

# Impact of Training on Firms' Output and Labour Productivity<sup>1</sup>

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*Training is an important, core component of human resource development and is emphasized in the Malaysian economic development process. The commitment of the government towards the aspect of training can be seen from a huge expenditure allocation on training and it is given almost the same importance as education. Conscious of this importance, the Malaysian Government established the Human Resource Development Fund (HRDF) managed by the Human Resource Development Limited (HRDL). The HRDL Act has stipulated that each company must contribute 1% of total wages of an individual employee to HRDF. Employers can then use this contribution to train their employees under several HRDF training schemes. This paper aims to analysis the impact of workers' training on firms' output and labour productivity. The analysis is based on the companies' data in the hotel sector; and information and communication technology (ICT) sectors collected in 2009 in Klang Valley and Penang, Malaysia. All companies have registered with the HRDL and are involved in workers' training either under HRDF or non-HRDF training schemes.*

Field of Research: Human Resource Management, Labour Economics

## 1. Introduction

Training is an important, core component of human resource development and is emphasized in the Malaysian economic development process. The commitment of the government towards the aspect of training can be seen from a huge expenditure allocation on training and it is given almost the same importance as education. For example, in 1995 the education and training development expenditure was 12.2% of the total government expenditure and was the highest in the category of social services expenditure. This percentage increased to

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<sup>1</sup> Paper presented at the Business and Social Science Research Conference, 3-4 January, Novotel Hotel, Dubai, UAE.

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16.5% in 2007 and 19.5% in 2009 respectively (Malaysian Finance Ministry 2008). Training becomes essential and relevant when fresh graduates enter the workforce, and need specific skills to suit a particular job requirement. The education institution provides basic knowledge to enable the graduates to think critically and to be creative. It is the responsibility of the employers to train or provide training for their newly employed workers. Nevertheless, some employers, citing excuses like no tangible benefits from the training schemes, not enough employees, no proper training schemes, take this lightly and some even are afraid that they will lose their workers once the training is over (Rahmah 2008).

Conscious of these problems, the Malaysian Government has established the Human Resource Development Fund (HRDF) managed by the Human Resource Development Limited (HRDL). In the early stages of its inception in 1992, this body was named Human Resource Development Council (HRDC) and it was changed to HRDL in 2002. The HRDL Act has stipulated that each company must contribute 1% of total wages of an individual employee to HRDF. Employers can then use this contribution to train their employees under several training schemes introduced by the HRDF. This body has assisted employers and employees alike to receive training and thus enhance their skills. The question is whether workers' training has a positive impact on firms' output and labour productivity.

This paper aims to analysis the impact of training on firms' output and labour productivity. The analysis is based on the companies' data in two sectors, namely, the information and communication technology (ICT) and the hotel collected in 2009 in Klang Valley and Penang, Malaysia. All companies have registered with the HRDL and involved in workers' training either under HRDF schemes or under non-HRDF. The paper is divided into five sections; the next section discusses the literature review. The third part discusses the theoretical framework, model specification and data. Section four and five are the results of the study and the conclusion respectively.

## **2. Literature Review**

According to human capital theory, human capital variable like training will enhance individual' skills, hence, contribute positively to output and productivity of the companies where they work. Lucas (1993), for example, postulates that human capital formation is a catalyst for the growth of macroeconomics variables. According to him, knowledge workers are the most important asset for firms and these type of workers will sustain firm' level of competitiveness. Apart from this, human capital accumulation is crucial for sustaining long-term economic growth.

In general, human capital is defined as formal education and training that can contribute to economic growth through workers' productivity, hence, firms' output

and productivity. Subsequently, firms will be more competitive in coping with fast changing technology (Bartel and Lichtenberg, 1987). There are many empirical researches that show positive effects from education and training on productivity growth and innovation and this will lead to faster industrial growth. Ability to absorb and utilise new knowledge among workers is very important and this will subsequently assist workers to gain further knowledge and increase their ability to earn higher income (Welch, 1970; Mincer, 1989, Lillard and Tan, 1992; Foster and Rosenzweig, 1996).

