UNIVERSITI PUTRA MALAYSIA

FACTORS AFFECTING LABOUR PRODUCTIVITY, SKILLED LABOUR AND RETURN TO EDUCATION IN MALAYSIA

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FEP 2014 23

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Thesis Submitted to the School of Graduate Studies, Universiti Putra Malaysia, in Fulfilment of the Requirements for a Degree of Doctor of Philosophy

November 2014

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ABSTRACT

Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfilment of the requirement for a degree of Doctor of Philosophy

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November 2014

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Faculty: Economics and Management

The importance of human capital, research and development (R&D) and technology spillovers have been widely recognised by the Malaysian government as a potential engine to achieve a productivity driven economy. Given that the skill and knowledge become an important source to achieve higher productivity towards developed country, hence, Malaysia emphasises investment in human capital, R&D and the role of technology in their long and medium term plans. For the first objective, this study aims to delve deeper into the impact of investment in human capital and R&D in influencing labour productivity in 53 manufacturing industries during the period of 2000 to 2008. The present study employs the SYS-GMM technique to estimate the labour productivity function. The result finds that the cost of training sponsored by employers and educational attainment with degrees levels are positive and significant in influencing labour productivity in manufacturing industry. The result also shows that R&D investment is negatively correlated with labour productivity, but it is statistically significant in influencing labour productivity. The findings on the importance of investment in human capital and R&D provide recommendations for government to design financial incentives and favourable tax policies that encourage individuals and employers to invest in post-compulsory education and in-service training for all workers. Regarding the negative correlation between R&D investment and labour productivity, government is encouraged to enhance further the provision of public education on the development of science, technology and engineering skills to increase the absorptive capacity amongst local workers to adopt the new technology.

Malaysia has recognised that the process of skill upgrading and development of technology capacity can be integrated with foreign direct investment (FDI) and

trade, because both channels have their spillover effects that are embodied in terms of technology and knowledge. In spite of Malaysia is among the major FDI recipient countries of the South East Region, but the benefit of the FDI spillovers to skill upgrading remains ambiguous. Hence, the second objective in this study is to investigate the effect of technology spillovers via FDI and trade for skill upgrading and thus increase the relative demand for skilled labour in 50 Malaysian manufacturing industries during the period of 2000-2008. After controlling for endogeneity by using the SYS-GMM estimator, the results confirm that the technology spillovers via FDI is significant for skill upgrading and in turn leads to an increase in demand for skilled labour. Even though the FDI coefficient indicates a negative correlation between FDI and skilled labour demand, but the effect of technology spillovers via FDI as indicated by FDI^2 is statistically positive and significant . This gives an indication that the effect of technology spillovers via FDI appears to be assimilated quickly by the workers in the Malaysian manufacturing industry through "learning effect" and the fast pace is biased towards skilled workers. Nevertheless, this study finds no evidence of technology spillovers via trade in influencing the demand for skilled labour.The findings from this study can potentially contribute to the long-run FDI policy, especially to encourage FDI inflows into low receiving industries.

The Malaysian Government has also given recognition to the importance of individual to make investment in education. Education increases the productivity of workers by imparting useful knowledge and skills as well as a main determinant of individuals to increase their earning potential is timely. Higher earnings are closely associated with additional education that can be thought of as a rate of return on educational investment. In line with these facts, the third objective in this study attempts to investigate the return to education at different levels of the highest certificate achieved in six economic sectors under the National Key Economic Areas (NKEA) in 2002, 2004 and 2007. They are; financial sector, business services sector, education sector, wholesale and retail sector, electrical and electronics (E&E) sector and communications content and infrastructure (CCI) sector. This study employs the OLS estimator with robust standard error . The results from the estimation of earning function can be concluded as follows: First, this study finds that the average return to education is highest for workers with degree qualifications in the financial, education, wholesale (except in 2002), CCI and E&E sectors (except in 2007) throughout the sample period. This result indicates that the average return to education increases with the level of highest certificate, and there is a match between occupation and qualification. Secondly, the result finds that over-education occurs in financial and wholesale sectors despite the largest average return enjoyed by the degree holders compared to their counterpart. Average return to education for over-educated workers shows a somewhat increasing trend between 2002 and 2007; perhaps the over qualification that they possess enables them to perform better for lower-skilled job and thus contributes to increase the firm's productivity.

Thirdly, the result finds that the average return to education for workers with primary education comes as the highest average return for earners only in the E&E sector in 2007. The reasoning is deemed plausible when explaining the

highest average return to education for primary workers because the E&E sector's activities are more concentrated on the assembly line and test stages, which is the lower value-added part of the E&E sector. Lastly, the result shows a decline in the average return to education at the degree qualification level between 2002 and 2007 in the E&E and CCI sectors. The declining return in both sectors is due to the shortfall in the skills available among workers when adapting to the dynamic and evolving nature of the industry as well as the emerging new technology that changes over time. Consequently, the requirements for any new entrée into an industry might be upgraded and the workers who are already employed will appear to be under-skilled. Another reason for the declining return of workers with degree qualifications is due to the supply of workers with this qualification for medium-skilled occupation, which is now outstripping the supply of workers at high-skilled jobs; thus leaving the graduate workers to willingly undertake the non-graduate job. Such willingness, however, will drag down the average return for degree-educated workers because they might be dissatisfied with their current job, and this would lower the firm's productivity. The findings from this study may contribute to solving the problem of mismatch between the education qualification and the skill demand in a firm, as the number of students completing their study at all levels of qualification keeps increasing year by year. The overall findings in this study conclude that education, trained and skilled workforce, R&D investment and technology spillovers via FDI play a major role in enhancing labour's skills and knowledge, which in turn increases Malaysia's productivity and economy growth.

ABSTRAK

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk ijazah Doktor Falsafah

FAKTOR-FAKTOR YANG MEMPENGARUHI PRODUKTIVITI PEKERJA, BURUH MAHIR DAN PULANGAN KE ATAS PENDIDIKAN DI MALAYSIA

Oleh

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Kepentingan modal insan, penyelidikan dan pembangunan (P&P) dan limpahan teknologi telah diiktiraf secara meluas oleh Kerajaan Malaysiasebagai enjinyang berpotensi untuk mencapai ekonomi yang didorong produktiviti. Memandangkan kemahiran dan pengetahuan menjadi sumber penting untuk mencapai produktiviti yang lebih tinggi ke arah negara maju, maka, Malaysia menekankan pelaburan dalam modal insan dan P&P serta peranan teknologi dalam rancangan jangka panjang dan sederhana.Untuk objektif pertama, kajian ini bertujuan untuk menyelidik dengan lebih mendalam mengenai peranan pelaburan dalam modal insan dan P&P dalam mempengaruhi produktiviti buruh di 53 industri pembuatan dalam tempoh 2000-2008 . Kajian ini menggunakan teknik SYS-GMM untuk menganggar fungsi produktiviti buruh. Hasil kajian mendapati bahawa kos latihan yang ditaja oleh majikan dan pencapaian pendidikan di peringkat ijazah adalah positif dan signifikan dalam mempengaruhi produktiviti buruh dalam industri pembuatan. Kajian juga mendapati, walaupun pelaburan dalam P&P adalah significant dalam mempengaruhi produktiviti buruh, namun ia menunjukkan korelasi negatif dengan produktiviti buruh. Kajian mengenai kepentingan pelaburandalam modal insan dan P&P dapat memberikan cadangan kepada kerajaan melalui pembentukan insentif kewangan dan dasar cukai yang dapat menggalakkan individu dan majikan untuk melabur dalam pendidikan pasca-wajib dan latihan dalam perkhidmatan untuk semua pekerja. Berhubung dengan kolerasi negatif antara pelaburan dalam P&P dengan produktiviti buruh, Kerajaan digalakkan untuk meningkatkan lagi peruntukkan dalam pendidikan awam kepada pembangunan sains, teknologi dan kemahiran kejuruteraan dalam meningkatkan kapasiti penyerapan dalam kalangan pekerja untuk menerima pakai teknologi baru.

Malaysia telah mengiktiraf bahawa proses peningkatan kemahiran dan pembangunan keupayaan teknologi boleh disepadukan dengan saluran pelaburan langsung asing (PLA) dan perdagangan kerana kedua-dua saluran tersebut mengandungi kesan limpahan dari segi teknologi dan pengetahuan. Meskipun Malaysia merupakan antara negara penerima utama PLA di Wilayah Timur Selatan, namun manfaat limpahan PLA dalam meningkatkan kemahiran buruh di Malaysia masih kurang jelas. Oleh itu, objektif kedua kajian ini adalah untuk menyiasat kesan limpahan teknologi melalui PLA dan perdagangan dalam meningkatkan kemahiran pekerja dan seterusnya meningkatkan permintaan relatif kepada pekerja mahir dalam 50 industri pembuatan di Malaysia dalam tempoh 2000-2008. Selepas mengawal endogeneity dengan menggunakan penganggar SYS-GMM, hasil kajian menunjukkan bahawa limpahan teknologi melalui PLA adalah penting dalam meningkatkan kemahiran dan seterusnya membawa kepada peningkatan permintaan bagi pekerja mahir.Walaupun pekali PLA menunjukkan korelasi negatif dengan permintaan tenaga buruh mahir,tetapi kesan PLA yang ditunjukkan oleh kesan kuadratik (PLA^2) adalah positif secara statistik dan signifikan. Ini menunjukkan bahawa kesan limpahan daripada PLA dapat diserap dengan cepat oleh pekerja mahir dalam industri pembuatan di Malaysia melalui kesan pembelajaran.Walau bagaimanapun, kajian ini mendapati tiada bukti kesan limpahan teknologi melalui perdagangan dalam mempengaruhi permintaan bagi pekerja mahir. Hasil kajian ini berpotensi untuk menyumbang kepada pembentukan dasar PLA dalam jangka masa panjang terutama dalam menggalakkan kemasukan PLA ke dalam industri yang kurang menerima limpahan PLA.

Kerajaan Malaysia juga telah memberikan pengiktirafan kepada kepentingan individu untuk membuat pelaburan dalam pendidikan. Pendidikan meningkatkan produktiviti pekerjamelalui penyampaian ilmu yang berguna dan kemahiran serta ianya menjadi penentu utama kepada individu untuk meningkatkan potensi pendapatan mereka pada masa yang tepat.Pendapatan yang lebih tinggi adalah berkait rapat dengan pendidikan tambahan yang boleh dianggap sebagai kadar pulangan ke atas pelaburan pendidikan. Selaras dengan fakta-fakta ini, objektif ketiga dalam kajian ini bertujuan untuk mengkaji pulangan kepada sijil tertinggi yang diperolehi dalam enam sektor ekonomi di bawah Bidang Ekonomi Utama Negara (NKEA) pada tahun 2002, 2004 dan 2007. Sektor- sektor tersebut ialah: sektor kewangan, sektor perkhidmatan perniagaan, sektor pendidikan, sektor jual borong dan jual runcit, sektor elektrik dan elektronik (E&E) dan Sektor Kandungan dan Infrastruktur Komunikasi (CCI). Kajian inimenggunakan Kaedah Penganggaran Kuasa Dua Terkecil (OLS). Keputusan daripada anggaran fungsi pendapatan dapat disimpulkan seperti berikut: Pertama, kajian ini mendapati bahawa pekerja-pekerja yang mempunyai kelayakan ijazah mencatat pulangan purata yang paling tinggi dalam sektor kewangan, sektor pendidikan, sektor jual borong dan jual runcit (kecuali 2002), sektor CCI dan sektor E&E (kecuali 2007) sepanjang tempoh persampelan. Keputusan kajian menunjukkan pulangan purata pendidikan meningkat mengikut tahap kelayakan tertinggi dan ini menunjukkan terdapat kepadanan antara bidang pekerjaan dengan kelayakan. Kedua,keputusan kajian mendapati wujudnya situasi iaitu pekerja mempunyai "lebih pendidikan"dalam sektor kewangan dan sektor jual borong dan jual runcit meskipun pulangan purata pendidikan yang tertinggi dinikmati oleh pemegang

ijazah berbanding dengan pekerja lain. Pulangan purata pendidikan bagi pekerja terlebih pendidikan menunjukkan trend meningkat antara tahun 2002 dan 2007; mungkin disebabkan kelayakan lebih yang dimiliki oleh pekerja dalam bidang pekerjaan yang berkemahiran rendah telah membolehkan mereka menunjukkan prestasi yang lebih baik dan ini seterusnya menyumbang kepada peningkatan produktiviti firma.

Ketiga, keputusan kajian mendapati bahawa pulangan purata pendidikan kepada pekerja berpendidikan sekolah rendah mencatat pulangan yang paling tinggi dalam sektor E&E pada tahun 2007. Hujah yang dianggap munasabah dalam menjelaskan peningkatan pulangan yang tinggi untuk pekerja berpendidikan sekolah rendah ini adalah disebabkan oleh aktiviti sektor E&E lebih tertumpu kepada pemasangan dan ujian peringkat yang merupakan bahagian nilai tambah yang lebih rendah dalam sektor E&E. Akhir sekali, hasil kajian menunjukkan berlakunya penurunan dalam purata pulangan untuk pekerja yang mempunya kelayakan ijazah antara tahun 2002 dan 2007 di sektor E&E dan CCI. Kejatuhan dalam pulangan purata pendidikan bagi pekerja-pekerja yang mempunyai ijazah dalam kedua-dua sektor ini adalah disebabkan oleh kemahiran sedia ada yang dimiliki oleh pekerja tidak mampu diaplikasikan dengan perubahan dinamik dan perkembangan dalam industri serta teknologi yang baru muncul yang seiring dengan perubahan masa.Oleh itu,syarat kemasukan baru ke dalam sesebuah industri mungkin dinaik taraf dan ini menyebabkan kemahiran sedia ada yang dimiliki oleh pekerja dianggap "terkurang kemahiran". Antara sebab lain yang boleh menjelaskan penurunan kepada purata pulangan pendidikan kepada pekerja-pekerja yang mempunyai kelayakan ijazah adalah disebabkan oleh penawaran pekerja yang mempunyai kelayakan ijazah dalam bidang pekerjaan separa mahir telah melebihi penawaran pekerja dalam pekerjaan berkemahiran tinggi, yang menyebabkan pekerja siswazah sangup melakukan pekerjaan yang bukan siswazah. Bagaimanapun, kesanggupan ini akan membawa kepada kejatuhan dalam pulangan purata pendidikan bagi pekerja ijazah kerana pekerja mungkin tidak berpuas hati dengan pekerjaan mereka dan in telah merendahkan produktiviti firma. Penemuan keseluruhan dalam kajian ini menyimpulkan bahawa pendidikan,tenaga kerja terlatih dan mahir, pelaburan P&P dan kesan limpahan teknologi melalui PLA memainkan peranan utama dalam meningkatkan kemahiran dan pengetahuan pekerja yang seterusnya meningkatkan pertumbuhan produktiviti dan ekonomi Malaysia.

ACKNOWLEDGEMENTS

Thank God that whatever my heart ever desired God hath given me, and more than I could ever seek. I thank God for all His blessings and for giving me courage and strength to finish my studies. It is understood that human beings cannot repay one another enough. Hence, it is better to request the Almighty Allah to reward the people who did me favours and to give them the best.

