MAKING THE TRANSITION INTO A HIGH-INCOME ECONOMY

THE PENANG CASE

Utrecht University

Master thesis Business Geography

Thesis by Thomas Verbraeken (3639940) and Jesse Terhorst (3855074)

Supervised by L.M.J. van Grunsven

Penang:

Thomas Verbraeken (3639940) & Jesse Terhorst (3855074)

Utrecht University

Preface

This study is part of the Master Business Geography at the Utrecht University. During the Master dr. L.M.J. van Grunsven mentioned the opportunity to participate in a research carried out by Penang Institute in Penang, Malaysia. While discussing the research in more detail with dr. L.M.J. van Grunsven we became enthusiastic about participating in this research project. Also, the study carried out by Penang institute was in line with to courses studied in the Master.

Following previous students, we started by getting familiar with the research subject, the skill situation in the Penang labour market. Our internship at Penang Institute started in February and lasted for a period of eight months. During this period, we worked closely together with researchers from Penang Institute. All of our colleagues were very friendly and helped us a lot during our stay. It was very exciting to live in a region that is home to many MNC's which carry out activities you were not familiar with.

Looking back at this period we definitely had a wonderful time and we feel lucky that we had the chance to meet lots of new people and experience a new culture. During our stay we also experienced some challenges. Sometimes it could be difficult to retrieve information from certain institutions, due to the availability of data, the language barrier and/or strict regulations sharing information. The second big challenge was contacting firms in Penang, they were not always willingly to participate in the study. Apart from these difficulties, we have learned much about Penang's' labour market dynamics, the structure of industries, Malaysia's politics and the great variety of cultures that exists in Penang.

Finally, we would like to thank people for their support during the completion of this study. First of all, we would like to thank our supervisor dr. L.M.J. van Grunsven for giving us the opportunity of doing this research and for sharing his knowledge by giving us constructive feedback during the entire process. We have had many valuable discussions that turned out to be of great value for our study. Secondly, we both would like to thank our supervisor at Penang Institute Ong Wooi Leng for her kindness and willingness to work together intensively. At last, we would like to express our gratitude to all of our colleagues of the Penang Institute, and the interesting people we met during our stay in Penang. This whole trip has been a fascinating and valuable experience.

Abstract

Keywords: **Labour market, high-qualified labour, skill gaps, skill shortages, Penang.**

This study reports on the skill situation in the Penang labour market and its businesses regarding high-qualified positions. Through surveys, JobStreet data analysis's and in-depth interviews it is found that firms active in Penang face a lack of required human capital. Due to labour and skill shortages within the Penang labour market and existing skill gaps within firms it is difficult for companies to carry out all knowledge intensive activities. Over the last decades' firm activities have evolved into higher-value added activities and new industries settled down. However, the skillsets of employees still need to improve and are not yet sufficient enough to make the transition into a high-income economy. Both the quantity and quality of talents available is lacking. Especially, graduates do not possess the skills required to carry out firms' activities.

Table of Contents

List of abbreviations

APHA	Association of private hospitals of Malaysia
BPO	Business Process Outsourcing
CAD	Computer-aiding Design
CEDEFOP	European Centre of Development of Vocational Training
CREST	Collaborative Research in Science Engineering and Technology
DAP	Democratic Action Party
E&E	Electrical and Electronics
EHC	Education and Human Capital
ETP	Economic Transformation Program
EMS	Electrical Manufacturing Services
FDI	Foreign Direct Investments
F&B	Food and Beverages
FMM	Federation of Malaysian Manufacturers
FIZ	Free Industrial Zone
FTZ	Free Trade Zone
GBS	Global Business Services
GDP	Gross Domestic Product
GNI	Gross National Income
GRP	Gross Regional Product
HTFV	Hard-to-fill Vacancies
HTML	HyperText Markup Language
IC	Integrated Circuit
ICT	Information and Communication Technology
IT	Information technology
KIBS	Knowledge Intensive Business Services
LED	Light-Emitting Diode
LLC	Local Large Company
MAC	Migration Advisory Committee
MASCO	Malaysia Standard Classification of Occupations
MICCI	Malaysia International Chamber of Commerce
MIDA	Malaysian Industrial Development Authority
MNC	Multinational Corporation
MSC	Multimedia Super Corridor

NCIA	Northern Corridor Implementation Authority
NEP	New Economic Policy
O&G	Oil & Gas
PDC	Penang Development Centre
PENFEIA	Penang Foundry & Engineering Industries Association
PMP	Penang Master Plan
PSDC	Penang Skills Development Center
PV	Photovoltaic
PwC	PricewaterhouseCoopers
R&D	Research and Development
REP	Returning Experts Programme
RM	Malaysian Ringgit
RFID	Radio Frequency Identification
SME	Small Medium Enterprise
SSC	Shared Service Centre
SSO	Shared Service Outsourcing
UKCESS	United Kingdom Commission for employment and Skills
UNESCO	United Nations Educational Scientific and Cultural Organization
US	United States
VET	Vocational Education and Training

1. Introduction

Over the past three decades several countries in Southeast Asia have evolved from low-income to middle-income economies. These countries are also referred to as the second generation Asian Tigers[1]. One of those second-generation tiger economies is Malaysia. During the 1970s Malaysia was heavily dependent on their natural resources (e.g. rubber and timber) but developed to an export manufacturing economy. The economic growth was primarily achieved by attracting foreign direct investment and a labour force to support the industrialisation (Yusuf & Nabeshima, 2009). The transformation from a low to middle income economy has made Malaysia a global player in exporting manufactured goods. However, there is a growing concern that – in the global competitive economy – Malaysia is trapped between low-wage economies and more innovative high-income economies. This can also be referred to as the *'middle-income-trap'* (World bank, 2013). It is referred to as a *'trap'* because it is harder for countries making the transition from a middle-income to a high-income economy than from a low-income to a middle-income economy. Low-income economies can use their low wages as a competitive advantage and attract labour-intensive manufacturing. When eventually wages increase, costs will also increase and new low-income economies will undermine the competitiveness of the low-tech manufacturing industries. According to Kharas and Kohli (2011) growth of both a capital and skill-intensive manufacturing sector and a high-productivity service sector are key in making the transition out of the 'trap'. Non-tradable services like hair cutting and house cleaning have no room for productivity improvements and market expansion. Instead, professional business services such as consulting, financial, health and environmental services can contribute to productivity growth.

Furthermore, there is a broad agreement that increased levels of skills in the workforce, accompanying investments in education and training are important to improve economic performance.

[1] The second generation of Asian Tigers collectively refers to the economies of Thailand, Malaysia, the Philippines and Indonesia. They are named second generation because they follow the same export-driven economic development model that was pursued by Singapore, Hong Kong South Korea and Taiwan, which are collectively referred to as the Four Asian Tigers.

Human capital has been widely recognised as the key to become a knowledge intensive economy (Shah & Burke, 2003).

Therefore, countries like Malaysia try to move up the value chain (i.e. exporting more technologically advanced products) and make the transition to a high-income economy. In order to achieve this transition, it is of importance that Malaysia moves away from merely assembling products that are designed in other regions. Local companies should invest more heavily in R&D, employ high educated workers and create new products to compete with newest technologies and leading brand names (Fleming & Søborg, 2012).

The federal government of Malaysia has recognised these issues and has been implementing a number of national initiatives since the beginning of this century. Well known initiatives are the regional development corridors programme which aims to bring prosperity to lacking regions in Malaysia, the establishment of TalentCorp Malaysia which provides incentives to retrieve talent back from overseas and easing immigration procedures to attract foreign talent workers and the Economic Transformation Program (ETP) which aims to attract investments to create new jobs and receive a developed nation status by 2020, indicating a GNI (Gross National Income) per capita of 15,000 US$ (Penang Institute, 2015; Overview of ETP, 2016).

In 2010 Prime Minister Najib Razak presented four different national plans to make Malaysia a knowledge-intensive and high-income economy by 2020. Two of those plans highlighted the importance of higher educational development. Especially the Tenth Malaysia Plan (2011-2015) focussed on higher education and development of skilled workers. The recently published Eleventh Malaysia Plan (2016-2020) also recognizes the importance of human capital development in supporting the transition. The plan aims to continue the development of human capital with the right skills, knowledge and attitudes. Both plans show that human capital plays a big role and is seen as necessary for Malaysia to escape the middle-income-trap.

According to the Eleventh Malaysia Plan the enrolment in higher education between 2000 and 2013 has already expanded remarkably. This trend already dates back to the beginning of the 1980s. Since then

the enrolment in secondary and tertiary education increased tremendously. However, according to a recent study of Fleming & Søborg (2012) it is not the supply of graduates (quantity) that is a problem in Malaysia but the 'skill baggage' graduates carry. Especially soft skills, such as communication, teamwork and decision-making are missing. This also becomes evident in the business environment where leading high-tech multinational firms are complaining about the lack of skills graduates possess. The World Bank (2013) stresses that*: "The "skills crisis" is a well-known shortcoming of the Malaysian economy"* (p. 6). Jiminez et al. (World Bank, 2012) illustrate that many parents in Malaysia invest in private schooling as a response to the quality deficiencies of public schools. They perceive high returns to investing in quality education. This solution however may exacerbate inequality since parents with low-income cannot afford private schooling.

The constraints described above also apply to a certain extent for the Malaysian state of Penang. A study done by the World Bank (2009b) showed that the state of Penang should upgrade the traditional 'high volume, low mix' manufacturing to a 'low volume, high mix' of technology intensive production to overcome the middle-income-trap. They argue that the current labour force lacks required skills, is too specialized and diversity of talent is missing. To overcome current constraints, Penang has come up with the 'Penang Paradigm' a development plant until 2025, which consists of different policies focused on upgrading the Penang economy in order to overcome and escape the middle-income-trap (The Penang Paradigm, 2016).

The problem of a possible mismatch between demand of firms within industries and supply in the labour market of Penang is the basis for this study. In particular, the scope of this study is to assess whether the Penang state and its industries possess the means and human capital to realise the policies described in the Penang Paradigm. Thus moving the state to a high-income economy.

1.1. Research questions

To what extent does the state of Penang and its industries possess the right level of human capital, and can they contribute to make the transition out of the middle-income-trap into a high-income economy?

1. How can the current labour market dynamics/conditions in Penang best be described?
2. Do there exist skills shortages in the Penang labour market?
3. What are the types of skills that are high in demand in the Penang labour market?
4. Do particular compartments within the regional economy experience labour and/or skills shortages to a larger extent than others?
5. Do firms experience skill gaps and skill shortages*?*
6. What (recruitment) strategies do firms apply to overcome possible skills shortages and gaps?
7. To what extent do firms in different industries experience skills gaps/deficiencies and shortages?

1.2. Scope of the study

For the purpose of this study a selection of relevant industries within the Penang economy has been made. This selection procedure will be elaborated in the methodology chapter. Another important aspect of this study is that it focuses on high-qualified employees regarding skill needs/gaps/shortages as these employees greatly contribute to a possible upgrade of the Penang economy. High-qualified employees, in this study, are described as people having a tertiary diploma, certificate, degree or higher qualification.

1.3. Research aim and relevance

This study addresses labour market dynamics in the state of Penang, Malaysia. Specifically, it aims to analyse the skill situation in the Penang labour market and skill needs of firms. By analysing labour market conditions/dynamics, firm behaviour and strategies, a better understanding of challenges regarding skills can be assessed. The framework of this study is based upon main findings extracted from literature

presented in the theoretical framework of this study. Therefore, this study must be considered as deductive. An assessment can be made on what actions or policies are needed to overcome challenges and eventually realize the transition out of the middle-income-trap.

This study can be useful to design policies in both labour market and migration arenas. Challenges regarding skills can be identified from different perspectives and may require specific policy attention. Addressing identified challenges can be of value to sustain or increase economic efficiency and growth in the long term.

From a scientific perspective this research can bring new insights on labour market mechanisms and firm behaviour/strategies in South-east Asia. Most of the literature on labour markets and firm behaviour consists of Western models and demographics while only a small number is based on Asian countries. Although this study is focused on one specific region which doesn not allow findings to be generalised it still can form the basis for further research on (South-East) Asian labour markets.

1.4. Outline of the study

The study consists of nine chapters. The next chapter will discuss the relevant literature regarding human capital and skills. Also, it elaborates on different labour market dynamics and characteristics on three different scales; macro, meso and micro. Following the theoretical framework an introduction to the Penang region and the evolution of its economy will be briefly outlined. Following this a conceptual framework will be put forward, presenting all relevant theoretical concepts and its linkages. Based on the framework, several hypotheses are formulated. Next, the methodology used in this study will be discussed and justified. After that results of the study are presented in three separate chapters, each presenting a different perspective; macro, micro and meso. The final chapter will end with a conclusion where an answer to the research question will be formulated and recommendations will be put forward.

2. Theoretical Framework

This chapter presents an overview of all relevant theoretical concepts. The first paragraph will elaborate on human capital and its relationship to skills. After that labour market dynamics and characteristics from a macro-perspective will be elaborated. Following this, differences between sectors and industries on meso-level will be discussed. The fourth paragraph presents a micro-perspective, which focusses specifically on firm behaviour and strategies. In the concluding paragraph all relevant theoretical concepts are presented in a conceptual model, providing an overview and proposed relationships.

2.1. Regional economic development and human capital

Regional economic development can be interpreted in many different ways. Usually it is assumed that the jobs are the key factor for development. When a place attracts new jobs, prosperity and wealth will follow. This view of economic development is often the backbone of many economic development policies, as policy makers aim to attract as many companies as possible to their country, region or city. Others perceive technology as the key for economic development. Highlighting examples like Silicon Valley argue that economic success has its roots in high tech clusters of big research universities, entrepreneurial start-up companies and an abundance of venture capital. However, according to recent thinking the main driver of economic development is a highly skilled and educated labour force. That some call talent. Talent is often referred to as human capital. It is assumed that places with higher levels of human capital will prosper, while places that lack human capital either stagnate or decline (Florida et al., 2008). Furthermore, it is presumed that an educated labour force is better at creating, implementing and adopting new technologies, which in their turn generate regional variation and economic growth (Benhabib & Spiegel, 1994).

A wide range of empirical studies provide evidence of the importance of human capital in regional growth. Barro (1991), Mankiw et al. (1992), Rauch (1993) and Simon (1998) all confirmed the relation between human capital and economic growth on a national level. Berry and Glaeser (2005) and Gennaioli et al. (2011) found empirical evidence on the correlation between human capital and regional economic growth.

As the former shows, human capital is of great importance to regional economic development and regional variety. Human capital exists on different levels within a certain labour market. Within the labour market, firms search for the right level of human capital to optimize their business activities which in their turn, contribute to the economic development and productivity of a region. In fact, human capital is a link between firm performance and regional economic development.

The concept of human capital can be defined in different ways. Schultz (1961) views human capital as 'the capacity to adapt'. The Bowles and Gintis (1975) view believes that human capital 'is the capacity to work in organizations, obey orders, adapt to life in a hierarchical/capitalist society'. The Spence view considers that 'observable measures of human capital are more a signal of ability than characteristics independently useful in the production process'. Yet, the standard approach in labour economics defines human capital 'as a set of skills/characteristics that increase worker's productivity' (Acemoglu & Autor, 2001). For the purpose of this study human capital is considered as a concept that consists of multiple components, of which one is skills.

2.1.1. Skills

The notion of skills has gained a lot of attention among both academics and policy makers in the past years (RPIC-ViP, 2011; World Economic Forum, 2015; Melguizo & Perea, 2016). Lindorff (2011) reported in his paper about skills gaps in Australian firms and Schwalje (2012) conducted research on skills gaps at firm level. Moreover, skills related issues have taken centre stage for policy makers. Skill related issues in UK economic policy gained relevance: In 2011, the UK commission for employment conducted research on skill shortages and skill updating needs in England (Bennett & McGuinness, 2009).

Skills can be perceived as 'an ability of an employee to complete a task effectively'. This means that a person has the desired level of knowledge and/or competence to perform a particular task. The particular task is unlikely to be completed successfully by someone who does not possess the right skillset (Shah & Burke, 2003). Although the range of skill sources is broad, skills are often associated with qualification through formal education or training. However, skills can also be obtained through informal

learning and learning-by-doing (Teixeira, 2002). Skills beyond 'learned knowledge' increasingly matter as technology and organizations evolve. Different types of skills typologies can be distinguished (table 2.1). First of all, generic and specific skills exist. Generic skills include 'basic generic skills'; numeracy and (computer) literacy and 'employability skills'; team work and reliability, that can be transferred among different occupations. Specific skills relate to skills that can be applied in a small number of firms, occupations and sectors. Their transferability is limited. Generic and specific skills must be divided into both hard and soft skills. Hard skills can be linked to skills that are technical and job-specific and are mostly acquired during on-the-job training, for example certifications. Soft skills can be defined as non-job specific skills (intangible) and relate to personal characteristics/attitudes, one can think of communication and leadership skills (RPIC-VIP, 2011).

***TABLE 2.1** Skills Typology*

	Hard skills *Technical job-specific skills that are usually easily observed, measured, trained, and closely connected with knowledge*	**Soft skills** *Non-job specific skills, which are usually intangible, hard to measure, and closely connected with attitudes*
General skills *Skills applicable in most companies, occupations and sectors.*	Generic hard skills	(generic) Soft skills
Specific skills *Skills applicable in a small number of companies, occupations and sectors.*	Specific hard skills	(specific) Soft skills

Source: RPIC-ViP, 2011, p. 6

Although, a theory that classifies the various types of skills is missing, three categories can be distinguished, soft skills, generic hard skills and specific hard skills. The distinction made is based on skill transferability in relation to the risk of failing in finding another job. Soft skills and generic hard skills can be regarded as '*transversal skills*' as their level of transferability is significant. While specific hard skills experience low levels of transferability. Thus, employees with high levels of transversal skills experience greater opportunities in finding a job. Therefore, both, employer and employee investing in skills are of great interest. Employers want to rely on a workforce that is skilled in order to be productive/efficient.

Employees should also invest in skill development, as their chances on the labour market will increase (RPIC-ViP, 2011).

Furthermore, the notion of skills is strongly related to the concepts of occupations and jobs. An occupation can be defined as 'a grouping of jobs involving similar tasks, which require a similar skills set'. It consists of multiple jobs or job titles that have similar characteristics. On the other hand, a job *'is bound to a specific work context executed by one person'* (Beblavý et al., 2016, p. 8). In both concepts skills are important building blocks thus different levels and bundles of skills are required to perform different jobs and categories of occupations. Hence, certain skills and skill-sets can be framed under occupations and jobs.

2.2. Macro-perspective: Labour market dynamics

Human capital and skills as described above are available in the labour market and affect employer and employee behaviour. This behaviour determines the labour market dynamics. Within the labour market employers (firms) are the buyers who are constantly looking for the right employees (sellers) with sufficient skills for their available positions.

