The Impact of Human Capital Attainment on Output and Labor Productivity of Malay Firms

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ABSTRACT

Human capital attainment among workers plays an important role in determining firm's output and labor productivity, hence enhances firm's competitiveness. More educated workers are believed to be more efficient and productive, reduce cost of production and raise the capability of firms to compete especially in the global market.. The intention of the Malaysian government to create the Bumiputera Commerce and Industrial Community (BCIC) (where the Malays are the majority) as spelt out in the New Economic Policy (NEP) requires the Malays to enhance their competitiveness in undertaking business. This paper attempts to analyze the impact of human capital attainment among workers for the Malay owned manufacturing and services enterprises on output and labor productivity. The analysis is based on 574 Malay firms surveyed in 2001/2002, which covers 264 manufacturing enterprises and 310 services enterprises in Peninsular Malaysia. The sample is selected from the Malay firms registered with the Malaysian Malay Chamber of Commerce (MMCC). The output and labor productivity of the firms are regressed against the human capital variables like education and training together with physical capital stock. The study shows that for the manufacturing enterprises an effective labor plays a higher and significant role on output and labor productivity growth. The capital- labor ratio is an important determinant of labor productivity.

Keywords: *human capital variables, output growth, labor productivity, Malay entrepreneurs*

INTRODUCTION

The Malays' involvement in business is quite small as compared to other ethnics and the implementation of the National Economic Policy (NEP) in 1971 marked the government's commitment to raise their participation. The objective of the government to create the Bumiputera Commerce and Industrial Community (BCIC) is to increase their income share in the national income. The business sector was proven to have higher productivity, hence increase income level of its participants.

Even though the number of Malay enterprises is dramatically increased, they involvement is still limited to certain activities that associated with low productivity. Most of the Malay enterprises are small in size and dealing with light-industries like food and beverage; and textiles industries using low initial capital and technology. As a result, they are less competitive and their ability to penetrate the export market is very much limited.

Apart from the above, the Malay firms frequently face shortage of capital, lack of knowledge and skills and too dependent on the government contract scheme (Kamal Salih and Hanafiah Hussein 1992). A Study by Ragayah and Rahmah (1996) found that the majority of small-scale industries (SSIs) where most of the Malays are in had less ability to penetrate the export market because of low quality product, lack of context and too specific product design. Apart from this, SSIs also adapt low level of technology and the majority of workers are with low educational level (Moha Asri 1999, Rahmah et al. 1996) .

In the era of globalization, knowledge that associated with new technology, innovation and design is particularly important for firms to compete in the global market. The human capital attainment among workers is one form of knowledge accumulation. Therefore, to improve knowledge, firms must invest in human capital especially in education or training. The importance of human capital emerges from its power to generate higher productivity, hence higher earnings (Shultz 1961, Becker 1962 and Mincer 1974). Subsequently this will increase firms' productivity and level of competitiveness.

This paper analyses the impact of workers human capital attainment on the output, labor productivity and firms' competitiveness of the Malay firms surveyed in 2001/2002. The survey covered 264 manufacturing and 310 services enterprises, who registered with the Malaysian Malays Chamber of Commerce (MMCC) in Peninsular Malaysia. There

are nine types of manufacturing enterprises and five types of services activities. The paper is organized into five sections. The following sections include the literature review, model specification and definition of the variables, the results and summary and conclusion.

LITERATURE REVIEW

Human capital investment affects firms' performance through output, productivity, profit, and competitiveness (Black & Lynch 1996, Honig 2001, Blundell et al. 1999, Barron et al. 1989, Blackemore and Hoffman 1988). Human capital theory developed by Schultz (1963) and Becker (1964); and extended by Dittman *et al*. (1976; 1980), indicates that firms' investment in specific human capital will increase their future returns.

Workers' training will improve the business undertakings and companies who involved in training are able to adapt new technology or other specific management (Keep and Mayhew 1988). A study by Sandra and Lynch (1996) finds that there is a positive relationship between workers' year of schooling and productivity and the impact of training is very much dependent on the training program. According to their study among the important training programs are that related to technical and computer skills.

