

DETERMINANTS OF TRAINING AND THE IMPACT OF TRAINING ON COMPANY PERFORMANCE: EVIDENCE FROM MSC MALAYSIA STATUS COMPANIES

Izyani Zulkifli*

Jarita Duasa**

March 3, 2008

Abstract

Using data from an online survey, this study attempts to (1) compare the quantity and quality of training between local and foreign MSC Malaysia status companies, (2) analyze the factors that affect the occurrence and magnitude of training for these companies as a whole, and (3) examine the impact of training on company performance level. The study finds that foreign MSC Malaysia status companies train significantly more and provide better quality training than their local counterparts. Training occurrence is higher among MSC Malaysia status companies that employ more full-time KWs and those that recruit KWs from diverse background. The magnitude of training provided, however, is largely determined by the companies' previous profitability, worker turnover, number of graduates employed, competition from imports, undertaking of training grants and recruitment of KWs with experience in similar fields. Results also show that the number of KWs trained has a more significant effect on company performance than how much is invested in training.

JEL Classification: J24

Keywords: Training, human capital investment, MSC-status companies, logistic regression

1. INTRODUCTION

Training is an important part of a company's human capital development. Firms undertake training to improve the performance of their workers (Black and Lynch, 1996; Acton and Golden, 2003; Bartel, 1995; Veum, 1995) and to expand the knowledge base of their company (Barry et al., 2004). According to the human capital theory, training is an investment that enhances the future productivity of workers. Thus, the likelihood of employers providing training for their workers would depend on the relative costs and benefits of undertaking such investment (Stevens, 1994). In doing so, companies need to evaluate the factors that influence their training decision. These factors or 'determinants' of training, however, are not always well defined despite being widely discussed in literature (Smith and Hayton, 1999). This is perhaps due to the fact that most studies on training often rely on ad-hoc surveys or case studies in their data collection (Ericson, 2005), hence, the findings often hinge on the

* PhD Candidate, School of Economics, The University of Nottingham, UK (email: lexiz@nottingham.ac.uk)

** Associate Professor, Department of Economics, International Islamic University Malaysia (email: jarita@iiu.edu.my)

information collected from the sample or companies in question. Nonetheless, the human capital theory provides guidance on the choice of these predictors (Booth, 1991) and reviews on empirical studies conducted over the last two decades (Brown, 1989; Tan and Batra, 1996; Bishop, 1996 and Ericson, 2005) have also identified a range of ‘common’ factors used to estimate the occurrence and magnitude of training provision by companies.¹

Notwithstanding the general or specific nature of training, a company’s decision to train is largely influenced by the *nature of the company or sector it is involved in* and the *characteristics of the workers employed*. Past studies have generally found that training is more likely to be provided when the company is larger in size; profitable; innovative; technology or R&D-driven; faces high competition; has low worker turnover; export-oriented; has foreign ownership; has a training policy; has a strong internal labour market and receives training grants. As for the characteristics of the worker, a company would generally train more male workers; the younger workers; the more educated; those who work full-time and those with more working experience. These findings were obtained mainly from studies on manufacturing companies and vocational training in other countries. In Malaysia, studies on training as human capital investment are very limited. Apart from the Malaysian Industrial Training and Productivity study (MITP, 1997), none to the best of knowledge, has provided a comprehensive insight on training among local manufacturing companies.² The lack of such studies on MSC Malaysia status (henceforth MSC-status) companies is even more profound given that information on training for individual companies is neither available nor accessible to the public.³

To fill this lacuna in literature, an online survey was conducted on the MSC-status companies to investigate their human capital development, by comparing the training provision between local and foreign MSC-status companies, exploring the determinants of training and examining the association between training and companies performance level. The organization of this paper is as follows. Section 2 provides a brief background of the study. This is followed by a description of the data and empirical analyses (Section 3). Section 4 discusses the findings and Section 5 concludes.

2. BACKGROUND OF MSC MALAYSIA

The MSC Malaysia is a government initiative designed to help Malaysia become an information- and knowledge economy by the year 2020 (MDeC, 2007). This multi-billion dollar mega project spans over twenty years and its implementation is divided into three

¹ Most studies on the determinants of company-level training are either focused on training provision and/or training participation. Data on training provision is obtained from the employers, whereas the latter are obtained from the employees. For the purpose of this study, the ‘determinants’ of interest are those of training provision.

² The MITP survey (1997) was a joint project between the World Bank, the UNDP and the Malaysian EPU. It was fielded to 2,200 manufacturing firms during 1994-1995 and documents the incidence and characteristics of training in Malaysia and also investigates the links between training and firm-level productivity.

