent. Only a small percentage of farms reach a high TE level (considered more than 0.8 percent). The results showed that the overall technical efficiency level was low, given that the average index was only 0.59 percent. Binam et al. (2004) who have studied factors affecting TE of peanuts and maize farmers in Cameroon show that access to credit, social capital, distances from roads and connection services are important factors explaining the variation in TE levels. Bozoğlu and Ceyhan

(2007) who measured TE levels from vegetable farm samples and explored technical inefficiency factors in the Turkish Samsun region show that the average production of vegetable farms in Samsun may increase by 18 percent under good technology as a result of factors such as education, experience, participation of women and information. However, age, number of family members, off-farm income and farm size show positive relationships with technical inefficiencies.

Agricultural biodiversity was also found to have a positive impact on overall productivity and soil quality (Meng et al., 2003). Agricultural diversity can also affect farm-level efficiency through the management of limited resources in a diverse plantation system. Agricultural TE study in Nepal conducted by Belbase and Grabowski (1985) showed that the average age of the main farmer is 80 years. Their analysis shows that nutrition, income and education levels have a significant relationship with TE, while agricultural experience has nothing to do with the TE level. Various approaches in measuring efficiency and analyzing empirical data have also been reviewed by Parikh and Shah (1994) involving a total of 397 farmers in the Northern Territory or West Pakistan. Burki and Shah (1998) stated the latest evidence of TE and its sources by reviewing the cost of 387 estates in five Punjab territories and concluding that the level of plant TE is related to farm enterprise education and related to farm size. The plant operator age factor did not show any effect on the TE level.

Study on TE of rubber manufacturing industry is limited in Malaysia. One study by Alias, Noor Maliza, and Baharom (2011) investigated the technical efficiencies of rubber product manufacturing industry using Stochastic Frontier Analysis (SFA) and secondary data from 313 rubber product manufacturing firms. Technical efficiency of manufactured rubber product industry in Malaysia is 0.70328 indicating majority of the firms are also fairly efficient in using available resources. A more general study looking at the TE of manufacturing sector in Malaysia found that it constantly increases at 0.01 percentage points each year (Rozilee, 2010). However, a study by Susila, Chia and Edward Wong (2015) concluded that the majority of the manufacturing firms in Malaysia are operating with technical inefficiency. Based on the above discussion, the latest study on the level of efficiency of the rubber manufacturing industry in Malaysia should be carried out as well as identifying the inefficiencies determining factors and thus improving its productivity.

3. METHODOLOGY, MODEL SPECIFICATION AND DATA

Data Envelopment Analysis (DEA) and Stochastic Frontier Analysis (SFA) are commonly applied to measure TE. The DEA model is a non-parametric approach that does not make any expectations regarding production functions. However, DEA is an empirical-based best practice based on input and output usage, (Fahmy-Abdullah et al., 2017). This study uses the Stochastic Frontier Analysis (SFA) approach to estimate Malaysia rubber industry TE in 2015. The SFA method has been widely used in the last two decades to analyze TE (Karunarathnaand Wilson, 2017). In this study, the models of Battese and Coelli (1995) are applied in accordance with the original model of Aigner, Lovell, and Schmidt (1977). According to Jarboui, Forget, and Boujelben (2015), the SFA model not only can measure the technical inefficiency but is also able to identify random surges beyond the control of the producer which affects production. In addition, this method is easily adapted to the environmental variables (Coelli et al., 2005; Fahmy-Abdullah, et al., 2017; Fahmy-Abdullah, Sieng, and Isa,2018). In fact, the SFA approach also identifies inconsistent data in the analysis. Cullinane et al. (2006) stressed that the SFA method can analyze structure and examine the determinants and the performance of the manufacturer. The SFA method was not only capable of measuring technical inefficiencies, but it can also identify random shocks beyond the manufacturers' control, which could impact their production (Fahmy-Abdullah et al., 2018; Jarboui et al., 2015).