2.2.1. Demand and Supply in the Labour Market

The demand in a labour market is determined by the firms that act in it. Demand of firms can be influenced by industry trends and of a qualitative- and/or quantitative nature (e.g. the amount of people and/or levels of skills required). The total supply of labour within a specific labour market consists of the labour force[2]. The size of the labour force can be affected by different demographic factors. The labour force can either grow by natural population growth or by positive net migration on both (inter)national and regional scale (meaning higher inflow than outflow). On the opposite, the size of the labour force can decline when the net migration is negative and/or mortality rates are higher than birth rates. Furthermore, ageing of the population and (early) retirement, voluntary unemployment (for example housewives) or

[2] The labour force refers to all people who are in the age of 15-64 years old and either employed or unemployed.

schooling and study can cause the labour force to decline. When the number of people outside the labour force[3] increases, the labour force participation rate[4] drops. The participation rate in the labour force can be determined by different factors. One can think of social perceptions or different economic situations (contraction or extension) as incentives. For example, over the past decades the participation rate of women in the labour force increased steadily because society changed and it became socially accepted.

According to the neoclassical theory the willingness of people to work is mainly driven by wages. When the amount of workers that is willing to work at the market price is identical to the employers' demand at the prevailing price the market is at equilibrium. On the opposite, the labour market is in disequilibrium if the quantity of labour offered by workers is higher than what employers wish to buy at a certain price, there is a market surplus. The other way around, when the quantity of labour that is desired by employers is higher than offered by the employees at a certain price, there is a shortage. A labour shortage is defined by Barnow et al. (2013) as follows: *"A sustained market disequilibrium between supply and demand in which the quantity of workers demanded exceeds the supply available and willing to work at a particular wage and working conditions at a particular place and point in time."* (p. 3).

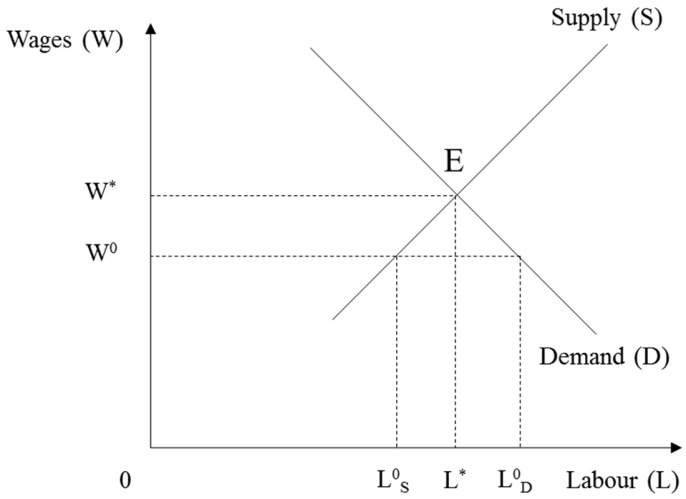
The neoclassical approach can be captured in a simple model (figure 2.1). In this model it is assumed that employers' behaviour is aimed at profit maximizing and employees aim at utility maximisation. The model shows the demand and supply curves for labour in a certain occupation within a particular labour market. In the model, W^0 is the wage level of a certain occupation at any given time. At this wage there is a demand of labour L^0_D and a supply of L^0_S. Because labour demand outstrips supply (L^0_D - L^0_S) there is a shortage and the market is in disequilibrium. The model however, assumes that when shortages occur they will be resolved due to competitive market forces. The market ensures that wages will rise in time of shortages and a new market equilibrium is established.

[3] Persons outside the labour force are persons aged fifteen and over who are neither employed nor unemployed (they are neither working nor seeking work). These persons are not part of the labour force.

[4] The labour force participation rate is the percentage of the population that is either employed or unemployed (e.g. outside the labour force).

So, in figure 2.1 the increased demand for labour will drive up the wage to W^*, the market clearing wage. At this point labour supply and demand will equal L^* and a new market equilibrium (E) has been attained (Cohen & Zaidi, 2002).

FIGURE 2.1 *Neoclassical view of labour shortages*



Source: Barnow et al., 2013, p. 5

The model however contains several shortcomings and does not take adequate account of all dynamics in the labour market. As mentioned before, it is conceivable that different factors contribute to the willingness of people to work (supply). Furthermore, employers may react different to changes in labour market conditions. Aside from offering higher wages they can also increase search costs or let current employees work more hours. Lastly, neither employers or employees possess all the information about market conditions. The market is continuously changing and therefore adjusting to new circumstances with many different factors involved (Cohen & Zaidi, 2002; Barnow et al., 2013).

So far demand and supply within the labour market have been highlighted from a quantitative perspective. It is however possible that from a quantitative perspective, a market equilibrium exists, but a mismatch in terms of quality still exists. This can also be referred to as skills shortages and occurs when there is a mismatch between the skills available in the market and skills demanded by the employers. For example, if a computer company searches for IT professionals on a labour market that is characterized by

people that lack computer literacy, we can speak of a substantial skills shortage. Skills shortages may apply for certain types of skills, a (range of) job(s) or can be evident for certain occupations (Shah & Burke, 2003).

Some reports translate skills shortages to occupations which, as outlined in the previous paragraph, refer to different jobs and job titles that require common skills. Often these reports present a critical occupations list. Critical occupations (with critical skills sets) can be interpreted in two ways. One is that critical occupations are seen as critical in the sense that they are necessary for economic development. The other interpretation is that critical occupations are most demanded by firms/industries and might be hard to fill and therefore critical to them (TalentCorp, 2016). However, the boundaries between occupational categories have become increasingly blurred. They have become less standardised and homogenous. Nowadays, the skills that are demanded for specific jobs within one occupation can vary tremendously. The same occupation often refers to jobs that differ in end product, working environment and tools and materials used (ESCO, 2016). Recently, more unique and specific skills are demanded by the employers. So, one can argue that the term and lists of critical occupations are to broad defined and do not cover the specific shortages in skills or certain jobs. For example, there is a shortage of a specific programming skill such as JAVA. This specific skill is only required for one or a limit amount of jobs within the software engineering occupation. But in the critical occupation terminology the software engineering occupation will be classified as critical, while in different jobs that can also be framed under software engineering this skill is not required and therefore not critical.

The rapid changes and increase in demand for more unique and specific skills can be addressed to the combination of three related innovations: information technology (IT), complementary workplace reorganization and new products and services (Bresnahan et al., 2002).

Due to the speed of the changes in required skills sets, skill mismatches and shortages become more severe. The most common explanation for this mismatch is that universities and other training institutions cannot keep up with the fast changing business environment which results in graduates lacking the right skills demanded in the labour market. Therefore, long-term investments in human capital are needed to upgrade the skills of the workforce.

2.2.2. Labour Market Characteristics: Tight or Surplus Labour Market?

As outlined in the previous paragraph, the labour market can either be in an equilibrium or disequilibrium. In the former case there is a match between demand and supply and in the latter a mismatch. This mismatch can both be of qualitative and/or of quantitative nature. When a mismatch exists due to supply outstripping demand, the labour market is considered as a surplus market. This means that overall, employers experience a rather easy time finding the right amount and qualified people for their vacant positions which causes employees to compete for the available jobs. Since positions are rather easy to fill, companies are able to look for additional qualities such as desirable personal qualities and precise relevant experience. Eventually this may even lead to expectations that are beyond the technical capabilities required. On the opposite, when a mismatch is caused by demand outstripping supply, the market is considered tight indicating that jobs are plentiful. In this case employers compete for labour and possibly experience recruitment difficulties which eventually may lead to lower expectations and hiring standards. It also implies that most of the unemployed will find work rather quickly (Richardson, 2007; Healy et al., 2015).

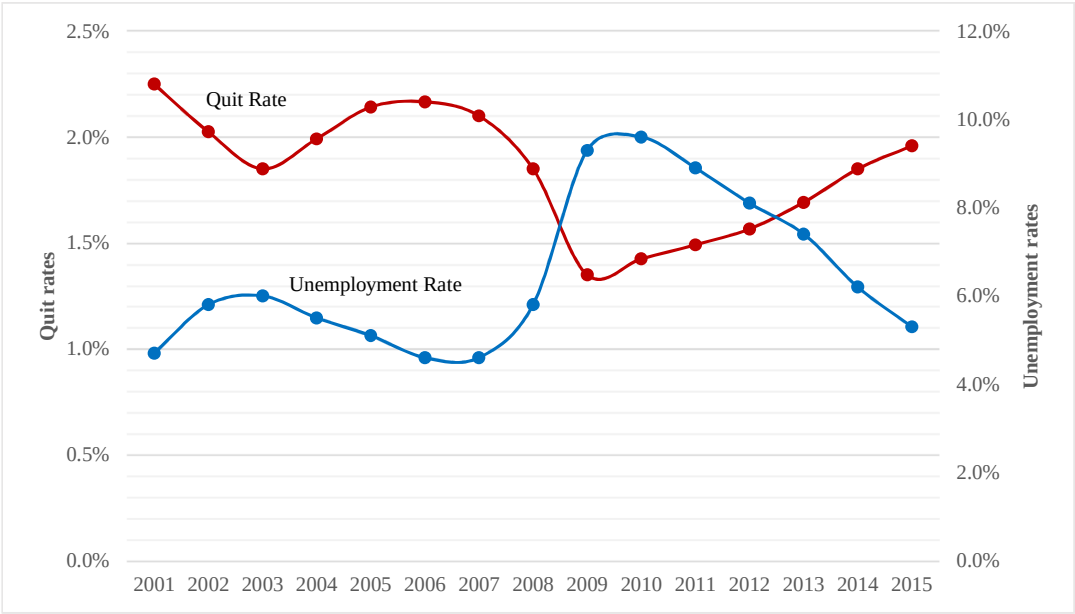
The number of vacancies in the labour market can act as an indicator for a tight or surplus labour market in relation to the size of the labour force. A growing number of vacancies implies that employers have a hard time to fill all their vacant positions and the labour market is tightening. On the other hand, when the number of vacancies is declining it is conceivable that a labour market surplus arises. Aside from the growing or declining number of vacancies it is also possible to look at the average duration time of vacancies. Haskel and Martin (1993a) argue that even in times of equilibrium firms still have (skilled) jobs available and continuously search for suitable workers. In time of an equilibrium each vacancy has a certain duration but when the labour markets get tighter the duration time will increase. When the duration time of vacancies increases they are referred to as hard-to-fill vacancies (HTFVs).

Furthermore, the unemployment rate is often used as an indication for labour market characteristics. Whereby, low unemployment rates indicate a tight labour market. Governments often see a high unemployment rate as a problem because it implies that many people are unable to make a living and a significant part of the potential labour force is not contributing to the national output. On the other hand,

when the unemployment rate is unusually low governments worry about an excess demand in the labour market. This will likely cause wages to rise, as argued in neoclassical theory, and higher wages will lead to price inflation. Furthermore, an exceptionally low unemployment rate may increase shirking among workers and reduce the available pool of talent of which new firms can extract (Ehrenberg & Smith, 2011).

A tight labour market induces labour mobility because employees are more likely to move jobs since it is relatively easy for them to obtain a better offer or position elsewhere. Thus, when a certain labour market is tight it is assumed that labour mobility will increase. Eventually, this will lead to higher turnover rates for companies. This expectation is confirmed by different studies which used time-series data (Hall et al., 1972; Schlicht, 1978). In figure 2.2 the quit rate (as a proxy for labour mobility) of the United States' labour force is compared to the unemployment rate. It becomes clear that indeed, when the unemployment rate decreases (indicating a tightening labour market) the quit rate increases and vice versa. During the financial crisis in 2008 the unemployment rate increased tremendously, at the same time quit rates dropped significantly.

FIGURE 2.2 *Quit rate compared to unemployment rate in the US, 2001-2015*



Source: Bureau of Labour Statistics, 2015

On the other hand, when the labour market is at a surplus it is conceivable that employees do not change jobs that quickly since there are only few opportunities within the market. In addition, not only the labour market characteristics determine the labour mobility. Different perceptions of employees and skillsets they possess can contribute to labour mobility and therefore affect the turnover rates of firms. Different studies argue that the perceptions of individuals on desirability and ease of movement affect labour mobility. The desirability to move is often displayed by job satisfaction and the ease of movement commonly equated by the perceived job opportunities (Jackofsky & Peters, 1983; Lee & Mitchell, 1994). Moreover, the skills that employees possess can affect their mobility. Employees that possess transferable skills (skills possessed by employees that are applicable in different jobs or tasks despite of the place acquired) will be more flexible in switching jobs, especially in a tight labour market (RPIC-VIP, 2011). Thus, high levels of skill relatedness within the workforce of a sector may lead to higher labour mobility.

High labour mobility can be both good and bad from a labour market perspective. High labour mobility is socially useful because it increases individual well-being and the quality of job matches. At the same time due to labour mobility a greater number of workers and employers is available in the market which lead to more flexibility in making job matches that best adapt to changing environments. On the other hand, high labour mobility translates into high turnover rates within firms causing higher financial costs for replacing employees and other indirect costs such as the potential loss of skills, knowledge and experience, disruptions of operations and negative effects on workforce morale. In addition, high turnover may cause a considerable burden on human resource managers as they continuously have to recruit and train new personnel. When this becomes such a big problem for firms it can eventually become a disincentive for them to invest in any more training programs for their employees. The absence of these investments can reduce the productive potential of employees and therefore output of firms which negatively impact the economic development of a city, region or country (Ehrenberg & Smith, 2011; Ponnu & Chuah, 2010).

The labour market processes described above are to a large extent created by a changing structure of the regional economy (more or less variety). When new sectors or industries emerges or fades, the

demand for labour and skills change which can cause mismatches, resulting in over- or undersupply. Due to these mismatches a labour market can be characterised by a surplus or a shortage of either labour (quantitative) or certain skills (qualitative).

2.2.3. Economic Structure and the Labour Market

The structure of a regional economy can often be divided into different clusters, each characterized by a variety in firm composition. When there is much variety, the economic structure is considered as heterogeneous. In such an economic structure it is assumed that labour mobility is less present since each cluster demands different skills(sets). It also implies that the variety of skills sets within the labour market is big, making the overall economy more resilient to economic changes or shocks. When one sector or industry is declining it is easier for a heterogeneous economy to change their focus on a different sector or industry.

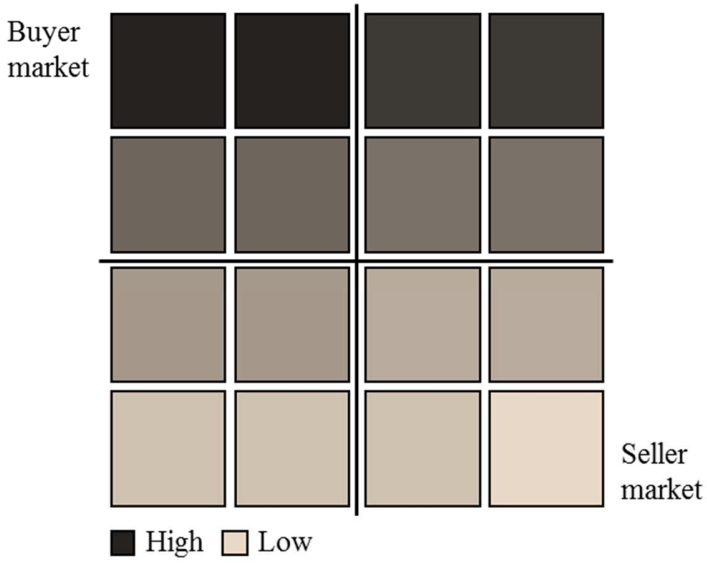
On the other side, when the economic structure consists of a single or small number of (similar) clusters each characterized by more or less similar types of companies it is considered as homogenous. Assuming that the majority of the labour force is employed in one main cluster it is conceivable that there exists high labour mobility since skills are all related and easily transferable. At the same time however, the skills of the labour force are quite sector/industry specific, meaning that they are not transferable to other industries. When for example, the main cluster in a homogeneous economy is hit by an economic shock and diversification is needed to overcome the economic downturn, it is hard to make the transition since the labour force only possesses skills sets which are applicable in a limited range of industries.

As mentioned above, cluster homo- or heterogeneity can be determined by the variety in firm composition within clusters. Firms can be categorized in different *compartments* each with specific characteristics. One can think of differences like local/foreign origin, productivity, company size and core activity/operations ranging from high- to low-end. Again, when all firms are alike one speaks of a homogenous cluster; when there is much variety it is considered as a heterogeneous cluster.

Each compartment can be marked by a certain level of attraction and retention in respect to labour. The level of attractiveness and retention for compartments depends much on preferences of labour for particular industries or firms in different compartments (preferences can refer to wage level, terms of employment, working conditions or fringe benefits). Also preferences from an employer's perspective can play a role with respect to categories of labour such as qualifications and skills.

So, alongside the compartmentalization of firms within clusters in the regional economy the labour market structure divides in sub-markets characterized by different levels of skills and labour attraction and retention. This is illustrated in figure 2.3 where in the top left corner the most attractive compartment is situated. Companies in this compartment are supposedly able to obtain sufficient labour that meets the requirements from ample or available supply. They are situated in a *'buyer market'* which means they can more or less dictate the terms and conditions of employment. On the opposite, the right bottom corner represents a *'seller market'* where it is assumed that conditions are rather set by employees e.g. hiring depends on the extent to which employers are able or willing to meet conditions demanded by employees. However, the distinction of pure buyer- and seller markets has to be nuanced since it is also influenced by the supply of specific skills, skill relatedness and employability.

FIGURE 2.3 *Competition between companies in different compartments in attraction and retention of labour*



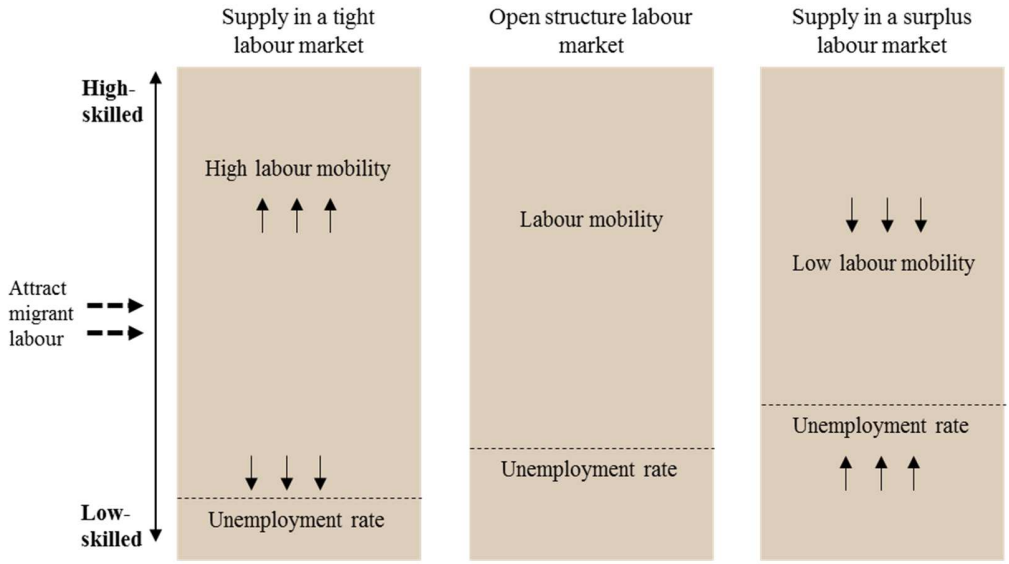
Source: Own draft, 2016

Companies in different compartments compete for labour and are characterized by differences in labour attraction and retention. In an open structured labour market where mobility is dependent on the situation of the labour market (e.g. tight or surplus) it is conceivable that in a situation of a tight labour market more labour mobility exists (left column of figure 2.4).