³ The only existing information on these companies are those contained in the annual Impact Surveys by MDeC, which outline the economic and technological contributions of MSC Malaysia to the country. Despite that, no analysis was undertaken on the companies’ training initiatives and detailed information on individual companies are still unavailable, thus, researchers must conduct independent surveys to obtain such information.

phases. In Phase 1 (1996-2003), efforts were made to attract world-class companies to set up their operations in MSC Malaysia in addition to the launch of seven flagship applications and the establishment of two new cities – Putrajaya, the new federal administrative centre and Cyberjaya, an intelligent city that houses ICT industries and research centres. To facilitate the development and promotion of MSC Malaysia in the future, the Multimedia Development Corporation (MDeC) was established to shape specific laws and policies for MSC Malaysia as well as to work closely with companies that want to set up their operations there (MDeC, 2007). In the current phase (2004-2010), known as the ‘Next Leap’, a web of similar corridors is being established throughout Malaysia. This national rollout comprises Cybercities status being awarded to Penang Cybercity 1 (PCC1) and Kulim Hi-Tech Park in Kedah and Cybercentre status awarded to KL Sentral, Perak, Melaka, Pahang, Johor and Negeri Sembilan.⁴ By the end of Phase 3 in year 2020, it is expected that the MSC Malaysia will be extended to the whole country, marking the nation’s transformation to a Knowledge-based economy and society, as envisaged in the Vision 2020.

In this study, the subjects of interest are companies that operate in MSC Malaysia, known as the MSC-status companies.⁵ These are local and foreign firms that rely heavily on multimedia and high-end technology to produce or enhance their products and services, and for process development (MDeC, 2007).⁶ To qualify for the status, companies must meet several eligibility criteria, among which is to employ a new class of employees known as ‘knowledge workers’ (KWs). In the Malaysian context, KWs are individuals who hold either an degree from an institute of higher learning (any field), OR a diploma in multimedia/ICT or specialized ICT certification plus at least two years’ of relevant experience in multimedia/ICT or in a field that is a heavy user of ICT, OR a professional, executive, management and technical, work categories in IT-enabled services (MDeC, 2007). Companies with MSC-status enjoy numerous benefits in the form of world-class Cybercities and Cybercentres, cutting-edge communications infostructure and cyberlaws protection (for more details, see <http://www.msomalaysia.my>).

3. DATA AND METHODS

Basically, data used in this study were drawn from an online survey of MSC-status companies.⁷ From the directory available at the MSC Malaysia website, a total of 1560

⁴ A Cybercity is defined as a self-contained intelligent city with world-class business and living environment offering the 10-point MSC Malaysia Bill of Guarantees (BoGs), whereas a Cybercentre is a building or complex with basic enabling environment offering partial BoGs

⁵ Currently, this status is awarded to three types of business entities – companies, incubators and institutes of higher learning (IHLs), each with different application criteria and guidelines.

⁶ Activities that are not eligible for MSC-status are manufacturing (activity referring to the production of goods and services in large quantities, usually undertaken in a factory environment) and trading (activity of buying and selling especially off-the-shelf hardware and software) (MDeC, 2007).

⁷ The survey was conducted as part of the researcher’s doctorate programme with some funds acquired from the University of Nottingham and IIUM. Surveys on both the companies and KWs were conducted online and face-to-face, but for the purpose of this paper, only the company survey was utilised.

companies were identified as the working population.⁸ Of this, ninety one MSC-status companies were targeted for the survey and selection was made using a stratified random sampling to ensure representation from both local and foreign ownerships as well as the six sub-sectors or technological clusters in MSC Malaysia.⁹

Prior to contacting the companies, support letters from the University and the Ministry of Science, Technology and Innovation (MOSTI) were obtained as proof of research authenticity, should they be required. The HR or Training Managers of the targeted MSC-status companies were then informed of the researcher's intentions and those who agreed to peruse the questionnaire were emailed a 'survey pack', which includes (1) a cover letter stating the purpose of the survey in more detail, (2) support letters, (3) a document version of the survey, and (4) a link to the Web-based survey. Companies that declined participation were replaced by another company from the same strata. Eventually, as increasing number of MSC-status companies that were *not* in the original sample list were contacted; the sample survey became a census. But due to non-response, the use of the census still does not guarantee that information was collected about all members of the population (Rodeghier, 1996), thus, the data constitute only a sample of the population and generalizations still had to be made back to the full population.

A total of 100 MSC-status companies responded to the survey, of which 93 percent of the companies fulfilled the specified strata. Although this number represents only a 6 percent response rate of the census, it meets the required sample size and is adequate for analysis. Table 1 reports the breakdown of the respondents.

Table 1. The MSC-status companies by ownership and sub-sector

Sub-sector	Local companies	Foreign companies ¹	Total companies
Creative multimedia	12	5	17
Software development	37	13	50
Support services	5	5	10
Hardware design	3	4	7
Internet-based business	9	1	10
Shared services & outsourcing (SSO)	3	3	6
Total	69	31	100

Note: ¹ There are in fact three entities of MSC-status companies but for the purpose of analysis, joint ventures and foreign-owned companies are pooled together and known collectively as 'foreign companies', as there are insufficient companies to enable analysis if they were taken separately.

As mentioned, three analyses were conducted. The first compares the quantity and quality of training between local and foreign MSC-status companies. Training in this study

⁸ During the fieldwork period (ending October 2008), a total of 1878 MSC-status companies were officially registered but not all of these companies were contactable as they may have discontinued business due to poor performance. As advised by MDeC, only 'active MSC-status companies' were included in the sampling frame. In addition, due to time and financial constraints, the survey excludes Institutes of Higher Learning (IHL), Incubators and companies located outside of the Klang Valley.