The original SFA specification involves production models devoted to cross-sectional data which has conditions for errors comprising two components, first describing the random effects (v_i) and second, explain technical inefficiencies (u_i). This original specification can be obtained from a comprehensive study previously conducted such as Forsund, Lovell, and Schmidt (1980), Schmidt (1985), Bauer (1990) and Greene (2008). Kumbhakar (1990) and Battese and Coelli (1995) have proposed an easy model for measuring inefficiencies. Consequently, Battese and Coelli (1995) proposed a SFA model which contained the firm's assumption that it was assumed to be scattered as a normal trimmed random variable. The Battese dan Coelli (1995) model can be written as follows:

(1) $Y_i = X_i\beta + (v_i - u_i)$

Where Y_i is the logarithm for the production of the i-th firm (i = 1, 2,…, N). $X_i$is the (k x 1) vector of the transformation of the input quantities of the i-th firm. β is the (k × 1) vector of unknown parameters. $u_i$is a non-negative random variable, representing the technical inefficiency, and is assumed to be independently distributed as truncations at zero of the $N(\mu, \sigma_U^2)$ distribution. $v_i$is a random error assumed to be iid$N(0, \sigma_V^2)$; where $\mu = z_i\,\delta$and variance σ_U^2; and z_i is the (1 × p) vector of explanatory variables associated with technical inefficiency of the rubber manufacturing industry over time; where $\delta$is a (p × 1) vector of unknown parameters. Equation (1) specifies the stochastic frontier production function in terms of the original production values. However, the technical inefficiency effect, u_i, is assumed to be a function of a set of explanatory variables, z_i, and an unknown vector of unknown parameters.

The coefficient of the frontier and inefficiency effect model in Equations (1) can be measured using the maximum likelihood method (MLE). Battese dan Broca (1997) replaced parameters σ_{v^2} andσ_{u^2} with $\sigma^2 = \sigma_{v^2} + \sigma_{u^2} : \gamma = \sigma_{u^2}/(\sigma_{v^2} + \sigma_{u^2})$ (see Coelli dan Battese, 1996) where γ has a value between 0 and 1. If H_0: $\gamma = 0$ is rejected, this proves that the actual deviation of the data from the boundary function is due to technical inefficiency. This means the null hypothesis of no technical inefficiency is rejected. To test the null hypothesis, one end likelihood ratio test (*generalized likelihood*-ratio – LR) L is implemented with the test statistic as follows:

(2) $$\lambda = -2\{ln[L(H_0)] - ln[L(H_1)]\}$$

Where $L(H_0)$ and $L(H_1)$show likelihood function under zero hypothesis and alternative hypothesis. If LR hypothesis test able to reject $H_0(H_0 : \delta = 0)$, then basic model without time factor will be used according to the model of Battesse and Coelli (1988). The specification of these two models has been widely used through past studies to determine TE values altogether. The production TE for the i-th firm is defined as the actual output ratio with the potential output as:

(3) $$TE_i = E[exp(-u_i)]$$

Since u_i is a non-negative variable, the efficiency lies between zero value and one. A firm is technically efficient if the TE value is equal to one (ie., the firm has an ineffective effect equal to zero). This study uses the Transcendental Logarithmic (Translog) approach (Coelli et al., 2005). While the hypothesis test is conducted to determine the appropriate model by selecting the best MLE level, SFA model based on Translog function can be written as follows;

$$(4) \quad lnY_i = \beta_0 + \sum_{j=1}^{n} \beta_j lnX_{ij} + \frac{1}{2}\sum_j^n \sum_i^n \beta_{ji} lnX_{ij} + (v_i - u_i)$$

Where Y_i is the log of the observed output of the i-th establishment. X variables are the log of inputs, while subscripted j and i indicate the inputs. In Equation (4), $Y_i$is the output, and the three inputs are the values of the capital (K_i), labour (L_i) and intermediate input (II_i).