Due to high demand and insufficient supply there are many opportunities and everybody, including less employable people, aims to improve their position. Because of shortages, there are many opportunities for employees to be employed in preferred compartments. Due to this one can expect that more seller markets exist because it is hard for companies to dictate the terms of employment when there is an overall shortage of labour or certain skills. However, due to high levels of mobility buyer markets can still persist.

When the labour market becomes *'too tight'* it is assumed that migrants are needed to keep up with demand. If a labour market is tight due to qualitative shortages and there exists all sorts of skill imperfections, it can be assumed that companies either lower their hiring standards or choose to move away. When companies lower their hiring standards labour mobility in the market will remain the same because companies adapt to the new situation. If companies, choose to move away the demand for certain types of skills will fade and a new equilibrium will be created.

FIGURE 2.4 *Open structure labour market*



Source: Own draft, 2016

On the other side, in a labour market characterized by a surplus it is assumed that labour mobility is lower (right column in figure 2.4). Everybody holds on to their position because there exists fierce competition for the few spots available. More compartments will be characterized by buyer markets since an abundance of labour exists, firms can dictate the terms of employment instead of being dependent on employees' acceptance. Unemployment rates rise, especially for the ones who do not possess the right qualifications demanded and therefore are low employable.

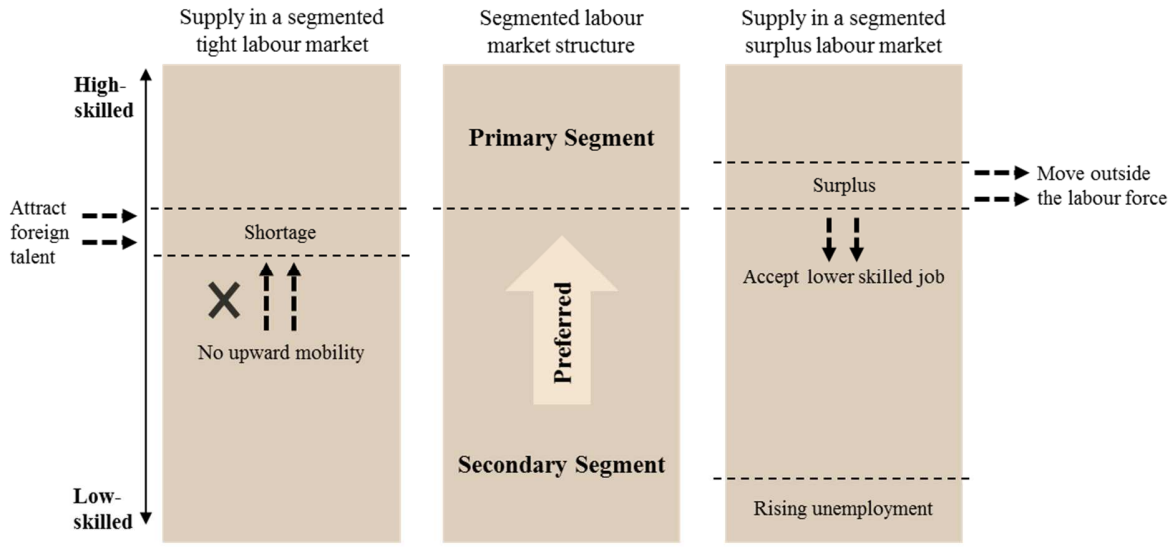
When (almost) no mobility between the different compartments exists due to preferences, institutional influences; labour laws, minimum wages and legislation on in-migration and social influences on pay and employment, labour markets reflect tendencies towards *segmentation* (Leontaridi, 1998). Segmentation refers to a situation where there is an extreme separation between different segments within the labour market.

Segmented labour markets can be very simplistically conceived by separating the labour market into a primary segment (similar to upper left corner in figure 2.5) including 'good jobs', jobs with high wages, good working conditions and better career and training opportunities and a secondary segment (similar to the bottom right corner in figure 2.5) characterized by 'bad' jobs, jobs with poor wages and bad working conditions and career opportunities (informal sector). Compared to the secondary segment, the primary segment is characterised by high levels of human capital (e.g. high skilled jobs) and employees have more power to determine their own work content. As a result, labour costs increase. One would expect high levels of labour mobility in the primary sector, as employees are in high demand and lower levels of mobility in the secondary segment as supply outreaches demand. At the same time aggregate unemployment in this segment is made up of job hoppers (or short stayers) who move in and out of work frequently. Therefore, it is assumed that a high labour turnover exists in this segment (Reich et al., 1973; Loveridge & Mok, 1979; Leontaridi, 1998).

Within a dual segmented labour market, it is assumed that everyone who participates in the labour market prefers to have a job in the primary segment (figure 2.5). In a market characterised by a labour surplus of (high) skilled workers (right bar in figure 2.5) it is conceivable that there are not enough jobs

available in this segment, only a small part of the qualified workforce will be able to fill these jobs. Those who did not get a job in the primary segment but possess the right qualifications may wait for better opportunities, accept lower skilled jobs, remain unemployed or migrate and leave the labour market. When many 'primary qualified' workers accept lower skilled jobs, workers in the secondary segment can be pushed out of the market causing high numbers of unemployed low skilled workers.

FIGURE 2.5 *Segmented labour market structure*



Source: Own draft, 2016

On the other side, it could be possible that there exists a shortage (e.g. more demand than supply) of qualified labour in the market (left bar figure 2.5). This is highly possible when kept in mind that there is a trend of increasing demand for high skilled labour. This would imply an increase in jobs within the primary segment of the labour market since it is assumed that high skilled labour is positioned here. Therefore, a possible shortage within this segment can occur. However, because of segmentation e.g. worker/employer preferences and other technical and bureaucratic requirements for admission to this segment (such as specific skills, race, gender or school credentials) none or almost no upward mobility occurs between the segments. It is assumed that between different segments almost no mobility exists, except downward mobility to some extent. Harrison and Sum (1979) argue that firms in the primary segment do not use their political influence to eliminate these institutional barriers but instead, respond to

such shortages by importing skilled labour from outside the local economy. In this case barriers for intersegment mobility are held up by the primary firms in the sense that they will not lower hiring standards and accept less desirable or lower skilled workers for their vacant positions.

The segmented labour market theory as described consists of two segments, in reality however the duality segment approach can be far more complex and only two compartments/segments may not be sufficient. A less extreme explanation for the low (upward) mobility between segments can be complementarity in the labour market. In this case there exists different compartments within the labour market with each their own unique characteristics. Low interaction exists between segments differ due to differences in skills requirements instead of preferences, legislation or exclusion. This is highly likely in a heterogeneous economy because many industries require different type of skills sets. Due to different requirements there exists less competition which implies low skill relatedness between jobs in the labour market.

2.3. Meso-perspective: Sectors and industries

From a meso-perspective, various economic dynamics can be recognized in different sectors and industries. Sectors and industries differ in levels of competition, growth and innovation, distribution of firms' size, and entry and exit rates (Iammarino & McCann, 2013). Firms are affected by these industry dynamics. Evolving technologies within industries can for example force firms to change their working practices and skill needs.

Although sectors and industries are commonly used interchangeably within literature, both concepts can be separated. Sectors refer to a compartment of the economy by which a large group of companies preform similar business activities (e.g. Manufacturing sector, Financial sector). Industries are more specific and refer to a particular group of companies with highly similar business activities. Industries can be roughly classified in primary, secondary and tertiary (service) industries. Firms that operate in primary industries extract and sell resources. They can be divided into extractive industries, whereby firms extract or draw goods from natural resources (e.g. mining) or genetic industries in which firm's main

activity focuses on the development and growth of flora and fauna (e.g. farming). The primary industry is often characterized by a small amount of large firms that produce homogenous products. Secondary industries relate to the production of finished products by using material derived from the primary industry. The size and number of firms in this industry vary and the products are more heterogeneous. Also, one can distinguish tertiary industries (services industries), which do not produce physical products but provide services. Often these industries exist of a various number of firms that in general provide both heterogeneous as homogeneous services (Marijs & Hulleman, 1997).

In literature it is argued that the dynamics and evolution of industries and sectors are the result of different interaction processes of elements such as technology, innovation, demand and firms. These interaction processes have to been seen as sector-specific and therefore different dynamics within sectors and industries exist. Technological opportunities vary across sectors. Firm's growth paths largely depend on the 'technological paradigm' that exists within the sector. The technological paradigm is defined as 'a system of scientific and production activities based on a widespread cluster of innovations, representing a response to a related set of technological problems, and relying on a common set of scientific principles and on similar organizational methods' (Cantwell & Naruala, 2001). Characteristics of prevailing technological paradigms within sectors, for example are, the degree of tactiness or pervasiveness of knowledge and levels of innovation (Iammarino & McCann, 2013).

Ericson and Pakes (1995) argue that industry dynamics are generated through the outcomes of firm's investment and firm performance as a consequence of competition from in- and outside the industry. Various resources contribute to the level of firm performance in industries. For example, firms within a rapidly changing industry like the banking industry, largely depend on resources like management quality, technological expertise and innovation capabilities (Mehra, 1996).

According to Nelson (1995) and Metcalfe (1998), the transformation of sectors is the result of the evolvement of following elements: technology, demand, firms, institutions and knowledge base. Two evolutionary processes identify sectoral dynamics: variety creation and selection. The process of variety creation by firms as for products and technologies is related to the levels of entry, innovation and R&D.

For example, the role of new firms can influence sector dynamics. New firms bring a variety of new knowledge and specialisation which influence innovation and production processes. The process of selection reduces the heterogeneity of firms, products and technologies. Market selection affects the growth and decline of firms. Malerba (2005) argues that sectors are based on three components: knowledge and technologies, actors and networks, and institutions. He identifies different dynamics across sectors. Firms within the same sector are similar to each other, share similar knowledge bases and use similar strategies to survive, grow and innovate. Also the study concludes that levels of knowledge, as a base for innovative activities, vary across sectors. Sectors that represent a great heterogeneity of firms tend to have more multi-source knowledge bases and experience rapid increasing technological change. Next to that, demand has proven to be crucial as for change in sectoral systems, as needs of consumers and other agents continuously change over time. This is an extra stimulus for innovative activities. Furthermore, institutions play a significant role in evolving dynamics as they affect the rate of technological change and the performance of sectors.

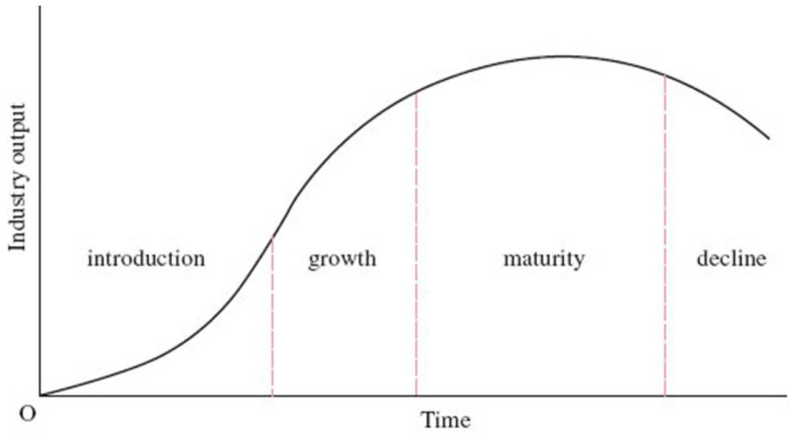
Marsili and Verspagen (2002) link sectoral patterns of innovation to the industrial structure (technological environment, size of firms) of five regimes (industries) within the Dutch manufacturing sector: Science-based regimes, fundamental process regimes, complex-systems regimes, product-engineering regimes and continuous-process regimes. They find out that the presence of medium-sized firms and industrial dynamics in terms of entry and survival of entrepreneurial firms are linked to different regimes. For example, the presence of medium-sized firms is especially low in the science-based regime. Also they find evidence that within science-based and product-engineering regimes innovation is mainly product based driven, entry firms face high mortality rates and firms benefit from research within the industry.

2.3.1. The Industry Life Cycle

Another factor that generates dynamics across sectors and industries is the stage of the industry life cycle in which sectors/industries find themselves. According to the industry life cycle four stages of

industry development can be distinguished: An early exploratory (introduction) stage, an intermediate (growth) stage, a mature stage and the declining stage (figure 2.6).

FIGURE 2.6 *Industry life cycle model*



Source: Lidwell et al., 2010

The early exploratory stage is characterized by a high degree of uncertainty, a big number of small firms as entry barriers are low, high levels of innovation, the design of primitive products and low volume. After this stage, industries evolve into an intermediate stage. At this point, technologies have become more complicated, outputs of products increase and a 'shakeout process' of firms takes place. In the mature phase, industries consist of a low number of firms, innovative activities are minimal, highly advanced technologies are used, entry barriers are high and the volume of output reaches its highest point (Klepper, 1997; Audretsch & Feldman, 1996). In the declining stage, output of the industry starts to decline as a consequence of a transformation in demand, the lack of innovation and other competitive industries. During this stage, dominant firms within a certain industry or sector face the negative effects of lock-in and do not possess the capabilities to renew themselves.

The industry life cycle model is primarily relevant to manufacturing sectors producing goods/products. Dynamics in service sectors, however, are different. Services have distinct features compared to products/goods in terms of: intangibility, inseparability, heterogeneity, perishability and ownership. Unlike goods, services do not always consist of physical attributes. They rather have to be qualified as experiences. As for inseparability, services, in contrary to goods are produced, sold and

consumed at the same time. This feature of services increases the importance of communication between producer and its clients. It is argued that services contain higher levels of heterogeneity than products because services are more dependent on the quality of firm's employees. This improves the quality of services. Therefore, employees need to have different skillsets, whereby employees in service sectors are more depended on soft skills (e.g. communication and customer-handling soft-skills) than employees in the manufacturing sector. A fourth distinct feature is that services are perishable. Products can be stored, services not. Next to that, consumers can own goods. Services are not owned by consumers. They only have the right to use it. Another distinction between the two sectors is the resources used in its industries. Service industries in general depend more on (high-qualified) employees compared to manufacturing industries. Manufacturing industries primarily rely on utilities (e.g. electricity, water, gas) and tangible assets. Differences between industries in the manufacturing and service sector result into specific industry dynamics (Buckley et al., 1992). The industry phase directly influences firm behaviour as for recruitment. For example, in a mature phase the demand of labour will be different than in an introduction phase because of the number firms active, scales of economies and prevailing technologies. These phase dynamics will affect firms' recruitment standards, strategies and difficulties.

Overall different factors and elements drive economic dynamics within sector and industries. Therefore, industries are heterogeneous. Important agents that on the hand drive dynamics and on other hand experience the consequences of economic dynamics at industry level are firms. As mentioned, firms adapt recruitment strategies and experience different difficulties because of industry dynamics. In order to carry out activities, firms need to have human capital possessing the right skills-set. The next paragraph describes behaviour of firms in relation to skill acquisition.

2.4. Micro-perspective: Firm Behaviour and Strategies

As described earlier, macro factors (segmentation, institutional regulations and labour shortages) can affect the behaviour and strategies of firms. Firms are actors within different industries in the labour market. They aim to acquire the right level of human capital to pursue their business objectives. From a broad perspective firms all share the goal of economic growth. However, firms differ in the business decisions they make as their objectives vary from profit maximization to continuance of the firm (Tirole, 1998). The labour market in which they operate is characterized by competition and different dynamics apply. Firms have to achieve and sustain competitive advantage as this makes them more unique and competitive. In order to achieve competitive advantage, firms apply different strategies. They might focus on R&D and innovation or rather realise increasing returns by entering new markets.

2.4.1. The firm

In the theory of a firm, broadly two views can be distinguished; the resource based view and the transaction cost economics view. The transaction cost perspective sees the firm as a bundle of activities. These activities are selected through the costs of transaction and coordination. This perspective does not take in account the role of knowledge and competence. Likewise, the resource-based perspective considers the firm as a bundle of activities (Green et al., 2005) or resources (Penrose, 1959). However, the firm must be seen as a bundle of activities based on the competences and the generation of new knowledge within organisations (Green et al., 2005). In order to understand firms, the organisation must be seen as a ‘collection of productive resources’ including physical and human resources. According to Penrose (1959), the role of human resources is very important. She assumes that opportunities to produce new products largely depend on the knowledge available in the firm. The activities within the firm that are carried out by employees generate knowledge. The level of human capital as a characteristic of firms depends on the ‘set’ or ‘bundle’ of skills and know-how owned by firm’s employees (Kor & Leblebici, 2005). This ‘bundle’ of skills is crucial for firm capabilities and thus for firm performance (Coff, 2002).

2.4.2. Heterogeneity of Firms

Various theories do exist in order to understand the firm and its performance. Yet, it is hard to precisely describe the actual factors that determine firm performance. The firm can be seen as 'a black box' whereby the collection of resources together contributes to firm behaviour and outcomes. The neoclassical economics theory, for example, only focuses on the relationship of inputs and outputs. It does not touch on the activities inside the firm. Views that try to open this 'black box' do exist. For example, the resource based view, described earlier. Still, opening the 'black box' is difficult as firms are heterogeneous and thus difficult to compare (Nonaka et al., 2000). Firms must be seen as heterogeneous actors that differ in terms of knowledge, innovation, technology and R&D. The development of R&D within MNC's has proven to be one of the most important factors increasing competition (Iammarino & McCann, 2013). Besides that, firms differ in size, resources available, levels of market power and attractiveness which all contribute to firm performance.

Resources

Firm performance depends on firm's access to resources. These include all firm-specific assets, capabilities, organizational processes, firm attributes and knowledge (Barney, 1991). Resources available can lead to a competitive advantage. Therefore, the importance of firm's resources has to be assessed in comparison to the resources available to competitors. Firms that possess the 'right' capabilities will be more successful in their performance than firms that lack capabilities. Of course, defining the 'right' capabilities for firms is different across sectors and industries. Firm performance in high-technology manufacturing industries heavily rely on the firm's technological capabilities. Factors that influence technological capabilities of a firm are size, human capital and the use of technology. For example, the development of technology capabilities in local firms can be increased by mechanisms of technology transfer. Also, employee knowledge, obtained while working in MNC's, contributes to the technological capabilities of the firm.