⁹ The sample size was calculated based on the formula for small population size (Rea and Parker, 1997) assuming a 95 percent confidence level and an acceptable margin of error of 10 percent. The six sub-sectors can be viewed in Table 1.

refers to both formal and informal training provided internally and externally by the company. Such a broad definition of training was adopted for flexibility given that no similar study has been conducted on the MSC-status companies in the past. Nine training measures consisting of both continuous and categorical data were used (see Table 2 for details). For the former, the Kolmogorov-Smirnov and Shapiro-Wilk normality tests were initially conducted as further statistical tests would depend on whether or not the data are normally distributed. Both tests basically compare the scores of the sample data to a set of normally distributed scores that have the same mean and standard deviation. If the test is non-significant, it indicates that the scores in the sample data do not significantly differ from a normal distribution. Otherwise, if the test is significant, the sample data is not normally distributed. Results in Table 3 show that all but two variables have normal distributions for both local and foreign company ownerships. For these data, an independent sample t-test was conducted to compare their means for local and foreign companies. The non-normal continuous variables, on the other hand, were analysed using the Mann-Whitney U test as it is more suitable for higher-level data and for two independent groups within the same sample. This non-parametric test is equivalent to the Independent t-test and looks at the differences in the ranked position of the scores between two conditions when different groups were used in each condition.

For the remaining categorical training measures, a chi-squared test was conducted to check whether ownership has any significant association with a company's quality of training provision. Prior to this test, the variables were cross-tabulated against company ownership to ensure that each cell does not fall below five expected counts since variables with too few observations might invalidate the chi-square test result.

Table 2. Summary of the quantitative and qualitative training indicators

Variable		Measure	Explanation	Nature of variable
Quantity Indicators	Training (in days)	The (natural) log of training days provided	More training days indicate more quantity of training provided	Continuous
	Share of KWs trained	Percentage of KW trained in the last 12 months	Higher number or proportion of KWs trained indicates that more training is offered	Continuous
	Intensity of training	Taking the log of [the number of days of training provided x by the number of KWs trained]	Higher intensity of raining indicates more training being provided to KWs	Continuous
Quality Indicators	Training policy	1 if there exists a formal training policy, 0 otherwise	Companies with a formal training policy will most likely meet their training objectives and ensure quality of their training	Categorical
	Informal training	1 if informal training is considered important, 0 otherwise	Informal and induction training further enhance the quality of training to KW	Categorical
	Induction training	1 if induction training is given, 0 otherwise		Categorical
	Training evaluation measure	1 if the company adopts a multidimensional training evaluation measure, 0 otherwise	Companies with many evaluation measures care more about the effectiveness and quality of their training	Categorical

Training expenditure (in RM'000)	The (natural) log of training expenditures	More training expenses indicate better quality training (assuming no waste and companies are efficient)	Continuous
Trainer's experience (in years)	The (natural) log of the trainers' years of experience	More experienced trainers indicate better quality training	Continuous

Table 3. Tests of Normality

Ownership of the MSC-status companies		Kolmogorov-Smirnov ^a			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Training (in days)	FO	.220	8	.200*	.931	8	.521
	LO	.116	31	.200*	.968	31	.477
Share of KW trained	FO	.223	8	.200*	.881	8	.193
	LO	.190	31	.006	.907	31	.011
Training intensity	FO	.188	8	.200*	.894	8	.257
	LO	.086	31	.200*	.981	31	.835
Training expenditure (in RM'000)	FO	.132	8	.200*	.940	8	.614
	LO	.113	31	.200*	.963	31	.344
Trainers' experience (in years)	FO	.319	8	.016	.828	8	.057
	LO	.255	31	.000	.889	31	.004

*. This is a lower bound of the true significance.

a. Lilliefors Significance Correction

Next, regression analyses were carried out to examine the factors that affect whether or not training is provided and the extent of the training.¹⁰ For this purpose, two dependent variables were used, namely training occurrence and training magnitude. The first is a binary variable that takes the value one if the company provided training in the last twelve months and zero otherwise. The second dependent variable is continuous and represents the (natural) log of the number of KWs trained in the previous year. The exploratory variables were chosen based on theoretical justifications and their relevance to the MSC Malaysia situation:

Technology and R&D – a positive connection between technology and R&D on training provision have been confirmed by many studies (Lillard and Tan, 1986; Mincer, 1989; Bartel, 1989; Bartel and Sicherman, 1998; Alba-Ramirez, 1994). In fact, Barry et al. (2004) have found that R&D-oriented companies will also spend more on training, suggesting that R&D and training are complements for the firms in their sample.

Worker turnover – the findings on the link between turnover and training investment by companies have been mixed. One view is that turnover affects training positively as companies with high turnover will invest in more training to replace the skills and competencies of outgoing personnel and/or to increase employment loyalty in the future

¹⁰ Following literature, this study distinguishes between the occurrence of training and the magnitude of training as the factors that affect the decision to train workers (occurrence of training) are not necessarily the same with the factors that determine the amount of training provided to the worker (magnitude of training) (Hansson, 2007; Orrje, 2000).