The first objective of this study is to measure the level of technical efficiency of the rubber manufacturing industry in Malaysia. The FRONTIER 4.1 program developed by Battese and Coelli (1995) is used to analyze the data. The second objective is to determine the determinants of technical inefficiency of rubber industry in Malaysia in 2015. The variables involved in the technical inefficiency of the SFA model are as follows:

$$(5) \quad u_i = \delta_0 + \frac{\delta_1 lnRK}{L_i} + \delta_2 lnTRN_i + \frac{\delta_3 lnSEC}{L_i} + \frac{\delta_4 DEG}{L_i} + \delta_5 lnW/L_i + \delta_6 lnICT_i + \delta_7 lnDFSME_i$$

Where u_i represents technical inefficiency. RK/L_i represents the ratio of the total capital divided by the number of employees in the i-th firm. TRN_i represents the total expenditure for employee training for the i-th firm. SEC/L_irepresents the ratio of workers with education at diploma and STPM level or equivalent for the i-th firm. DEG/L_irepresents the ratio of workers with education at higher levels, which include postgraduate degrees or equivalent for the i-th firm. W/L_irepresents the wage rate for the i-th firm. ICT_i represents the communication expenses for firm i-th. $DFSME_i$ is a dummy for the i-th firm with small firms representing 1, while the others represent 0.

This study uses data at the firm level obtained from the Survey of Manufacturing Industries (SMI) conducted by the Department of Statistics(DOS) Malaysia through the latest Economic Census conducted in 2015. The study involved 6 sub-industries at 3-digit level according to Malaysian Standard Industrial Classification (MSIC) 2008. Based on the original data obtained from DOS, the screening process was once again carried out with some firms being dropped due to lack of relevant information such as incomplete information (output value or unmarked capital) and the number of employees was very small and do not meet the purpose of small and medium firms (less than 5 employees or 0) that will give effect to sample analysis. In total, 145 firms involved in this study are based on the latest Economic Census of 2015. As a common practice in SFA studies, these variables had been mean-corrected prior to estimation. Besides, all monetary variables are expressed in real 2010 Malaysian Ringgit.

4. RESULTS AND DISCUSSION

Table 1 shows the estimated results of the SFA parameters obtained with most variables in the rubber manufacturing industry is significant; whereas the gamma parameter (γ) obtained in 2015 has shown positive and significant values. This shows that technical inefficiencies have had a significant impact on the level and the change in production of the rubber manufacturing industry in Malaysia. In addition, the sigma value of squared ($\sigma^2 = \sigma_{v^2} + \sigma_{u^2}$) is also consistently significant indicating that there is a firm in a non-efficient operation.

TABLE 1
SFA Results

Variables	Parameter	Coefficient
Constant	β_0	3.713
		(3.631)***
ln Capital	β_1	-0.370
		(-1.996)**
ln Labor	β_2	0.661
		(2.965)***
ln intermediate input	β_3	0.456
		(2.745)***
0.5 (ln Capital)^2	β_4	0.041
		(2.847)***
0.5 (ln Labor)^2	β_5	0.078
		(2.595)***
0.5 (ln intermediate input)^2	β_6	0.059
		(3.273)***
(ln Capital) * (ln Labor)	β_7	-0.021
		-1.285
(ln Capital) *	β_8	0.007
(ln Intermediate Input)		(0.450)

TABLE 1 *(continued)*

Variables	Parameter	Coefficient
(ln Labor) *	β_9	0.062
(ln Intermediate Input)		(-2.769)***
Sigma-squared	$\sigma^2 = \sigma_v^2 + \sigma_u^2$	0.015
		(7.972)
Gamma	γ	0.135
		(2.085)
MLE		106.7

Notes:
1. *, **, *** indicate level of significance at 10%, 5% and 1%, respectively.
2. Value in parentheses is *t*-value