Firm market power

Market power can be seen as an explanation why some firms perform better and are associated with higher value than others. Firms operate in markets where they possess different of levels market power. Firm market power can be described as: A firm's ability to influence the actions of others in a product market (Makhija, 2003). In literature it is argued that firm's market power depends on their market position, in terms of market share and the level of product differentiation (Isely & Roelofs, 2004). Market power is important because it leads to higher revenues, enlarges competitiveness, and contributes to firm's brand name. Products are sold from manufactures to consumers via intermediaries (e.g. stores). Therefore, manufacturers depend on the motivation of intermediaries. Intermediaries want to sell high volumes of products as quick as possible and therefore depend on demand of consumers The extent to which consumers are aware of individual brands is decisive for selling products. High market share brands will be more interesting for intermediaries than unknown market brands that do not differentiate. Next to that, firms with more market power are able to influence prices and policies and can effectively manage relationships with intermediaries (Shervani et al., 2007).

Attractiveness

In literature it is argued that firms that are more familiar to applicants are regarded as more attractive employers (Turban & Greening, 1997). Social identity theories suggest that, the firm brand influences the individual self-concept of employees. They classify themselves into social categories based on the brand of the company (Dutton & Dukerich, 1991). In their study on the attractiveness of employers within in China, Turban et al. (2001) conclude that prestigious companies are seen as more attractive employers than companies that lack familiarity. Specifically, Chinese applicants attach great importance to the brand of a company, as they can improve status among their relatives. Companies are aware of their image and invest in 'branding'. They try to differentiate themselves in order to attract talents and increase the likelihood that their product and services will be chosen over others. Employer branding can be described as: *"The sum of company's efforts to communicate to existing and prospective staff that it is a*

desirable place to work" (Lloyd, 2002,). Thus, unique aspects of firms contribute to the brand of firms. This enables them to 'win the war' for talent and skilled employees (Collins & Stevens, 2002).

Size

Another factor that affects firm performance is the size of firms. Firms differ in size and therefore possess different characteristics and capabilities. Large organisations tend to have a more complex structure and higher amounts of resources than smaller compact organizations. In general, MNC's experience more path-depended growth paths for their products and services. They produce on large scale, represent a relatively large market share and are expected to generate incremental innovation. In contrast, smaller firms like start-ups, are abler to adapt to new technologies and strategies, produce small numbers of products and services and their company structure is less complex. Radical innovation is expected to be more present in this type of company. This leads to the creation of new economic activities (Fagerberg & Verspagen, 2000). MNC's become more vulnerable to 'lock-in' because their core activities are less innovative. Innovative activities that they develop through R&D are often distributed to subsidiaries or spin-offs. These types of organizations are less complex and therefore develop more innovative activities.

2.4.3. Skill gaps and shortages: Causes, consequences and remedies

This paragraph will elaborate on the causes, consequences and remedies as for skill gaps and skill shortages. One has to note that many stakeholders are involved in these dynamics, e.g. industry collectives and local governments. However, this paragraph will focus purely on firm perspective.

Skill gaps

Employers can face difficulties in searching the right skilled employees. Different types of difficulties can be distinguished. First, firms can experience skills gaps, which can be defined as deficiencies existing within firms' workforce. In contrast to shortages, skill gaps occur in the internal labour market of a firm. For example, when the existing workforce of a firm does not possess the skills to perform their tasks. Skills gaps relate to both generic and specific (hard and soft) skills. Employees that possess the right certificates but do lack soft skills can be a source of skills gaps too. For example, a manufacturing

company may rely on a group of engineers having certificates but are lacking communication skills. As a consequence of skills gaps business results are affected negatively. Another aspect of skills gaps is that they are normative; it is the gap between what is and what should (Roy et al., 1996). The normative aspect depends on employers' perception of skills gaps, as employers know what kind of skills will contribute to optimal business result. The concept of skills gaps lacks clarity. In literature, different definitions can be found:

1. 'A skills gap refers to a situation where employers are hiring workers whom they consider under-skilled or that their existing workforce is under-skilled relative to some desired level.' (Shah & Burke, 2003);
2. 'A deficiency in relation to some suitably defined optimal level of skills.' (Green et al., 1998);
3. 'Skills gaps are identified when an employee does not possess the skills required to do the job he/she does currently proficiently.' (Sutherland, 2010);
4. 'A discrepancy or a gap arises when a competency an individual possesses is lower than required for job performance.' (Wickramasinghea & Zoyzab, 2009).

According to Schwalje (2012), from all definitions described above two can be distinguished. The first definition of skills gaps exists in a situation by which employers perceive current employees under skilled for their current jobs (Shah & Burke, 2003). This perception adopts a proficiency-based definition asking employers how many employees within each occupational group are competent to perform their task. It also perceives skills gaps through a competence-based view. The competence-based view highlights the role of strategic management within organizations in adapting and integrating external and internal skills, resources and competences towards evolving environments (Teece & Pisano, 1994). A competitive advantage is obtained through management's ability to develop a highly skilled human capital pool.

The second definition considers skills gaps as a gap between skills of current employees and skills needed to complete business objectives. This business objective-based measurement approach takes a resource-based point of view (Schwalje, 2012). The view aims to describe why particular firm resource

endowments result in increasing profits and higher levels of competitive advantage. Firm resource endowment focuses on maximizing profits through effective strategies that deal with the employment of skilled employees (Wernerfelt, 1984). A firm will be more successful in generating sustainable competitive advantage if it controls more effective resources than other firms (Freiling, 2004).

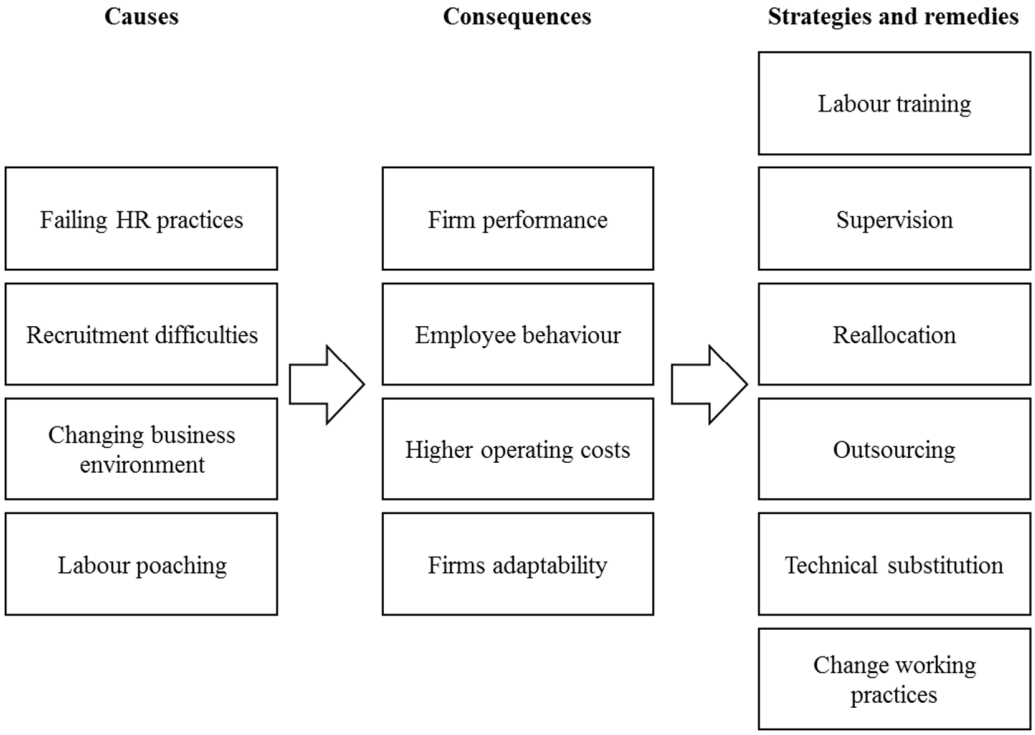
In both, the competence-based view and the resource-based view, the role of knowledge in the form of human capital is critically influencing firm performance. However, they differ in the way human resources can realise, on an organisational level, optimal firm performance through the collective action of individual employees (resource-based) or through moulding of workforce skills into market-focused competencies (competency based) (Schwalje, 2012). As both have their pros and cons, Schwalje (2012) proposes a definition of skills gaps that integrates both views; *"… a situation in which current employees lack the skills to perform their jobs which results in the compromised ability of a firm to meet business objectives"* (Schwalje, 2012, p. 13). It is important to have a clear definition of skills gaps, as it is interpreted differently among employers. Measurements of skills gaps will lack validity and trustworthiness if interpretations differ too much.

Skill shortages

Beside skill gaps, employers can have problems with the supply of skills in the labour market. Those problems occur when the supply of skills does not fit the demand. This can be referred to as skills shortages and apply to firms' external labour market.

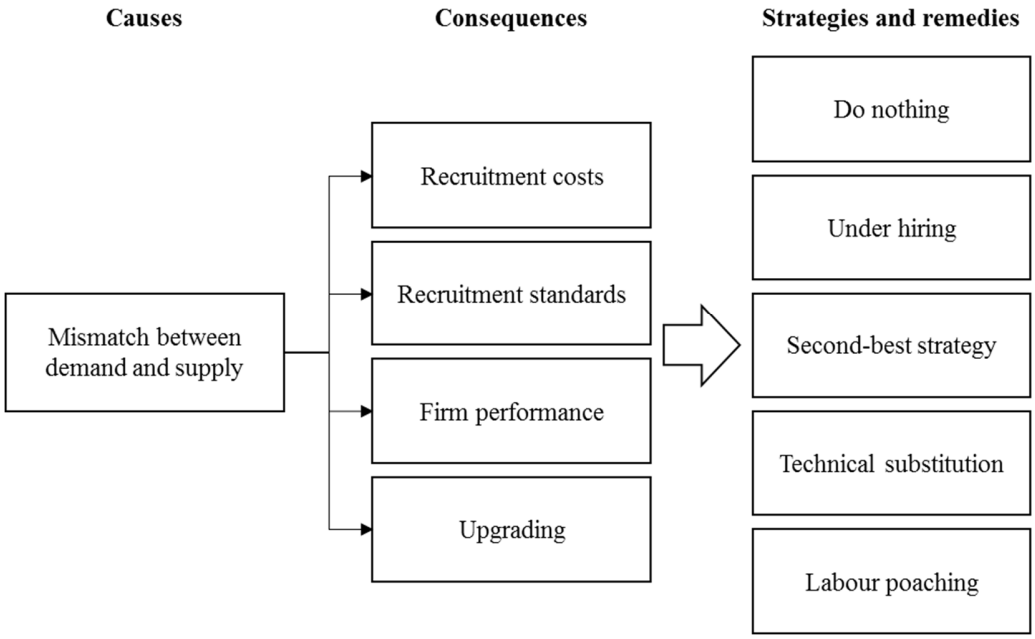
The next paragraphs will further elaborate on causes, effects and remedies for skill gaps and shortages, which are schematically presented in figure 2.7 and 2.8 (see next page). Thereby focussing on behaviour and strategies firms apply.

FIGURE 2.7 *Schematic overview of causes, consequences, strategies and remedies for skill gaps*



Source: Own draft, 2016

FIGURE 2.8 *Schematic overview of causes, consequences, strategies and remedies for skill shortages*



Source: Own draft, 2016

Causes

Skill gaps

The lack of a clear definition of skill gaps makes the search for potential causes difficult. Yet, different causes can be detected. Skills gaps can emerge as a consequence of failing HR practices, recruitment difficulties, strategic shifts in evolving business environments and shortage of employee orientation and integration.

First of all, failing HR practices. HR practices related to employee development can increase skills levels of the workforce. Firms provide training to develop the skillset of their employees. New skills are crucial in evolving business environments and changing technologies. Employer's willingness and capability to train its workforce depends on different aspects. Firms depend on managerial capabilities of its HR department. A lack of capabilities can mean that future trends will not be picked up in time. Responses, in the form of training, then will be too late as other firms already took their chances. Also, managerial miscalculations of the returns to training, as a consequence of information gaps, may retain employers from providing training (Lall, 1999). Labour poaching and high costs may be reasons to abstain from training as well. As said earlier on, poaching threats can influence HR manager's perspective on training their workforce. Also, HR departments may design policies to increase employee's motivation. For example, rewards, promotion systems and compensations can increase employee's productiveness and willingness to learn. Furthermore, HR departments simply can have experienced that training will not provide the desired outcome.

Secondly, recruitment difficulties can cause skills gaps. These difficulties can be the consequence of a lack of interested people, too many other competitors, poor working conditions offered for the job such as unattractive working hours and low pay, poor career prospects or a location that is difficult to reach with public transport (Schwalje, 2012). Recruitment difficulties have to be distinguished from skill shortages, as recruitment difficulties do not see upon situations where there are too few people available in the labour market that possess the right skills.

Thirdly, skills gaps can be caused by strategic shifts in changing business environments. One can think of evolving technologies, the development of new products or services, introduction of new working practise, legislative requirements or increased competitive pressure. Successful shifts depend upon the renewal of firm competencies. According to the competence-based perspective these competencies depend on employees' skillset. Skills gaps will occur if employees do not possess specialized skills.

Fourthly, transitional stages of employee orientation and integration can lead to skills gaps. Employers stress out that lack of work-experience among employees and post-merger employee integration can be a source of skills gaps too.

Skill shortages

Skill shortages are the consequence of a mismatch of demand and supply. As explained in paragraph 2.2, mismatches are the result of a process that takes place at macro level. When the demand for skills is higher than the supply skill shortages exist.

Consequences

Skill gaps

In general skills gaps negatively influence firm performance. Measurements of skills gaps are limited to surveys that rely on employers' perception therefore caution is needed. In his study on the effect of skills gaps of organisations, Lindorff (2011) finds that skill gaps increase levels of stress among employees within firms, lower staff morale, influence customer service standards and reduce profits. Skills gaps that are frequently mentioned by employers include leadership, professional and industry specific skills. Furthermore, he discovers that skill gaps differ across small, medium and large firms. For example, managers in medium or large firms are more likely to feel skills gaps than those in small firms. Therefore, firm size must be taken into account when assessing effects of skills gaps. Also, he provides evidence that effects of skills gaps vary among industries. Notably, respondents in charities and non-profit organisations reported on skills gaps. According to Sheldon and Thorntwaite (2005), this can be explained by the fact that they, unlike big businesses, lack Vocational Education and Training (VET) policies.

Furthermore, skill gaps negatively affect firm's market position. Skills gaps can lead to lower levels of innovation, reducing profits and revenues and also can affect firm's product quality. As a result, firms lose business to competitive firms and have lower quality standards. Firms may therefore choose to not enter high quality demanding niches and rather access markets that are characterized by low levels of technology and quality (Schwalje, 2012).

On operational level skills gaps can influence firm's performance. As a consequence of skills gaps, firms experience higher operating costs, are forced to outsource more business operations and face difficulties adapting new technologies and working practices. According to Ashton and Sung (2002), high levels of employee skills can lead to new working practises, such as the use of self-managing work teams, adopted by employees themselves. Also, skills gaps constrain the integration of new technologies, which results in underused capital assets and thus hinders optimal firm performance (Ashton et al., 1999).

Skill shortages

Skills shortages negatively affect firm's performance. They result in increasing recruitment costs, lower retention rates and affect the quality of the products or services firms offer. Also, shortages hinder evolving technology processes. As shortages hindrances upgrading, subsidiaries might lose mandate to other subsidiaries of the company. According to Stevens (2007), shortages of skilled labour also have a significant effect on firm's employment behaviour as adjustment costs increase. Firms, in the absence of skilled workforces, often adopt a second-best strategy and produce low skill intensive products (Steedman & Wagner 1987; 1989). This hinders them climbing up the value-chain. Some skills shortages only apply in certain industries and therefore harm industry specific firms but have none or little impact on others.

Also, skill shortages force firms to lower their recruitment standards. They have to hire employees that not fully possess the skills needed, in order to keep firm activities going. Under hiring negatively affects firm performance.

Strategies and remedies

Skill gaps

Firms apply different strategies in order to prevent skills gaps. These strategies are the outcome of manager's perception on skills gaps and therefore vary among firms. First of all, it is important that HR management is proactively focusing on closing down skills gaps. Before skills gaps exist firms already can respond to future gaps by predicting future skills needs and developing early warning systems. One can think of feedback mechanisms that include performance reviews. Next to that, it is important HR managers have an understanding of resource allocation. This will increase the effectiveness of strategies in avoiding the occurrence of skills gaps (Schwalje, 2012).

Once firms experience skill gaps different strategies can be applied. For short-term solutions, firms can outsource business activities to other companies. Another short-term solution can be reallocation of employees to positions within the company that are important.

In the long term, company-based training is a commonly used strategy. Especially in large organizations employees need to possess company specific skills in order to operate effectively. Training periods may vary from days to months, depending on the skill set of employees. Also, firms train employees continuously as technology changes, new legislative is introduced or new services and products are developed. Internal training methods include on-the-job training (mentoring and coaching) and off-the-job training (classroom instructions). Training methods enhance skill formation and generate transferable or specific skills. According to Sheldon and Li (2013), the development of transferable skills within firm's workforce implies that poaching threats intensify. A workforce with growing skills becomes interesting for rival firms. Therefore, employers face a 'training dilemma'. On the one hand they need to improve their workforce skills capacity in order to be competitive. On the other, by improving workforce skills they enhance labour poaching threats. This dilemma can undermine employers' view to the need for training, which can lead to inadequate responses (Cooke, 2005).

In their study on experiences of foreign-invested enterprises with localized shortages of skilled process workers, Li and Sheldon (2010), found that particularly large firms had no choice but to train their

own skilled employees. However, firms can take measures to reduce the risk of labour poaching threats. First, they may choose to focus workplace training on skills that are firm specific. This will reduce the attractiveness of firm's employees to rival firms. Second, firms may increase incentives in the form of higher wages when employees complete training programs (Stevens, 1996). Third, training firms may reduce training 'visibility' to avoid revealing information as to what extent employees have undergone training (Katz & Ziderman, 1990). Last, employers may force employees to sign long-term employment contract as a condition for participating in future training programs (Moen & Rosén, 2004).

Internal training is effective up to a certain level. Obtaining more specific skills might require training from external organisations. According to Lindorff (2011), company-based training and development is still underutilized as a solution for skills gaps. As said earlier employer's perception on training can be affected by poaching threats, missing institutional incentives or a lack of information. Especially small firms invest relatively less in company-based training than large firms (Freyens, 2006). Probably, this has to with a lack of access to resources (costs, time, information, experience). Firms, also, can cooperate through public-private training partnerships. These collaborations result in lower training costs. Besides company-based training, firms might choose to adopt second-best strategies, invest in technical substitution, change work-practices or increase supervision of staff.

Skill shortages

In response to skills shortages firms apply different strategies. Firms can simply choose not to react when the expectations of future sales are depressing or labour market prospects are expected to be better in future. In case firms do react, different strategies can be applied. They can decide to under hire employees that do not fully possess all skills needed. Another alternative is to change the proportions of skilled and unskilled labour. However, evidence suggests that firms rarely use this second-best strategy, because shifting from skilled to unskilled labour is not favourably (Steedman & Wagner 1987; 1989).