(Turcotte et al, 2003). Another view is that a high turnover rate may act as a deterrent to investment in human capital since, following the human capital theory, employers are faced with the risk of not being able to recoup their (general) training investment in the event that their trained personnel leave (Hansson, 2007; Frazis et al., 1998; Baldwin and Johnson, 1995).

Employment status – compared to full-time workers, part-timers receive less formal training. Working on a part-time basis has a significant negative impact on the incidence (Orrje, 2000) and intensity of training (Frazis et al., 1998). A possible reason is that part-timers have a shorter working time thus reduces the company's incentives to invest on them. Contract workers were also found to have a positive association with greater training expenditures (Frazis et al., 1998; Alba-Ramirez, 1994), suggesting that a worker is better off working on a contractual basis rather than work permanently but on a part-time basis.

Education level – majority of studies have found that the more educated the worker, the more formal training they will receive (Mincer, 1989; Lillard and Tan, 1986; Bishop, 1985; Oryshchenko, 2006; Black and Lynch, 1998). Green (1993) finds that workers with higher qualifications are more likely to receive training as they would benefit more from the training or because the psychic costs may be lower. Education and training are also complementary as more educated workers have greater aptitude and willingness to be trained than a less educated worker (Spence, 1974). In addition, educated workers have the comparative advantage in jobs that require a large amount of knowledge and provide many opportunities for training (Altonji and Spletzer, 1991). But there are those who disagree with these findings. Sicherman (1990) and Hersch (1991) both argued that overeducated individuals receive less OJT compared to individuals with less education because the former are less willing to learn, which increases the (marginal) costs of training, thereby leading to lower training incidence.

Training policy – companies that have a written training policy or an induction programme for newly hired workers are more likely to provide training for their employees. Sutherland (2004) found that companies with induction programmes increase the likelihood of their workers to receive training. Nonetheless, training policies do not necessarily have any association with the magnitude or how much training is provided to workers (Hansson, 2007).

Internal labour market – this refers to the act of promoting workers from within the organization rather than from outside the organization. These internal promotions cause companies to provide lesser training (Hansson, 2007). This differs from Bartel (1989) who finds that a strong internal labour market provides a more conducive environment for training. Additionally, Forrier and Luc Sels (2003) established no connection between training investment and the strength of the internal labour market, stating that in their regression analyses, the strength of the internal labour market has no influence on the level of training investment.

Performance – performance level is often measured by firm's prior profitability and it is commonly found to positively affect its decision to train (Aragon-Sanchez et al., 2003; Oryshchenko, 2006) as well as the proportion of employees being trained (Hansson, 2007). A possible reason is that unprofitable companies might cut back on expenses by reducing their training expenditures.

Competition – Most studies agree that any form of competition will drive companies to improve their human capital. Yadapadithaya (2001) for instance, found that worldwide

competition pushes companies to invest in training, as they must adapt their business strategies to take into account of the new realities of global and domestic competition. Competition from imports or external markets is equally important. Oryshchenko (2006) found that competition from imports affects training provision for managers and professionals although the magnitude is rather low. This contradicts the findings of Turcotte et al. (2003) who do not find competition to have a significant effect on the decision to train, except for companies with a small number of competitors.

Job tenure and work experience – when switching careers, job tenure is one of the important factors being considered by a potential employer. Someone who stays in the same job for too long may signal that he has either never received a promotion or was content with the status quos. On the other hand, a person who changes jobs frequently implies that he is non-committal or unstable (Miertschin, 2004). Empirical findings have shown mixed results regarding the relationship between tenure and the likelihood of training. Harris (1999) found that job tenure has a strong positive relationship with the probability of receiving training whereas Bishop (1997) found a significant negative impact. With regards to the type of training, Frazis et al. (1998) identified that job tenure only has a significant effect on informal training. The OECD views tenure as a continuing spell of employment (OECD, 2001), hence, it can be said that tenure is part of one's total working experience. Since workers may have experience prior to joining their current employers, this factor may also be considered for the provision of training. Barron et al. (1987) have shown a negative impact of work life experience on training provision but in a different study, a positive impact was established (Barron et al., 1997).

Training grant – Barry et al. (2004) did not find any robust evidence that training grants improve training activity in Irish manufacturing industries. This is in contrast to the findings in the U.S by Holzer et al. (1993) where companies that receive training grants substantially increase the amount of training investment in terms of the number of hours provided. Their reason was that grants reduce the costs of training to companies. Likewise, a study by Simpson (1984) also found that government training assistance has a positive significant effect on training provision i.e. it increases specific training by three months on average but has an insignificant negative effect on general training.