I wish to express my deep sense of appreciation and gratitude towards my committee chairman and supervisor, Associate Prof. Dr. Rusmawati Said for her valuable patience, guidance and supervision of this dissertation. Your moral fiber, constant support and encouragement have helped me to press on until the research was written and completed. I learned and experienced a lot in doing a good research.

I am grateful to my advisory committee members, Professor Dr. Ahmad Zubaidi Baharum Shah and Associate Prof. Dr.Wan Azman Saini Wan Ngah for your recommendations and guidance that lead this thesis to successful completion. I am also grateful for your valuable suggestions and guidance during this study, without which the completion of my research would not have been possible.

I would like to thank to Ministry of Higher Education of Malaysia for providing financial support and Universiti Sains Malaysia for granting study leave.

I wish to thanks my colleagues for providing a stimulating and fun environment in which to learn and grow. I an especially grateful to Zunika Mohamed, Jamilah Mohd Mahyideen, Wan Nurhanan Wan Suhaimi, Noraida Wahob, Amna Aleeya, Aysha Aziz and Ruhaida Saidon.

Words are not enough to express my gratitude to my parents and entire family for supporting me. Finally I am especially grateful to my dear husband Mohd Saharudin Ramli, my son Muhammad Shafiy Nasif and my daughter Syifa Azzahra for their patience during the course of my study. To them I dedicated this thesis.

I certify that a Thesis Examination Committee has met on 27 November, 2014 to conduct the final examination of Norhanishah Mohamad Yunus on her thesis entitled **"**Factors Affecting Labour Productivity, Skilled Labour and Return to Education in Malaysia" in accordance with the Universities and University Colleges Act 1971 and the Constitution of the Universiti Putra Malaysia [P.U.(A) 106] 15 March 1998. The Committee recommends that the student be awarded the Doctor of Philosophy.

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This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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DECLARATION

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I hereby confirm that:

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Signature: _____
Name of Chairman of Committee: Wan Azman Saini Bin Wan Ngah, PhD

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ABBREVIATIONS

CCI	Communications Content and Infrastructure
CPS	Current Population Survey
DIFF-GMM	Difference Generalised Method of Moments
DOS	Department of Statistic
DPD	Dynamic Panel Data
EDI	Electronic Data interchanges
E&E	Electric and Electronic
EPF	Employees Provident fund
EPU	Economic Planning Unit
ETP	Economic Transformation Programme
FDI	Foreign Direct Investment
FIEs	Foreign-Invested Enterprises
GDP	Gross Domestic Product
GERD	Gross Expenditure on R&D
GMM	Generalised Method of Moments
HOSS	Heckscher-Ohlin and Stolper-Samuelson
HIS	Household Income Survey
HRDF	Human Development Fund
HSC	High School Certificate
ICT	Information Communication Technology
IMP3	Third Industrial Master Plan
ISIC	International Standard Industrial classification
IV	Instrumental Variable
KPIs	Key Performance Indicators
LCE	Lower Certificate of Education
LFS	Labour Force Survey
M&A	Mergers and Acquisition
MASCO	Malaysia Standard Classification of Occupations
MASTIC	Malaysian Science and Technology Information Centre
MCE	Middle Certificate of Education
MCEV	Middle Certificate of Education for Vocational
MOE	Ministry of Education
MOU	Memorandum of Understanding
MPC	Malaysian Productivity Corporation
MNCs	Multinational Corporations
MNEs	Multinasional Enterprises
NKEA	National Key Economic Areas
MSIC	Malaysian Industrial Classification System
OLS	Ordinary Least Square
OPP2	Second Outline Perspective Plan
OPP3	Third Outline Perspective Plan
PICS	Productivity and Investment Climate Survey
PLA	Pelaburan Langsung Asing
P&P	Penyelidikan dan Pembangunan
PSID	Panel Study of Income Dynamic

R&D	Research and Development
SBTC	Skill- biased Technological Change
SMEs	Small Medium Enterprises
SOEs	state-owned enterprises
SOCSO	Social Security Organization
SYS-GMM	System Generalized Method of Moments
TEI	Teacher Education Institutes
TFP	Total Factor Productivity
TUKAR	The Transformation of Small Retailer Shops
TVET	Technical Vocational Education and Training
UNDP	United Nations Development Programme
UNESCO	United Nations Economic and Social Council
U.K.	United Kingdom
U.S.	United States of America
8MP	Eighth Malaysia Plan
9MP	Ninth Malaysia Plan
10MP	Tenth Malaysia Plan

CHAPTER I

INTRODUCTION

1. Background of Study

The importance of human capital, research and development (R&D) and technological spillovers have been widely recognised by the Malaysian government as a potential engine to achieve a productivity-driven economy (EPU, 2006, 2010). Given that the achievement of higher productivity can become an important source when aiming for a high-income economy, productivity growth must be closely integrated with skills, knowledge and technology. First, as one of the main criteria in the drive towards becoming a high-income country, Malaysia needs to attain a 4.7% labour productivity growth annually (EPU & World Bank, 2010). The performance in labour productivity, as measured by output per worker performance, is a main indicator of economic efficiency and also a fundamental determinant of real wages (EPU & World Bank, 2010).

Historically, since the mid-1980s, the Malaysian labour productivity growth rate has decreased. It declined from 5.5% during the period of 1987-1997 to 2.9% in 1998-2007. The decreasing trend in labour productivity growth by 2.6% between 1987-1997 and 1998-2007 is sufficient to describe that Malaysia remain constrained by the lack of skills and shortage of creativity and innovation. The lack of skills can be measured by the contribution of education on output, which remained unchanged at 0.3% during the period of 1987-2007 (EPU & Bank, 2007, World Bank 2010). Meanwhile, the shortage of creativity and innovation as indicated by TFP growth, which is the contribution of TFP on economic growth, slightly declined from 1.7% during the period of 1987-1997 to 1.6% after the period of 1998-2007 (EPU & Bank, 2007). A cross comparison country also show that, during the post-crisis years (1998-2007), Malaysia has had an annual labour productivity growth of 2.9%, which is lower than other countries, such as China (9.2%) and India (4.4%) (EPU & Bank, 2007).

After 2008, the Malaysian labour productivity growth, as measured by real value added per worker, was at 3.0% but decreased to 2.0% in 2009 due mainly to a sharp decline in labour productivity in the manufacturing sector, as production fell in response to the significant deterioration in external demand in the early part of the year. However, the labour productivity growth recovered in 2010, at 2.2%, demonstrating an increase from 1.2% from 2009 because of the government's impetus to achieve the fully developed country with the launch of several national programmes in 2010. Consequently, it contributes to economic performance at 7.2%, which also exceeded the targeted growth of 6% and contributed to higher productivity growth in 2010 (MPC, 2010/2011). In 2011, the Malaysian labour productivity growth continuously increased from 2.4% in 2011, which can be attributed to the performance of key sectors of the economy,

as well as technological progress, capital deepening and widening, and the quality of labour. However, the achievement of Malaysia's labour productivity growth rate still lagged behind that of other Asian countries, such as China, India and Korea as shown in Figure 1. For instance, in 2011, Malaysia's labour productivity growth in 2011 was at 2.4% compared to China (9.1%), India (5.0%) and Korea (2.7%).

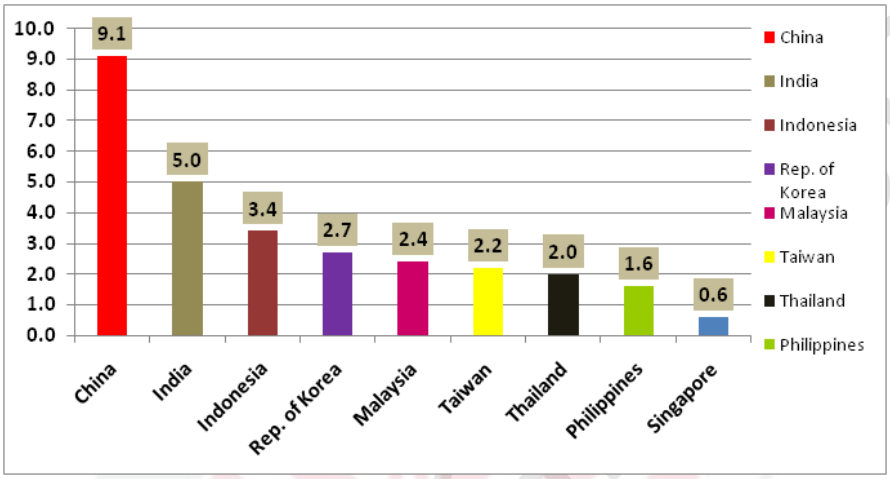

Figure 1: Labour Productivity Growth (%) (Value Added per Workers) for Selected Asian Countries in 2011

Source: IMD World Competitiveness Yearbook, 2011.

As is well documented, education and innovation both address the shortfall in the Malaysian labour productivity growth (OECD, 2011, EPU, 2010). One important source of influence on the performance of labour productivity is the presence of skilled workers with tertiary education[1]. A survey conducted by the EPU and World Bank in 2009 reveals that a 1% increase in employee with a college degree resulted in a 10% increase in labour productivity and a 4% increase in TFP. Consequently, investment in human capital and R&D has always been a priority of the Malaysian government, because skill and knowledge are key enablers of labour productivity. Under the successive five-year development plans, Malaysia's educational budget allocations for education and training kept increasing with each budget session since the Second Malaysia Plan (2MP, 1971-1975) until the Ninth Malaysia Plan 9MP (2006-2010), as shown in Table 1.1.

[1]The performance of labour productivity depends on the stock of (physical) capital, the quality of the skill base of the workforce, the available mass of land, and an unexplained residual termed total-factor productivity (TFP).

Table 1.1: Federal Government Development Allocation for Education and Training (RM billion)

Program	1 st MP	2 nd MP	3rd MP	4th MP	5th MP	6 th MP	7 th MP	8th MP	9th MP
Education		**558.4**	**1,815.8**	**3,483.2**	**5,621.7**	**6,982.1**	**17,542.6**	**37,922.0**	**40,356.5**
Pre School					-	58.0	107.5	215.7	807.3
Primary Education	74.7	117.3	379.1	665.4	800.3	1,127.1	2,631.8	5,369.3	4,837.3
Secondary Education	232.1	198.3	521.5	818.2	1,764.6	1,909.0	5,317.5	8,748.1	6,792.8
Government& Government Aided					1,011.4	1,475.4	3,853.7	7,931.2	5,549.1
Mara Junior Science	36.5	45.5	48.0		64.6	28.7	707.2	4,331.1	614.5
Technical &Vocational School				278.4	688.6	404.9	756.6	383.8	629.2
Higher Education	30.0	119.3	643.1	1,372.7	2,604.6	3,039.4	5,005.5	13,403.9	16,069.0
Teacher Education	31.9	9.0	112.1	149.0	229.0	155.6	332.5	1,368.1	577.7
Other Educational		69.0	112.0	199.4	223.1	693.0	4,147.8	8,816.9	11,272.4
Training		**174.7**	**330.5**	**1,082.6**	**355.0**	**581.0**	**2,181.9**	**4,450.9**	**4,792.6**
Industrial Training	35.6	*	*	*	322.3	370.0	1,827.0	3,930.6	4,103.6
Commercial Training		*	*	*	8.0	14.0	71.2	158.6	179.5
Management Training		*	*	*	16.7	197.0	283.7	361.7	509.5
TOTAL	**440.8**	**733.1**	**2,146.3**	**4,565.8**	**5,976.7**	**7,563.1**	**19,724.5**	**42,372.9**	**45,149.1**

Source: Various Malaysia Plan, EPU, based on the revised allocation.
*not available

In spite of the financial turmoil that negatively affected the Malaysian economy and caused Malaysia to devalue the currency in 1998, the government's allocation for the educational sector has never been reduced. It is observed that higher education and secondary education are among the major concentrations in educational development in the plans. The revised allocation of RM45.2 billion accounts for 25.0% of the total development allocation of the 9MP, which indicates the priority given by the government in its effort to achieve a knowledge-based economy through human resource development and the use of knowledge-based education as a tool for employment restructuring.

In an effort to increase labour productivity, skills training has received special attention by the Malaysian government, because it is closely associated with improving employee skills. Since the inception of the 9MP, the capacity of public training institutions for pre-employee training has been expanded with the establishment of 20 skill training institutions and the upgrading of 10 existing institutions. Currently, there are 405 public skill training institutes and 584 private skill training institutes in Malaysia (EPU, 2011-2015). Continuous effort has been undertaken by the establishment of several advanced skill training institutes such as the German-Malaysian Institute, the Malaysian-France Institute, the Japanese-Malaysian Technical Institute, the British-Malaysian Institute and the Malaysian Spanish Institute (9MP, 2006-2010). In terms of the federal government allocation on training, Table 1.1 also asserts that the total number of expenditure increased tremendously from 7MP (1996-2000) to 9MP (2006-2010). It increased by 54.4% from 2,181.9 billion in 7MP to 4,792.6 billion in 9MP.

From the total training expenditure allocation in 7MP , a total of 1,827.0 billion has been provided for industrial training, and the number of provision has increased to 55.4% during the 9MP.

In spite of the government's allocation increases over the years, Malaysia's training expenditure at the industry level is comparatively lower compared to the expenditure by the US on training (Karuppiah, 2004). The percentage of training cost sponsored by employees in the manufacturing sector shows the slight increases during the period of 2000-2008 as shown in Table 1.2. For instance, the training cost increased by 0.8% between 2000 until 2004. However, after 2004, the cost of training sponsored by employers increased by 4.85% during the period of 2004-2008.

Table 1.2: Total Training Cost in Manufacturing Industries (%), 2000-2008[2]

Year	Total Training Cost (%)
2000	8.67
2001	8.49
2002	8.48
2003	8.46
2004	9.47
2005	12.71
2006	15.49
2007	13.90
2008	14.32

Source: Author's Calculation based on Malaysian Department of Statistics, 2000-2008

Note: The current data available for training expenditure at the 3-digit industry level in the manufacturing sector until 2008 based on MSIC Code 2000.

This result is consistent with the survey conducted by Karuppiah (2004) on four selected Malaysian Manufacturing Companies that reveals that companies are devoting less attention to the importance of employers' training. A survey by the Productivity Investment Climate Survey (PICS) in 2002 and 2007 shows that the training provided by employers varies by firm size in the manufacturing sector. For small manufacturing establishments, the proportion training changed dramatically in past years. For instance, training provided by employers increased by 6% and 15%, respectively, for small-sized establishments and medium-sized manufacturing establishments between 2002 and 2007. The percentage of employers in small firms provided training was lower than that of medium-sized manufacturing establishments, because small firms tend to conduct training only for skilled workers as compared to medium and large firms, which provide more widespread training programs (Chung, 2004). A recent survey shows that the lack

[2]Cost of training is calculated as an aggregate and includes in-house training and on-the-job training. The cost of training also includes the training of all workers because of the non-availability of data disaggregating training costs according to forms of training, job classification, and skill group.

of spending on training within firms, especially in SMEs due to the limited of financial resources and human resources personnel, contributes to limited knowledge upgrading and undermines the progression to higher value added and productivity-driven activities (OECD, 2011).

The Malaysian Government has given recognition to the importance of joint investments in human capital and R&D to enhance productivity growth. Consequently, measures were put in place by a provision in the budget for R&D activities. This can be indicated by the gross expenditure on R&D (GERD) as a percentage of GDP in Malaysia. The gross expenditure (GERD) in Malaysia has been steadily increasing since 2000. The R&D expenditure continuously increased from 0.47% in 2000 to 1.07% in 2011 (except in 2008)[3] as shown in Table 1.3.