Training has additional benefits either to firms or to workers, and the benefits are more obvious as compared to general education. On the other hand, firms have an autonomous power to decide what type of skills needed in order to raise workers' performance. Nevertheless, in some OECD countries like Portugal, participation in training is very low as a result of low incentive given by the authority. Moreover, participation in training is more likely among the more knowledgeable and educated workforce compared with the low skilled and aging workforce (OECD, 2000). According to human capital theory wage structure, which is based on skilled workers has reduced workers' incentive to invest in general training (Becker, 1962). There are several economic consequences from this phenomenon, for example, the emerging of a large wage gap between the skilled and the unskilled workers; and less ability of the unskilled workers to sustain their jobs in a fast changing economic structure.

Even though there are strong evidents that support a positive effect of general training in raising workers' productivity and wages, but evidents that relates a positive relationship between on-the-job training, which is more specific in nature and workers' productivity and wages are quite limited. For example, Barrett and O'Connell (2001) found that the specific training is not statistically significant in affecting the productivity growth compared with the general training, which has a significant positive effect and varies with the amount of human capital investment. Nevertheless, the OECD countries argued that on-the-job training is important for labour productivity growth and job security besides the general training from the education system.

Acemoglu and Pischke (1998, 1999) argued that wages are not paid according to perfect competition, but on the bargaining process and this explains why firms need to have on-the-job training. On- the-job training will increase workers' productivity above their wages and this will benefit the firms. Dearden, Reed and Van. Reenen (2005) analysed the relationship between training, wages and produktivity in Britain using panel data. They found that an increase of 1% of the number of workers receiving training will increase the sector' value added by 0.6% and the average wage by 0.3%. Bartel (1995) on the other hand, found that training has a positive effect on workers' wage profile and career development in the large firms. In another study by Moretti (2004), it was shown that in the urban areas, firms who hired majority college graduates have higher productivity as compared to firms with less educated workers.

Rene Boheim et al. (2009) found that the effect of training has resulted in a positive productivity elasticity of 0.04, even though the training expenditure is quite low. Using workers' data from the Austria firms, they found that in-house training was more effective and the administrative and self skills related courses were more effective than the sales and information technology courses. This study found that there was a significant relationship between wages and training but training was not significant in determining wage inequality. On a different view, Ballot and Taymaz (2001) argued that training subsidy will increase productivity, maintain firms growth and assist firms to compete with technological change.

Workers who attend training are found to be more productive than those who do not attend any training, hence contribute to firms' productivity ( Jozef Konings 2008). In a study by Jozef Konings (2008) using a longitudinal data of more than 13000 firms in Belgium showed that on- the- job training increase firm' productivity by 1-2% compared with firms without training facilities. The effect of training on the average wage also found to be positive but it was lower than its effect on the productivity at only 0.5% . Further, this study found that the manufacturing firms have a higher tendency to train their workers compared with the services sector. The average output for workers with training was 23% higher than those without training, while the wage increase was 12%. (Jozef Koningsy and Stijn Vanormelingenz, 2009).

Returns from training to employers or employees are determined by various factors. Groot (1999a) measured training based on the number of days and found that the elasticity of productivity-training increased by 0.12 for 140 days training course. Bishop (1994) studied determinants of workers' productivity like years of schooling, working experience and formal training from their previous employers. Using a dummy variable to measure training incidence, he found that workers who received formal training from their previous employers were 16% more productive than workers who did not receive any training from their previous employers.

Bartel (1994) estimated the effect of formal training on firms' productivity using data of 1983-1986. He found that firms that provide new training program for a certain group of workers significantly increased their productivity by 19%. On the other hand, Lynch and Black (1995) estimated production function and found that number of workers attended training determined firms' productivity. Their study showed that computer training increased firms' productivity of more than 20%, while the manufacturing sector, which provides a more formal training, had received a significant positive effect from training on firms' productivity. However, Cassidy, Gorg and Strobl (2005) in their study using a panel firm's data in Ireland of 1999-2002 found that the effect of training would only increase domestic firms' productivity but not the foreign firms.

### 3. Theoretical Framework, Model Specification and Data

In the neoclassical exogenous growth theory, there are two kinds of input that determine output growth, namely, physical capital and quantity of labour (Solow 1956). However, Lucas (1988) and Romer (1989) suggest that endogenously accumulated human capital has a direct impact on the productivity of labour, hence, stimulate the economic growth. They argued that an endogenous growth model, which takes into account the quality of labour and technological advancement, is a more appropriate production function. The same concept can also be used for firms' output and productivity growth function.