A logistic regression model was used to analyze the determinants of training occurrence, whereas a multiple OLS regression model was developed to evaluate the factors that influence the magnitude of training provided.¹¹ Unlike the OLS, however, logistic regression uses the maximum likelihood estimation (MLE) to derive parameters; hence, the MLE relies on a larger sample size as too few cases in relation to the number of variables may not be possible to converge on a solution. Also, adequate sampling size is important to enable the goodness-of-fit measures to work properly. As a rule of thumb, Peduzzi et. al (1996) recommend that the smaller of the classes of the dependent variable should have at least ten events per parameter in the model. Due to these restrictions, not many of the predictors were utilized in the logistic regression despite strong theoretical underpinnings.

¹¹ For the OLS regression, both the White's and the Breusch-Pagan (with Koenker's correction for small sample size) tests for heteroscedasticity were used and failed to reject the null hypothesis of homoscedasticity.

The third and final analysis investigates the relationship between training investments with the company's performance level. Using a logistic regression model, the performance measure used as the dependent variable was whether or not the company had made profits in the year that it invested on training. This was preferred over other productivity measures because profits are net of the investment costs of training. Although no causality links between the variables are portrayed, the objective of the analysis is not to test cause-effect relationships but to assess the significance and intensity of relationships between those variables. The variables used in all the models are described in Table 4.

Table 4. Summary of all variables used in the regression models

Variable	Measurement
Dependent variables	
Training occurrence	1 if training is provided to KWs in the last 12 months, 0 otherwise
Training magnitude	The (natural) log of the number of KW trained in the last 12 months
Profit	1 if profits are made in 2007, 0 otherwise
Independent Variables	
R&D expenditures	The (natural) log of total expenditures on R&D
Worker turnover	The (natural) log of annual worker turnover
Full-time KW	The (natural) log of total number of full-time KWs
Graduates	The (natural) log of total number of graduate workers
Training policy	1 if there exists a formal training policy, 0 otherwise
Internal labour market	1 if the company has a strong internal labour market, 0 otherwise
Profits	1 if profits are made in 2006, 0 otherwise
Foreign ownership	1 if there exists foreign ownership in the company, 0 otherwise
Competition	1 if there exists competition from foreign (overseas) companies, 0 otherwise
Same experience	1 if experience in the same field is regarded as important, 0 otherwise
Different experience	1 if experience in a different field is regarded as important, 0 otherwise
HRDF ¹	1 if the company took HRDF grant in the last 12 months, 0 otherwise
Own technology	1 if the company uses own technology, 0 otherwise
Training expenditure	The (natural) log of total training expenditure

Note: ¹The Human Resource Development Fund (HRDF) is a training levy-reimbursement scheme, where eligible companies may claim a portion of allowable training expenditures

4. FINDINGS

4.1. Local versus Foreign Company Training in MSC Malaysia

In comparing the quantity of training provided, the results of the Levene's Test (Table 5) reveal that the variances for local and foreign ownerships are equal (when $p > .005$) for all the quantitative training indicators, in which case the top line will be referred to when analyzing the t-test result. None of the findings are significant so the null hypothesis that the two group means are equal cannot be rejected. In other words, no significant difference is found between the number of training days and the amount of training intensity offered to KWs between local and foreign MSC-status companies. However, foreign companies do train proportionately more KWs, as shown by the Mann-Whitney test (Table 6). Hence, there is evidence to suggest that foreign MSC-status companies provide more training than their local

counterparts. This result conforms to the findings of several other studies (Sousa, 2001; Oryshchenko, 2006; Tan and Batra, 1996).

As for the quality of training, four of the measures used are categorical and the result of the chi-squared test is not significant. Likewise, the result of the independent t-test on training expenditures also proves insignificant. In other words, both local and foreign MSC-status companies have a formal policy to guide their training provision; place similar importance on informal training; provide induction training for their KWs; adopt a multi-dimensional measure to evaluate their training investment and incur more or less the same training expenditures in 2007. However, result from the Mann-Whitney test (Table 6) has shown that since the absolute Z scores for the trainers' experience is more than 1.96 and the corresponding $p < .05$, there is evidence to suggest that foreign companies do offer better quality training to their KWs as their internal trainers have more years of experience.

Table 5. Independent sample T-test for local and foreign MSC-status Companies

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Training (in days)	Equal variances assumed	2.663	.107	.789	67	.433	.22967	.29115
	Equal variances not assumed			.926	51.820	.359	.22967	.24798
Training expenditure	Equal variances assumed	.784	.379	-.879	66	.383	-.34505	.39270
	Equal variances not assumed			-.788	26.960	.438	-.34505	.43794
Training intensity	Equal variances assumed	1.575	.214	.562	60	.576	.25544	.45461
	Equal variances not assumed			.524	29.590	.604	.25544	.48781

Table 6. Mann-Whitney test statistics for local and foreign MSC-status companies

	Percentage of KW trained in the last 12 months	Trainer's year of experience (in natural log)
Mann-Whitney U	369.000	266.500
Wilcoxon W	1594.000	2036.500
Z ^b	-2.117	-3.289
Asymp. Sig. (2-tailed)	.034	.001

a. Grouping variable: Ownership of the MSC-status company, ^b As a sample becomes larger, the distribution of U approaches the normal curve and U is interpreted using the Z statistic. Absolute Z scores of less than 1.96 indicate that the two samples come from the same underlying distribution at the 5 percent significance level.