Furthermore, employers poach to overcome labour shortages. Labour poaching is more common in tight labour markets. Employers try to recruit employees from competitive firms by offering them higher wages, better working conditions or other interesting incentives. Labour poaching can be of great value in

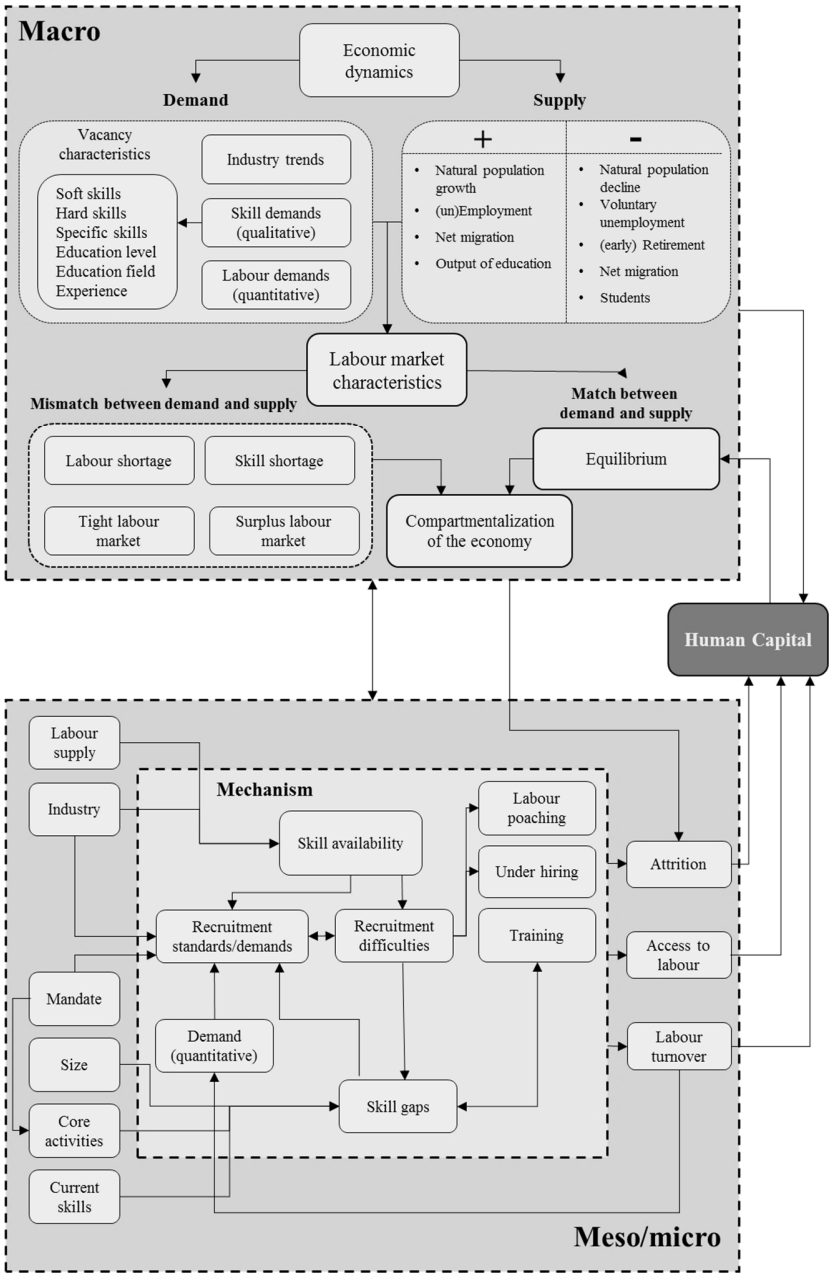
two ways. Firstly, the poaching firm gains besides, the skillset of the employee, access competitor's knowledge base. As a consequence of 'poaching' labour costs in occupations that experience skills shortages increase. Secondly, when firms experience long-term shortages, they might substitute factors by investing more in tangible resources (capital). This makes them more resilient to skills shortages.

All of the causes, consequences, strategies and remedies as described above are captured in the figures 2.7 and 2.8, presented at the start of this paragraph. As mentioned earlier, various stakeholders (industry-collectives, regional developers, local governments) play a role as well regarding the causes, consequences and strategies of skill gaps and shortages. However, this part of the study takes a firm perspective and therefore the influence of various stakeholder regarding stakeholders will not be elaborated on.

2.5. Conceptual model

All the relevant theoretical concepts outlined in the framework above can be captured in a conceptual model as presented in figure 2.9. The conceptual model provides an overview of all relevant concepts and how they are related to each other. The arrows represent proposed relationships between the different theoretical concepts.

FIGURE 2.9 *Conceptual model*



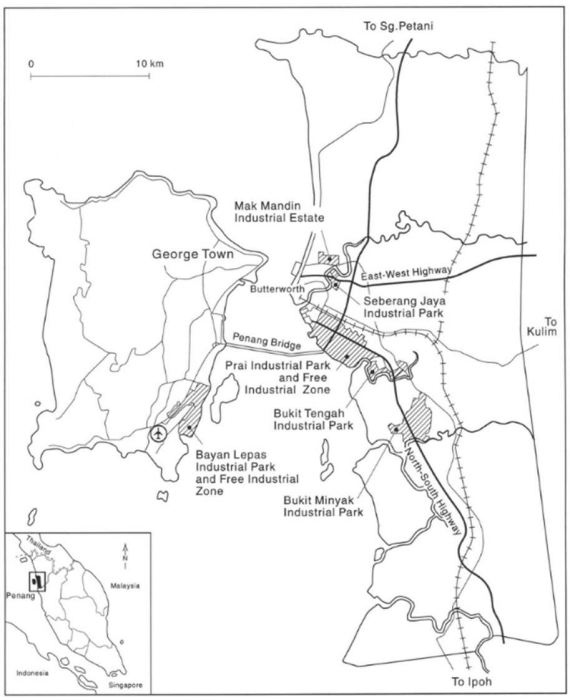
3. Introducing the Case: Penang

This chapter will present an introduction to the Penang region. The chapter contributes to a better understanding of the context of the study and will touch on various aspects. First, social-economic characteristics of Penang are introduced. Secondly, the history and evolution of Penang's industries is described. Also, some characteristics of Penang's economy are highlighted. The third paragraph will elaborate on the current labour market characteristics and conditions in Penang. The chapter concludes with a paragraph presenting expectations based on the theory and information outlined so far.

3.1. Penang

The state of Penang is located in the northwest of Malaysia. The Penang region consists of two parts; First Penang Island, which is home to the capital 'George Town' and the Free Industrial Zone located in Bayan Lepas industrial park, and second Seberang Perai that is located on the main land including different industrial parks of which Prai industrial park is the most important one (figure 3.1).

FIGURE 3.1 *Free industrial zones and industrial parks established by the PDC in the state of Penang*



Source: Fold & Wangel, 1997, p. 113

The Penang region is home to 1,6 million people of which 750,000 live in the capital George Town. In 2008 UNESCO appointed George Town as being a world heritage site. This was a boost for Penang's tourist sector on which Penang relies the most after the manufacturing sector. The manufacturing sector is dominant for over 40 years already and today accounts for 48.2 percent of state's gross regional product, whereby the service sector represents 47.9 percent of its GRP (including tourism). Key industries in the manufacturing sector are for example, precision engineering, automation, broadband equipment, Integrated Circuits (IC) and Light Emitting Diodes (LED) (Hutchinson & Saravanamuttu, 2012).

The ethnic composition of Penang is due to its mix of ethnicities unique. This can be seen as a key-quality of the region. Of its population 41 percent is Chinese, 41 percent Malay and 10 percent Indian. Also unique, is Penang's political situation. Penang is the only state that is governed by an opposition party, the Democratic Action Party (DAP). The party's vision consists of a social and peaceful democracy that unites different races, religions and cultures. This reflects the more open mind-set of Penang people (Hutchinson & Saravanamuttu, 2012).

3.2. Evolution of Penang's industries

1500-1750: Penang's strategic location

In the 16th century the port of Penang became a strategic location for Portuguese traders to refill their water supplies in their long way to the Far East. Penang port was the ideal place for ships, to shelter during their travels through the straits of Malacca and therefore was used by many traders. For a long time, Penang would be a port-of-call on the India-China route (Hutchinson & Saravanamuttu, 2012).

1750-1950: Penang's trading economy

On August 1786, the British took possession of Penang Island and named it 'Prince of Wales Island. Since then, British influences started to spread around in Penang. During the 1820s, Singapore's location became more interesting for traders travelling from West to East. As a consequence, Penang had to restore its attractiveness. It did so, by representing itself as the link between rich European and Chinese businessmen and the supply of Malaysian resources (tin, rubber). With the opening of the Suez-Canal in

1869 British trade increased and led to prosperity in the Penang region. During the 19th century, Penang experienced economic growth and became one of the most important hubs in the Southeast Asian region.

During the Second World War the British nation was under pressure, it had to withdraw its forces from Penang. Japanese troops took over and occupied Penang for three years. Those three years were cruel for Penang's local citizens and many fled to the mainland. The British recaptured Penang in 1945. However, at that time British imperialism came to an end. By 1946 Penang entered the Malayan Union and became a state of the Federation of Malaya in 1948, which in 1957 gained independence. Penang's changing role over time has resulted in the existence of a cultural mix of ethnicities that to this day characterize Penang (Hutchinson & Saravanamuttu, 2012).

1950-1995: Industrialisation

Penang experienced an economic decline during the 1950s. Penang lost its free port status in 1969 and faced high levels of competition from foreign ports. In order to achieve economic growth and counter the losses change was needed. This resulted in a long tradition of strategic planning in Penang (table 3.1). In 1964 the Munro Report was published. The report recommended the establishment of an industrial site in the Penang region. Unfortunately, the recommendations where not followed up until 1970 (Kharas et al., 2010).

TABLE 3.1 *History of planning Penang's progress*

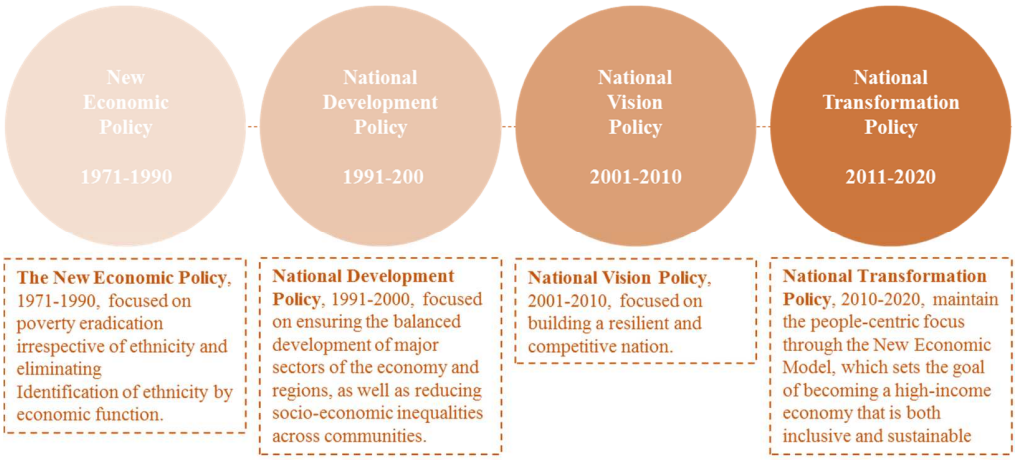
Period	Plan document	Outcome
1964-1982	Munro Report	• Industrial development
1970-1990	Penang Master Plan (Nathan Report)	• Export-led manufacturing • Global orientation
1991-2000	First Penang Strategic Development Plan	• Solid GDP and FDI growth • Few local linkages
2000-2010	Second Penang Strategic Development Plan	• Faltering growth and competitiveness • Slow transition to K-economy
2007-2025	Northern Corridor Economic Region Socio-economic Blueprint	• World-class economic region and a choice destination for investment, work and living

Source: Kharas et al., 2010, p. 18

In 1970, the federal government launched the Penang Master Plan (PMP). This plan document was a response to the loss of Penang's free port status. Its main goal was to link Penang's market with the global

economy. Manufacturing (export) besides tourism had to be the lead sector because natural resources were scarce but hard infrastructure and human capital were relatively strong (Kharas et al., 2010). At the same time a national policy was launched. The New Economic Policy (NEP) was implemented in order to achieve economic growth objectives and creating unity in a nation with many ethnic and religious groups (figure 3.2). The Penang state government in 1970 took a major step in developing Free trade zones (FTZ's) in order to attract foreign direct investments (FDI's). Together with the federal government, the Free Trade Zone Act 1971 came into force. This resulted in the opening of Malaysia's first Free Trade Zone in Bayan Lepas, Penang. The zone offered foreign companies tax benefits, descent infrastructure and cheap labour (Yeow & Ooi, 2009).

FIGURE 3.2 *National Development Plans of Malaysia, 1971-2010*



Source: Government of Malaysia, 2015

The impacts of documented plans and national policies and the opening of the FTZ were of great significance for the Penang region. Growth objectives were realized and GDP grew during 1975-80 by about 11 percent annually. Also, the opening of the FTZ can be considered as the starting point of greater industrialisation, more specific the start of the electrical and electronics industry in Penang. Originally, eight MNCs from Japan and the US and later from Europe, started to settle down in the FTZ (table 3.2). They were satisfied with the quality of the labour force for their low-tech downstream assembly operations and the physical infrastructure met their requirements. Initially the activities of these companies primarily focused on assembly operations. Most of the work was performed by female workers (Yeow & Ooi, 2009).

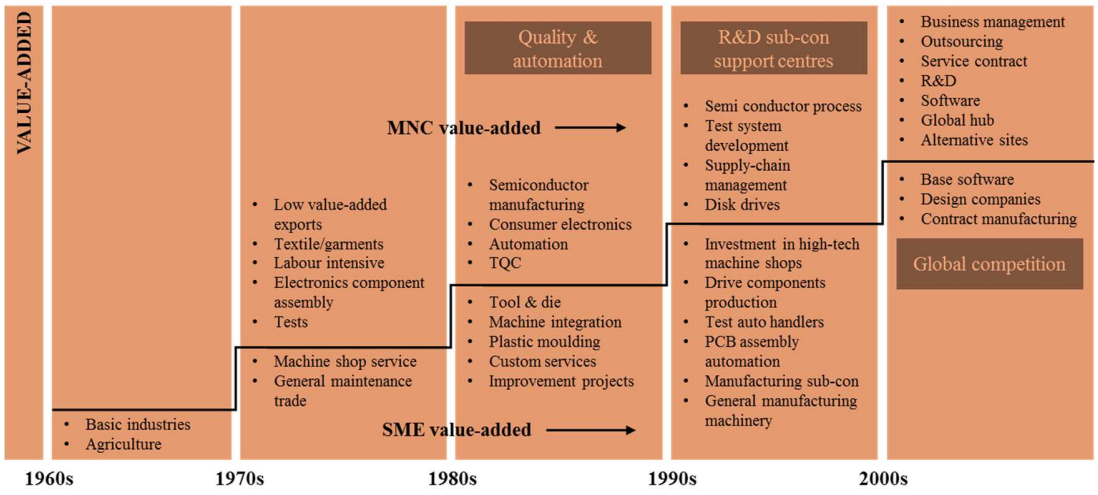
***TABLE 3.2** First multinational corporations to set up their operations in Penang*

	Company name	Origin country
1	Advanced Micro Devices	U.S.
2	Hewlett Packerd (Now Agilent Technologies)	U.S.
3	Clarion	Japan
4	National semiconductor (Now Fairchild Semiconductor)	U.S.
5	Renesas (Now Hitach Semiconductors)	Japan
6	Intel	U.S.
7	Litronix (Now Osram Opto Semiconductors)	Germany
8	Robert Bosch	Germany

Source: Hutchinson & Saravanamuttu, 2012, pp. 68-69

The success of the Bayan Lepas FTZ resulted in increasing foreign investments. From 1980 onwards, more MNC's started to settle down and diversified operations to process automation, die fabrication and other assembly activities for automation and tooling (figure 3.3). Because of its success, the Penang state opened another three phases in the Bayan Lepas area. Also, an area in Prai on the mainland was appointed as Foreign Investment Zone.

***FIGURE 3.3** Value roadmap - the Penang story*



Source: Kharas et al., 2010, p. 36

As a result, Penang became a (low-) manufacturing hub for MNC's. Stakeholders in the manufacturing sector functioned in an ecosystem characterized by a strong network of major E&E MNC's and supporting SME's. Penang by the mid-1980s became the world's largest exporter of semiconductors

(Athukorala, 2014). The transformation into an export-orientated manufacturing economy boosted economic development. Penang for decades became the best performing state of Malaysia in terms of economic growth and by the end of 1990s had established a reputation as the '*silicon island*' of the East (Hutchinson & Saravanamuttu, 2012).

During 1970-90 SME's contributed to the economic growth of the Penang region significantly. SME's mainly functioned as local contract manufacturers that could provide MNC's lower-end manufacturing support characterized by high volume, low costs and little variation of products. These activities concerned the assembly of semiconductors, logistics and technical services (70s), local precision tooling and back-end automation (80s) and test automation (90s). This diversification of activities has to be placed in perspective. The upgrading of activities showed in figure 3.3 was experienced only by a certain amount of SME's. Most of them remained carrying out their original activities (Hutchinson & Saravanamuttu, 2012).

1995-2005: Upgrading and diversification of activities

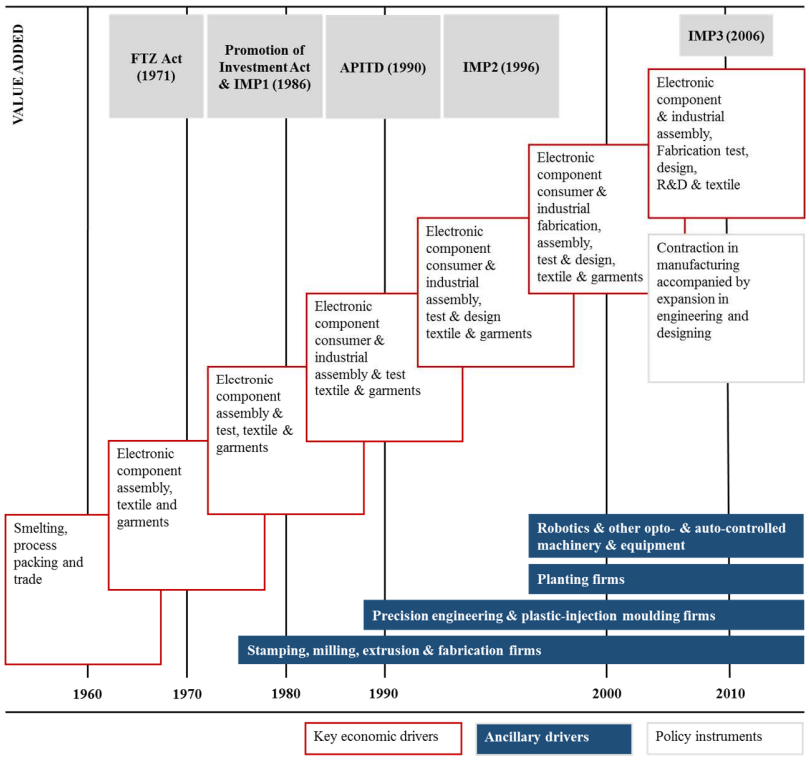
From 1995 onwards, a diversification of activities within electronic and electronic industry could be recognized. MNC's started to upgrade their low-manufacturing activities to high-tech manufacturing activities. Within the E&E sector new industries started to rise. The hard disk drive and medical device industry started to settle down in Penang and companies like Western Digital and Seagate opened up their plants. Local companies using high-level precision engineering technologies supported the disk-drive industry by producing disk drive components. Also, big MNC's active in the manufacturing of electronic consumer products started to establish their assembly plants (e.g. Sony, NEC and Dell).