An increase in the level of productivity reflects an improvement in inputs efficiency. Therefore, the same level of inputs is able to produce a higher output level and the cost of production will be reduced. In other words, it reflects an improvement in the quality of inputs. A positive relationship between human capital and productivity is very much influenced by workers' wage rate. A higher wage rate received by the workers will encourage them to work harder and contribute to higher productivity. Workers with higher level of education and training skills tend to receive higher wages and they are more likely to contribute to career development, research and development and further human capital accumulation (see Blundell et al. 1999, Montague 1986). Consequently, this contributes to higher productivity growth. Therefore, it is very important for firms to have more educated workers to gain this stimulus effect.

A study by Mason and Finegold (1997) in the United States and Britain support the positive relationship between human capital and firm's performance. They find that education and training are more important than physical capital in determining productivity. Moreover, human capital achievement will create services and geographic diversifications especially in the professional services where human interaction is important (see Hitt *et al*. 2001)

Firms with many educated workers are more able to sustain and control their present technology or adopt modern and new technology. They are more able to make further investment in human capital like training because knowledge workers are the faster learners and more innovative (see for example Bosworth and Wilson 1993, Bishop 1994 and Chapman and Tan 1990). Katz (1969) calculated residual factors to show the contribution of technological progress to output and labor productivity growth in Argentina during the 1946-1961 periods. He concluded that capital was the major determinant of labor productivity.

Technological advancement is closely related to capital intensity. Accordingly, in the capital- intensive firms, productivity may be higher. For example, Hishashi (1991) finds that in Japan the contribution of capital to productivity growth is larger for the capital-intensive industry compared with the labor-intensive industry. Another important determinant of productivity is capital-labor ratio. In fact, this ratio is frequently used as an indicator for level of technology, where higher capital-labor ratio is associated with higher level of technology. Haskel and Martin (1993) study 81 manufacturing firms in the United Kingdom and find that during the 1980- 1986 period, productivity increases by 4.7 per cent. Of this 2.2 per cent is due to the growth of capital-labor ratio. Further, this study reveals that a decrease in skilled-labor by 2.6 per cent will lead to productivity reduction by 0.7 per cent each year. In other words, if there is no reduction in the number of skilled-labor, productivity would have increased to 5.4 per cent.

Labor productivity is very much related to workers skills that can be acquired through proper training. Workers who are attended training will be more efficient, productive and contribute to productivity growth. Rahmah (2000), for example finds that expenditure on training by SMEs has a significant positive impact on labor productivity. Nik Hashim (1998) focuses his study on the contribution of total factor productivity (TFP) growth to output or productivity growth in the manufacturing sector in Malaysia during the 1985-1994 periods. His study reveals that capital is the major determinant of productivity growth, and the role of TFP growth is still minimal. Using the same data source Rahmah

and Idris (2001) finds that the growth of capital -labor ratio significantly determines labor productivity in the textile, wood-based, plastic-based, rubber-based, metal products and electrical electronics industries. The contribution of capital-labour ratio on the productivity growth is larger for the rubber-based and metal products industries compared to other industries.

Other studies estimate impact of training on productivity. Hall (1982) suggests that firms must view their investments in human capital, such as training as a long-term asset from which they receive positive returns during the employees' tenure with the firms. Holzer et al. (1993) and Bartel (1994) studied 250 firm and 150 firms respectively found that training and productivity had a direct relationship.

Lynch and Black (1995) and Black and Lynch (1996, and 1997) show that number of workers who attended training was not statistically significant in effecting productivity, but the effects. For example, in the manufacturing companies, the higher the proportion of workers who undergo training, the higher will be the productivity, whereas in the non-manufacturing companies, types of training influenced productivity, in particular, training in computer skills will increase productivity. Barrett and O'Connell (2001) found the effect of training (whether the general or specific training) on productivity growth was positive and statistically significant. The finding of this supported the study by Holzer et al. (1993) and Bartel (1994).