4.2. Determinants of Training

The above analysis provides preliminary evidence that foreign-owned MSC-status companies are “better” at investing in their KW’s human capital. However, neither correlation nor regression results for the current sample shows that foreign ownership has any significant effect on the companies’ decision to train. Therefore a separate analysis for local and foreign companies is not warranted and the subsequent analyses are conducted on the MSC-status companies as a whole.¹² A binary logistic regression model enables the identification of factors that may influence the companies’ decision to provide training or not. In assessing the model’s goodness of fit, several robustness tests are adopted as there is no widely accepted measure that is analogous to the R^2 used in OLS. Both the chi-square test and its alternative, the Omnibus test, conclude that there is adequate fit of the data to the model, implying that at least one of the predictors is significantly related to the dependent variable. The likelihood ratio, which reflects the significance of the ‘unexplained’ variance in the dependent variable, also indicates that the model fits the data well. Additionally, all the pseudo R^2 , which measure the strength of association show a relatively good fit of the model. As for the multiple OLS model used to estimate the magnitude of company training, it too has a very good fit with the model predicting 71 percent of the variations in the dependent variable. The results of both the logistic and OLS regressions are presented in Table 7.

From the logistic regression, it can be seen that MSC-status companies that hire more full-time KWs are nine times more likely to provide training compared to companies that do not. In addition, companies that recruit KWs from diverse employment background increase their odds of providing training by six times compared to their counterparts that prefer only KWs with similar working experience. Both of these findings adhere to theory as companies are generally more inclined to train full-time workers than part-timers and workers that lack familiarity in their job scopes would certainly need to be trained. These factors are significant at the 1 percent and 10 percent levels, respectively.

As for the determinants of the magnitude of training provided, six factors were found to be significant, two of which contradict the expected findings. MSC-status companies that earned profits in the previous year and those faced with competition from imports train about 60 percent less KWs compared to their unprofitable rivals and companies that faced lesser degree of overseas competition. Such results could imply two things; firstly, profitable MSC-status companies may decide to focus on other aspects, such as, marketing and product improvement in order to sustain their profitability. Secondly, competition from imported goods and services may be dealt with better in the short-run by focusing on product and/or service improvements instead of investing on human capital. Both of these contradicting results are significant at the 1 percent level.

The other significant factors all have the expected signs. Although worker turnover has no impact on the occurrence of training, it is significantly and negatively associated with the amount of training provided. MSC-status companies with higher worker turnover train 35 percent less KWs than companies with lower worker turnover. Theoretically, it would not be beneficial for the former to offer more training as they would not be able to recoup their

¹² Splitting the sample into local and foreign ownerships does not yield a robust estimate, this perhaps due to the lack of sample size.

investment in the future when their workers leave. Likewise, companies that only employ KWs from similar fields train 45 percent fewer workers compared to companies that have no preference on their KWs' past experience. This is reasonable since workers coming from the same field would already be familiar with the job scope and need not be trained often.

Educated workers also contribute significantly to the companies' training magnitude. It is found that for every ten percent increase in the number of graduates employed, the number of KWs trained increase by nine percent.¹³ This follows the human capital theory in that more educated workers would generally be offered more training as they are believed to possess greater absorptive capacity. In addition, companies that undertake the HRDF training grant to subsidies training for their local workers are found to train 56 percent more KWs compared to companies that did not take the grant. All of these determinants are significant at the 1 percent level except for KWs with similar working experience, which is significant only at the 10 percent level.

Table 7. Parameter estimates for the logistic regression and OLS models

Variables	Logistic estimates		OLS estimates
	Training occurrence (Training provided in the last 12 months)		Training magnitude (The log of KW trained in the last 12 months)
	B	Exp(B)	B
Constant	-2.368 [4.702]	.094	.383 (.453)
Profit in 2006	-		-.637*** (-3.332)
R&D expenditures	-.089 [.369]	.915	.030 (.450)
Worker turnover	-.385 [.608]	.680	-.350*** (-2.963)
Graduates	-		.911*** (7.144)
Full-time KW	2.187*** [.752]	8.908	-
Competition from imports	-		-.636*** (-3.194)
Same experience	-		-.453* (-1.810)
Different experience	1.783* [1.059]	5.950	-
HRDF	-		.566*** (2.974)
Own technology	-1.247 [.942]	.287	-
Adjusted R ²	-		.713
F			15.582***
Cox & Snell R ²	.250		-
Nagelkerke R ²	.424		
McFadden R ²	.323		

¹³ In essence, all KWs are graduates following the definition of KWs in the Malaysian context.

Chi-square test ^a	3.578	-
Omnibus tests ^b	15.829***	-
-2 Log likelihood ^c	33.192	-

Note: t-ratios are in parentheses, standard errors of B are in square brackets, ***statistically significant at the 1% level; **significant at the 5% level; *significant at the 10% level; ^aThis test for overall fit of a logistic regression model (aka Hosmer and Lemeshow test) is most recommended for small sample size and when the model contains continuous covariates. A finding of non significance indicates that the model adequately fits the data.