A Cobb-Douglas production function with two inputs is written as below,

$$Y_t = AK_t^\alpha L_t^\beta \quad (1)$$

Where Y is output, K is physical capital stock, L is quantity of labour and t is time trend. This production function does not take into account the quality of labour, but instead assumes that labour is homogenous. According to Lucas (1988) a production function that takes into account the quality of labour can be written as follows,

$$Y_t = AK_t^\alpha (uhL)_t^\beta \quad (2)$$

Where  $\alpha + \beta = 1$  (constant returns to scale), A is efficiency parameter, K is physical capital stock, u is time spent to produce output, (1-u) is time spent for human capital investment, h is stock of human capital, L is labour force or employment and  $uhL = L^*$  is effective labour

Adding the external effect to equation (2), we derive,

$$Y_t = AK_t^\alpha L_t^\beta ha_t^\gamma U^\lambda \quad (3)$$

Where,  $ha$  is workers' mean year of schooling or human capital,  $U$  = human capital gained from learning-by-doing. Difficulty in measuring U especially to represent the whole economy, it is commonly substituted by previous year output level,  $Y_{t-1}$  and equation (3) is written as,

$$Y_t = AK_t^\alpha L_t^\beta ha_t^\gamma Y_{t-1}^\lambda \quad (4)$$

The concept of effective labour in equation (2) can also be measured by level of education as follows (Corvers 1997):

$$Y_t = A_t K_t^\alpha (L_t^*)^\beta \quad (5)$$

Where,

$$L_t^* = L_t L_{t1}^{01} L_{t2}^{02} L_{t3}^{03} \quad \text{is effective labour} \quad (6)$$

Substituting equation (6) into equation (5), we derive,

$$Y_t = A_t K_t^\alpha (L_t L_{t1}^{01} L_{t2}^{02} L_{t3}^{03})^\beta \quad (7)$$

Where Y is real output; K is the physical capital stock; L is labour input;  $L_i^\theta$  is number of employees with levels of education i.e. 1=primary level, 2=secondary level, 3= tertiary level;  $\theta_i$  is share of labor at different levels of education; A is an exogenous knowledge and technological factor;  $\alpha$  and  $\beta$  are the capital and labour shares respectively.

In order to derive labour productivity equation, we divide both sides of equation (7) by  $L_t$ ,

$$Y_t/L_t = [A_t K_t^\alpha (L_t L_{t1}^{\theta_1} L_{t2}^{\theta_2} L_{t3}^{\theta_3})^\beta] / L_t \quad (8)$$

$$Y_t/L_t = A_t (K_t/L_t)^\alpha L_t^{\alpha+\beta-1} L_{t1}^{\beta\theta_1} L_{t2}^{\beta\theta_2} L_{t3}^{\beta\theta_3} \quad (9)$$

In the estimation, other variables like firm' characteristics and employer' characteristics can be added into the equation.

## Estimation Model

Based on equation (7) and (9), the estimation models to meeting the objectives of this paper are as follows;

$$\ln Y_i = \beta_{10} + \beta_{11} \ln K_i + \beta_{12} \ln L_i + \beta_{13} \ln L_{2i} + \beta_{14} \ln L_{3i} + \beta_{15} \ln THRDF_i + \beta_{16} ICT_i + \beta_{16} ICT_i + \beta_{17} \ln TEXP_i + \beta_{18} \ln FA_i + \beta_{19} OW_i + \mu_i \quad (10)$$

$$\ln\left(\frac{Y}{L}\right)_{ii} = \beta_{20} + \beta_{21} \ln\left(\frac{K}{L}\right)_i + \beta_{32} \ln L_{1i} + \beta_{43} \ln L_{2i} + \beta_{54} \ln L_{3i} + \beta_{15} \ln THRDF_i + \beta_{66} ICT_i + \beta_{66} ICT_i + \beta_{16} \ln TEXP_i + \beta_{78} \ln FA_i + \beta_{89} OW_i + \mu_{12} \quad (11)$$

Where,

Y = average value of sales

K = average value of capital stock

Y/L = average labour productivity

K/L = average capital-labour ratio

L=total number of employment

$L_1$  = average number of managerial, professional and executive workers

$L_2$ = average number of technical and supervisory workers

$L_3$ = average number of other workers like chefs, cleaners, clerks and general staff