MODEL SPECIFICATION AND SOURCE OF DATA

Lucas (1988) developed the output function as below,

$$Y = AK^{\alpha}(uhL)^{\beta} \qquad (1)$$

Where,

A = efficiency parameter
K = capital stock
u = time allocated for producing output
(1-u) = time allocated for human capital investment
h = human capital stock
L = workers
uhL = L* =effective labor

Taking into consideration time factor and adding external factor, equation (1) becomes,

$$Y = AK(t)^{\alpha} L^{*}(t)^{1-\alpha} ha(t)^{\gamma_1} U^{\gamma_2} \qquad (2)$$

Where,

ha = average years of schooling among workers.
U = human capital obtained from learning by doing
L = u(t)h(t)L(t)*

Human capital model developed by Corvers (1996, 1997) is based on Cobb-Douglas production function and can be written a folllow,

$$Y = AK^{\alpha}L^{*\beta} \qquad (3)$$

Where,

Y = output

K = capital
L^* = effective labor
A = efficiency parameter

Effective labor is labor with three levels of education, primary, secondary and tertiary,

$$L^* = L \bullet L_1^{\theta 1} L^{\theta 2} L^{\theta 3}$$

Where,

L = quantity of labor
L_1 = number of workers with primary education
L_2 = number of workers with secondary education
L_3 = number of workers with tertiary education

Equation (1) can be written as,

$$Y = AK^{\alpha}(L\, L_1^{\theta 1} L_2^{\theta 2} L_3^{\theta 3})^{\beta} \qquad (4)$$

Dividing the equation (4) by number of workers (L), we get;

$$\frac{Y}{L} = \frac{AK^{\alpha} L^{\beta} L_1^{\beta\theta_1} L_2^{\beta\theta_2} L_3^{\beta\theta_3}}{L} \qquad (5)$$

Rewriting the equation (5), we get,

$$\frac{Y}{L} = A \left(\frac{K}{L}\right)^{\alpha} L^{\alpha+\beta-1}\, L_1^{\beta\theta 1} L_2^{\beta\theta 2} L_3^{\beta\theta 3} \qquad (6)$$

and substituting $1-L_2-L_3$ for L_1 in equation (6), we get,

$$Y/L = A \left(\frac{K}{L}\right)^{\alpha} L^{\alpha+\beta-1} (L-L_2-L_3)^{\beta(1-\theta 2-\theta 3)} L_2^{\beta\theta 2} L_3^{\beta\theta 3} \qquad (7)$$

Equation (7) shows that labor productivity depends on the relative share contribution of three types of labor.

Estimation Equation

Based on the above specification, we derive the estimation models as below:

$$\ln Y_{ij} = \beta_{10} + \beta_{11} \ln(CAPITAL)_{ij} + \beta_{12} \ln(ELABOUR)_{ij} + \beta_{13} \ln(SCH)_{ij} + \beta_{14} \ln(TRAIN)_{ij} + \mu_{1ij}$$

(8)

$$\ln(\frac{Y}{L})_{ij} = \beta_{20} + \beta_{21} \ln(KL)_{ij} + \beta_{23} \ln(LABOUR)_{ij} + \beta_{24} \ln(SCH)_{ij} + \beta_{25} \ln(PRIM)_{ij}$$

$$\beta_{26} \ln(SEC)_{ij} + \beta_{27} \ln(TER)_{ij} + \mu_{2ij} \qquad (9)$$

Where,

Y=value of output in ringgit Malaysia (RM)

CAPITAL= value of capital stock in ringgit MAlaysia (RM)
ELABOUR=number of effective labor
SCH=worker's mean year of schooling for firm i and industry j
TRAIN=number of workers who attended training
$\frac{Y}{L}$ =value of output per labor in ringgit Malaysia (RM)
$\frac{K}{L}$ =value of capital per labor in ringgit Malaysia (RM)
LABOUR=number of employment
PRIM=number of workers with primary level of education
SEC=number of workers with secondary level of education
TER=number of workers with tertiary level of education
i = firm
j= sector; manufacturing and services

Equation (8) and (9) are estimated using ordinary least squares (OLS) procedure. Several adjustments were made to these equations to suit with the data. Since the data also contain workers without formal education, this variable was added in estimating the effective labor. Number of workers who attended training is used to measure human capital obtained from learning by doing. Since information on time allocation are not available, effective labor is measured by multiplying quantity of labor by workers at various education level by giving them weight, with higher weight for higher education.

Data for this analysis were gathered from the field survey conducted in the 2001/2002 for 574 Malay firms. The study covered 264 manufacturing firms and 310 service firms. The sample consists of nine types of manufacturing enterprises, namely, food products, textiles, wood-based, paper products, chemical, basic metal, fabricated metal, non-metallic mineral products and other manufacturing. The service enterprises consist of five activities, i.e. electricity, gas and water; transportation; wholesale and retail; finance and other services.