^bAn alternative to the chi-square test, this checks if the model with the predictors is significantly different the model with only the constant. A finding of significance indicates that there is adequate fit of the data to the model. ^cThis is analogous to the use of sum of squared errors in OLS regression and reflects the significance of the unexplained variance in the dependent variable.

4.3. Training and company performance

In the final analysis, three models are estimated to evaluate the impact of training (measured by the number of KWs trained and training expenditure incurred) on the companies' performance level. The first model includes both the training measures, as well as prior profitability, internal labour market and worker turnover. The second and third models retain all the independent variables but kept only one of the training measures in each model. From the results in Table 8, it can be seen that all of the models have good overall fit, as shown by the chi-square and Omnibus tests, and that strong associations prevail between the explanatory variables as portrayed by both Cox and Snell R^2 and Nagelkerke R^2 .

For all three models, controlling for past profitability is important as it measures the net contribution of training to the company's current profits (Hansson, 2007). This factor is the most significant for all the models (significant at the 1 percent level), implying that past performance is a good indicator of current performance. It can be seen that training does have a positive and significant association with the likelihood of earning profits, as depicted by the number of KWs trained, which is significant at the 5 percent level. The coefficients for training expenditure, on the other hand, have mixed signs and not a significant factor.

A strong internal labour market is positively and significantly related to company performance only when the training measures are analyzed separately. This implies that MSC-status companies that practice internal promotions should *either* train more of its KWs *or* spend more on training expenditures instead of undertaking both types of training investments to benefit from promoting their KWs internally. As for worker turnover, as expected in theory, it is negatively associated with company performance in all three models but only significant in the presence of how many KWs were trained and not on how much was invested on training.

Table 8. Parameter estimates for training and company performance

Variables	Logistic estimates		
	Dependant variable: Profit		
	(1)	(2)	(3)
Constant	-.168 [.845]	-3.081 [.046]	-5.879 [.003]
KWs trained	2.255** [9.532]	1.502** [4.489]	-

Training expenditure	-.451 [.637]	-	.510 [1.666]
Profit in 2006	7.114*** [1229.135]	6.227*** [506.035]	4.701*** [110.003]
Internal labour market	1.897 [6.664]	2.203* [9.048]	2.115* [8.286]
Worker turnover	-1.579** [.206]	-1.463** [.232]	-.708 [.493]
Cox & Snell R ²	.511	.482	.440
Nagelkerke R ²	.749	.729	.652
Chi-square test	7.694	2.372	3.987
Omnibus tests	15.866***	15.505***	9.192**
-2 Log likelihood ^c	21.515	23.836	28.326

Source: SQ1

5. CONCLUSION

Training is a necessary human capital investment for companies to become more competitive and profitable. As training involves huge amounts of outlay for companies, there is a need to know what causes training to take place and by how much. Results from an online survey have shown that foreign MSC-status companies train significantly more and provide better quality training than their local counterparts. However, the existence of foreign ownership is not a significant factor that influences the companies' training decision for the current sample. Training occurrence is higher among MSC-status companies that employ more full-time KWs and those that recruit KWs from diverse background. In terms of training magnitude, MSC-status companies tend to train more of their KWs if they employ more graduate workers and undertake training grants. On the other hand, companies that made profits in the previous year train fewer KWs, as well as companies with high worker turnover, face competition from imports and recruit KWs with experience in similar fields. As for the impact of training on company performance, results show that the number of KWs trained has a more significant effect on company profits than how much is invested in training.

The findings in this study, albeit lacking in the number of respondents, give a good indication of human capital development among MSC-status companies. It is hoped that more studies can be conducted in this area, as MSC Malaysia is an important vehicle for Malaysia's transition to become a fully developed nation by the year 2020. Closer monitoring by the relevant authorities is needed to ensure that the MSC-status companies maintain a quality workforce to remain competitive and achieve the goals envisioned for MSC Malaysia.

REFERENCES

- Acton, T. & Golden, W. (2003). Training the knowledge worker: a descriptive study of training practices in Irish software companies, *Journal of European Industrial Training*, pp.137-146
- Alba-Ramirez, A. (1994). Formal training, temporary contracts, productivity and wages in Spain, *Oxford Bulletin of Economics and Statistics*, Vol.56 (2), pp.151-70