THRDF =average number of worker attended HRDF training

TNHRDF=average number of workers attended non-HRDF training

ICT = dummy variable for sector, coded 1 if ICT, 0 otherwise

TEXP =average HRDF training expenses

FA = number of years of firm' establishment

OW = dummy variable for firm' ownership structure, coded 1 if Private Limited, 0 otherwise

ln=natural logarithm

i= firm's i

The analysis of the study is based on the data collected in 2009 through field survey using a structured questionnaire. The sample contains of 30 companies in selected services sub-sector of ICT and hotel. The survey was conducted in two main industrial areas in Malaysia, namely, i) Klang Valley, Selangor and ii) Penang. The respondents were identified from the list provided by Human Resource Development limited (HRDL). They are among companies who have registered with HRDL and have sent their workers for training under HRDL training scheme. The three years information were captured from the questionnaire to cover 2006, 2007 and 2008. The average value or quantity of this information is used in the analysis.

## **4. Discussion and Findings**

### **Company's Profile**

There distribution of respondents by the ICT and hotels companies are almost equal. More than half of the respondents are females. The majority of the firms are owned by the Malays followed by the Chinese and the Indians and most of them are located in Klang Valley, Selangor. For the hotel sector the majority of them are subsidiaries companies, whereas all of the ICT companies are parent companies. Both sectors are dominated by Private Limited Companies and have utilised HRDF grant for workers' training (refer to Table 1).

Table 1. Company's profile

Variable	Sector		Total (%)
	Hotel (%)	ICT (%)	
<b>Owner Gender</b>	3 (21.4)	4 (25.0)	7 (23.3)
Males	11 (78.6)	12 (75.0)	23 (76.7)
Females	7 (50.0)	12 (75.0)	19 (63.3)
<b>Owner Ethnicity</b>			
Malays	5 (35.8)	4 (25.0)	9 (30.0)
Chinese	1 (7.1)	0	1 (3.3)
Indians	1 (7.1)	0	1 (3.3)
Others	11 (78.6)	16 (100)	27 (90.0)
<b>Location</b>			
Klang Valley, Selangor	3 (21.4)	0	3 (10.0)
Penang	14 (100)	16 (100)	30 (100)
<b>Companies' Status</b>			
Parent Companies			
Branch	2 (14.3)	13 (81.3)	15 (50.0)
Subsidiaries	2 (14.3)	0	2 (6.7)
Others	7 (50.0)	3 (18.7)	10 (33.3)
	3 (21.4)	0	3 (10.0)
<b>Ownership Structure</b>			
Private Limited Companies			
Public Limited Companies	13 (92.9)	14 (87.5)	27 (90.0)
Joint Venture	1 (7.1)	1 (6.3)	2 (6.7)
	0	1 (6.3)	1 (3.3)
<b>HRDF Grant Utilisation</b>			
Yes			
No	10 (71.4)	13 (81.3)	23 (76.7)
	4 (28.6)	3 (18.7)	7 (23.3)
	14 (100)	16 (100)	30 (100)

Source: Field Survey2009



Figure 1 presents types of computer services covered in the survey. The distribution of the firms is almost equal among the six sub- sectors, namely equipments, software, data processing, database, computer maintenance and repair and other activities