During the late 1990s firms in the E&E industry had fully automated and integrated assembly and testing facilities. The semiconductor industry reached maturity stage. Clusters of suppliers active in the automation and contract-manufacturing industry supported the semiconductor industry. Through this, the industry could move up the value chain and became able to produce high-tech chips (e.g. multi-leaded chips and flip chips). The proximity of different industries enhanced the possibilities for learning and innovation. As a result, Penang became a leading region in the global quality productivity revolution. SME's fulfilled

an important role in this revolution and could be seen as the backbone of Penang's economy. The local automotive industry became well known for its back-end process improvement and automation innovations.

After decades of prosperity, Penang's economy from 2000 and onwards came under increased pressure. Export growth slowed in the mid-1990s because of rising costs and competition from China and because Southeast-Asia was slow to diversify into higher-value products (Yusuf & Nabeshima, 2009a). No longer Penang could retain its cheap labour position. Salaries increased and other countries could provide lower levels of labour costs. Low-cost operation, such as assembly processes, moved out of Penang to countries like China and Vietnam. In order to encourage sustainable growth, it was important to transform its low-manufacturing industry to a high-tech manufacturing industry characterized by high value adding activities (e.g. R&D) (figure 3.4).

FIGURE 3.4 *Industrial development in Penang, 1960-2010*



Source: Kharas et al., 2010, p. 34

2005-2015: Diversification of industries and integration of activities

In order to restore the high levels of economic growth experienced earlier, the Penang government realised it had to diversify its economy and become less dependent on its E&E and tourism sector. Their strategy was to expand the service sector through building a SSO market and put emphasize on professional business and medical tourism services (Leong, 2010). This strategy was consistent with The Tenth Malaysia plan (2011-2015) which emphasized that growth had to be achieved by supporting greater specialization of economic activity (Hutchinson & Saravanamuttu, 2012). Companies that open up a Shared Service Centre (SSC) can get the 'Multimedia Super Corridor (MSC) status' if certain requirements are met. Obtaining MSC status provides benefits such as; competitive financial incentives, unrestricted employment of local and foreign knowledge workers and the freedom to source capital globally. The SSO industry evolved through two ways: The establishment of SSO companies without direct ties with Penang and the diversification of activities within established industries.

Penang became an interesting destination for MNC's that carry out global operations, as for emerging information technology and business process outsourcing (IT-BPO) (KPMG, 2009). With the introduction of the MSC status for SSO companies in 2004, the SSO industry began to grow. Penang, during 2005-15 became home to the more than 50 new SSO/GBS companies such as KPMG, AirAsia GBS, IHS Global and First Solar.

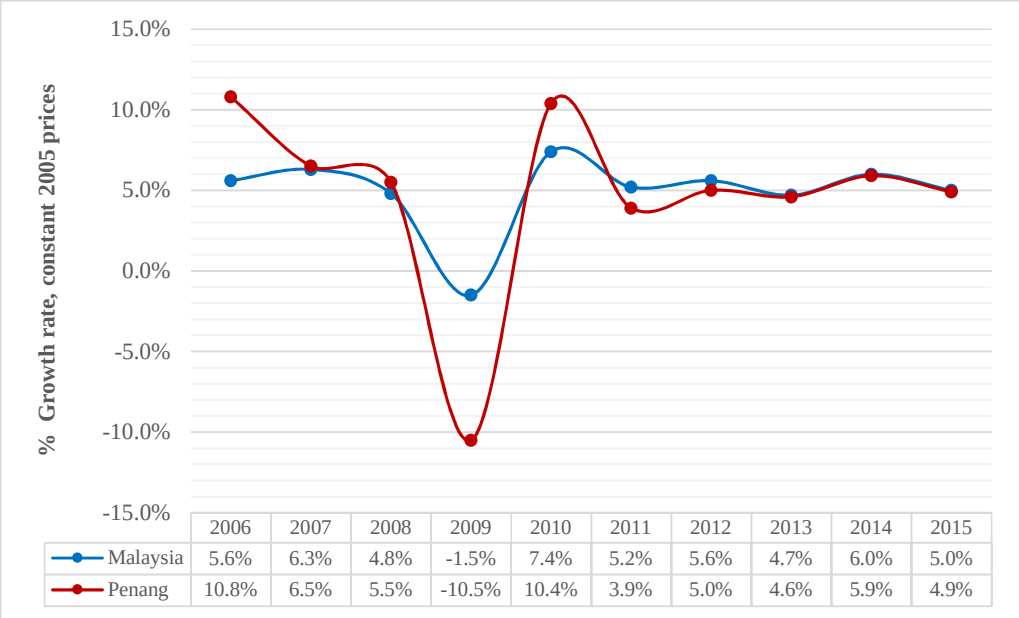
Furthermore, around 2005, MNC's in the E&E industries started to upgrade their activities into higher-value added activities. MNC's started to integrate R&D, high technologies activities (application development and the design of electronics) and shared and global business services into their business processes. Integrating shared and global business services has mainly to do with receiving MNC status. Large MNC's in the E&E industry like Jabil, Osram, Keysight Technologies and Dell set up their own global business service department. Different resources were needed to carry out these knowledge-intensive activities. MNC's needed high skilled employees with competencies in areas such as: Engineering, Finance Accounting, Supply chain management and Marketing. At the same time industries started diversifying into new fields (e.g. Aerospace, Renewable energy).

An industry within the manufacturing sector that grew rapidly is the medical device industry. In 2009, total investments reached a peak. Key players such as B. Braun, St Jude Medical, Ambu and Vigilenz medical devices expanded their activities over the last years. Each individual company has invested more than RM 100 million in their projects. B. Braun in 2010, invested more than RM1.75 billion on building a new plant to expand their (high-tech) manufacturing activities. This was the largest investment ever done in the medical device industry within Malaysiaf. Other industries within the manufacturing sector that started to grow during this time were the Light Emitting Diodes (LED) industry, and the photovoltaic (PV) industry (Hutchinson & Saravanamuttu, 2012).

At the same time, the situation of local SMEs became critic with low-tech manufacturing activities of MNC's moving to low-cost countries (e.g. China, Vietnam). Many of Penang's SME's were not able to evolve together with the needs of the MNC's in the E&E industry. They did not invest in new opportunities to upgrade themselves. The absence of upgrading mainly had to do with the comfortable position of SME's, as demand of MNC's was high and continuous. As a consequence of a huge demand decrease, local SME's started to sell their low –end products overseas to MNC's in China. However, due high levels of competition of Chinese SME's (costs & geographical proximity) it became hard to continue business. Overall, one could say that local SME's have failed to adapt to structural changes that the market has experienced over the last two decades. A mismatch between MNC's and local SME's today exists (Hutchinson & Saravanamuttu, 2012).

In sum, recent national policies and state plan documents have positively influenced the development Penang economy. Penang, over the last decades, has managed to upgrade its core industries and at same time was able to diversify its economy towards new industries such as SSO, Medical devices professional business services. The manufacturing in 2005 was responsible for a 54.6 percent GDP share. This dropped down to 47.0 percent. Share in 2015. On the contrary, the service sector grew from a 41.0 percent GDP share in 2005 to 48.6 percent in 2015. After the financial crisis in 2008, Penang's economy experienced a decline of GDP growth (-10.5 percent in 2010) but from 2010 onwards managed to grow again (figure 3.5). Since then Penang and Malaysia's economy experienced similar growth rates.

FIGURE 3.5 *GDP growth rate for Malaysia and Penang, 2006-2015*



	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Malaysia	5.6%	6.3%	4.8%	-1.5%	7.4%	5.2%	5.6%	4.7%	6.0%	5.0%
Penang	10.8%	6.5%	5.5%	-10.5%	10.4%	3.9%	5.0%	4.6%	5.9%	4.9%

Source: Bank Negara Malaysia and Penang Institute

2015 and onward

In the period 2005-15 Penang's economy developed because of upgrading activities within the manufacturing sector and a diversification into new industries (e.g. SSO, Medical devices). This was possible due to right levels of human capital available in the labour market. In order to retain economic development, new policies have to be developed. At the moment there is no lack of strategies and plans. At national level two policies can be recognized, the Economic Transformation Plan (ETP) and the Eleventh Malaysia Plan (2016-2020), 'The northern corridor development strategy' (2007-2025) applies at regional level and the *'Penang paradigm'* (2015-2015) at state level. All these policies emphasize the role of human capital as being important to regional upgrading and making the transition into a high-income economy.

The Penang paradigm must be seen as the program that is most tailored fit for the Penang region. According to the Penang Paradigm the following key industries can be notified within the manufacturing and service sector, see table 3.3.

TABLE 3.3 *Key industries for which Penang has the competency to further develop*

High value-added engineering		Modern services
High-tech manufacturing	**Life science & food processing**	
• Light Emitting Diodes (LED) • Radio Frequency Identification (RFID) • Integrated Circuits (IC) • Automation and precision machinery • Automotive • Broadband equipment • Renewable energy • Oil & Gas (O&G) facilities	• Medical devices • Biopharmaceuticals • Food processing • Halal industry • Agriculture & Agro Life Science • Aquaculture	• Tourism • Education • Shared Services Outsourcing (SSO) • Information Communications Technology (ICT) • Creative hub

Source: Penang Institute, 2015, p. 31

If Penang seeks to be globally competitive, it should continue diversifying into high value-added industries within the manufacturing and service sector by building on its strengths and opportunities. The experience worldwide is that relatively small regions can develop niches that allow them to grow rapidly (Kharas et al., 2010). The manufacturing sector already experiences diversification towards activities with more sophisticated technologies such as the medical devices industry and the biopharmaceutical industry.

According to the Penang Paradigm the following key industries need to be focussed on (Penang Institute, 2015):

- ❖ The growth of industries within the high tech manufacturing sector and the high tech bio-agro sector.
    - Medical device industry
    - E&E industries
    - Halal food industry
    - Aquaculture industry
- ❖ The further development of high-value modern services:
    - Becoming a global centre for Shared Service Outsourcing (SSO) and Business process outsourcing (BPO).
    - The establishment of a creative cluster to upgrade the creative industry.

- Becoming a regional medical centre to further develop the medical tourism industry.
- The setting up of a regional educational hub to develop the education industry.

The state government after four decades of industrialisation recognized that it not only could depend on FDI. Besides MNC's, important key players in the Penang economy are SMEs of which most (41 %) operate in automation, machinery & precision tooling, fabricated metal products and food & beverages. As mentioned, SMEs nowadays not any longer function as suppliers to MNCs. During the last two decades they fail to upgrade their activities. As a consequence, growth and innovation of SME's slowed down. According to the Penang Paradigm, the state government should encourage SME's investing in R&D and innovation in order upgrade their activities. Taiwan functions as an interesting benchmark of best practices for SME development. The clustering of SME's within Taiwan enabled them to benefit from knowledge-spill overs and shared economies of scale. The Penang state government started initiatives to enhance the development of SMEs as a means to increase economic growth; the Penang SME centre, the SME Market Advisory and SME villages (Tan, 2016).

To this day, the manufacturing and service sector still must be seen as the main contributors to Penang's economy as they present 48 and 48.6 percent of the GDP share (table 3.4). In comparison to Malaysia, Penang's service sector growths at higher rate. However, its manufacturing sector over the last two years grew less fast (2014; 4,8%, 2015; 3.8). The mining, construction and agriculture sectors represent a relatively small part of Penang's economy compared to Malaysia's economy.

TABLE 3.4 *Malaysia and Penang's GDP growth and share, 2014-2015*

Economic activity	**Malaysia**				**Penang**			
	% growth		% share		% growth		% share	
	2014	2015	2014	2015	2014	2015	2014	2015
Agriculture	2.6	3.1	7.1	6.9	4.5	3.5	1.9	1.8
Mining	3.1	2.8	7.8	7.6	14.5	13.5	0.1	0.1
Construction	11.6	10.7	4.1	4.3	0.8	-0.2	2.3	2.2
Manufacturing	6.2	5.5	25.0	25.1	4.8	3.8	47.8	47.4
Services	6.3	5.6	56.0	56.1	7.1	6.1	48.0	48.6
GDP growth/share	**6.0**	**4.5-5.5**	**100.0**	**100.0**	**5.9**	**4.9**	**7.0**	**7.0**

Source: Bank Negara Malaysia and Penang Institute, 2015

3.3. The characteristics and conditions of the Penang labour market

After having described the Penang economy and the evolution of its driving industries, this paragraph will elaborate on the current conditions and characteristics of the Penang labour market. General statistics of the Penang labour market are presented; providing a general picture of recent dynamics

3.3.1. Labour force and (un)employment

The working age population (15-64 years old) in Penang continued to grow and consisted of 1,22 million in 2015 compared to 1,2 million in 2014, representing 72 percent of the total population in Penang. Within the working age population, the labour force steadily increased over the past ten years and consisted of 834,200 people in 2015 (figure 3.6).

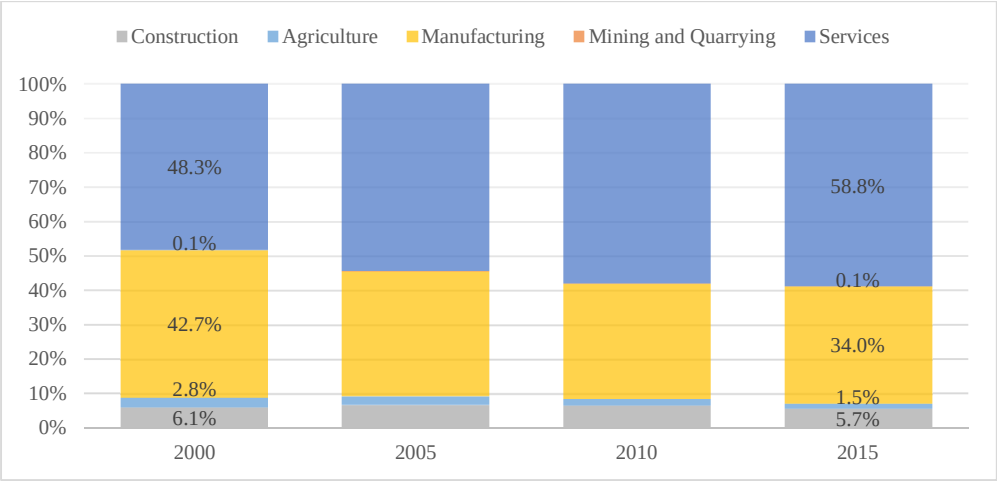
FIGURE 3.6 *Labour force growth in Penang, 2005-2015*

Source: Department of Statistics Malaysia, 2015

Among all employed workers within the labour force in Penang the largest share is employed in the service sector (58.8%) (figure 3.7). However, one has to note here that the service sector is composed of all different sub-industries, including lower segment services such as community, social and personal services, administrative and support service activities. The services sector is followed by the manufacturing sector (34.0%) and the construction sector (5.7%). Between 2000 and 2015 the share of employment in the

manufacturing sector has declined by almost nine percent, while in contrast employment in the service sector increased from 48 percent to almost 59 percent of total employment.

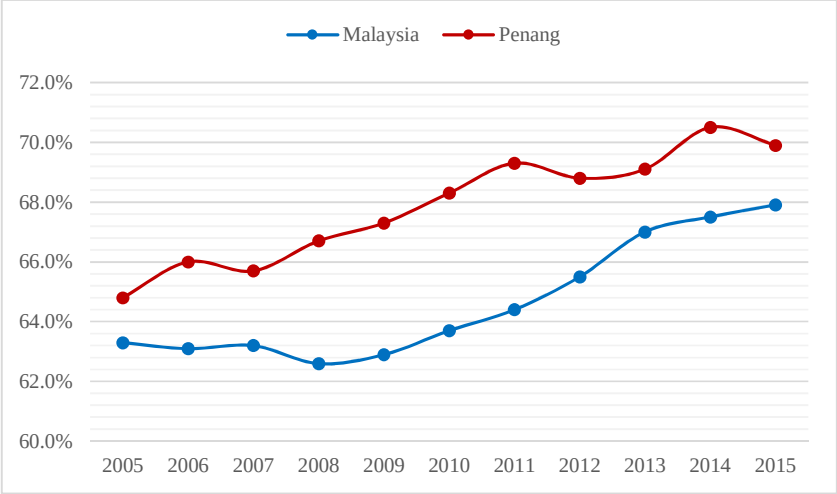
FIGURE 3.7 *Employment by industry in Penang, 2000-2015*



Source: Department of Statistics Malaysia, 2015

Alongside the growing labour force, the labour participation rate has been increasing as well in the past decade. In 2015, the labour force participation rate in Penang was almost 70 percent, which is slightly higher compared to the whole of Malaysia (68%) (figure 3.8).

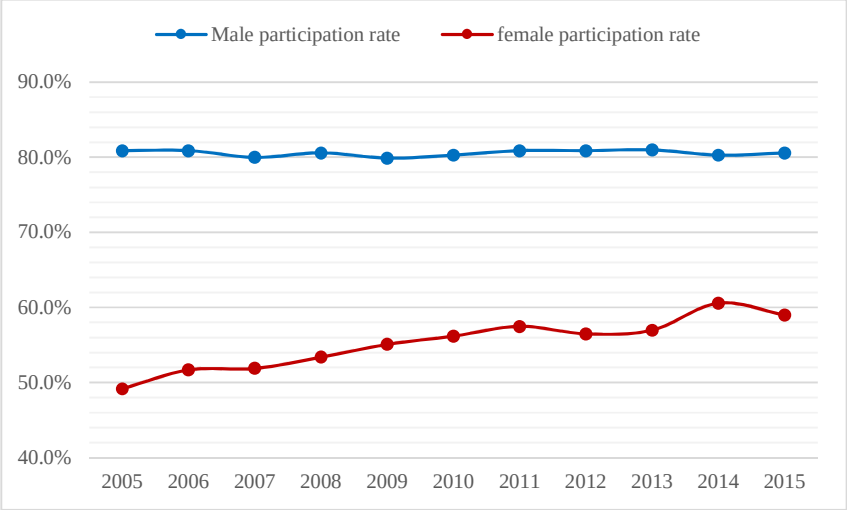
FIGURE 3.8 *Labour force participation rate in Malaysia and Penang, 2005-2015*



Source: Department of Statistics Malaysia, 2015

The increase in labour force participation rate was mainly due to the increased participation rate of women. Since 2005, the male participation rate remained more or less stable (around 80%) while the female participation rate increased by almost ten percentage points (from 49% to 59%) (figure 3.9).