Table 1.3 : A Cross Country Comparison of gross expenditure (GERD) in Malaysia as a percentage of GDP in 2000-2011[4]

Country	2000	2002	2004	2006	2008	2009	2010	2011
United States	2.7	2.6	2.55	2.65	2.72	2.91	2.83	2.77
United Kingdom	1.82	1.8	1.69	1.74	1.77	0.84	1.8	1.77
Japan	3	3.12	3.13	3.41	3.47	3.36	3.26	n.a
Germany	2.47	2.5	2.5	2.54	2.69	2.82	2.8	2.84
China	0.9	1.02	1.23	1.39	1.47	1.7	1.76	1.84
South Korea	2.3	2.4	2.68	3.01	3.36	3.56	3.74	n.a
Sweden	3.58	3.8	3.58	3.8	3.4	3.6	3.39	3.37
Ireland	1.11	1.09	1.22	1.24	1.45	0.77	1.71	1.75
Singapore	1.85	2.1	2.13	2.16	2.84	2.43	2.09	2.3
Hong Kong	0.46	0.58	0.72	0.79	0.72	0.77	0.75	n.a
Malaysia	0.47	0.65	0.6	0.64	0.79	1.01	1.07	1.07

Source: World Bank, 2000-2011
Note: Malaysia& Hong Kong Using 2006 represent for 2005
n.a : not applicable

According to MASTIC, Malaysia recorded the highest GERD recorded at RM 9,422 million in 2011, an almost threefold increase from the GERD value in 2006 (RM 3,646.70 million). The increment of percentage GERD is in line with the aim of Malaysia to achieve an economy driven by innovation. However, the

[3] According to the 10th Malaysia Plan, gross expenditure on R&D dropped to just 0.21% of the GDP in 2008 due to the global financial crisis and the rapid increase in oil prices which affected Malaysia's economy.

[4] Gross Total Expenditures for R&D as a percentage of GDP includes both public and private R&D expenditures(current and capital expenditures)

increase in the Malaysian GERD is still comparatively lower than its key Asian competitors. For instance, in 2010, GERD in South Korea was 3.74%, Singapore (2.09%) and China (1.76%).

Secondly, in the pursuit of achieving a knowledge-based economy, Malaysia needs to 35% skilled workers by 2015 and up to 50% in 2020. In spite of the investment made in human capital and R&D, these investments alone are insufficient to enhance the amount of skilled labour available as well as to develop the quality of the workforce (EPU & Bank, 2007b). Therefore, Malaysia has recognised that the process of skill upgrading and development of technology capacity can be integrated with foreign direct investment (FDI) and trade, because both channels have their spillover effects that are embodied in terms of technology and knowledge (EPU & Bank, 2007b). This is likely to be consistent in the case of Malaysia, as the amount of FDI and import of capital and intermediate goods have substantially increased over the years. Furthermore, the Malaysian government also believed that the expansion of the number of skilled workers could act as a key determinant to absorb knowledge and technology spillovers via FDI and trade as well as to develop the technological capacities of the country (EPU &World Bank, 2007).

Since 1970, the trend of FDI inflows shows a rising trend over the years. From the bottom, at US$ 94 million FDI inflows in 1970, the Malaysian economy had received a peak level of US$5,741 million FDI inflows in 1996, as shown in Table 1.4. Malaysia's performance has started to grow impressively beginning in the 1990s compared with the years before the 1990s. The slow growth was attributed to the world recession and the electronic crisis in the 1980s. The rising trend in the flow of FDI during the 1990s in Malaysia may be attributed to the policy shift and growing market orientation of the country. In addition, in Southeast Asia, Malaysia has emerged as a promising developing nation characterized by high institutional quality, sound macroeconomic management, excellent physical infrastructure, large public investments in education and a high degree of openness, investment promotion and efficiency, thus attracting a high level of FDI inflows over the years (Mithani, Ahmad& MohdSaifudin,2008).

After ASEAN and Malaysia has recovered from the Asian financial crisis in late 1997 and 1998, Malaysian foreign direct investment inflows were able to grow, but in 2001, a drastic drop occurred again during that time. The trend of FDI inflows to ASEAN has declined from $30.3 in 2000 to $18.5 in 2001. Meanwhile, Malaysia has experienced the declining trend of FDI inflows, which decreased by 57.1%, from 6.3 billion in 2000 to 2.7 billion in 2001. The declining trend of FDI inflows were the result of the by September 11, 2001 incident at the World Trade Center in the United States. According to the ASEAN Investment Report, 2005, the declining trend of FDI inflows to ASEAN and Malaysia can be closely associated with the FDI inflows that concentrated their activity on the new emerging markets such as China, India and African countries. After the incident, inflows of the foreign direct investment became volatile in the following years from 2002 until 2005.

Table 1.4: FDI Inflows in ASEAN and Malaysia (US$ Million)

Year	ASEAN	Malaysia
1970	374	94
1980	2,415	934
1985	3,448	1,397
1986	3,163	1,261
1987	275	797
1988	2,229	695
1989	2,841	489
1990	4,305	423
1991	7,002	719
1992	7,591	1,668
1993	12,740	2,611
1994	13,619	4,043
1995	12,699	5,138
1996	16,602	5,741
1997	20,399	451
1998	25,367	5,816
1999	29,370	7,296
2000	30,370	6,324
2001	18,505	2,714
2002	1,450	3,203
2003	14,695	2,473
2004	23,437	4,624
2005	34,128	3,967
2006	63,689	6,072
2007	84,152	8,538
2008	49,289	7,248
2009	46,896	1,405
2010	92,279	9,155
2011	114,111	12,000

Source: UNTAC, ASEAN Economic Report 2005, 2012
World Investment Reports, 1998,2002,2004,2006,2012

After 2006, FDI inflows to Malaysia increased tremendously until 2011, except in 2008, which showed a slight decrease, and it continued to decrease in 2009 by 80.6% from 2008. The decline of the FDI in 2009 is due to the rise in outflows of capital from Malaysia affected by the global economic crisis. The number of FDI declined in 2009 not only in Malaysia, but also in the entire Southeast Asian region, with a reduction of just 22%. However, the decline of the FDI investment in 2009 was recovered in 2010; in fact, Malaysia has received the highest of FDI inflows in 2010 after Singapore (US$ 24,006 million in 2009 to US$48,751 million in 2010) and Indonesia (US$ 4876 million in 2009 million to US$13,770 million in 2010). The FDI inflows to Malaysia increased more than six fold, from US$1405 million in 2009 to US$9155 million in 2010. The main contributing factor to the growth of FDI inflows in ASEAN countries is the strong expansion

in the private sector activity and robust domestic demand. The annual survey reports by the United Conference on Trade and Development (UNCTAD) report that the FDI inflows in Malaysia saw tremendous increases in 2010 due to the increased confidence among investors regarding doing business in Malaysia. It is also attributed to the new capital-intensive technologies project, particularly in the E&E industry, including petrochemicals, basic metal products, printing and publishing (MIDA, 2010). The FDI inflows in Malaysia continuously increased by 31.0% in 2011 due to the Malaysian shifts from labour-intensive investments to high-technology investments.

In terms of the share of investment projects in the manufacturing sector (measured by approved investment projects), as can be seen in Table 1.5**,** the share of foreign investment registered the highest share compared to domestic investments during the period of 2000 to 2010 (with the exception of 2009 and 2011)[5]. Projects involving foreign investment show an increased trend from 19.84 billion ringgit in 2000 to 34.2 billion ringgit in 2011.

Table 1.5: Approved Investment Project in the Manufacturing Sector, 2000-2011(RM billion)

	Domestic Investment (RM billion)	Share of Domestic Investment (%)	Foreign Investment (RM billion)	Share of Foreign Investment (%)	Total Capital Investment (RM billion)
2000	13.76	40.9	19.84	59.1	33.60
2001	5.24	24.7	16.11	75.3	21.35
2002	6.30	35.3	11.57	64.7	17.87
2003	13.50	46.3	15.64	53.7	29.14
2004	15.63	54.3	13.15	45.7	28.78
2005	13.17	42.4	17.88	57.6	31.05
2006	25.76	56.0	20.27	44.0	46.03
2007	26.51	44.2	33.43	55.8	59.94
2008	16.69	26.6	46.01	73.4	62.70
2009	10.49	32.1	22.14	67.9	32.63
2010	18.12	38.4	29.10	61.6	47.22
2011	21.9	55.4	34.2	44.6	56.07

Source: DOS& MIDA, 2000-2011

[5]The share of foreign investment decline in 2009 is due to the rise in outflows of capital from Malaysia and is affected by the global economic crisis. Meanwhile, in 2011, the share of domestic investment was higher than foreign investment by 21.7% due to the greater response from the domestic direct investments (DDI) to spearhead the Economic Transformation Programme (ETP).

In this regard, the Malaysian government continues to undertake various measures and initiatives to improve its delivery system contributing to a high rate of implementation in approved projects. For the period of 2007-2011, a total of 4,390 manufacturing projects were approved. The implementation of these projects in the manufacturing sector has created 338,555 employment opportunities, of which 68.4% are managerial, in the professional, technical, supervisory and skilled manpower categories. This is in parallel to the government's aim to ensure the function of FDIs' transfer of knowledge to labour that must be based on Key Performance Indicators (KPIs). Based on the total investments approved in 2011, the E&E industry remained the leading industry, followed by basic metal products, transport equipment, chemicals and chemical products, and food manufacturing. The most foreign investment focused on the E&E industry and machinery manufacturing to intensify in-house R&D and D&D activities.

International trade is a significant part of the economy, particularly in the process of upgrading the existing skill and enhancing the number of skilled labour in the manufacturing sector (EPU & World Bank, 2007). Malaysia has taken action regarding its involvement in trade through the import of capital and intermediate goods. Both goods may be believed to be necessary for skills upgrading that are embodied in terms of ideas, products and knowledge-imitation as well as learning about the products through reverse engineering (Caselli & Wilson, 2004; Eaton & Kortum, 2001). The Malaysian government has also recognised that the imitation process can include acts as a main channel for skill upgrading, which contributes to innovation activities and leads to higher TFP and economic growth (EPU, 2006). Therefore, the pattern of imports has remained largely unchanged with the import of intermediate goods and capital goods continuing to dominate the Malaysian total imports. As shown in Table 1.6, during the period of 2000 to 2005, total imports of intermediate goods increased from 233.21 billion in 2000 to 309.67 billion in 2005 and grew at an average rate of 4.9% during this period. It contributed 71.0% to the gross import in 2005, while imports of capital goods increased from 44.24 billion in 2000 to 58.90 billion in 2005, and it constituted on average 14.0% of Malaysia's total imports during this period. Of these imports, machinery and transport equipment, parts and accessories for transport equipment accounted for 56.6% of Malaysia's total imports during the same period.

Efforts continued with the importing of capital and intermediate goods during the period of 2006-2010. Malaysia's total imports grew to 5% in 2007 from the 2006 totals. An increase in capital formation from investment activities and expansion of manufacturing activities in 2007 led to an increase in the import of capital goods and intermediate goods by 7.2% and 6.9%, respectively. Both goods accounted for 85% of the total imports in 2007, and their contribution continued to increase, up to 88.1% in 2008. However, Malaysia's total imports has declined in 2009. Total imports decreased by 16.6% to RM434.9 billion, compared to RM521.6 billion in 2008. This arose from the global economic slowdown, as the resulting demand from Malaysia's major trading partners are lower, and imports of intermediate and capital goods showed similar trends. The share of intermediate goods declined by 1.7% in 2009. Meanwhile, the share of import of

capital goods also dropped by 5.9% from RM69.9 billion in 2008 to RM65.8 billion in 2009. However, in 2010, total imports increased by 21.7% to RM529.19 billion as compared to RM434.94 in 2009. This growth was mainly caused by higher imports of intermediate and capital goods with the contribution of both goods, which accounted for 83.0% of the total imports

Table 1.6: Total Imports in the Manufacturing sector, 2000-2010 (RM billion)[6]

	Intermediate Goods (RM billion)	Share of Intermediate Goods(%)	Capital Goods (RM billion)	Share of Capital Goods (%)	Total Import (RM billion)
2000	233.21	74.88	44.24	14.20	311.45
2001	204.12	72.84	41.28	14.73	280.29
2002	219.14	72.30	43.19	14.25	303.09
2003	235.45	74.38	40.79	12.49	326.53
2004	287.88	72.04	55.48	13.88	399.63
2005	309.67	71.54	58.90	12.69	463.87
2006	336.38	70.35	64.17	13.42	478.15
2007	359.09	71.53	67.75	13.50	502.04
2008	378.94	72.90	68.61	13.20	519.80
2009	297.46	68.43	65.19	15.00	434.67
2010	363.15	68.62	81.00	15.31	529.19

Source: Malaysia Department of Statistics, 2010

Thirdly, in line with the aspiration of the country to become a knowledge economy, education began to play the most important role in measuring the level of skills of individuals (EPU & World Bank, 2007a; OECD, 2011). It is known that education increases the productivity of workers by imparting useful knowledge and skills. Specifically, educational attainment affects not only employability, but also employment income. Therefore, the decision to make an investment in education as a main determinant of individuals to increase their earning potential is timely. In other words, higher earnings are closely associated with additional education that can be thought of as a rate of return on that educational investment (Patrinos & Psacharopoulos, 2010). Return on investment in education is an important factor in determining labour participation and educational attainment, and it ultimately influences wages/income (Psacharopoulos,1994).

Due to the higher levels of educational attainment being strongly associated with higher employment rates and perceived as a gateway to better job opportunities

[6] The trend of total import in manufacturing sector can be made since 2000 onwards becausethis data, which was classified according to the three digit Standard International Trade Classification level, was then matched to the three-digit Malaysian Industrial Classification, 2000.

and earnings, the Malaysian government has encouraged an increase in the enrolment rate in tertiary education. At the macro level, the percentage of enrolment in tertiary education increased by 41.41% between 2006 and 2011 (EPU, 2010). In terms of enrolment at different levels of education, Table 1.7 also shows that the highest enrolment at the degree and diploma levels accounted for more than 70% of the total enrolment. This is in line with the government's policy to enhance the share of professional workers and to meet the industry demand for associate professionals and technicians. Meanwhile, the percentage of enrolment in the Masters and PhD degree programs has increased by 1.86% and 2.10%, respectively, between 2006-2011, and this trend is in line with the government's target under the 10MP to raise the number of lecturers with PhD qualifications in public universities (MOHE, 2010). However, the percentage of enrolment at the certificate level shows a continuously decreasing trend over the same period.