THE RESULTS

Table 1 shows the results of estimation of equation (8) for the overall manufacturing and services sector. The value or R^2 for the manufacturing sector is higher than that for the services sector. The effective labor has a significant greater impact on the output growth for the manufacturing sector compared to the impact of capital stock, but this coefficient is not statistically significant for the service sector. Other measures of human capital variable like workers' mean year of schooling also has a positively significant impact on the output growth for both sectors. The coefficient of worker's training, however, is negative and statistically significant in determining output for the service enterprises. This result may be due shortage of labor faced by the firms when workers undergo training and types of training may not be appropriate to the firms' need.

Table 1. Results of regression estimates of the production function

Variable	Manufacturing	Services
INTEREPT	10.757 (5.783) ***	15.864 (4.809) ***
CAPITAL	0.199 (3.480) ***	0.037 (0.805)
ELABOUR	0.440 (3.098) ***	0.086 (0.146)
SCH	0.738 (1.661) *	1.460 (1.948) **
TRAIN	0.148 (0.949)	-0.671 (-2.540) **
R^2	0.291	0.076
R^2 Adjusted	0.280	0.064
N	264	310

Note: *** significant at 10%; ** significant at 5%; * significant at 1%

The results from the estimation of the productivity function are presented in Table 2. The R^2 is rather low in both sectors but it is slightly higher in the manufacturing sector compared to the service sector. In the manufacturing enterprises, the capital-labor ratio is a sole significant determinant of productivity. An increase of 1% in this ratio will increase labor productivity by 0.197 percent. But in the service enterprises, the capital-labor ratio is not statistically significant, even though the sign is positive. Instead, worker's training will significantly decrease labor productivity in this sector. This may be due to firms' strategy regarding workers' training where the priority is given to the workers to the senior or high level of workers. These workers play an important role in the production line. Therefore, an increase in the number of workers who attending training will reduce labor productivity and this in line with its negative impact on output as shown in the earlier table.

Table 2. Results of regression estimates of the productivity function

Variable	Manufacturing	Services
INTERCEPT	12.904 (3.076) ***	13.251 (2.093) **
KL	0.197 (3.381) ***	0.022 (0.481)
LABOUR	-0.965 (-0.895)	0.060 (0.030)
SCH	-1.357 (-1.145)	-0.775 (-0.422)
TRAIN	0.150 (0.947)	-0.723 (-2.669) ***
PRIM	0.114 (0.516)	-0.484 (-1.098)
SEL	0.469 (0.815)	-0.683 (-0.890)
TER	0.421 (0.686)	0.012 (0.010)
R^2	0.062	0.052
R^2Adjusted	0.036	0.030
N	264	310

Note: *** significant at 10%; ** significant at 5%

The results of the regression estimates of the production function by types of industry are presented in Table 3. The R^2 are higher in the basic metal, wood-based and paper products industries. The lowest R^2 is recorded in the fabricated metal products. In all industries, the results show that the coefficient of effective labor is higher than that of the capital, even though for some sub industries they are not significant. The coefficient of effective labor is statistically significant in the food, wood-based, paper products and basic metal products industries. The positive sign of this coefficient indicates that an increase in the number of effective labor will increase output growth for these particular industries. The capital variable is statistically significant determinant of output growth for the food and paper products industries and workers' mean year of schooling significantly increase the output growth for the basic metal products industry.

Table 3. Results of regression estimates of the production function by manufacturing types of industry

Variable	Food	Textile	Wood-based	Paper products	Chemical products	Basic metal	Fabricated metal
INTERCEPT	6.585	19.205	6.097	2.973	12.990	12.422	6.373
	(1.238)	(1.933) *	(2.112) **	(0.512)	(1.199)	(5.804) ***	(0.559)
CAPITAL	0.171	0.299	0.08	0.517	0.096	0.199	0.222
	(1.771) *	(1.465)	(1.040)	(2.753) ***	(0.176)	(1.438)	(0.817)
ELABOUR	0.801	-0.524	0.826	0.850	0.591	0.284	0.496
	(1.741) *	(-0.655)	(3.580) ***	(1.883) *	(0.453)	(1.750) *	(1.028)
SCH	0.322	-2.997	0.918	0.152	-1.418	1.023	0.798
	(0.252)	(-1.175)	(1.308)	(0.109)	(-0.731)	(2.059) *	(0.289)
TRAIN	0.116	0.901	0.143	-0.389	-0.118	0.061	0.286
	(0.341)	(0.985)	(0.768)	(-0.797)	(-0.104)	(0.284)	(0.394)
R^2	0.305	0.203	0.478	0.448	0.295	0.761	0.182
R^2 a	0.244	0.044	0.438	0.398	0.061	0.681	0.034
N	51	25	57	49	17	17	27