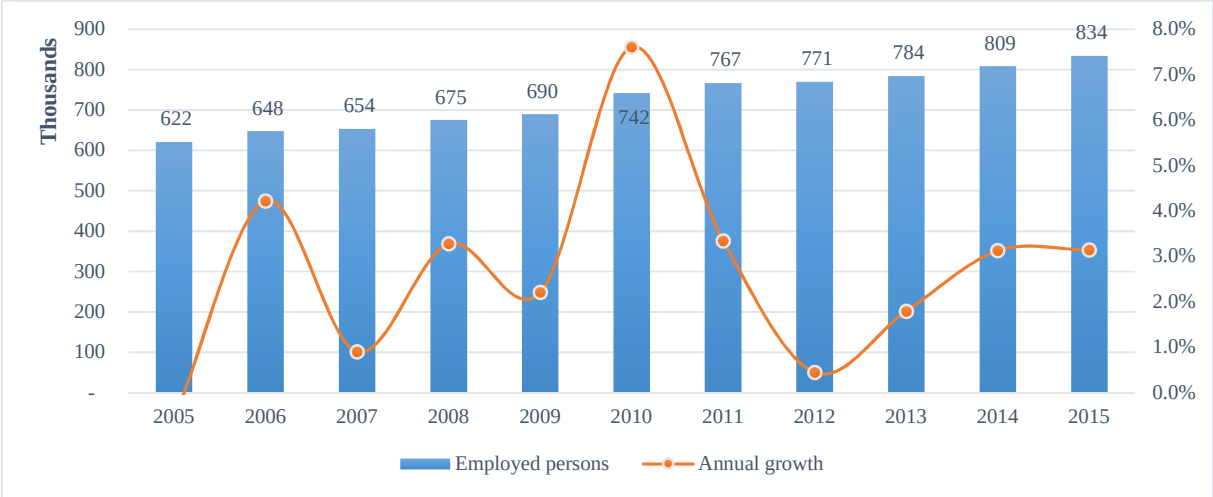
FIGURE 3.9 *Labour force participation rate by gender in Penang, 2005-2015*



Source: Department of Statistics Malaysia, 2015

The growing labour force and increased labour force participation rate coincided with a steady growth in employment (figure 3.10). Since 2005, employment increased at an annual average of almost three percent.

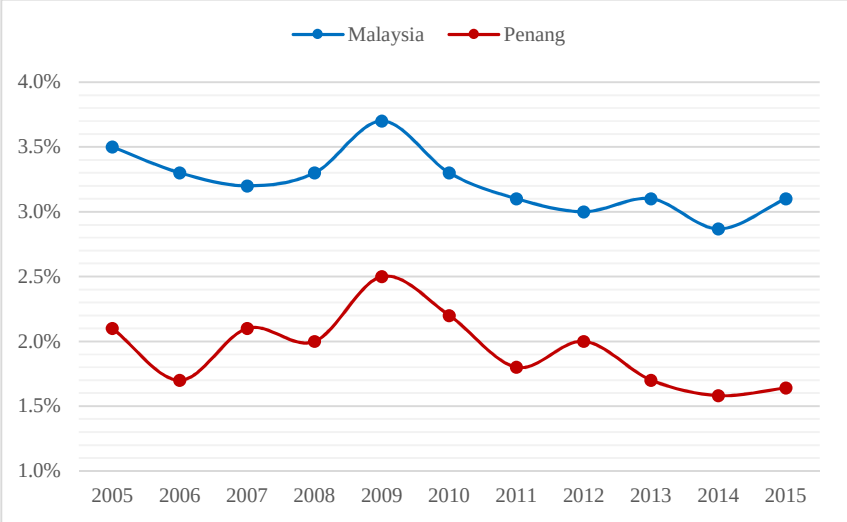
FIGURE 3.10 *Employment growth in Penang, 2005-2015*



Source: Department of Statistics Malaysia, 2015

At the same time, the unemployment rate declined steadily after a small peak during the global financial crisis in 2008/09. Both the Malaysian and Penang economy experience full employment with unemployment rates dropping to 3.1 and 1.6 percent respectively in 2015 (figure 3.11).

FIGURE 3.11 *Unemployment rate in Malaysia and Penang, 2005-2015*



Source: Department of Statistics Malaysia, 2015

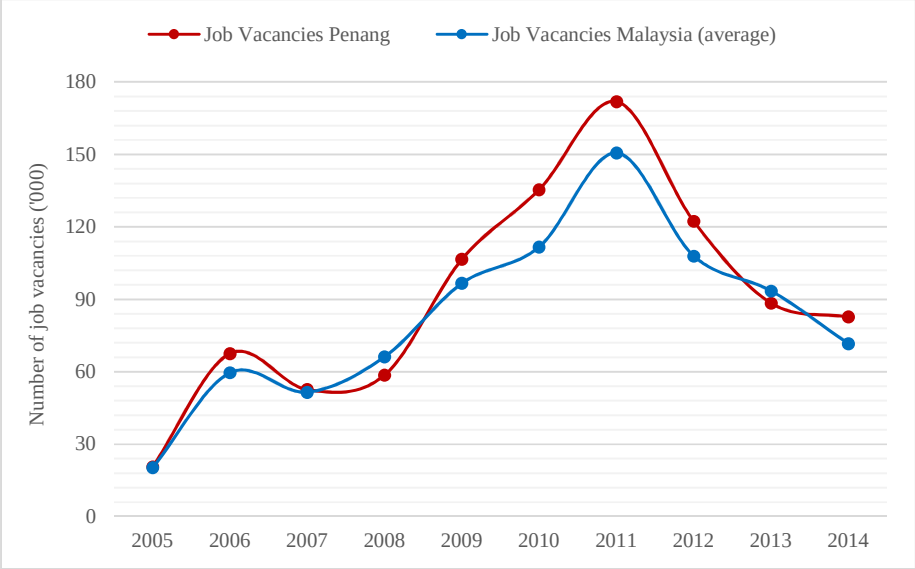
The growth in labour force (participation) and employment together with the low unemployment rates indicate that despite more people entering the labour force. This can be explained by the continuous significant and robust labour demand in the Penang economy. Over the past three years (mid-2013 to mid-2015), there have been around 21,000 vacancies advertised annually on Malaysia's biggest online job portals JobStreet. More than half of these vacancies have been in the manufacturing sector while the electronics/semi-conductor/wafer fabrication industries accounted for approximately 40 percent of the vacancies in manufacturing (JobStreet, 2015).

3.3.2. Vacancies

In addition to the development described above, the number of job vacancies reported by employers through the JobsMalaysia portal have been growing for the past ten years until a peak in 2011 (figure 3.12). Since then, the number has been decreasing. The number of job vacancies reported in Penang are slightly

higher than on average in the whole of Malaysia. The overall growth of vacancies in the last ten years indicates an increase in demand for employees.

FIGURE 3.12 *Number of registered vacancies in Penang by JobsMalaysia portal, 2005-2014*



Source: Ministry of Human Resources Malaysia via the Department of Statistics Malaysia's Social Statistical Bulletin, 2015

This becomes more evident when looked at the ratio of unemployed persons to job vacancies (reported in the JobsMalaysia portal) in Penang (figure 3.13). Since 2007, the unemployment to job vacancy ratio fell from 0.7 to fluctuate between 0.1 and 0.3, indicating that the number of job openings have always been higher than the number of persons looking for a job. In 2014 only 0.15 unemployed persons were available for every vacancy meaning that one unemployed person is available for every six vacancies. Also, according to the Social Statistics Bulletin, the number of job vacancies reported in 2014 through the JobsMalaysia portal (82,690 vacancies) was fifteen times higher than the number of new job seekers[5] (5,525) in Penang.

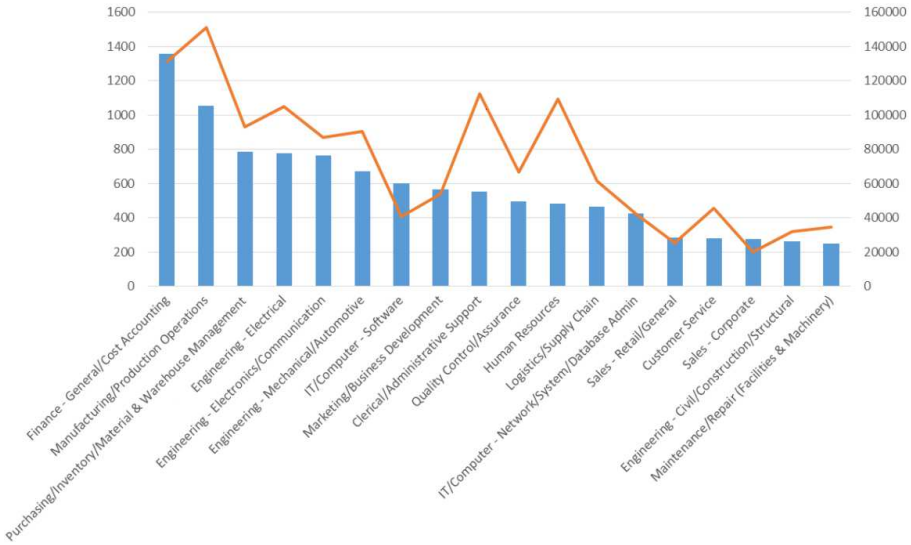
[5] Job seekers are defined as people who apply for jobs in the JobsMalaysia Portal and of which the application period is still valid. The validity period of the application is 12 months from the date of signing the first time or update date application information.

FIGURE 3.13 *Unemployment to job vacancy ratio in Penang, 2005-2014*

Source: Department of Statistics Malaysia, author's calculations

However, in the case of JobStreet, the number of applicants is very high. For the top 20 specialisations, the number of applications is over a hundred times higher than the number of vacancies advertised (figure 3.14). This multiplier shows little variation between different specializations. Vacancies posted on JobStreet therefore draw a large number of applications. It should however be noted that the unique number of applicants is substantially less since applicants are able, and often do, apply to more than one advertisement. Still, one cannot conclude that an overall shortage of applicants exists.

FIGURE 3.14 *JobStreet vacancies and applications received in top 20 specializations, first half 2015*



Source: JobStreet, 2015

It seems that despite growing demand combined with low unemployment, which could indicate a tightening labour market characterised by quantitative shortage of labour, the supply of labour remains abundant. This seeming contradiction can be explained by labour mobility. Due to a tightening labour market, demand for workers starts to exceeds supply which gives employees the opportunity to switch to 'better jobs' easily and improve their position within the labour market. This tendency towards high labour mobility was confirmed by interviews with recruitment firms which confirmed that job-hopping is very common: *"Because of high demand job hopping occurs, employees work only 1-2 years for one company, especially among young people."*. Another participant stated: "*Every worker is job hopping for only twenty ringgits more"*. One of the recruitment firms indicated that the years of service to one company dropped significantly: *"Nowadays, if people work 3 years for the same company, it is considered as a stable candidate. This used to be 5-10 years."*

The apparently high labour mobility within the market is less likely to occur in a labour market characterised by a surplus. In this case, as set out in the theoretical framework of this study, people rather hold their positions due to fierce competition for jobs available.

In sum, all of the above figures indicate that the Penang labour market is an overall constrained labour market. It seems that demand continuous to grow and is not met by equal supply and therefore a mismatch (shortage) exists. However, at the same time supply still seems to be abundant looking at application numbers in JobStreet. This indicates that the labour market shows a tendency towards high labour mobility in which everyone aims to get a better position.

3.4. Expectations

Based on the theoretical framework, including the conceptual model and the given outline of Penang's economy and its labour market, the following expectations have been formulated:

Macro level

Expectation 1: A qualitative mismatch between demand and supply exists in the Penang labour market due to a lack of demanded skills.

Expectation 2: Because of a growing service sector in Penang which require more soft skills compared to other sectors, it is expected that soft skills are frequently asked (demanded) for in JobStreet vacancies.

Expectation 3: Because of an increase in importance of unique and specific skills it's expected that specific hard skills are more often requested in JobStreet vacancies than general hard skills.

Expectation 4: Alongside the compartmentalization of the regional economy, it is expected that differences in attraction and retention of labour exist between different groups of firms (e.g. compartments).

Meso/micro level

Expectation 5: Skill gaps within firms mainly pertain to of a lack of soft skills rather than hard skills.

Expectation 6: Due to a constrained labour market it is expected that firms experience skill shortages, thus not succeed in filling up all their vacant positions and have hard-to-fill vacancies.

Expectation 7: Due to experienced skill shortages it is expected that firms are extensively involved in labour poaching, under hiring and retaining strategies.

Expectation 8: Because of different industry dynamics (attractiveness, skill demand and phase) skill shortages are expected to be experienced to a larger extent by firms in manufacturing industries (medical devices, high-tech manufacturing) than firms in service industries (hospitality, healthcare and professional business services).

4. Methodology

This chapter will elaborate on the methodology used in this study. It will provide an explanation and justification for the methodological research decisions that have been made. It elaborates on the steps taken and design type that is selected. The chapter consists of different paragraphs. The first paragraph will start with a brief description of the research design. Also, an overview of the study approach will be put forward. The second paragraph will clarify concepts that are used throughout this study. Following this, the variables and indicators, information and data sources, ways of analysing data and limitations of three perspectives (macro, meso and micro) will be put forward in three separate paragraphs.

4.1. Research design

The primary objective of this study is to get a better understanding of the labour market dynamics in Penang. Therefore, the study takes Penang as a case. This technique is chosen to collect data because the research focuses on specific industries in a specific place at certain moment in time. A case study is the appropriate design to carry out an intensive and detailed analysis of certain cases. The downside of a case study however, is that findings cannot be generalized and therefore the external validity of the research is weak. Findings and results are difficult to replicate because they are bound to a specific location with unique characteristics at a certain time (Bryman, 2012). However, the main goal of this study is not to generalize but to describe the unique labour market dynamics of Penang and identify firm behaviour and strategies related to possible skill gaps and shortages.

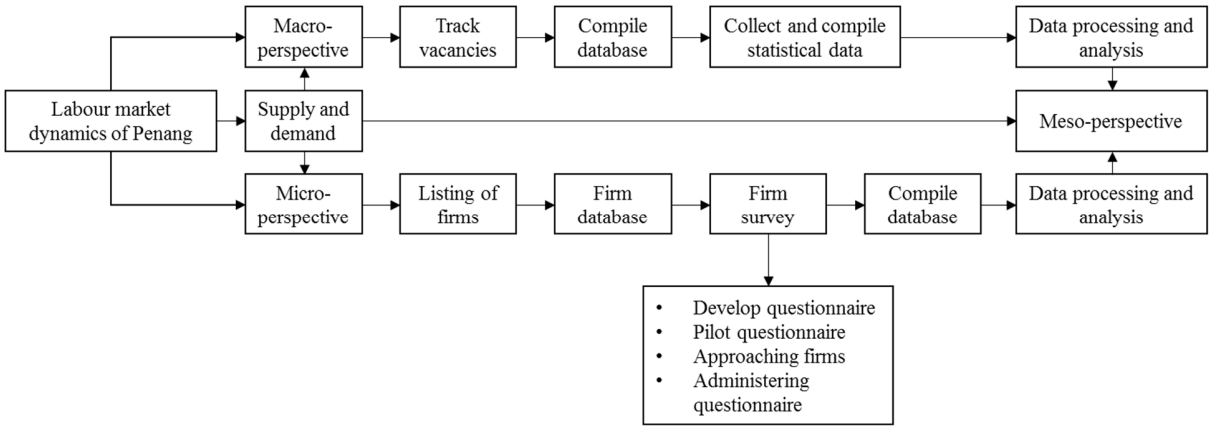
To conduct the research, a mixed method approach is used in order to fully disclose the labour- and skill-situation in the Penang labour market. A mixed-methods approach implies that both quantitative and qualitative data is obtained and used for analysis purposes. This process can also be referred to as triangulation (crosschecking) and improves the validity and reliability of the study.

As outlined in chapter three, manufacturing and services sectors are the key contributors to Penang's economy. Therefore, this study focuses on these two economic sectors. Taking into consideration

criteria such as significance to Penang's economy, technology characteristics and the relevance to making the transition into a high-income economy, the study will date for 22 key industries (see appendix A for the full list). Five of those industries will be analysed more extensively from a meso-perspective.

The study approaches the labour market from three different perspectives: macro, meso and micro. On the macro level demand and supply within the labour market are addressed. The meso perspective will focus on dynamics and developments regarding labour and skills in five key industries that are considered as important for the Penang economy. At micro level strategies and behaviour of firms in finding the right human capital and skills required will be assessed. For each of these perspectives a different research process was followed with different variables used to measure the various indicators. To obtain data and information on indicators, different sources and methods of data collection were used. By looking from three different perspectives, making use of multiple types of data (primary and secondary) and various sources it is sought to provide a complete picture of the labour and skills situation in Penang. For each of the perspectives different research steps have been carried out. Figure 4.1 provides a schematic overview of all the steps taken. The following paragraphs will be elaborate on each of the steps taken in different perspectives. Before this elaboration, a brief clarification of concepts that are used throughout this study will be put forward.

FIGURE 4.1 *Flowchart of study approach*



4.2. Clarifying concepts

In this study different concepts are used which require some explanation since they are strongly related to each other and can cause confusion in the interpretation.

- **Occupation**

  As outlined in chapter two of this study, occupations refer to 'a grouping of jobs involving similar tasks, which require a similar skills set'. An occupation can consist of multiple jobs or job titles which have similar characteristics. This study uses the classification adopted by the Ministry of Human Resources Malaysia named: Malaysia Standard Classification of Occupations (MASCO, 2008). The MASCO distinguishes ten major groups of occupations (table 4.1) which can be categorized into three groups; low-, semi- and high-skilled respectively (World Bank, 2015). Major occupation groups 1-3 (managers, professional and technicians and associate professionals) are classified as high-skilled, major occupations groups 4-5 (clerical support workers and service and sales workers) as semi-skilled and major occupation groups 6-9 (skilled agricultural, forestry and fishery workers, craft and related trade workers, plant and machine-operators and assemblers and elementary occupations) as low-skilled. This study mainly focuses on the major occupation groups which can be classified as semi- or high-skilled.

TABLE 4.1 *Occupational groups according to MASCO 2008*

Number	Name	Skill level
Major group 1	Managers	High-skilled
Major group 2	Professionals	
Major group 3	Technicians and associate professionals	
Major group 4	Clerical support workers	Semi-skilled
Major group 5	Services and sales workers	
Major group 6	Skilled agricultural, forestry and fishery workers	Low-skilled
Major group 7	Craft and related trades workers	
Major group 8	Plant and machine-operators and assemblers	
Major group 9	Elementary occupations	
Major group 0	Armed forces occupations	Not applicable

Source: MASCO, 2008

- **Job title**

  As becomes clear from the above, a job title is more specific than an occupation and provides a clearer explanation of what kind of job the employee performs. For example, within the major occupation group professionals a chemist, mechanical engineer or a biologist can be classified as job titles.