- Altonji, J.G. & Spletzer, J.R. (1991). Worker characteristics, job characteristics and receipt of on-the-job training, *Industrial and Labour Relations Review*, Vol.45 (1), pp.58-79
- Baldwin, J.R. & Johnson, J. (1995). Human capital development and innovation: the case of training in small and medium-sized firms, No. 74, Statistics Canada
- Barry et al. (2004). Multinationals and training: some evidence from Irish manufacturing industries, *Scottish Journal of Political Economy*, Vol.51 (1), pp.49-61
- Bartel, A.P. (1989). Formal employee training and their impacts on labour productivity: evidence from a human resources survey, Working Paper No. 3026, National Bureau of Economic Research, Cambridge, M.A
- Bartel, A.P. (1995). Training, wage growth and job performance: evidence from a company database, *Journal of Labour Economics*, Vol.13 (3), pp.401-25
- Bartel, A.P. & Sicherman, N. (1998). Technological change and the skill acquisition of young workers, *Journal of Labour Economics*, Vol.16 (4), pp.718-55
- Bishop, J.H. (1997). What we know about employer-provided training? A review of literature, CAHRS Working Paper Series 96-09. Retrieved from DigitalCommons website <http://digitalcommons.ilr.cornell.edu/cahrswp/180>
- Black, S.E. & Lynch, L.M. (1996). Human capital investments and productivity, *American Economic Review Papers and Proceedings*, Vol.86, pp.263-67
- Black, S.E. & Lynch, L.M. (1998). Beyond the incidence of employer-provided training, *Industrial and Labour Relations Review*, Vol.52 (1), pp.64-81
- Booth, A.L. (1991). Job-related formal training: who receives it and what is it worth?, *Oxford Bulletin of Economics & Statistics*, Vol.53, pp.281-94
- Brown, J.N (1989). Why do wages increase with tenure? On-the-job training and life-cycle wage growth observation within firms, *American Economic Review*, Vol.79 (5), pp.971-91
- Ericson, T. (2005). Personnel training: a theoretical and empirical review, IFAU Working Paper 2005:1, Institute for Labour market Policy Evaluation
- Frazis et al. (1998). Determinants of training: an analysis using both employer and employee characteristics, Working Paper, Bureau of Labour Statistics, Washington, DC
- Forrier, A. & Sels, L. (2003). Flexibility, turnover and training, *International Journal of Manpower*, Vol.24 (2), pp.148-68
- Green, F. (1993). The determinants of training of male and female employees in Britain, *Oxford Bulletin of Economics & Statistics*, Vol.55, pp.103-22
- Hansson, B. (2007). Company-based determinants of training and the impact on company performance: results from an international HRM survey, *Personnel Review*
- Harris, R. (1999). The determinants of work-related training in Britain in 1995 and the implication of employer size, *Applied Economics*, No.31, pp.451-63
- Hersch, J. (1991). Education match and job match, *The Review of Economics and Statistics*, pp.140-44
- Holzer et al. (1993). Are training subsidies for firms effective? The Michigan experience, *Industrial and Labour Relations Review*, Vol.46, pp.625-36
- Lillard, L.A. & Tan, H.W. (1986). Private sector training: who gets it and what are its effects, Rand monograph R-3331-DOL/RC
- Multimedia Development Corporation (MDeC), <http://www.mscomalaysia.my>

- Miertschin, B. (2004). The importance of job tenure, *CityStaff's Newsletter*, Vol.7 (1)
- World Bank. (1997). *Malaysia: Enterprise training, technology and productivity*, World Bank Country Study, The World Bank
- Mincer, J. (1989). Human capital response to technological change in the labour market, Working Paper No. 3207, National Bureau of Economic Research
- Orrje, H. (2000). The incidence of on-the-job training: an empirical study using Swedish data, SOFI Working Paper 2000-6, Swedish Institute for Social Research, Stockholm University, Sweden
- Oryshchenko, V. (2006). Does foreign ownership matter for enterprise training: empirical evidence from transition countries, *Research Monitor: The bi-annual newsletter of the Global Development Network*, pp.10-12
- Peduzzi et. al (1996). A simulation of the number of events per variable in logistic regression analysis. *Journal of Clinical Epidemiology*, Vol.99, pp.1373-79
- Rodeghier, M. (1996). Survey with confidence: a practical guide to survey research using SPSS, SPSS Inc
- Sicherman, N. (1990). The measurement of on-the-job training, *Journal of Economic and Social Measurement*, Vol.16, pp.221-30
- Simpson, W. (1984). An econometric analysis of industrial training in Canada, *The Journal of Human Resources*, pp.435-52
- Smith, A. & Hayton, G. (1999). What drives enterprise training? Evidence from Australia, *The International Journal of Human Resource Management*, Vol.10(2), pp.251-72
- Sousa, N. (2001). Multinationals and technology transfer through labour training, mimeo, University of Nottingham (presented at a CEPR Workshop on Labour Market Effects of European Foreign Investments, Dublin, July 2001)
- Spence, M. (1974). Job market signalling, *Quarterly Journal of Economics*, pp.355-74
- Stevens, M. (1994). A theoretical model of on-the-job training with imperfect competition, *Oxford Economic Papers*, Vol.46, pp.537-62
- Sutherland, J. (2004). The determinants of training, *Economic Issues*, Vol.9 (1), pp.23-39
- Tan and Batra, 1996; Enterprise Training in Developing Countries: Overview of Incidence, Determinants and Productivity Outcomes World Bank Working Paper
- Turcotte et al. (2003). New evidence on the determinants of training in Canadian business locations, Statistics Canada/ Human Resources Development Canada, 71-584-MIE No.5
- Veum, J.R. (1995). Training, wages and the human capital model, NLS report 96-31, Bureau of Labour Statistics
- Yadapadithaya, P.S. (2001). Evaluating corporate training and development: an Indian experience, *International Journal of Training and Development*, Vol.5 (4), pp.261-74