Table 1.7: Enrolment in Higher Education Institutions by Level of Study, 2006-2011 (%)

Level of Study	2006	2007	2008	2009	2010	2011	% Changes, 2006-2011
Certificate	15.10	14.96	12.45	11.89	11.42	10.56	-4.54
Diploma	32.11	32.74	33.19	34.11	34.03	32.50	0.38
First Degree	46.58	46.78	47.84	46.49	46.66	47.94	1.36
Masters	4.92	4.18	5.00	5.66	6.05	6.78	1.86
PhD	0.13	1.34	1.52	1.65	1.83	2.23	2.10

Source: EPU& Ministry of Education ,2006-2011

The expansion of the enrolment rate in tertiary education has resulted in an increase in the number of graduates, which in turn has increased demand for workers with higher education. Recently, at the macro level, the amount of labour with higher education has increased sharply. It increased markedly by about 70% from 30,732 in 2000 to 51,771 in 2005, and it has continued to increase by nearly by 25% in 2010. Thus, the unemployment rate of graduates declined from 3.8% in 2005 to 3.1% in 2010 (EPU, 2010). In spite of the Malaysian labour market remaining favourable to medium skilled workers, the improvement in the level of education at the tertiary level has led to changes in the labour market for skilled workers. The increasing demand for skilled and intelligent workers with specific skills is in line with the increased use of sophisticated technology. The Third Industrial Master Plan (IMP3) has documented the importance of skilled workers in industrial sectors to achieve quality targets that are targeted by the sector. For instance, many employers in E&E sectors require workers in the areas of R&D and to some extent Engineering Support (i.e. software engineering) to transform the production from value-added activities to complex value-added activities (TalentCorp, 2012).

According to a productivity investment climate survey (PICS) report, since 2002, the share of high-skilled[7] workers in the Malaysian labour market has improved due to the marked improvement level of education in tertiary education (EPU & World Bank, 2007b). A similar situation can be seen in several economic sectors. As can be seen in Table 1.8, the overall trend of high-skilled workers with degree qualifications shows an increasing trend by 4.1%, 1.6% and 8.6% in E&E, information and communication technology (ICT) and the education sectors, respectively, between 2002 and 2007.

Table 1.8 : The Share of High Skilled Workers by Highest Certificate Achieved in the Economic Sector (%), 2002 and 2007

Qualification/ Occupation	E &E				ICT				Education			
	2002				2002				2002			
	PROF	*MANG*	*TECHN& PROF*	Total	*PROF*	*MANG*	*TECHN& PROF*	Total	*PROF*	*MANG*	*TECHN &PROF*	Total
LCE	0.0	0.7	1.3	2.0	0.0	0.2	2.8	3.0	0.1	0.0	1.8	1.9
MCE/MCEV	0.2	0.9	8.7	10.0	0.6	2.0	10.9	13.5	2.5	0.2	12.0	15.3
HSC	0.0	0.0	1.1	1.0	0.0	0.8	0.6	1.4	0.9	0.1	4.6	5.6
Diploma	0.4	1.1	3.9	5.5	2.8	2.2	4.8	9.8	7.8	0.8	24.6	33.2
Degree	2.6	1.5	0.4	4.6	3.6	7.2	1.0	11.8	23.0	0.9	2.9	26.8
	2007				2007				2007			
LCE	1.5	4.7	6.2	12.4	0.0	0.7	1.9	2.6	0.0	0.0	3.8	3.8
MCE/MCEV	1.8	18.2	2.5	22.5	1.9	2.8	16.4	21.1	3.0	0.0	14.4	17.4
HSC	0.4	2.2	3.6	6.1	0.0	0.9	1.4	2.3	1.2	0.9	5.4	7.6
Diploma	0.0	0.0	4.2	5.1	0.0	0.0	0.5	0.5	0.8	1.0	2.3	3.1
Degree	1.5	0.7	6.5	8.7	2.8	4.0	6.6	13.4	10.3	1.5	23.6	35.4

Source: Author's Calculation based on HIS 2002&2007

In terms of occupation, at a glance, the overall table also indicates that the share of technician and associate professional represents the largest share among the high-skilled categories in all economy sectors. In terms of trend, technician and associate professional categories also show an increased trend between 2002 and 2007 as compared to professional and manager categories at degree qualifications in all economy sectors. The increment of shares of technician and associate professional categories is due to the effect of the Returning Scientists Programme in 2001 to attract Malaysian experts abroad to return and serve in their fields of expertise in IT, science and technology, industry, finance, accounting, and medicine and health (EPU, 2006). For example, the share of technicians and associate professionals with degrees and diploma qualifications shows the increased trend by 6.0% and 0.3%, respectively, between 2002 and 2007 in the E&E sector. In the CCI sector, the share of technician and associate professional categories with degree qualifications increased by 5.6% between 2002 and 2007, in spite of the high share of workers with MCE and HSC, and it remained high as

[7]This is not a standard definition of skill levels in Malaysia. Based on the Malaysian Standard Classification of Occupations (MASCO) 2008, high-skilled workers are legislators, senior officials and managers, professionals, technicians and associate professionals. Mid-skilled are clerical and related occupations and sales and service workers. Low skilled workers: agricultural and fishery workers, craft and related trade workers, elementary occupations, plant and machine operators and assemblers. The concept of occupational categories according to educational level as shown in Appendix A.1.

compared to their counterparts. Meanwhile in the education sector, the share of technician and associate professionals category is dominated by workers with diplomas. However, in terms of trend, the share of workers possessing diploma qualifications in this occupation category showed a significant decline by 22.3% between 2002 and 2007. This result indicates that there is an increase in demand for technician and associate professionals with degree qualifications. It can be seen that the share of technical and associate professionals with degree qualifications has shown a tremendous increase of 20.7% from 2002 to 2007.

Nevertheless, empirical studies since the work of the Chicago economists, and part of neoclassical economics, claims that an expansion of education has resulted in an excess supply as one of the main factors that can explain the differences between the labour income and the type of occupation (Lee, 2004). Much evidence has confirmed that a greater amount of educated individuals leads to better earnings and more prestigious occupations compared to when there are less educated employment candidates available. The first and most comprehensive estimates of the private and social rate of returns education in Malaysia were conducted by Hoerr (1973) using the 1967-1968 data. He finds that the highest private rate of return was for upper secondary schooling at 18.9%, and the lowest was for degree holders at 11.4%. Mazumdar (1981) found evidence of particularly high returns for education from completed educational phases after the primary level, although the returns to additional years of schooling were not constant. In contrast, generally, many recent studies conducted in Malaysia indicated that rates of return to education are high at the secondary, upper secondary and university levels (Chung, 2004; Said et al., 2009; Kennayatullah,2013). Nonetheless, the return to education by the highest certificate in the economic sector is still unclear due to the requirement of firms for skills that vary between industries.

According to a PICS survey in 2002, many employers in the manufacturing sector tend to hire technical workers, while in the business services sector, the employers' demand for both technical and soft skills were a main criterion in hiring workers. Due to the education-occupation mismatch of either over-educated/over-qualified or under-educated/under-qualified as well as the shortage of skills compared to the demands of industry, this has become a main constraint in the economic sector to doing business, and thus, this affects the return of workers to education[8].

[8]Over-educated/over-qualified refers to the situation in which individuals are employed in jobs that do not require their current qualifications or the skills they have are higher than the skills required for the job. Under-educated/ under-qualified refers to workers whose qualifications are lower than that required by their occupation (Hung, 2008).

The skill shortage can be defined as follows: The first is defined as recruitment difficulties caused especially by a shortage of individuals with the required skills in the accessible labour market. Secondly, there are skill gaps which are deficiencies in the skills of the existing workforce of employers, both at the individual level and overall, which prevent the firm from achieving its business objectives (Frogner, 2002). Skill shortages are distinct from the phenomenon of skill mismatch, but the two concepts are closely related. Skill mismatch is divided into two concepts: over-skilled and under-skilled. Over-skilled refers to the skills supplied by workers that are above those required by their job (workers report that their skills can cope with more demanding duties at work). Under-skilled

In conclusion, the complementarities between investments in human capital in terms of skills and education and the link with R&D investment and technology spillovers play a pivotal role in solving the problem emerging in the Malaysian labour market for skills, namely, the lack of skills and knowledge and the inadequate amount of skilled labour. Therefore, based on the current situation in Malaysia, the first objective of this study aims to delve deeper into the impact of investment in human capital and R&D in influencing labour productivity in the manufacturing industries. It attempts to investigate whether both investments need to be increased or which investment significantly enhances labour productivity.

Secondly, the study also explores to what extent the effects of technology spillovers via FDI and trade can possibly contribute to skill upgrading and thus increase the relative demand for skilled labour. Thirdly, this study attempts to investigate the return to education in the Malaysian economic sector. As the return to education and wage differential are inter-related, the aim of this study is to determine whether the return to education increases with the level of the highest certificate in the economic sector. Given that education is an investment decision, it is hoped that the updated details of the return to education at different levels will help households understand the importance of investing in their children's education. Additionally, investment in education is important to provide a good match between the skills acquired whilst being educated and on the job and those required in the labour market.

This chapter provides an overview of the proposed study. The description of issues and the problem statement identified for this study will be provided next. This will be followed by Section 1.3, which is a discussion of the objectives of the research that are proposed to be undertaken. Section 1.4 provides the significance of the study, and Section 1.5 provides the organisation of the thesis.

1.1 Problem Statement

One of the major challenges in the Malaysian labour market is the shortage of the necessary skills and knowledge to be productive in the fast-changing and increasingly competitive labour market (EPU, 2010). The first issue in this study is related to the problem of slow labour productivity growth, which is closely associated with a low level of skills labour as well as inadequate R&D capacity (EPU & World Bank, 2007b, 2010; OECD, 2011). The endogenous growth theory states that improvements in productivity or TFP are linked to a faster pace

refers to skills supplied by workers that are below those required by their job (workers report that they need further training to cope well with their duties at work) (Desjardins &Rubenson,2011).

of innovation and more investment in human capital (Romer, 1990). Many empirical studies also find that education, training and R&D investment are the main variables that contribute to the productivity of a firm or TFP (Ballot, Fakhfakh, & Taymaz, 2001; Corvers, 1997). However, the impact of both human capital and R&D investments on labour productivity are not adequately discussed in the empirical study, especially at the industry level. Therefore, this study contributes to the limited literature by investigating the impact of investments in human capital in terms of knowledge and skill and link with the R&D investments on labour productivity at the industry level in the manufacturing sector. The impact of both human capital and R&D investments are important subjects for investigation because the issues of the slow labour productivity growth remains as one of the major constraints in spite of the fact that the government has allocated substantial expenditures on human capital development and R&D. For instance, the Malaysian government development allocation for education, R&D and venture capital increased by 40% in the Tenth Malaysia Plan (10MP, 2011-2015) as compared with 21.8% in the Ninth Malaysia Plan (9MP, 2006-2010).

The first issues of slow labour productivity growth in Malaysia were found when we compared the Malaysian labour productivity with other selected Asian countries such as Hong Kong, India and the Philippines. A cross comparison country in 2008 showed that the Malaysian labour productivity growth was only 3.0% during the period of 2000-2005, and it increased to 3.6% in 2005-2008, which thus increased by only 0.6%, even though both investments in human capital and R&D in Malaysia was higher than these countries (APO, 2011)[9]. The labour productivity growth in Hong Kong, India and the Philippines increased respectively as follows: Hong Kong (3.1% to 4.2%), India (3.6% to 5.4%) and the Philippines (1.3% to 3.7%) (APO, 2011). The Malaysian public expenditure on percentage GDP was at 4.1% in 2008 as compared to Hong Kong (3.6%), India (3.2%) and the Philippines (2.7%). In terms of R&D expenditure as a percentage of GDP, Malaysia's R&D expenditure in 2008 was 0.79%, which was higher than Hong Kong (0.723%), India (0.76%) and the Philippines (0.11%). This result indicates that, in most Asian countries, the contribution of quality of workforce assumes a prominent role in facilitating innovation, and its effects are indicated by the improvement in labour productivity. However, Malaysia saw low labour productivity because of the abundance of low-skilled labour and the utilization of highly labour intensive production. Recent data also shows that the main source of labour productivity growth rate in Malaysia during the period of 2002-2011 is non-ICT capital at 1.2%. Compared to selected Asian countries such as Singapore, South Korea and Japan, the contribution of non-ICT capital into the production factors were only 0.6%, 1.1% and 0.1%, respectively, during the same period (MPC, 2012/2013).

Based on industry evidence, the issue of slowing labour productivity can be evident in the firm capital intensive such as in E&E, transport equipment and chemicals industries. This was because, since the 8MP, the government has

[9]There is no training data at the international level published for comparison purposes.

concentrated on the provision of the budget in capital intensive industries such as E&E, chemical and transport equipment, as these industries required the highest number of technology transfer agreements (EPU &World Bank, 2010a). The government has also established the centres of engineering excellence through collaboration between industry and academia to conduct R&D activity and training in order to upgrade the existing talent and supply of relevant talent (EPU, 2010). Research activity mostly involves in the firm capital intensive[10].In terms of gross expenditure on R&D, the percentage of R&D expenditure in capital intensive firms increase between 2000 to 2008 by 7.2% , 0.01% and 3.4% in E&E, chemical and transport and equipment. In light of the importance of trained workers, the cost of training sponsored by employers also increased during the period of 2000 to 2008 by 1.91%, 5.98% and 1.2% respectively in the E&E, chemical and transport and equipment industries, as contributed by skilled workers with tertiary educations. In terms of educational attainment, the share of workers with degree educations has increased by 1.95%, 3.79% and 5.5%, respectively, in the E&E, chemical and transport and equipment industries between 2000 and 2008. However, the labour productivity growth declined in the chemical (14.1%), E&E (7.04%) and transport equipment (22.43%) industries, respectively, between 2000 and 2008[11]. Based on the situation described above, we lack knowledge of whether human capital or R&D investments are needed to increase further the enhancement of the Malaysian labour productivity in the manufacturing sector because the slow labour productivity growth remains as one of the major constraints of Malaysia towards productivity driven knowledge.

The second issue is regarding the low absorption among the Malaysian skilled workers from the presence of technology spillovers. The endogenous growth theory reveals that there is a complementary relationship between technology spillovers and the demand for skilled workers (Romer, 1990). The effects of technology spillovers not only introduce and create new technologies for domestic usage, but it also expands the utilisation of spillovers, thus inducing organisational improvement[12] (Coe & Helpman, 1995; Hollanders & ter Weel, 2002; Görg & Greenaway, 2004; Liu, 2008). This fosters the restructuring process and increases both the demand and supply of skills (Bruno, Crinò, and Falzoni, 2012). Through past works of literature on the effects of technological change on skilled labour demand, it is noted that the importance of technological change is undisputable. Empirical studies have also documented that the effect of technology spillover via FDI and trade play a key role in explaining the increasing skill demand (Acemoglu, 1998; Machin, 2002; Araújo, Bogliacino, & Vivarelli, 2009). However, the effect of technology spillovers via FDI

[10] For instance, The E&E alone accounts for 46% of total foreign R&D in 2008 (OECD,2011)

[11] Labour productivity growth is measured as value added per workers. According to industry evidence, the data is calculated by the author based on the panel data provided by DOS according to MSIC classification, 2000

[12]The technological knowledge generates benefits called "spillovers". First, new technological knowledge can be used in any country to produce more efficiently or higher quality goods and, thus, increases the labour productivity of the country that adopts it. Second, technological knowledge to produce new ideas or new applications in research and development (R&D). This increases R&D effectiveness in receiving countries.

particularly for skills upgrading is much less clear in developing countries and also at industry levels (Slaughter,2002; Pinn et al., 2011). Hence, this study fill the gaps by investigating the effects of technology spillovers via FDI and trade upon relative demand for skilled labour in Malaysia manufacturing industries. The effect of technology spillovers via FDI is an important subject for investigation because Malaysia is among the major FDI recipient countries of the South East Region (Masron, Zulkafli, & Ibrahim, 2012). Therefore, it raises a question regarding the real benefits of technology spillovers from FDI that Malaysia is able to reap from their presence.