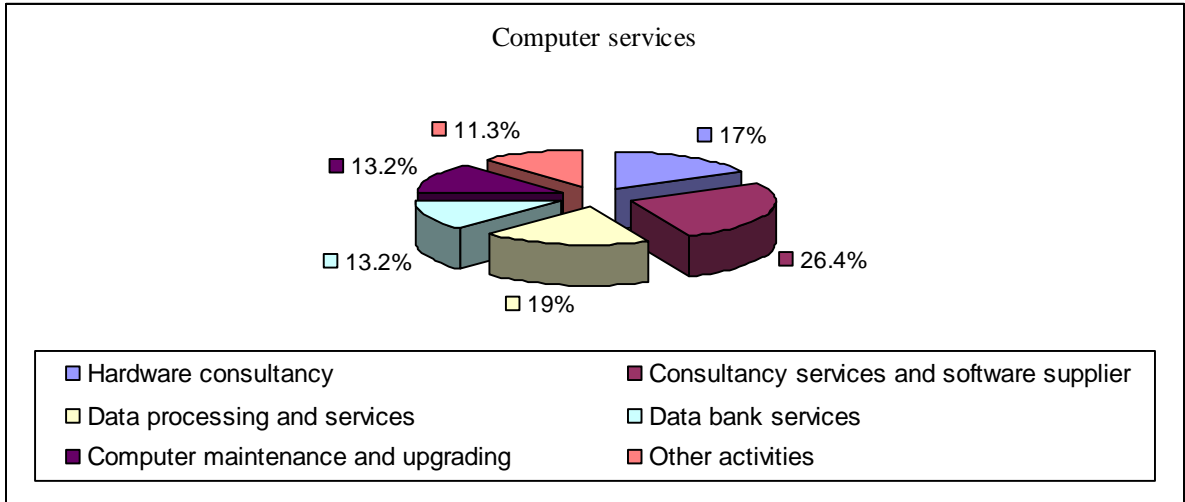


Figure 1. Computer sub sector

Source: Field Survey 2009

Figure 2 shows that 85.7% of the companies in the hotel sector are involved in hotel service, while the remaining 7.2% and 7.1% respectively are involved in the budget hotel and apartments.

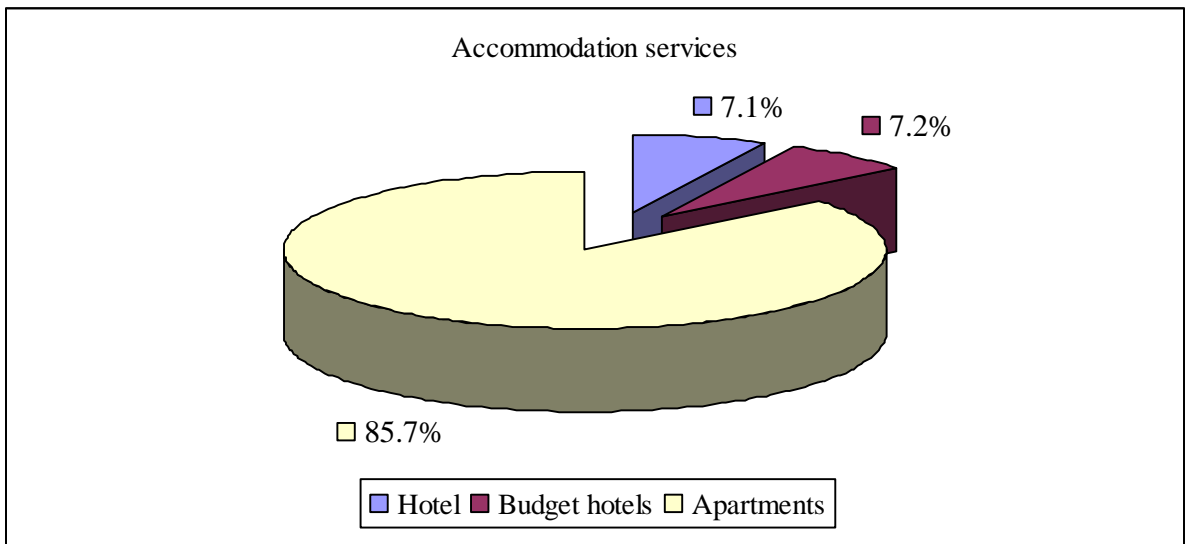


Figure 2: Hotel subsector

Source: Field Survey 2009

## Workers' and Training Information

The total number of workers who attended training in both sectors is 977 of which 174 are from the ICT sector and 803 from the hotel sector. This reflects better awareness among the employers in the hotel sector of the importance of workers' training. Workers who are involved in training come from all level of job categories like managerial, professional and executives, technical and supervisory workers, clerical and general workers. For both sectors, an involvement in training is more prevalent among workers at the higher rank job categories. In addition, the HRDF training is more popular than the non-HRDF training scheme. This implies that employers are more likely to use HRDF grant in training their workers.