Note: *** significant at 10%; ** significant at 5%; * significant at 1%

The results of the estimation for the services sub-sectors are presented in Table 4. The capital and effective labor are not statistically significant in determining output growth for all sub-sectors, but workers' mean year of schooling is significant determinants for some sub-sectors, such as the finance sub-sector. Workers' who attended training has a significant positive impact on the output growth for the other services. In contrast, it negatively determines the output growth for the wholesale and retail; and finance enterprises.

Table 4. Results of regression estimates of the production function by type of service activity

Variable	Electricity, Gas and Water	Transportation	Wholesale and Retail	Finance	Other Services
INTERCEPT	22.416 (1.601)	10.427 (1.313)	18.166 (3.603) ***	22.505 (3.087) ***	19.145 (2.557) **
CAPITAL	-0.200 (-0.807)	0.059 (0.539)	0.063 (1.025)	-0.091 (-0.787)	-0.009 (0.092)
ELABOUR	0.011 (0.009)	0.605 (0.782)	-0.529 (-0.982)	-0.022 (-0.038)	-0.906 (-0.933)
SCH	2.730 (0.880)	0.299 (0.170)	1.884 (1.666)*	2.993 (1.757) *	1.680 (1.086)
TRAIN	-0.847 (-0.981)	0.033 (0.063)	-1.593 (-2.274) **	-0.859 (-1.880) *	1.781 (2.123) **
R^2	0.085	0.096	0.080	0.170	0.454
R a	-0.009	0.042	0.044	0.118	0.256
N	44	72	109	69	16

Note: *** significant at 10%; ** significant at 5%; * significant at 1%

The results from the estimation of labor productivity for the manufacturing sub-industries are presented in Table 5. All coefficients in the textiles industry are significant. The major determinant of the productivity growth for this industry is the secondary level of education holders, followed by workers who attended training and capital-labor ratio. On the other hand, workers' mean year of schooling and number of workers are negatively associated with the labor productivity growth for this sector. The capital-labor ratio is also a significant determinant of labor productivity growth for the paper products industry.

Table 5 Results of regression estimates of the productivity function by manufacturing types of industry

Variable	**Food products**	**Textile**	**Wood-based**	**Paper products**	**Chemical products**	**Bacis metal**	**Fabricated metal**
INTERCEPT	8.197	47.980	6.163	-4.096	43.024	6.394	0.891
	(0.548)	(3.108) ***	(1.120)	(-0.335)	(1.250)	(0.918)	(0.033)
KL	0.170	0.381	0.083	0.543	-0.118	0.240	0.266
	(1.608)	(2.600) **	(1.028)	(2.791) ***	(-0.186)	(1.465)	(0.895)
LABOUR	-0.494	-8.801	-0.128	2.196	-8.015	1.225	1.871
	(-0.123)	(-2.149) **	(-0.080)	(0.625)	(-0.902)	(0.678)	(0.270)
SCH	0.131	10.850	0.864	2.141	9.912	0.632	2.229
	(0.032)	(2.392) **	(0.554)	(0.604)	(1.014)	(0.343)	(0.299)
TRAIN	0.112	1.213	0.143	-0.097	-0.446	0.049	0.116
	(0.302)	(1.871) *	(0.736)	(-0.146)	(-0.368)	(0.188)	(0.136)
PRIM	0.238	-0.306	0.267	-0.881	-0.070	-0.069	0.003
	(0.285)	(-0.316)	(1.058)	(-0.665)	(-0.041)	(-0.213)	(0.004)
SEC	0.453	5.216	0.195	-0.367	3.372	-0.891	-1.878
	(0.263)	(2.727) **	(0.201)	(-0.221)	(0.819)	(-0.936)	(-0.503)
TER	0.516	-0.181	0.466	-0.793	5.035	-0.618	0.324
	(0.239)	(-0.068)	(0.556)	(-0.317)	(0.992)	(-0.694)	(0.093)
R^2	0.090	0.674	0.118	0.226	0.229	0.335	0.116
R^2 Adjusted	0.058	0.540	0.008	0.094	0.219	0.183	0.109
N	51	25	57	49	17	17	27