The presence of technology spillovers via FDI seems to have limited success for skills upgrading towards becoming a highly skilled labour force (EPU & World Bank, 2007b, OECD, 2011). This is because the share of skilled labour in Malaysia has remained at 28% since 2009 until 2013 and indicated only a 2% increase from 2007 even though Malaysia has received a lot of FDI since the 1990s and recorded RM 152 billion in net FDI inflows during the period of 2000-2009. The inflows of FDI continuously increased more than six fold to US$ 9.1 billion in 2010. In terms of components of import, the largest contribution to total import was found to be attributed by the import of capital goods and the intermediate goods component of imports. Both goods account for more than 80% of total imports during the period of 2000 to 2013 (MIDA, 2014).

According to industry evidence, the issue regarding the presence of both spillover effects can be seen in the E&E industry, as it is well recognised that the E&E industry has had tremendous growth, and it is dominated by leading MNCs with a few linkages to local firms. The trend of FDI in the E&E industry is increased by 38.7% between 2000 and 2008, while the import of capital goods and intermediate goods increased by 53.3% and 6.50%, respectively, over the same period, but the share of skilled labour only increased by 1.71% between 2000 and 2008 (MIDA, 2009). In addition, the E&E industry is also still categorised as an industry that has employed relatively more low skilled workers and lack of R&D intensities because the E&E activity remains focused on assembly and test stages, which is the lower value-added part of the industry (EPU & Bank, 2007b, OECD, 2011). Based on the situation above, it raises a question of to what extent the presence of technology spillovers via FDI and trade can contribute to skills upgrading and thus may increase the relative demand for skilled labour.

The third issue in this study pertains to the fact that the employees in the economy sector are less willing to pay based on the level of education attained. There are two situations by which to describe the education problem. First, returns to education do not increase with the level of education. In spite of the many empirical studies that provide mixed results regarding the return to education related to the level of education, the return to education at the highest certificate achieved, that is the "sheepskin effect,[13]" is unclear (Trostel,2005).

[13]Sheepskin effects refer to the independent effect that certificates of qualification appear to have even after controlling for years of education. Certificate of completion might signal to employers a higher level of ability, resulting in higher earnings.

Therefore, this study provides new evidence in the literature especially by using the level of highest certificate to measure the return to education in the economy sector because it not adequately studied in the Malaysian context[14].

The issues of return to education does not increase according to the level of highest certificate can be seen among the workers with diplomas and degree qualifications in the manufacturing sector. For instance, in 2007, the share of workers with degree and diploma qualifications was 1.4% and 0.5% respectively, while the average return for workers with a degree is 12.3% as compared to diploma-qualified workers at 27.2% (HIS, 2007). This result indicates that the average return for diploma holders is higher than those with degrees by 14.9%, despite the overall demand for workers with a degree being higher than diploma workers by 0.9%. This situation contradicts the human capital theory, which reveals that higher educated workers earn higher wages partly due to their higher productivity level, greater earning growth over their life time, lesser unemployment experience and longer working experience (Becker, 1973).
The second concern with regards to education is the declining trend of the average return to education for those with a degree qualification in the manufacturing sector between 2002 and 2007. The share of degree-educated workers experiencing the increased trend compared to workers with other qualifications increased by 0.6% between 2002 and 2007. On the other hand, the share of workers with a diploma, High School Certificate (HSC) and Middle Certificate Education (MCE)/Middle Certificate of Education for Vocational (MCEV) showed a declining trend by 0.57%, 0.05% and 0.64%, respectively, over the same period.

The increase in demand for workers with degree qualifications shows in line with the effect of technological change because educated workers are more likely to adopt new technology and thus are paid accordingly higher (Acemoglu, 2002; Bartel & Sicherman, 1997). However, the trend of the return to a degree qualification declined by 5.27% between 2002 and 2007, while the average return to diploma, HSC, MCE/MCEV workers increased by 3.71%, 2.41% and 1.96%, respectively, over the same period. This situation is supported by signalling or screening theory that claims the declining return to education is due to the inability of the highly educated to persistently maintain their productivity-unrelated earnings advantage over the less educated[15] (Spence, 1973;

[14]Many previous study in Malaysia using the level of formal education to measure return to education studied the issue of return to education by gender (Chung, 2003; Said et al., 2009; Kennayatullah, 2013). The estimation based on the highest level of schooling completed (credentials) is more accurate because it provides an alternative structure for recovering the returns to schooling (Harmon, Oosterbeek, & Walker, 2003).

[15] There are two theories regarding the relationship between education and earning; signalling/screening and human capital theories. Signalling or screening theory asserts that education only reflects inherent human capital. Education acts as a signal to employer to sort out the most productive workers or as an indication of innate ability. However, education is not the main signal to employers to pay higher wages or returns. The higher wages or returns paid to employees is based on labour productivity. This theory contradicts the human capital theory, which argues intuitively that

Groot&Oosterbeek,1974). Hence, this raises questions regarding the declining average return to education. First, does educational mismatches (over and under educated) occur amongst workers with degree qualifications?[16] If so, does it lead to a lower average return to education? Secondly, is there a shortage in the skill availability of workers who can adapt to the dynamic and evolving nature of the manufacturing sector, and as a result, do the workers who are already employed tend to be "under-skilled"? If there is indeed a skill shortage, does the circumstance decrease the average return for workers who are equipped with the required skill?

In conclusion, Malaysia will continue to be caught in the middle income trap if Malaysia remains constrained by workers with low skill and knowledge who lack R&D activity, lack of absorption of new technology, are inadequate to provide skilled labor and fail to solve both educational and skill mismatches, especially among workers with tertiary and post-secondary qualifications. These factors become the main obstacle in Malaysia to achieve the targeted productivity towards becoming a high-income country.

1.2 Objectives of the Study

The general objective of this study is to examine the impact of human capital, R&D and technology spillovers on labour during the 2000 to 2008 period in the Malaysian manufacturing industry. The specific objectives are as follows:

i. To investigate the impact of investments in human capital and R&D on labour productivity.
ii. To examine the effect of technology spillovers via FDI and trade on the relative demand for skilled labour.
iii. To analyse the trend of return to education at different levels of the highest certificate achieved in the Malaysian economic sector in 2002, 2004 and 2007.

1.3 Significance of the Study

This study investigates the impact of human capital, R&D and technology spillovers on labour. For the first objective, this study contributes to the literature by presenting new evidence at the industry level by investigating the effect of human capital investment in terms of skills, education and links with R&D investment on labour productivity in Malaysian manufacturing industries. The current information pertinent to education and training in Malaysia is currently

education endows an individual with productivity-enhancing human capital and that this increased productivity results in increased earnings in the labour market.

[16]Following Kiker, Santos and De Oliveira (1997), both the over-educated and under-educated phenomena can be observed/measured when there are discrepancies between job requirement and education attainment.

rather limited (Chung, 2004). The absence of reliable training data in many developing countries has become a problem for policymakers to make critical resource allocation decisions when designing education and training policies (Tan & Batra,1995; Karuppiah, 2004).

In addition, there exists a small number of empirical papers that relate the productivity of a firm to training (Dearden, Reed, & Van Reenen, 2006). Moreover, the effects of training on productivity has little or no mention in the costs of training (Ballot et al., 2001; Barrett & O'Connell, 2001; Dearden et al., 2006). Thus, this study uses the cost of training to estimate the impact on labour productivity. The cost of training is important for an employer to make decision not only about whether workers need to be trained, but also to determine what kinds of training should be provided for employees. Given that the impact of training on productivity is very much dependent on the type of training programme, thus, the likelihood of employers providing each type of training is hypothesised to depend on the relative costs and benefits of investing in training in line with the skills needed to enhance labour productivity. Meanwhile, for policy implication, the findings on the importance of investment in human capital and R&D provide recommendations for government to design financial incentives and favourable tax policies that encourage individuals and employers to invest in post-compulsory education and in-service training for all workers.

For the second objective, this study is among the pioneer works that explore the impact of technology spillovers through the channel of FDI and trade upon relative demand for skilled labour in the Malaysian manufacturing industries. The impact of FDI on demand for skilled labour is still absent from the empirical literature and is still under scrutiny, particularly in developing countries and at the industry level (Pinn et al., 2011). The effect of technology spillovers via FDI must be investigated because Malaysia is among the major FDI recipient countries of the South East Region, but the benefit of the FDI spillovers to skill upgrading remains ambiguous (Masron, Zulkafli, & Ibrahim, 2012). Therefore, the findings from this study can potentially contribute to the long-run FDI policy, especially to encourage FDI inflows into low receiving industries. This is in line with the government's aim to increase the number of skilled labour towards high-income countries (EPU & World Bank, 2007).

In terms of methodology, the estimation of labour demand usually requires a panel data analysis, which is rare in industry-level work (Hansson, 2005). Many previous studies show the positive results of technology spillover effects, but these results suffer from aggregation bias or failure to control for endogeneity due to limited panel data at the industry level and also difficulty to find instrumental variables (Keller, 2004). Consequently, by using panel data at the industry level, this study employs a more advanced dynamic panel econometric technique that formally addresses industry-specific effects and simultaneity bias.

For the third objective, this study provides new evidence by examining the return to education at different levels of qualification in the economic sector because, to date, this has not been adequately discussed in the Malaysian literature. An investigation into the private return to education at different levels of qualification in the New Key Economic Area (NKEA) sectors is important, because these sectors potentially contribute to job creation and enhance the nation's productivity growth towards a high-income economy. The return to education is a powerful tool for educational decision making, since it calculates how much return from the investment has been made, thereby, the information of return to education is valuable for stakeholders for several reasons. For individuals, the information on the return to education is helpful in assessing whether it is efficient to opt for extra education. The findings from the return to education at different levels of qualification act as a useful indicator of productivity of education and as an incentive for individuals to invest in their own human capital. The findings from this study may contribute to solving the problem of mismatch between the education profile/qualification and the skill demand in a firm, as there are very few studies identifying mismatch in Malaysia. The issues of educational mismatch should be given special attention, as the number of students completing their study at all levels of qualification keeps increasing year by year. This is because much of the apparent fall in the return to education, particularly for new graduates, is concentrated specifically on graduates who fail to get graduate-level jobs as the demand for qualified people varies between industries (EPU & Bank, 2012). For instance, if there is a decrease in the return to education, it reflects that the available skills among qualified workers do not move in line with the changing sector's needs because of both educational and skill mismatches (Quintini, 2011; Kiker, Santos, & De Oliveira, 1997; Büchel,2002; Green & Zhu 2010; Verhaest & Omey, 2006, 2009). Consequently, the result will provide new, in-depth guidance for fresh graduates to choose an appropriate career or job that matches with their level of qualifications.

Meanwhile, for policy makers with scarce resources to allocate between competing policies, the result of the return to education study provides valuable information for the decision to provide extra funds for education. The magnitude of the return to education is important for assessing the efficiency of public investment in education and thus allows the government to decide whether to increase spending on higher education, including scholarships and other financial assistance. This is especially true if additional provisions on education can produce quality human capital that enables an increase in the productivity of the country. The result of a study on the return to education at different levels of qualification in the economic sector will not only potentially inform policy makers of the effectiveness of different types of qualification, but also determine the labour supply and demand conditions in the economic sector.

1.4 Organisation of the Study

The organisation of this study is structured as follows. Chapter 1 discusses the background of the study, the problem statement, objectives of the study and the significance of the study related to the issues of human capital, R&D and technology spillovers and their impact on labour. Chapter 2 provides a theoretical review and discusses the various empirical works from the literature according to the objectives of the study. Specifically, the first part of Chapter 2 starts with a review of the theoretical framework and is followed by empirical studies of human capital, R&D and productivity. The second part of Chapter 2 discusses the theoretical frameworks and empirical works of technology spillovers via FDI and trade on the relative demand for skilled labour. Lastly, chapter 2 discusses theory of human capital related to education, and this is followed by empirical evidence of the return to education.

Chapter 3 provides the methodology of study. This chapter starts with the theoretical model, empirical model and econometric specification according to the objectives of the study. For the first and second objectives, this study employs the System Generalised Method of Moments (SYS-GMM) to estimate the labour productivity and skilled labour demand labour functions. For the third objective, the Ordinary Least Square (OLS) estimator is applied by using regression with robust standard errors. The last section in Chapter 3 provides a description of data sources and the scope of study.

Chapter 4 provides a descriptive statistic for a household income survey for the years 2002, 2004 and 2007. The descriptive statistic in this chapter is utilised to accomplish the analysis result of the return to education at different levels of qualification in Chapter 5. The first section in this chapter discusses the general distribution of household by economy sector, level of education and the highest certificate achieved. The last section of Chapter 4 provides a detailed descriptive statistic of occupation distribution of the highest certificate by economic sector, and this is followed by descriptive statistics of the years of work experience in the economy sector.

Chapter 5 presents empirical results. The first section of Chapter 5 discusses the results of the impact of human capital and R&D investments on labour productivity. Following that, the second section in Chapter 5 discusses the results of the effect of technology spillovers on demand for skilled labour. The last part of Chapter 5 discusses the results of the return to education at different levels of qualification in the economic sector. Chapter 6 provides a summary, policy implications and limitations of the study and provides suggestions for further research.

REFERENCES

Abraham, K. G., & Farber, H. S. (1987). Job duration, seniority, and earnings: *American Economic Review, 77*(3), 278-297.

Acemoglu, D. (1997). Training and innovation in an imperfect labour market. *The Review of Economic Studies, 64*(3), 445-464.

Acemoglu, D. (1998). Why do new technologies complement skills? Directed technical change and wage inequality. *The Quarterly Journal of Economics, 113*(4), 1055-1089.

Acemoglu, D. (2002). Technical change, inequality, and the labor market. *Journal of Economic Literature, 40*(1),7-72.

Acemoglu, D., & Pischke, J. S. (1999). Beyond Becker: training in imperfect labour markets. *The Economic Journal, 109*(453), 112-142.

Acemoglu, D., Aghion, P., &Zilibotti, F. (2006). Distance to frontier, selection, and economic growth. *Journal of the European Economic Association, 4*(1), 37-74.

Adams, J. D. (1999). The structure of firm R&D, the factor intensity of production, and skill bias. *Review of Economics and Statistics, 81*(3), 499-510.

Afrooz, A., Rahim, K. B. A., Noor, Z. B. M., & Chin, L. (2010). Human Capital and Labor Productivity in Food Industries of Iran. *International Journal of Economics and Finance, 2*(4), 47-57.

Aghion, P., & Howitt, P. (1992). A model of growth through creative destruction. *Econometrica, 60*(1), 323-351.

Aghion, P., Howitt, P., & García-Peñalosa, C. (1998). *Endogenous growth theory*. United States of America: MIT Press.

Aitken, B. J., & Harrison, A. E. (1999). Do domestic firms benefit from direct foreign investment? Evidence from Venezuela. *American Economic Review, 19*(2), 605-618.

Albuquerque, R. (2003). The composition of international capital flows: Risk sharing through foreign direct investment. *Journal of International Economics, 61*(2), 353-383.

Allen, J., & Van der Velden, R. (2001). Educational mismatches versus skill mismatches: effects on wages, job satisfaction, and on-the-job search. *Oxford Economic Papers, 53*(3), 434-452.