Table 2. Number of workers attended training by job category

Type of job	Number of Workers			
	ICT		Hotel	
	HRDF	NHRDF	HRDF	NHRDF
Managerial, professional and executive	59	48	158	10
Technical and supervisor	46	12	209	10
Clerical and others	7	2	228	37
General workers	0	0	132	19
Total	112	62	727	76

Source: Field Survey 2009

Table 3 shows average training expenditure of the companies in the past three years. The majority of the companies spend less than RM 20000 a year on training. The percentage of the companies that spend on workers' training on a bigger scale is higher under HRDF training scheme as compared to the non-HRDF training scheme. This again reflects the higher level of HRDF grant utilization by employers in training their workers to take advantage of their monthly levy commitment. Even though employers pay levy for workers' training they do not rely wholesomely on HRDF training scheme because of their needs for other kinds of training, which are not been offered under the scheme. This is evident by non-HRDF training attended by some workers.

Table 3: Average expenditure on training

Range of Training Expenditure (RM)	HRDF (%)	Non-HRDF (%)
> 5000	10.0	7.0
50001 – 10 000	8.0	8.0
10 001 – 15 000	7.0	5.0
15 001 – 20 000	17.0	4.0
> 20 001	18.0	14.0

Source: Field Survey 2009

Table 4 presents the estimation results of the output and labour productivity models. In both models there is only one variable that significantly affect output or labour productivity. For the output model, capital stock is the only statistically significant variable in explaining the output. The output-capital elasticity is 0.939, which explains that a 1% increase in capital stock will increase output by 0.939%. For the labour productivity model, the elasticity of the productivity- capital-labour ratio is 0.932, which explains that a 1% increase in the capital-labour ratio will increase labour productivity by 0.932%. Both coefficients are significant at 1% significance level. The insignificant of the training variables like THRDF, TNHRDF and TEXP reflects that workers' training and firms' training expenditure do not contribute significantly to either firms' output or labour productivity. This reflects an ineffectiveness of the training schemes. The result strongly shows that capital stock is the most important variable for the companies to grow and to raise their labour productivity.

Table 4. Estimation results of output and labour productivity model

Variable	Output (t-value)	Labour Productivity (t-value)
Intercept	4.402 (1.345)	3.279 (1.356)
Capital	0.965 <sup>***</sup> (7.072)	- 0.952 <sup>***</sup> (7.363)
Capital-labour ratio		
<b>Job Category</b>		
Managerial, professional and executive (L1)	-1.117 (-0.973)	-0.858 (-1.012)
Technical and supervisory (L2)	0.717 (0.642)	0.601 (0.728)
Others (L3)	0.457 (0.435)	0.279 (0.365)
THRDF	0.292 (0.232)	0.256 (0.278)
TNHRDF	0.358 (0.494)	0.226 (0.423)
ICT	2.067 (0.871)	1.799 (1.026)
TEXP	-0.074 (-0.372)	-0.069 (-0.474)
FA	-0.169 (-0.161)	-0.084 (-0.109)
OW	-4.703 (-1.443)	-3.603 (-1.503)
R <sup>2</sup>	0.807	0.818
R <sup>2</sup> Adjusted	0.705	0.723
N	30	30

Note : Variable L is dropped from the estimation because of multicollinearity problem

<sup>\*\*\*</sup> Significant at 1% significance level

## 5. Conclusion

Human **capital** theory postulates that training can enhance firms' output and labour productivity through skills gained by workers. Workers who attended training will be more knowledgeable and creative in applying their knowledge. Therefore, firms must emphasize on the importance of training through providing training facilities within the firms or send their workers to get outside training. The establishment of HRDF under HRDL is one of the kinds to stimulate workers

training by forcing companies to contribute to HRDF and use the grant afterwards. This model aims at enhancing workers training in view of the lacking emphasis given by the employers on workers training.

However, the analysis in this paper shows that training variable either in terms of number of workers who attended training or amount of expenditure allocated for training is not a significant determinant of companies' output or labour productivity. This finding reflects the ineffective training scheme in Malaysia. But output and labour productivity is highly determined by the capital stock and capital-labour ratio. These findings bears some policy implications.

The results from this analysis suggest that training scheme should be redesigned to suit with the companies' needs. In-house training may be better than outside training because it can be tailored to the companies' requirements. One of the complaints we receive from the employers is the restriction made by the HRDL on grant facilities in terms of training program. The HRDF must allow the companies to design their own training program using grant contributed to HRDF. Therefore, the HRDL cannot put a limitation on the employers only to training scheme under HRDL when disbursing its grants.

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