Note: *** significant at 10%; ** significant at 5%

Table 6 presents the results of the estimation of labor productivity for the services sub-sectors. Most coefficients are not statistically significant except some variables in the finance and other services. Workers with training attendance

have a negative impact on the labor productivity growth for the finance activity. This relationship may be due to labor shortage when workers undergo training. In contrast, for the other service sub-sector workers' with training attendance and level of education contribute positively to labor productivity growth. An increase in one per cent of this type of workers will increase productivity by 1.554 percent.

Table 6. Results of regression estimates of the productivity function by type of services activity

Variable	Electric, water and gas	Transportation	Wholesale and retail	Finance	Other services
INTERCEPT	-25.214 (-0.540)	8.416 (0.867)	24.112 (1.137)	34.208 (2.304) **	108.321 (2.958) **
KL	-0.221 (-0.829)	0.077 (0.690)	0.019 (0.279)	-0.097 (-0.804)	0.049 (0.567)
LABOUR	13.849 (1.036)	0.093 (0.038)	-3.018 (-0.474)	-4.863 (-1.159)	-31.332 (-2.646) **
SCH	11.236 (0.835)	0.145 (0.055)	374 (0.542)	6.718 (1.521)	30.045 (2.609) **
TRAIN	-0.661 (-0.711)	-0.243 (-0.429)	-1.229 (-1.611)	-0.988 (-2.068) **	1.554 (2.077) *
PRIM	-1.694 (-0.988)	-0.112 (-0.131)	-1.010 (-0.986)	1.323 (1.229)	5.275(2.442)**
SEC	-7.806 (-1.235)	-0.516 (-0.384)	1.020 (0.368)	0.850 (0.524)	10.847 (2.520) **
TER	-6.580 (-0.871)	1.397 (0.686)	-0.222 (-0.060)	3.287 (1.067)	21.414 (2.418) **
R^2	0.139	10.034	0.143	0.153	0.663
R^2 Adjusted	0.029	0.002	0.084	0.055	0.438
N	44	72	109	69	16

Note: *** significant at 10%; ** significant at 5%

SUMMARY AND CONCLUSION

This paper analyzes the impact of human capital attainment among workers for the Malay owned manufacturing and services firms in Malaysia. The results show that the effect of effective labor on the output growth is greater than that of capital stock. Other human capital variables like workers' mean year of schooling also contribute positively to the output and productivity growth. Further, the results show that for the manufacturing sector the most important determinant of the productivity growth is the capital-labor ratio. However, for the services sector, it is found that number of workers who attended training will reduce the productivity growth due labor shortages..

The estimation results by types of industry for the manufacturing firms also show that the effective labor has greater contribution to output growth than the capital stock. However, the statistically significant results are found only for some sub- industries like food products, wood-based, paper products and basic metal products. In the service sector, however, human capital variables like workers' mean year of schooling contribute positively, whereas workers' training contributes negatively to the output growth for most activities but most of the coefficients are not significant.

Further, the study found that human capital variables are not important determinants of labor productivity except in the textile industry. In this industry, workers' training and workers with secondary level of education are found to contribute positively to labor productivity. Another significant determinant of labor productivity is capital-labor ratio as shown in the paper products industry. In the service sector, workers' training contributes negatively to its labor productivity but it is positive in other services. For the later activity, workers' mean year of schooling and workers level of education are the positively determine the of productivity growth.

The results above suggest that the Malay firms must increase the proportion of more educated workers to raise the value of effective labor. The majority of workers are at the secondary level of education and the percentage with tertiary level is very small. In most cases workers' training contributes negatively to output and productivity growth. This problem arises from labor shortage faced by the firms when they send workers for training. The questionnaire only captures workers who attended training during the survey year. To overcome this problem, firms may need a proper manpower planning.

In order to increase the contribution of human capital to labor productivity, the study suggests that workers must have proper training that really relevant to the firms' need.. Even though the results show a less contribution of human capital variables on output and productivity growth for some sub-sectors, the Malay firms must further increase level of educational attainment among their workers. In the future, they must expand size of production, diversify the products and have more number of educated and trained workforces.

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