Angrist, J. D., & Krueger, A. B. (1991). Does compulsory school attendance affect schooling and earnings? : *Quarterly Journal of Economic,106* (2), 979-1014.

APO. (2011). *Asian Productivity Databook 2011*. Tokyo: Asian Development Bank.

Araújo, B. C., Bogliacino, F., & Vivarelli, M. (2009). The role of skill enhancing trade in Brazil: Some Evidence from Micro data. *Economic Research Papers, 97*(10), 1-22.

Arellano, M., & Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies, 58*(2), 277.

Arellano, M., & Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics, 68*(1), 29-51.

Ariff, M., Yokoyama, H., & Kenkyūjo, A. K. (1992). *Foreign Direct Investment in Malaysia: Trends, Determinants and Implications.* Tokyo: Institute of Developing Economies.

Atrostic, B. K., & Nguyen, S. V. (2005). IT and productivity in US manufacturing: Do computer networks matter? *Economic Inquiry, 43*(3), 493-506.

Aslam, M. (2009). Education gender gaps in Pakistan: Is the labor market to blame? *Economic Development and Cultural Change, 57*(4), 747-784.

Assaad, R. (1997). The effects of public sector hiring and compensation policies on the Egyptian labor market. *The World Bank Economic Review, 11*(1), 85-118.

Athukorala, P.-c., & Yamashita, N. (2006). Production fragmentation and trade integration: East Asia in a global context. *The North American Journal of Economics and Finance, 17*(3), 233-256.

Baldwin, J., & Johnson, J. (1995). Human capital development and innovation: The case of training in small and medium sized-firms: *Futures, 28*(2), 103-119.

Ballot, G., Fakhfakh, F., & Taymaz, E. (2001). Firms' human capital, R&D and performance: A study on French and Swedish firms. *Labour Economics, 8*(4), 443-462.

Balmaceda, F. (2005). Firm-Sponsored General Training. *Journal of Labor Economics, 23*(1), 115-133.

Bandick, R., & Hansson, P. (2009). Inward FDI and demand for skills in manufacturing firms in Sweden. *Review of World Economics, 145*(1), 111-131. doi: 10.1007/s10290-009-0002-9

Barrett, A., & O'Connell, P. J. (2001). Does training generally work? The returns to in-company training. *Industrial and Labor Relations Review, 5*(2),647-662.

Bartel, A. P. (1994). Productivity gains from the implementation of employee training programs. *Industrial Relations: Journal of Economy and Society, 33(4), 411-425.*

Bartel, A. P., & Lichtenberg, F. R. (1987). The comparative advantage of educated workers in implementing new technology. *The Review of Economics and Statistics, 49*(1), 1-12.

Bartel, A. P., & Lichtenberg, F. R. (1991). The age of technology and its impact on employee wages. *Economics of Innovation and New technology, 1*(3), 215-231.

Bartel, A. P., & Sicherman, N. (1998). Technological change and the skill acquisition of young workers. *Journal of Labour Economics, 16*(4),718-755.

Becker, G. S. (1962). Investment in human capital: A theoretical analysis. *Journal of Political Economy,70*(5), 9-49.

Becker, G. S. (1967). Human capital and the personal distribution of income: An analytical approach. *Journal of Political Economy, 8(*1), 281-302.

Becker, G. S. (1973). *Human capital: A theoretical and empirical analysis, with special reference to education* (pp. 1-22). New York: National Bureau of Economic Research Publishing.

Belorgey, N., Lecat, R., & Maury, T.-P. (2006). Determinants of productivity per employee: An empirical estimation using panel data. *Economics Letters, 91*(2), 153-157.

Bennell, P., & Segerstrom, J. (1998). Vocational education and training in developing countries: Has the World Bank got it right? *International Journal of Educational Development, 18*(4), 271-287.

Berman, E., Bound, J., & Griliches, Z. (1994). Changes in the demand for skilled labor within US manufacturing industries: Evidence from the annual survey of manufacturing. *Quarterly Journal of Economics, 16*(3),367-397.

Bishop, J. (1989). Is the test score decline responsible for the productivity growth decline? *The American Economic Review, 5*(1),178-197.

Bishop, J. (1994). *The impact of previous training on productivity and wages*. Chicago: University of Chicago Press.

Black, S. E., Devereux, P. J., & Salvanes, K. G. (2003). Why the apple doesn't fall far: Understanding intergenerational transmission of human capital. *American Economic Review, 95*(1), 437-449.

Black, S. E., & Lynch, L. M. (1996). Human-capital investments and productivity. *American Economic Review, 86*(2), 263-267.

Black, S. E., & Lynch, L. M. (2001). How to compete: the impact of workplace practices and information technology on productivity. *Review of Economics and Statistics, 83*(3), 434-445.

Blomström, M., Fors, G., & Lipsey, R. E. (1997). Foreign direct investment and employment: Home country experience in the United States and Sweden. *The Economic Journal, 107*(445), 1787-1797.

Blomström, M., & Kokko, A. (1998). Multinational corporations and spillovers. *Journal of Economic Surveys, 12*(3), 247-277.

Blonigen, B. A., & Slaughter, M. J. (2001). Foreign-Affiliate Activity and U.S. Skill Upgrading. *The Review of Economics and Statistics, 83*(2), 362-376.

Blundell, R., & Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Econometrics, 87*(1), 115-143.

Blundell, R., Bond, S., & Windmeijer, F. (2001). *Estimation in dynamic panel data models: Improving on the performance of the standard GMM estimator*. Working Paper Series (W00/12). London: Institute for Fiscal Studies.

Blundell, R., Dearden, L., Meghir, C., & Sianesi, B. (1999). Human capital investment: The returns from education and training to the Individual, the firm and the economy. *Fiscal Studies, 20*(1), 1-23.

Blundell, R., Dearden, L., & Sianesi, B. (2004). *Evaluating the impact of education on earnings in the UK: Models, methods and results.* London: Centre for the Economics of Education.

Bol, T., & Van de Werfhorst, H. G. (2011). Signals and closure by degrees: The education effect across 15 European countries. *Research in Social Stratification and Mobility, 29*(1), 119-132.

Booth, A. L., & Snower, D. J. (1996). *Acquiring skills: Market failures, their symptoms and policy responses*. New York: Cambridge University Press.

Branstetter, L. (2006). Is foreign direct investment a channel of knowledge spillovers? Evidence from Japan's FDI in the United States. *Journal of International Economics, 68*(2), 325-344.

Bravo-Ortega, C., & García Marín, Á. (2011). R&D and productivity: A two way avenue? *World Development, 39*(7), 1090-1107.

Brynjolfsson, E., & Hitt, L. M. (2003). Computing productivity: Firm-level evidence. *Review of Economics and Statistics, 85*(4), 793-808.

Bronzini, R., & Piselli, P. (2009). Determinants of long-run regional productivity with geographical spillovers: The role of R&D, human capital and public infrastructure. *Regional Science and Urban Economics, 39*(2), 187-199.

Brunello, G., & Medio, A. (2001). An explanation of international differences in education and workplace training. *European Economic Review, 45*(2), 307-322. doi: 10.1016/s0014-2921(99)00065-3

Bruno, G. S. F., Crinò, R., & Falzoni, A. M. (2012). Foreign Direct Investment, Trade, and Skilled Labour Demand in Eastern Europe. *Review of Labour Economics and Industrial Relation, 26*(4), 492-513. doi: 10.1111/labr.12001.

Büchel, F. (2002). The effects of overeducation on productivity in Germany—the firms' viewpoint. *Economics of Education Review, 21*(3), 263-275.

Buchinsky, M. (1994). Changes in the U.S. Wage Structure 1963-1987: Application of Quantile Regression. *Econometrica, 62*(2), 405-458. doi: 10.2307/2951618

Buckley, P. J., Clegg, J., & Wang, C. (2007). Is the relationship between inward FDI and spillover effects linear? An empirical examination of the case of China. *Journal of International Business Studies, 38*(3), 447-459.

Calderon, C., Chong, A., & Loayza, N. (2002). Determinants of current account deficits in developing countries. *Contributions to Macroeconomics,2*(1), Article 2.

Cantwell, J. (2000). *A survey of theories of international production*. *The nature of the transnational firm.* United States: Physocology Press.

Caponi, V., & Plesca, M. (2009). Post-secondary education in Canada: can ability bias explain the earnings gap between college and university graduates? *Canadian Journal of Economics, 42*(3), 1100-1131.

Card, D. (1995). The wage curve: a review. *Journal of Economic Literature, 33*(2), 785-799.

Caroli, E., & Van Reenen, J. (2001). Skill-biased organizational change? Evidence from a panel of British and French establishments. *Quarterly Journal of Economics*, *116* (4), 1449-1492.

Carruth, A., Collier, W., & Dickerson, A. (2004). Inter-industry wage differences and individual heterogeneity. *Oxford Bulletin of Economics and Statistics, 66*(5), 811-846.

Chan, F. M. (2002). *ICT in Malaysian schools: Policy and strategies.* Paper presented at the Seminar/Workshop on the Promotion of ICT Education to Narrow the Digital Divide.Tokyo, Japan. 15–22 October. Malaysia: Ministry of Education.

Chang, C.-L., & Oxley, L. (2009). Industrial agglomeration, geographic innovation and total factor productivity: The case of Taiwan. *Mathematics and Computers in Simulation, 79*(9), 2787-2796.

Chang, C.-L., & Robin, S. (2008). Public policy, innovation and total factor productivity: An application to Taiwan's manufacturing industry. *Mathematics and Computers in Simulation, 79*(3), 352-367.

Chapman, B. J., & Tan., H. W. (1990). *An analysis of youth training in Australia, 1985-86: Technological change and wages*. *Youth in the Eighties.* Australian Longitudinal Research Project (CEPR, Canberra, 1992: 99-125). Australia: Australian National University.

Chaudhary, L., & Cellini, S. R. (2012). The labor market returns to a for-profit college education. *Economics of Education Review, 43*(0), 125-140. doi: http://dx.doi.org/10.1016/j.econedurev.2014.10.001

Chennells, L., & Van Reenen, J. (1999). *Has technology hurt less skilled workers. An econometric survey of the effects of technical change and the structure of pay and jobs*. Working Paper (No.9927).

Cheung, K.-y., & Lin, P. (2004). Spillover effects of FDI on innovation in China: Evidence from the provincial data. *China Economic Review, 15*(1), 25-44.

Chirwa, E. W., & Matita, M. M. (2009). *The rate of return of education in Malawi*. Working Paper (No. 2009/01). Malawi: Department of Economic, University of Malawi.

Chiswick, B. (1973). *Schooling, screening, and income. Does college matter* (pp.151-158).New York: Academic Press.

Chung, T. P. (2004). The returns to education and training: evidence from the Malaysian family life surveys. *Pacific Economic Review, 9*(2),103-116.

Coe, D. T., & Helpman, E. (1995). International R&D spillovers. *European Economic Review, 39*(5), 859-887.

Cohen, W. M., & Klepper, S. (1996). Firm size and the nature of innovation within industries: the case of process and product R&D. *The Review of Economics and Statistics, 35*(1),232-243.

Colombo, E., & Stanca, L. (2008). *The impact of training on productivity: evidence from a large panel of firms*. Working Papers (No.134). Italy: Department of Economics, University Of Milan - Bicocca.

Conner, K. R. (1991). A historical comparison of resource-based theory and five schools of thought within industrial organization economics: do we have a new theory of the firm? *Journal of management, 17*(1), 121-154.

Cortez, W. W. (2001). What is Behind Increasing Wage Inequality in Mexico? *World Development, 29*(11), 1905-1922.

Corvers, F. (1997). The impact of human capital on labour productivity in manufacturing sectors of the European Union. *Applied Economics, 29*(8), 975-987.

Crespi, G., & Zuniga, P. (2012). Innovation and Productivity: Evidence from Six Latin American Countries. *World Development, 40*(2), 273-290. doi: http://dx.doi.org/10.1016/j.worlddev.2011.07.010

Davidson, & MacKinnon. (2004). *Econometric Theory and Methods*. New York: Oxford University Press.

De Grip, A., & Sauermann, J. (2013). The effect of training on productivity: The transfer of on-the-job training from the perspective of economics. *Educational Research Review, 8*(3), 28-36.

Dearden, L., McIntosh, S., Myck, M., & Vignoles, A. (2002). The Returns to Academic and Vocational Qualifications in Britain. *Bulletin of Economic Research, 54*(3), 249-274. doi: 10.1111/1467-8586.00152

Dearden, L., Reed, H., & Van Reenen, J. (2000). *Who gains when workers train? Training and corporate productivity in a panel of British industries*. IFS Working Papers (W00/04). London, UK : Institute for Fiscal Studies.

Dearden, L., Reed, H., & Van Reenen, J. (2006). The Impact of Training on Productivity and Wages: Evidence from British Panel Data. *Oxford Bulletin of Economics and Statistics, 68*(4), 397-421.

Denison, E. F., Poullier, J. P., & Institution, B. (1967). *Why growth rates differ: postwar experience in nine western countries* (Vol. 198). Washington: Brookings Institution.

Desjardins, R., & Rubenson, K. (2011). *An analysis of skill mismatch using direct measures of skills.* OECD Education Working Papers (No. 63). France: Organisation for Economic Co-operation and Development.

Devereux, P. J., & Fan, W. (2011). Earnings returns to the British education expansion. *Economics of Education Review, 30*(6), 1153-1166.

Dolado, J. J., & Llorens, V. (2004). *Gender wage gaps by education in Spain: glass floors versus glass ceilings*. Spain:Centre for Economic Policy Research.

DOS.(2002). *Household Income Survey, 2002.* Malaysia: Department of Statistic.

DOS.(2008). *Statistic of employment in wholesale & retail trade, 2001-2008*. Malaysia: Department of Statistic.

Dolton, P. J., & Silles, M. A. (2008). The effects of over-education on earnings in the graduate labour market. *Economics of Education Review, 27*(2), 125-139.

Duncan, G. J., & Hoffman, S. D. (1982). The incidence and wage effects of overeducation. *Economics of Education Review, 1*(1), 75-86.

Dunning, J. H., & Rugman, A. M. (1985). The Influence of Hymer's Dissertation on the Theory of Foreign Direct Investment. *The American Economic Review, 75*(2), 228-232.

Duranton, G. (1999). Trade, wage inequalities and disparities between countries: The technology connection. *Growth and change, 30*(4), 455-478.

Dustmann, C., & Meghir, C. (2005). Wages, experience and seniority. *The Review of Economic Studies, 72*(1), 77-108.

Egger, P., & Stehrer, R. (2003). International outsourcing and the skill–specific wage bill in eastern Europe. *The World Economy, 26*(1), 61-72.

EPU. (2006). *Ninth Malaysia Plan, 2006-2010*. Malaysia: Economic Planning Unit, Prime Minister's Department, Putrajaya.

EPU. (2010a). *Tenth Malaysia Plan, 2011-2015*. Malaysia: Economic Planning Unit., Prime Minister's Department, Putrajaya .

EPU (2010b).Economic Transformation Programme Handbook. A Roadmap for Malaysia. *Chapter 8: Building a more dynamic retail market***.** Malaysia: Economic Planning Unit, Putrajaya.

EPU, & World Bank (2007a). *Malaysia and the knowledge economy: Building a world-class higher education system* (pp. 1-258): Malaysia: Economic Planning Unit., Prime Minister's Department, Putrajaya .