The level of TE of the rubber manufacturing industry in Malaysia is at a high level in 2015, that is 0.919. The rubber manufacturing industry involved includes the manufacture of tires and rubber tubes, tires and rubber tire repairs, rubber remanufacturing and rubber latex processing, rubber house smoke, rubber gloves manufacturing, and rubber product manufacturing. This shows that almost all firms operate at a high level to produce optimum output. The increase was related to an increase in exports of rubber goods in 2016, which exceeded RM18 billion and contributed 40 percent to total exports of rubber products and recorded a positive annual growth of 0.9 percent (MREPC, 2017). Table 2 shows the results of the technical inefficiency variables in 2015. The negative sign obtained from the analysis shows that when there is an increase in the variables, there is a reduction in the inefficiency of the rubber manufacturing industry in Malaysia. On the other hand, if a positive sign is obtained, it indicates an increase in the inefficiency of the firm's technique.

TABLE 2
Result of Determining Factors of Technical Inefficiency

Variable	Parameter	Coefficient (MLE)
Constant	δ_0	0.836
		(4.867)***
Ln Capital/Labor	δ_1	-0.075
		(-2.117)**
Ln Training	δ_2	0.002
		0.225
Ln Ratio TIER	δ_3	-0.628
		(-0.941)

TABLE 2 *(continued)*

Variable	Parameter	Coefficient (MLE)
Ln Ratio SEC	δ_4	0.131
		(0.396)
Ln Wage Rate	δ_5	-0.141
		(-4.198)***
Ln ICT	δ_6	0.004
		(0.295)
Dummy of firm size	δ_7	-0.222
		(-4.251)***

Notes:
1. *, **, *** indicate level of significance at 10%, 5% and 1%, respectively.
2. Value in parentheses is *t*-value

Based on the analysis, capital-labor ratios could reduce the inefficiency of the rubber manufacturing industry technique in Malaysia significantly at the 5 percent significance level. The capital-labor ratio is the amount of capital allocated for each employee in the production process. Through this ratio, the allocation of capital for each employee in the production process can be identified (Fahmy-Abdullah, 2017; Fahmy-Abdullah et al., 2017). Based on the Economic Census of 2016 (2017), the average working capital ratio of the rubber manufacturing industry in 2015 was RM360 thousand per labor compared to 2010 of RM438 thousand per labor. This shows that the amount of capital received with the existing number of employees has greatly contributed to the increase in the rubber manufacturing industry in Malaysia. Bertrand (2013) shows that the high composition of capital utilization has a positive impact on TFP's efficiency and growth as production levels increase as there is an increase in the use of machines in the production process. In fact, Katz (1969) emphasized that capital is one of the major contributors to output growth and productivity. In addition, Gapinski (1996) shows the difference between developed and developing countries coming from the capital-labor ratio.