EPU, & World Bank (2007b). *Productivity and investment climate survey*. Malaysia: Economic Planning Unit., Prime Minister's Department, Putrajaya .

EPU, & World Bank (2010). *Malaysia Economic Monitor:Growth through innovation*. Malaysia: Economic Planning Unit., Prime Minister's Department, Putrajaya .

EPU, & World Bank (2012). *Malaysia Economic Monitor. Chapter3: Modern jobs: higher wages, secure workers, competitive firms*. Malaysia: Economic Planning Unit, Putrajaya.

Fägerlind, I., & Saha, L. J. (1997). *Education and National Development*: New Delhi: Reed Educational and Professional Publishing Ltd.

Fajnzylber, P., & Fernandez, A. M. (2009). International economic activities and skilled labour demand: evidence from Brazil and China. *Applied Economics, 41*(5), 563-577.

Feenstra, R. C. (1998). Integration of trade and disintegration of production in the global economy. *The Journal of Economic Perspectives, 12*(4), 31-50.

Feenstra, R. C., & Hanson, G. H. (1996a). Globalization, outsourcing, and wage inequality. *American Economic Review, 86,* 240-245.

Feenstra, R. C., & Hanson, G. H. (1996b). Foreign Investment, outsourcing and relative wages. *Journal of International Economics, 42*(4), 371-393.

Feenstra, R. C., & Hanson, G. H. (1997). Foreign direct investment and relative wages: Evidence from Mexico's maquiladoras. *Journal of International Economics, 42*(3–4), 371-393. doi: 10.1016/s0022-1996(96)01475-4

Feenstra, R. C., & Hanson, G. H. (1999). The impact of outsourcing and high-technology capital on wages: estimates for the United States, 1979–1990. *The Quarterly Journal of Economics, 114*(3), 907-940.

Fernandez, A. M., & Fajnzylber, P. (2004). *International Technology Diffusion and the Demand for Skilled Labor: Evidence from East Asia and Latin America.* Paper presented at the Econometric Society 2004 Latin American Meetings, June 22, 2004 (pp.1-42). Washington DC: World Bank.

Figini, P., & Görg, H. (1999). Multinational companies and wage inequality in the host country: the case of Ireland. *Review of World Economics, 135*(4), 594-612.

Fischer, M., Bartkowska, M., Riedl, A., Sardadvar, S., & Kunnert, A. (2009). The impact of human capital on regional labor productivity in Europe. *Letters in Spatial and Resource Sciences, 2*(2), 97-108.

Frantzen, D. (2000). R&D, Human Capital and International Technology Spillovers: A Cross-country Analysis. *The Scandinavian Journal of Economics, 102*(1), 57-75.

Freeman, R. B. (1976). *The overeducated american*: New York: Academic Press.

Frenette, M. (2004). The overqualified Canadian graduate: the role of the academic program in the incidence, persistence, and economic returns to overqualification. *Economics of Education Review, 23*(1), 29-45.

Geishecker, I. (2002). *Outsourcing and the demand for low-skilled labour in German manufacturing: new evidence*. DIW Discussion Paper(No. 313). German: Department of Business and Economics, University of Berlin.

Geishecker, I., & Görg, H. (2005). *Winners and losers: Fragmentation, trade and wages revisited*. IZA Discussion Paper (No. 982). Retreived from http://ssrn.com/abstract=494083.

Girma, S., Greenaway, D., & Wakelin, K. (2001). Who Benefits from Foreign Direct Investment in the UK? *Scottish Journal of Political Economy, 48*(2), 119-133.

Glaeser, E. L., & Resseger, M. G. (2010). The complementarity between cities and skills. *Journal of Regional Science, 50*(1), 221-244.

Glass, A. J., & Saggi, K. (2002). Multinational Firms and Technology Transfer. *The Scandinavian Journal of Economics, 104*(4), 495-513. doi: 10.2307/3440978

Goedhuys, M., Janz, N., & Mohnen, P. (2008). What drives productivity in Tanzanian manufacturing firms: technology or business environment? *The European Journal of Development Research, 20*(2), 199-218.

Gould, D. M., & Gruben, W. C. (1996). The role of intellectual property rights in economic growth. *Journal of Development Economics, 48*(2), 323-350.

Görg, H., & Greenaway, D. (2004). Much ado about nothing? Do domestic firms really benefit from foreign direct investment? *The World Bank Research Observer, 19*(2), 171-197.

Green, F., & Zhu, Y. (2010). Overqualification, job dissatisfaction, and increasing dispersion in the returns to graduate education. *Oxford Economic Papers, 62*(4), 740-763.

Griliches, Z. (1979). Issues in assessing the contribution of research and development to productivity growth. *Bell Journal of Economics, 10(1), 92-116.*

Griliches, Z. (1980). R&D and the Productivity Slowdown: *National Bureau of Economic Research Books*.United States of America: Cambridge, Mass.

Griliches, Z. (1995). *R&D and productivity: Econometric Results and Measurement Issues.* United States of America: Blackwell Press.

Griliches, Z., & Mairesse, J. (1998). *Production functions: The search for identification: Econometrics and economic theory in the 20th century.* Cambridge: University Press.

Groot, W., & Maassen Van Den Brink, H. (2000). Overeducation in the labor market: a meta-analysis. *Economics of Education Review, 19*(2), 149-158.

Grossman, G. M., & Helpman, E. (1991). *Innovation and growth in the global economy*. United States of America: MIT press.

Hall, B. H., Mairesse, J., & Mohnen, P. (2010). Measuring the Returns to R&D. *Handbook of the Economics of Innovation, 2*, 1033-1082.

Handel, M. J. (2003). Skills Mismatch in the Labor Market. *Annual Review of Sociology, 29*, 135-165.

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica: Journal of the Econometric Society*, 1029-1054.

Hansson, P. (2005). Skill upgrading and production transfer within Swedish Multinationals. *Scandinavian Journal of Economics, 107*(4), 673-692.

Harmon, C., Oosterbeek, H., & Walker, I. (2003). The Returns to Education: Microeconomics. *Journal of Economic Surveys, 17*(2), 115-156.

Hartog, J. (1980). Earnings and capability requirements. *The Review of Economics and Statistics, 62*(2), 230-240.

Haskel, J., & Martin, C. (1993). Do Skill Shortages Reduce Productivity? Theory and Evidence from the United Kingdom. *The Economic Journal, 103*(417), 386-394.

Haskel, J. E., & Slaughter, M. J. (2002). Does the sector bias of skill-biased technical change explain changing skill premia? *European Economic Review, 46*(10), 1757-1783.

Hejazi, W., & Safarian, A. E. (1999). Trade, foreign direct investment, and R&D spillovers. *Journal of International Business Studies*, *5*(2), 491-511.

Heshmati, A., & Kim, H. (2011). The R&D and productivity relationship of Korean listed firms. *Journal of Productivity Analysis*, *36*(2), 125-142.

Hijzen, A., Görg, H., & Hine, R. C. (2003). International fragmentation and relative wages in the UK. (IZA Discussion Paper No. 717). Available at SSRN: http://ssrn.com/abstract=385170

Hijzen, A., Görg, H., & Hine, R. C. (2005). International Outsourcing and the Skill Structure of Labour Demand in the United Kingdom. *The Economic Journal, 115*(506), 860-878.

Hollanders, H., & Ter Weel, B. (2002). Technology, knowledge spillovers and changes in employment structure: evidence from six OECD countries. *Labour Economics*, *9*(5), 579-599.

Hsieh, C. T. (2005). The impact of outsourcing to China on Hong Kong's labor market. *The American Economic Review, 95*(5), 1673-1687.

Huber, P. J. (1992). *Robust Estimation of a Location Parameter*. *Breakthroughs in Statistics* (pp. 492-518). New York: Springer.

Huselid, M. A., & Becker, B. E. (1996). Methodological issues in cross-sectional and panel estimates of the human resource firm performance link. *Industrial Relations: A Journal of Economy and Society*, *35*(3), 400-422.

Ismail, R., & Yussof, I. (2003). Labour market competitiveness and foreign direct investment: The case of Malaysia, Thailand and the Philippines. *Papers in Regional Science, 82*(3), 389-402.

Javorcik, B. S. (2004). Does foreign direct investment increase the productivity of domestic firms? In search of spillovers through backward linkages. *The American Economic Review, 94*(3), 605-627.

Jenkins, A., Greenwood, C., & Vignoles, A. (2007). *The returns to qualifications in England: Updating the evidence base on level 2 and level 3 vocational qualifications*. Retrieved from: http://eprints.lse.ac.uk/19378/

Johansson, B., & Lööf, H. (2008). *The impact of firm's R&D strategy on profit and productivity*. CESIS Electronic Working Paper Series (No. 156). Retrieved from Centre of Excellence for Science and Innovation Studies (CESIS) website: http://www.cesis.se.

Jorgenson, D. W., Gollop, F. M., & Fraumeni, B. M. (1987). *Productivity and US economic growth*: Harvard: University Press Cambridge, MA.

Kafouros, M. I., & Wang, C. (2008). The role of time in assessing the economic effects of R&D. *Industry and Innovation*, *15*(3), 233-251.

Kampelmann, S., & Rycx, F. (2012). The impact of educational mismatch on firm productivity: Evidence from linked panel data. *Economics of Education Review, 31*(6), 918-931.

Kanji, G. K., Malek, A., & Tambi, B. A. (1999). Total quality management in UK higher education institutions. *Total Quality Management, 10*(1), 129-153.

Karuppiah, K. (2004). *Education and training practices in four selected Malaysian Manufacturing Companies.* Masters thesis, Universiti Putra Malaysia.

Katz, L. F., & Autor, D. H. (1999). Chapter 26 Changes in the wage structure and earnings inequality. In C. A. Orley & C. David (Eds.). *Handbook of Labor Economics* (Vol.3, Part A, pp. 1463-1555): Elsevier.

Katz, L. F., & Murphy, K. M. (1992). Changes in relative wages, 1963–1987: supply and demand factors. *The Quarterly Journal of Economics, 107*(1), 35-78.

Keller, W. (2004). International technology diffusion. *Journal of Economic Literature, 42*(3), 752-782.

Kenayathulla, H. B. (2013). Higher levels of education for higher private returns: New evidence from Malaysia. *International Journal of Educational Development, 33*(4), 380-393.

Kharas, H. J., Zeufack, A. G., Majeed, H., & Nasional, K. (2010). *Cities, People & the Economy: A Study on Positioning Penang.* Kuala Lumpur: Khazanah Nasional.

Kijima, Y. (2006). Why did wage inequality increase? Evidence from urban India 1983–99. *Journal of Development Economics, 81*(1), 97-117.

Kiker, B. F., & Roberts, R. B. (1984). A note on the effect of schooling, experience and aging on wage growth. *Economics of Education Review, 3*(2), 155-158.

Kiker, B. F., Santos, M. C., & De Oliveira, M. M. (1997). Overeducation and undereducation: evidence for Portugal. *Economics of Education Review, 16*(2), 111-125.

Klette, T. J., & Griliches, Z. (2000). Empirical patterns of firm growth and R&D investment: A quality ladder model interpretation. *The Economic Journal, 110*(463), 363-387.

Kneller, R., & Stevens, P. A. (2006). Frontier Technology and Absorptive Capacity: Evidence from OECD Manufacturing Industries*. *Oxford Bulletin of Economics and Statistics, 68*(1), 1-21.

Kohpaiboon, A. (2006). Foreign direct investment and technology spillover: A cross-industry analysis of Thai manufacturing. *World Development, 34*(3), 541-556.

Konings, J. (2001). The effects of foreign direct investment on domestic firms. *Economics of Transition, 9*(3), 619-633. doi: 10.1111/1468-0351.00091

Konings, J., & Vanormelingen, S. (2010). The impact of training on productivity and wages: Firm level evidence. *Review of Economics and Statistics, 1*(0), 8-12. doi:10.1162/REST_a_00460.

Kopczuk, W., Saez, E., & Song, J. (2010). Earnings inequality and mobility in the United States: evidence from social security data since 1937. *The Quarterly Journal of Economics, 125*(1), 91-128.

Lamo, A., & Messina, J. (2010). Formal education, mismatch and wages after transition: Assessing the impact of unobserved heterogeneity using matching estimators. *Economics of Education Review, 29*(6), 1086-1099.

Lazear, E. P. (1976). Age, experience and wage growth. *American Economic Review, 66*(1), 548-558.

Leamer, E. E. (1994). *Trade, wages and revolving door ideas*. NBER Working Paper Series (No. 4716). Retrieved from National Bureau of Economic Research website: http://www.nber.org/papers/w4716.

Lee, E., & Vivarelli, M. (2006). The social impact of globalization in the developing countries. *International Labour Review, 145*(3), 167-184.

Lee, J.-W., & Wie, D. (2015). Technological Change, Skill Demand, and Wage Inequality: Evidence from Indonesia. *World Development, 67*, 238-250.

Lee, M. N. N. (2004). Global trends, national policies and institutional responses: Restructuring higher education in Malaysia. *Educational Research for Policy and Practice, 3*(1), 31-46.

Leng, K. S. (2012). From tellers to sellers to thinkers: the case of Malaysian banks. *Journal of Human Capital Development*, ISSN: 1985-7012 Vol. 5(1).

Levin, H. M., & McEwan, P. J. (2002). *Cost-effectiveness and educational policy*: *Eye on education*. New York: American Education Finance Association.

Levy, F., & Murnane, R. J. (2003). The skill content of recent technological change: An empirical exploration. *The Quarterly Journal of Economics, 118*(4), 1279-1333.

Lichtenberg, F. R., & Siegel, D. (1991). The impact of R&D investment on productivity–New evidence using linked R&D–LRD data. *Economic Inquiry, 29*(2), 203-229.

Lillard, L. A., & Kilburn, M. R. (1997). Simultaneity of Ability and Education: Family Fixed Effect Estimates. *Unpublished paper. Rand Corporation*.

Lynch, L. M. (1992). Private-sector training and the earnings of young workers. *The American Economic Review, 82*(1), 299-312.

Machin, S. (2002). The changing nature of labour demand in the new economy and skill-biased technology change. *Oxford Bulletin of Economics and Statistics, 63*(1), 753-776.

Machin, S., & McNally, S. (2007). Tertiary education systems and labour markets. *Review of Tertiary Education* (pp. 1-57). London: Education and Training Policy Division, OECD.

Machin, S., & Van Reenen, J. (1998). Technology and changes in skill structure: evidence from seven OECD countries. *The Quarterly Journal of Economics, 113*(4), 1215-1244.

MacDonald, G., & Weisbach, M. (2001). The economics of has-beens. *Journal of Political Economy, 112*(2), 289-310.

Mahadevan, R. (2002). *New Currents in Productivity Analysis: Where To Now?* : Tokyo: Asian Productivity Organization.

Mahy, B., Rycx, F., & Vermeylen, G. (2013). *Educational mismatch and firm productivity: Do skills, technology and uncertainty matter?* Working Paper Series (pp.1-35). Belgium:Walloon Institute for Evaluation, Prospective and Statistics (IWEPS).

MOH. (2004). *Malaysia's Health 2004*. Malaysia:Ministry of Health.

Manda, D., & Bigsten, A. (1998). C*hanges to returns to education overtime in Kenya*. Kenya: Oxford University Press.

Mario, C. (2009). What is the optimal rate of R&D investment to maximize productivity growth? *Technological Forecasting and Social Change, 76*(3), 433-446.

Markusen, J. R., & Venables, A. J. (1998). Multinational firms and the new trade theory. *Journal of International Economics, 46* (1),183-204.

Martins, P. S., & Pereira, P. T. (2004). Does education reduce wage inequality? Quantile regression evidence from 16 countries. *Labour Economics, 11*(3), 355-371. doi: 10.1016/j.labeco.2003.05.003

Mason, G., & Finegold, D. (1997). Productivity, machinery and skills in the United States and Western Europe. *National Institute Economic Review, 162*(1), 85.

Masron, T. A., Zulkafli, A. H., & Ibrahim, H. (2012). Spillover Effects of FDI within Manufacturing Sector in Malaysia. *Procedia - Social and Behavioral Sciences, 58*(0), 1204-1211.

MASTIC.(2008). *National survey of research and development*. Malaysia: Malaysian Science and Technology Information Centre, Ministry of Science,Technology and Innovation.

Mazumdar, J., Quispe-Agnoli, M., & Atlanta, F. R. B. o. (2002). *Trade and the skill premium in developing countries: the role of intermediate goods and some evidence from Peru*: Federal Reserve Bank of Atlanta.

McGuinness, S. (2003). Graduate overeducation as a sheepskin effect: evidence from Northern Ireland. *Applied Economics, 35*(5), 597-608.

McNabb, R., & Said, R. (2013). Trade Openness and Wage Inequality: Evidence for Malaysia. *The Journal of Development Studies*(ahead-of-print), 1-15.

Mei-ci, Y. (2010). *International trade, technology spillover, and skill demand in developing countries*.Paper presented at International Conference on Management Science and Engineering (ICMSE), 2010, Melbourne, VIC, 24-26 November, 2010 (pp.812-818). Australia: IEEE

Meschi, E., Taymaz, E., & Vivarelli, M. (2011). Trade, technology and skills: Evidence from Turkish microdata. *Labour Economics. 18*(1), 60-70.

MIDA. (2009). MIDA Annual Report: In*vestment Performance2009.* Malaysia: Minister of International Trade and Industry.
Minister of International Trade and Industry.

MIDA. (2010). MIDA Annual Report: In*vestment Performance 2010.* Malaysia: Minister of International Trade and Industry.

MIDA. (2014). MIDA Annual Report: In*vestment Performance2014.* Malaysia: Minister of International Trade and Industry.

Milkman, R., & Pullman, C. (1991). Technological change in an auto assembly plant. *Work and Occupations, 18*(2), 123-147.

Mincer, J. (1958). Investment in human capital and personal income distribution. *The Journal of Political Economy, 66*(4), 281-302.

Mincer, J. (1962). On-the-job training: Costs, returns, and some implications. *The Journal of Political Economy,70*(5), 50-79.

Mincer, J. (1974). *Schooling, Experience, and Earning* (pp.1-182). New York: National Bureau of Economic Research.

Mithani, D. A. M., Ahmad, S., &MohdSaifudin, A. (2008). Foreign direct investment in Malaysia: Trends and prospects. *International Review of Business Research Papers, 4*(10), 249-258.

Mohd Noor, Z., & Ismail, R. (2008). The effect of worker, job and industrial charecteristics on the receipt and intensity of training in Malaysia. *Journal of Human Resouce and Adult Learning.4*(1),1-11.

MOHE. (2010). *Statistic of Malaysian Higher Learning 2010*. Malaysia: Ministry of Higher Education.

MOHE. (2012). *Preliminary Report: Malaysia Education Blue Print 2013-2025*. Malaysia: Ministry of Higher Education.

Mohnen, P., & Roller, L. H. (2005). Complementarities in innovation policy. *European Economic Review, 49*(6), 1431-1450.

Mokshein, S. A., Ahmad, H., & Vongalis-Macrow, A. (2009). *Secondary Teacher Policy Research in Asia: Towards providing quality secondary education: Training and retaining quality teachers in Malaysia*. Bangkok: UNESCO.

Moretti, E. (2004). Workers' education, spillovers, and productivity: evidence from plant-level production functions. *American Economic Review, 94*(3), 656-690.

MPC.(2010/2011). *Productivity Report 2010/2011*. Malaysia: Malaysia Productivity Corporation.

MPC.(2012/2013). *Productivity Report 2013/2014*. Malaysia: Malaysia Productivity Corporation.

MyStarjob. (Apr 27, 2013). *Work-life balance in the E&E industry*. Retrieved from mystarjob.com/articles/story.aspx?file=/2013/4/27/mystarjob.

Nelson, R. R. (1982). The role of knowledge in R&D efficiency. *The Quarterly Journal of Economics, 97*(3), 453-470.

Nelson, R. R., & Phelps, E. S. (1966). Investment in humans, technological diffusion, and economic growth. *The American Economic Review, 56*(1/2), 69-75.

Nunnenkamp, P., & Spatz, J. (2004). Intellectual property rights and foreign direct investment: a disaggregated analysis. *Review of World Economics, 140*(3), 393-414.

O'Connor, D., & Lunati, M. R. (1999). *Economic opening and the demand for skills in developing countries: A review of theory and evidence*: OECD Paris.

O'Mahony, M., & Vecchi, M. (2009). R&D, knowledge spillovers and company productivity performance. *Research Policy, 38*(1), 35-44.

OECD. (2001). *Measuring productivity: Measurement of aggregate and industry-level productivity growth: OECD Manual*. France:Organisation for Economic Co-operation and Development.

OECD. (2011). Review of innovation in Southeast Asia: *Country profile of innovation in Malaysia*: Malaysia: Organisation for Economic Co-operation and Development.

OECD. (2012). *Better Skills, Better Jobs, Better Lives: A strategic approach to skills policies - building the right skills and turning them into better jobs and better lives*.Retreived from http://skills.oecd.org/documents/Skills_strategy_final. _PDF.pdf

OECD.(2013). *Education at a Glance 2013*. Retrieved from http://dx.doi.org/10.1787/eag-2013-en.

Omar, N. H., Abdul Manaf, A., Mohd, R. H., Che Kassim, A., & Abd. Aziz, K. (2012). Graduates' employability skills based on current job demand through electronic advertisement. *Asian Social Science*,*8*(9),103-110.

Parham, D. (2006). *Empirical analysis of the effects of R&D on productivity: Implications for productivity measurement*. Switzerland:Organisation for Economic Co-operation and Development.

Park, J. H. (1999). Estimation of sheepskin effects using the old and the new measures of educational attainment in the Current Population Survey. *Economics Letters, 62*(2), 237-240.

Patrinos, H. A., & Psacharopoulos, G. (2010). Returns to Education in Developing Countries. In P. Peterson, E. Baker & B. McGaw (Eds.), *International Encyclopedia of Education (Third Edition)* (pp. 305-312). Oxford: Elsevier.

Petersen, T., & Saporta, I. (2004). The Opportunity Structure for Discrimination1. *American Journal of Sociology, 109*(4), 852-901.

PIKOM (2013). *ICT Job market outlook in Malaysia June 2013.*

Potterie, B. P., & Lichtenberg, F. (2001). Does foreign direct investment transfer technology across borders? *Review of Economics and statistics, 83*(3), 490-497.

Powdthavee, N., & Vignoles, A. (2006). *Using rate of return analyses to understand sector skill needs*. London: Centre for the Economics of Education.

Pritchett, L. (2001). Where Has All the Education Gone? *The World Bank Economic Review, 15* (3), 367-391.

Psacharopoulos, G. (1981). Returns to education: an updated international comparison. *Comparative Education, 17*(3), 321-341.

Psacharopoulos, G. (1985). Returns to education: a further international update and implications. *Journal of Human Resources, 20*(4), 111–134.

Psacharopoulos, G. (1994). Returns to investment in education: A global update. *World Development, 22*(9), 1325-1343.

Psacharopoulos, G. (1995). The Profitability of Investment in Education: Concepts and Methods. *Human Capital Development and Operations Policy*. Working Paper (No.63). Washington: World Bank.

Psacharopoulos, G., & Patrinos, H. A. (2004). Returns to investment in education: a further update. *Education Economics, 12*(2), 111-134.

Psacharopoulos, G., & Woodhall, M. (1997). *Education for development: An analysis of investment choices*. New York: Oxford University Press.

Quinn, M. A., & Rubb, S. (2006). Mexico's labor market: The importance of education-occupation matching on wages and productivity in developing countries. *Economics of Education Review, 25*(2), 147-156.

Quintini, G. (2011). *Right for the Job: Over-qualified or under-skilled.* OECD Social, Employment and Migration Working Papers (No. 120). France: Organisation for Economic Co-operation and Development.

Radošević, S., & Rozeik, A. (2004). *Foreign direct investment and restructuring in the automotive industry in Central and Eastern Europe*. Economics Working Papers (No. 53). London, United Kingdom: Centre for the Study of Social and Economic Change.

Rashid, M. (2005). Proceedings of National Seminar : *The development of technology and technical-vocational education and training in an era of globalization: Trend and issues*. Kuala Lumpur:Ministry of Education.

Rasiah, R., & Abidin, M.Z (2009). *The global financial crisis and the Malaysian economy: Impact and responses*.

Redding, S. (1996). The low-skill, low-quality trap: Strategic complementarities between human capital and R & D. *The Economic Journal*, *15*(2), 458-470.

Rim Ben Ayed, M. (2007). Impact of trade liberalization on firm's labour demand by skill: The case of Tunisian manufacturing. *Labour Economics*, *14*(3), 539-563.

Robbins, D. (1996). *Evidence on trade and wages in developing world*: Harvard Institute for International Development, Harvard University.

Robst, J. (2007). Education and job match: The relatedness of college major and work. *Economics of Education Review*, *26*(4), 397-407.

Romer, P. (1990). Endogenous technological change. *Journal of Political Economy*,*98*(2), 71-102.

Roodman, D. (2009). A Note on the theme of too many instruments*. *Oxford Bulletin of Economics and Statistics*, *71*(1), 135-158.

Rosen, S. (1982). Authority, control, and the distribution of earnings. *Journal of Economics*, *18*(3), 311-323.

Rycx, F. (2002). Inter-industry wage differentials: evidence from Belgium in a cross-national perspective. *De Economist*, *150*(5), 555-568.

Said, R., Haris, A., & McNabb, R. (2009). Return to education in Malaysia. *International Journal of Management Studies*,*16*(2), 243-262.

Sattinger, M. (1993). Assignment models of the distribution of earnings. *Journal of Economic Literature*, *18*(2),831-880.

Schultz, T. W. (1953). *The economic organization of agriculture*.New York: McGraw-Hill.

Shefer, D., & Frenkel, A. (2005). R&D, firm size and innovation: An empirical analysis. *Technovation*, *25*(1), 25-32.

Sianesi, B., & Reenen, J. V. (2003). The Returns to Education: Macroeconomics. *Journal of Economic Surveys*, *17*(2), 157-200. doi: 10.1111/1467-6419.00192

Sicherman, N. (1990). Education and occupational mobility. *Economics of Education Review*, *9*(2), 163-179. doi: 10.1016/0272-7757(90)90044-6

Sicherman, N. (1991). " Overeducation" in the labor market. *Journal of Labor Economics*, *9*(2),101-122.

Slaughter, M. J. (2002). *Does inward foreign direct investment contribute to skill upgrading in developing countries*? CEPA Working Paper (2002-08).New York: Center for Economic Policy Analysis.

Sloane, P. J., Battu, H., & Seaman, P. T. (1999). Overeducation, undereducation and the British labour market. *Applied Economics*, *31*(11), 1437-1453.

Smith, A. (1976). *The wealth of nations*: United Kingdom: Oxford University Press.

Solow, R. M. (1957). Technical change and the aggregate production function. *The Review of Economics and Statistics*, *39*(3), 312-320.

Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics*, *87*(3), 355-374.

Stolper, W., & Samuelson, P. A. (1941). Protection and real wages. *Review of Economic studies, 9*(1), 58-73.

Tan, H., & Batra, G. (1995). *Enterprise training in developing countries.* Washington, DC: World Bank.

TalentCorp. (2012). *E&E Sector Study on the Supply-Demand of Talent in Malaysia*. Malaysia: Ipsos Business Consulting.

Taylor, K., & Driffield, N. (2005). Wage inequality and the role of multinationals: evidence from UK panel data. *Labour Economics, 12*(2), 223-249.

THIa, T. U. N., & Martin, L. (2011). *The relationship between innovation and productivity conditional to R&D and ICT use. An empirical analysis for firms in Luxembourg*. Paper presented at 3rd Vietnam Economist Annual Meeting (VEAM),24- 25 August 2010, (pp. 300-328), Vietnam.

Thurow, L. C. (1972). Education and Economic Equality. *Public Interest*. *28*(2), 66-81.

Tinbergen, J. (1942). Professor Douglas' production function. *Review of the International Statistical Institute, 39* (1), 37-48.

Todo, Y., Zhang, W., & Zhou, L.-A. (2009). Knowledge spillovers from FDI in China: The role of educated labor in multinational enterprises. *Journal of Asian Economics, 20*(6), 626-639.

Trostel, P. A. (2005). Nonlinearity in the return to education. *Journal of Applied Economics, 8*(1), 191-202.

Tsang, M. C. (1987). The impact of underutilization of education on productivity: A case study of the US Bell companies. *Economics of Education Review, 6*(3), 239-254.

UNDP. (2011). *The Millennium Development Goals at 2010*. Malaysia: United Nations Country Team, Malaysia.

Vainiomäki, J., & Laaksonen, S. (1995). Inter-industry wage differentials in Finland: Evidence from longitudinal census data for 1975–85. *Labour Economics, 2*(2), 161-173. doi: 10.1016/0927-5371(95)80051-x

Warunsiri, S., & McNown, R. (2010). The Returns to Education in Thailand: A Pseudo-Panel Approach. *World Development, 38*(11), 1616-1625.

Van der Meer, P. H. (2006). The validity of two education requirement measures. *Economics of Education Review, 25*(2), 211-219.

Verhaest, D., & Omey, E. (2006). The impact of overeducation and its measurement. *Social Indicators Research, 77*(3), 419-448.

Verhaest, D., & Omey, E. (2009). Objective over-education and worker well-being: A shadow price approach. *Journal of Economic Psychology, 30*(3), 469-481.

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics, 126*(1), 25-51.

Wolff, E. N. (2000). Human capital investment and economic growth: exploring the cross-country evidence. *Structural Change and Economic Dynamics, 11*(4), 433-472.

Wood, A. (1994). *North-South trade, employment and inequality: Changing fortunes in a skill-driven world*. Oxford: Clarendon Press.

Xiu, L., & Gunderson, M. (2013). Credential Effects and the Returns to Education in China. *Journal of Labour Economics, 27*(2), 225-248.

Yamashita, N. (2007). The Impact of Production Fragmentation on Industry Skill Upgrading: New Evidence from Japanese Manufacturing. *Journal of the Japanese and International Economies*, *22* (4), 545-565

Yol, M. A., & Ngie, T. T. (2009). Estimating the domestic determinants of foreign direct investment flows in Malaysia: Evidence from cointegration and error-correction model. *Jurnal Pengurusan, 28(2)*, 3-22.

Zhao, Y. (2001). Foreign direct investment and relative wages: The case of China. *China Economic Review, 12*(1), 40-57. doi: 10.1016/s1043-951x(01)00042-6