Meanwhile, wage rates also show significant results for a reduction in technical inefficiency at the 1 percent significance level. As seen, the average annual salary for the rubber manufacturing industry has increased from RM9,133 in 2010 to RM12,077 in 2015 (Economic Census of 2016, 2017). This situation has led to a decrease in the inefficiency. The payment of the appropriate wage rate can increase the level of self-motivation in carrying out a task in a firm (Ismail et al., 2009; Hamdan, Fahmy-Abdullah, and Sieng, 2018; Idris, Fahmy-Abdullah, and Sieng, 2019; Sabli, Fahmy-Abdullah, and Sieng, 2019) and it also plays an important role as a motivator and stimulant to employees to increase production in the future (Fahmy-Abdullah et al., 2017; Fahmy-Abdullah et al., 2019; Hamdan, Fahmy-Abdullah, and Sieng, 2019). Meanwhile, firm size also shows a significant relationship at the 1 percent significance level that can reduce the inefficiency of firms. Based on the results, nearly 78 percent of firms involved in the rubber manufacturing industry are large in size and 12 percent of firms are small and medium size. The firm's technical efficiency level increases with firm size (Batra and Tan, 2003). Some other studies also show firm size can affect firms' technical efficiency (Sinani, Jones and Mygind, 2008; Charoenrat, Harvieand Amornkitvikai, 2013; Amornkitvikai, Harvie and Charoenrat, 2014; Fahmy-Abdullah et al., 2019). On the other hand, the results found that the determinants of training expenses had no significant relationship to reduce the technical inefficiency. This situation is likely due to the wastage of the expenses when the training is not in line with employee needs. As a result, the expenses incurred do not provide the proper returns to the rubber manufacturing industry. Similarly, the employees with high and middle levels education factor not significantly contribute to industrial technical inefficiency. This situation indicates that most of the workers who work in the rubber manufacturing industry do not have the appropriate educational background in the industry. This makes it difficult for the industry to reduce industry inefficiencies. This finding contradicts previous finding by Fahmy-Abdullah et al. (2017), Latif, Fahmy-Abdullah, and Sieng, (2018) and Latif, Fahmy-Abdullah, and Sieng, (2019). Similarly, ICT spending does not significantly reduce the inefficiency of the rubber manufacturing industry. In essence, ICT spending alone is a side-effect of the industry. This can be seen when the rubber manufacturing industry does not emphasize the ICT aspect as it emphasizes the production aspects that utilize machine technology.

5. CONCLUSION

The study aims at examining the level of efficiency and analyzing the factors determining inefficiency of the rubber manufacturing industry in Malaysia. This study involved 145 firms obtained from DOS in 2015. Results shows that the level of rubber manufacturing industry efficiency in Malaysia is high with average efficiency of 0.919. Subsequent results indicate that determining factors of technical inefficiency include capital-labor ratios, wage rates and firm size play an important role in reducing the inefficiency of firms. This suggests that these determining factors play a very important role in efforts to improve the technical efficiency of the rubber manufacturing industry in Malaysia and certainly challenge policymakers to ensure future relevance of the rubber manufacturing industry.

In terms of policy implications, this finding emphasizes that the rubber manufacturing industry still needs a lot of effort to further improve the TE level, especially emphasizing the determinants that can improve the firm's efficiency. The implication of the policy is important as efforts to improve rubber manufacturing industry efficiency can increase government revenue and income as Malaysia is one of the world's largest producers of natural rubber. First, increase the amount of capital through technology investment and research. This measure will increase the industry's ability to improve production efficiency such as the production of new rubber breeds that can contribute to economic development. In fact, the diversity of products produced by the industry should also be emphasized and not relying heavily on latex dye subsector which can enhance the industry international competitiveness. In addition, the introduction of latest tapping technology, advisory and consultancy services on demand should be extended to enable the rubber manufacturing industry to focus on a new technology or innovation or a renewed practice method.

Second, to motivate and improve efficiency and productivity, the firm should increase wage rates. High pay rates are received by employees to encourage them to work harder and contribute to higher efficiency and productivity. The implementation of the Minimum Wage Order (PGM) effective July 1, 2016 is an accurate step to protect employee interests without ignoring employer interests. Third, despite the increase in size in the rubber manufacturing industry, efforts to double their performance need to be continued using minimal input but may result in a maximum amount of output at which a greater emphasis on economic achievement scale (IRS - rising return scale). In fact, the industry needs to be more aggressive by having technical cooperation with the industry internationally including enhancing investment and marketing missions specific to several countries and increasing interest in international industry players to collaborate with the local industry for overseas markets. Besides, foreign direct investment (FDI) is an important contributor to the growth and transformation of the rubber manufacturing industry, especially to increase production capacity, job opportunities, trade and technological capabilities. Thus, domestic investment is the driving force of industrial growth that has incorporated advanced technology and top-level investments by international industrial players. This not only ensures technology transfer and innovation, but also generates high-income jobs and economic opportunities for local industries.

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