- **Job position**

  The job position relates to the classification that is used by JobStreet and refers to a certain level or experience required for someone's position within a firm. The classification adopted by JobStreet includes five different job positions (from the least experienced to most experience): entry level, junior executive, senior executive, manager and senior manager.

- **Position**

  A position refers to a single '*spot*' within a firm. It can relate to a number of spots available within a firm, regardless of the level of experience required (such as job position).

4.3. Macro-perspective

From a macro perspective the main variable(s) are labour and skills shortages and will be measured by various indicators. The information and data on indicators are obtained from different sources. The following paragraphs will elaborate on which and how different indicators are used, from which sources data and information was obtained and what procedures and steps have been undertaken to analyse the data. Lastly, a discussion will be presented which points out several limitations of the data obtained and used.

4.3.1. Variables and indicators

In general, macroeconomic indicators for labour and skills shortages mainly consist of quantitative data provided by national statistical programs which can be used to identify employment situation as well as to observe aspects of supply and demand to assess labour market conditions. Table 4.2 provides an overview of all indicators used to measure the variables labour and skill shortages.

TABLE 4.2 *Macro level variables, indicators and sources*

Scale	Variable(s)	Indicators	Sources
		Supply side indicators	
Macro	Labour and skills shortages	1. Employed persons	• Statistics
		2. Unemployment rate	• Statistics
		3. Entrant into labour market (graduates): by field of study	• Statistics • Interviews/focus groups
		4. Extensiveness of labour training/skilling infrastructure	• Interviews/focus groups • Inventory institutions • Employer survey
		Demand side indicators	
		5. Vacancies	• Statistics
		6. Vacancy fill rates and hard-to-fill vacancies	• Vacancy data and analysis, obtained from agencies and employer survey
		7. Number of vacancies	• Statistics

The following section will briefly outline how the different indicators are used to measure the variables. In the descriptions, indicators are joined together since they are related. The first two indicators are merged under the heading *'(un)Employment'*, indicators three and four are captured by the heading '*Qualifications of output (supply) of educational institutions vs. demand, upskilling infrastructure and retaining'*. Finally, the demand side indicators five to seven are situated under the heading '*vacancies'*.

Labour and skills shortages

Different studies (Trutko et al., 1993; Cohen, 1995) have shown that secondary available data can be used to assess the existence of labour and skills shortages. Statistics show 'snapshots' of the labour market and allow researchers to make an evaluation of changes in demand and supply. Because statistics only show snapshots it is best to observe the data over time. Different indicators can provide information on the tightening of a labour market and possible mismatches (both quantitative and qualitative) between demand and supply.

(un)Employment

Often employment and unemployment rates and numbers are used as indicators for labour and skills shortages. Unemployment can be an indication of imbalances in supply and demand which could either be oversupply or undersupply (Cedefop, 2012). As mentioned before, a high unemployment rate

could indicate excess supply of high-, intermediate or low qualified individuals. It can merely signify the presence of additional stock of labour. However, a high unemployment rate would not necessarily be an indication of a surplus of labour. Shah and Burke (2003) argue that unusual high unemployment rates could be a result from employability issues associated with skill deficiencies. Therefore, MAC (2008) considers unemployment rate also as an indirect indicator for skill shortages. One has to note however, that this appears contingent on overall labour market situation. It may be a less suitable indicator for tight labour markets.

Unemployment could occur in certain occupations where specific educational qualifications are needed to carry out tasks. When the actual skills sets possessed are not in line with these required qualifications, employability issues will appear. As a result of changes in firms' production technology, demand for workers in particular occupations that are associated with a high level of education (e.g. professionals and managers) increases. When supply primarily consists of people with low levels of education, a demand-supply mismatch of skills at several educational levels will occur. Eventually, this lead to redundancy and high unemployment among low- and intermediate-educated workers. At the same time the overall economy experiences shortages of highly educated workers.

Downside of using unemployment rate as an indicator are that unemployed persons include people who are voluntarily out of work (not due to an unavailability of jobs in the economy) which leads to an overestimation of supply (Shah & Burke, 2003). Also, while actively looking for a (new) job, a qualified person may temporarily be employed in lower- or differently qualified jobs. This also leads to underestimation of supply of labour that possesses a specific skill-set. However, overall this indicator is relevant to assess potentially existing skill shortages (Veneri, 1999).

Qualifications of supply of labour vs. demand, upskilling infrastructure and retraining

Supply of labour possessing specific educational attainment is often related to skills shortages. For a part, educational attainment indicates employability of graduates in the labour market. The more graduates follow the fields of study required by the companies, the more likely firms fill their vacancies according to their requirements. Different studies have highlighted discrepancies between the curriculum in tertiary

education institutions and the competences required by employers. Also, discrepancies between competences that may be expected on the basis of educational qualification but in reality is missing (Teijeiro et al. 2013; Froy, 2013).

Although the balance between working skills and formal education must be timely mitigated, education systems are often slow in responding to observed skills shortages. This is exacerbated by the different levels of specialization and the rapidly changing skill-sets required (MAC, 2008b). Even if educational institutions respond quickly, there always remains a time lag before the changes have impact.

An efficient approach to ensure that programs offered by tertiary educational institutions is to detect demand for new qualifications early. The slowness in responses by actors and institutions responsible for education and training may amplify skills shortages on the one hand and increase graduate unemployment on the other hand. To avoid this from happening a better cooperation and interaction between corporate and educational/training institutions can be part of the solution (Pauw et al., 2008; JPMorgan Chase & Co., 2014; Ahlan et al., 2010).

Vacancies

Another way of detecting imbalances in the labour market is using statistics on vacancies (MAC, 2008; Shah & Burke, 2003). The number of vacancies could point at imbalances in the overall labour demand and shortages. When the number of vacancies increases, demands outstrips supply indicating increase of unfilled vacancies. This is more likely to happen for some job positions and/or occupations in a particular industry or range of industries than in other job positions or occupations in the same or other industries. Therefore, the breakdown of job vacancies into functional and/or occupational and/or different industries is necessary to estimate skills shortages.

The number of job vacancies is equivalent to the number of employees that makes jobs vacant and employers want to fill again, plus jobs created. In general, expansion of firms' operations leads to new jobs. Also, when a new company decides to establish in a region, new jobs will be created. The expansion and set-up of new firms may cause skill shortages when the supply of skills in that particular region does not satisfy the requirements of new and existing firms.

When both unemployment and vacancy numbers are available the ratio (V/U) can be used to study the relationship between employment and vacancies at the aggregate level.

Aside from the growing number of vacancies and vacancy ratios, qualitative aspects of vacancies are more of interest and relevant to address skill shortages. The average duration time or search time of vacancies relate to the length of the period taken for a job vacancy to be filled. Many studies make use of hard-to-fill vacancies as indicator of skill shortages. When the duration time of vacancies increases they are referred to as hard-to-fill vacancies (HTFVs), which implies that it takes firms a longer time (than usual) to hire a suitable worker (Haskel & Martin, 1993b). HTFVs or recruitment difficulties can however, occur for a several other reasons than skills shortages such as the conditions of work offered (e.g. wages or work hours) and an employers' reputation (MAC, 2008). Furthermore, instead of indicating a skill shortage that needs to be addressed through market intervention, hard-to-fill vacancies may simply indicate a high turnover within the particular occupation (MAC, 2008). In addition, Andrews et al. (2008) found that in case of vacancies for non-manual labour such as healthcare workers, sales workers and others, search time is longer as suitable candidates are more frequently drawn from the existing market pool.

4.3.2. Information and data sources

As presented in table 4.2 various primary and secondary sources have been used to obtain information and data on macro level. Primary sources included semi-structured interviews and focus group discussions with recruitment agencies and educational institutions (see appendix B for topic list for recruitment firms). Additionally, semi-structured interviews with several training centres and other relevant institutions were used as primary source of data (see list table 4.3).

TABLE 4.3 *List of participating recruitment firms, educational institutions and other institutions*

	Recruitment firms	Date	Interview	Focus group
1.	Adecco Personnel Sdn Bhd	20 April 2016	X	
2.	All Staff Outsourcing Sdn Bhd	21 April 2016	X	
3.	Kelly Services	21 April 2016 3 June 2016	X	X
4.	Career Channel	04 May 2016	X	

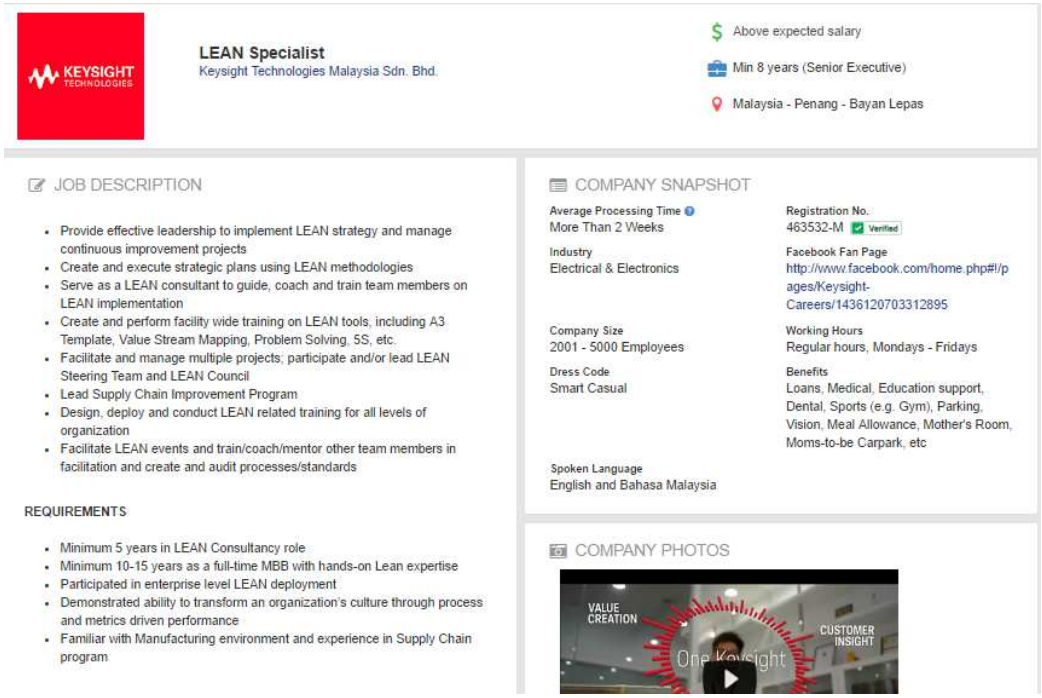
	Recruitment firms	Date	Interview	Focus group
5.	EPS Consultants Sdn Bhd	07 June 2016 13 June 2016	X	X
6.	Manpower Group	13 June 2016		X
7.	Global TeamGroup	13 June 2016		X
8.	JobStreet	13 June 2016		X
	Educational institutions	**Date**	**Interview**	**Focus group**
1.	Wawasan Open University	04 August 2016	X	
2.	Inti International College Penang	24 August 2016		X
3.	Tunku Abdul Rahman University College	24 August 2016		X
4.	SEGi College Penang	24 August 2016		X
	Training centres and other institutions	**Date**	**Interview**	**Focus group**
1.	Malaysia International Chamber of Commerce (MICCI)	14 April 2016	X	
2.	CAT Centre	18 April 2016	X	
3.	Penang Labour Department (Jobs Malaysia)	21 April 2016	X	
4.	Talent Corporation Malaysia Berhad	01 July 2016	X	
5.	Penang Skills and Development Centre (PSDC)	13 June 2016	X	
6.	Northern Corridor Implementation Authority (NCIA) - Education and Human capital department (EHC)	16 August 2016	X	
7.	Penang Science Café	17 August 2016	X	

The secondary data on macro level was obtained from the following sources: Department of Statistics Malaysia, Ministry of Human Resources Malaysia and Ministry of Higher Education Malaysia. These sources were used to obtain data on the demand and supply side statistics of the labour market. Statistics on demand in the labour market include vacancies to assess labour and skill needs. On the other side supply statistics consisted of (un)employment numbers, share of graduates by field of study and the extensiveness of labour training and skilling infrastructure. The data was, whenever possible, gathered on state-level, otherwise national data was used as a proxy. These statistics enabled to draw a picture on the current trends and conditions in the Penang labour market. It involves statistics on labour force characteristics (such as participation rate), (un)employment numbers and characteristics), vacancies, and graduates by field of study.

Aside from statistical data, data on vacancies was obtained from Malaysia's biggest online job portal; JobStreet. This portal is commonly used by companies to advertise vacancies. For the Penang region approximately 2,000 vacancies are advertised every two weeks (including new and reposting's). The

vacancies are advertised for a period of one month. After one month the advertisement can either be extended or ended. A third possibility is that the vacancy is removed before the end of the one-month period because it is filled already. To include the vacancies that were removed before the end of the advertisement period and JobStreet.com could not provide complete datasets of vacancies, the online job advertisements were extracted every two weeks for a period of six months (December 2015 – June 2016). An example of an advertisement posted on JobStreet is given in figure 4.2.

FIGURE 4.2 *Example of online JobStreet advertisement*



Source: www.JobStreet.com, 2016

Before extracting the data from JobStreet a range of criteria are applied to assemble job vacancy listings on JobStreet. An advanced search was done to filter as much relevant vacancies as possible. The advanced search was done by selecting a location (Penang), a range of job specializations (more or less in line with the industry scope of the study), job positions and job type. Making use of this advanced search (appendix C), it was possible to capture – to some extent – high-qualified workers within the industry scope of this study.

For the first three months' data was extracted from JobStreet by using Adobe PDF Creator. This software allowed to turn every single online advertisement in one pdf file. This method however, was very time consuming and produced numerous pdf files which could not be sufficiently analysed and needed to be manually transferred to excel or SPSS format. Therefore, after three months a new software; Visual Web Ripper was used to extract the online job advertisements from JobStreet. This software allowed to transfer all the needed data from JobStreet directly into a Microsoft Office Excel format. In order to get a complete database in excel format, all the downloaded PDF files that were obtained in the first three months using the adobe PDF creator had to be transferred. To do this, the software PDF converter was used. When all raw data was transferred to excel format, Microsoft Windows Excel was used to extract all the relevant information and create a complete database of all the job advertisements that had been collected. The final database includes approximately 21,000 vacancies of about 1,860 different firms. For each vacancy different characteristics were extracted and transferred into an excel database. An overview of all different characteristics obtained per vacancy can be found in table 4.4 below. In appendix D, one can find a more comprehensive overview of obtained characteristics and different codes used to classify each characteristic.

TABLE 4.4 *Vacancy characteristics collected from JobStreet advertisements*

	Vacancy characteristics	Description
1.	Date advertised	DD/MM/YYYY
2.	Closing date	DD/MM/YYYY
3.	Job position	See appendix D
4.	Job title	-
5.	Industry	See appendix D
6.	Company name	-
7.	Company size	See appendix D
8.	Required educational level	See appendix D
9.	Required education field	See appendix D
10.	Required working experience	See appendix D
11.	Required generic hard skills	Legislative and regulatory awareness
		Economic awareness
		Basic skills in science and technology
		Environmental awareness

	Vacancy characteristics	Description
		ICT skills/E-skills
		English language
		Other language
12.	Required soft skills	Personal effectiveness
		Relationship and service
		Impact and influence
		Achievement skills
		Cognitive skills
13.	Required specific hard skills	Yes/No

The different skill groups (e.g. hard generic, soft and specific hard) are extracted according to a classification adopted by RPIC-ViP (2011). A description of what is meant by each of the skill groups can be found in appendix E. The adopted classification of skills, including their description (appendix E), has been confirmed by EU survey respondents.

The data, after filtering, enabled an analysis of vacancy characteristics and identify what job positions and titles are currently high in demand and which skills are most often required for firms within the scope of this study. At the same time, the data was used to determine which occupations/vacancies would reoccur multiple times in succession over the given period. These were marked as ‘persistent vacancies’ and could indicate hard-to-fill vacancies.

To find out what happened to the different vacancies that were advertised on JobStreet, a short survey was conducted by sending out an online questionnaire to selected advertising firms. An online questionnaire was opted because it is less time consuming than sending out letters and it is an easy way for firms to fill out and submit the questionnaire. The questionnaire contains questions about the causes of vacant positions, how they were filled (by (un)qualified workers) and if companies experience recruitment difficulties (see part E of the employer survey in appendix F). This survey was also incorporated within the employer survey (which will be discussed in detail in paragraph 4.5.2) because many firms in the company database overlap with companies that advertise on JobStreet.com, and it’s not feasible to contact them multiple times for different surveys.

Firms that are approached for only the short survey were selected according to the number of vacancies they have been advertising in the given time period. This method was used since a majority (about 70%) of companies only had put up between 1-5 vacancies. To send out a survey to those companies would not give any valuable results. At the same time the companies with the most job advertisements represent the majority of all vacancies. At first, all firms were selected that had been posting above the average number of 11 job advertisements. This resulted in a number of 100 firms which were not included in the company database. After intensively calling, collecting contact details and sending out surveys the response rate was lower than expected. In addition, another 100 companies were added to push up the response rate. In the end, contacts of 130 firms were collected out of the 195 firms that were selected. The online survey was send to the 130 firms and 33 firms submitted the survey, which means a response rate of about 25 percent. Overall the interviews and focus groups combined with statistical and JobStreet data (including the short survey) provided a better understanding of what is demanded by the market and if possible labour and skills shortages exist.

4.3.3. Analysing data

This paragraph will provide an outline of all steps and procedures undertaken to analyse all the data that was obtained. First, the analysing method of the primary data will be described. Secondly, the analysing process of obtained secondary statistical data will be outlined and lastly the method of analysing JobStreet data is presented.

Primary data

Notes and recordings from interviews and focus groups discussions have been used to verify findings in literature and secondary data collected.

Secondary statistical data

All the different statistics that were obtained from different institutions were transferred to Microsoft Office Excel. This software allows to process the data into charts and tables, which are used to confirm or oppose assumptions and/or observations.

Secondary JobStreet data

As mentioned in paragraph 4.3.2, the filter on the JobStreet website provided a database of about 21,000 vacancies from 1,860 different firms. The advanced search on the JobStreet website provided vacancies within the scope of the study to a certain extent. It however, still includes vacancies from companies outside our geographical and industrial scope. For example, a recruitment firm located in Kuala Lumpur could advertise a job in the Penang region. Therefore, a second filter was done to include only vacancies from companies (and therefore industries) within the scope of the study. All unique company names in JobStreet were compared to the firms in the company survey database (see paragraph 4.5.2). After comparison a match was found for 369 companies, advertising almost 10,000 vacancies in the time period December 2015 – June 2016. Apparently, a relative small amount of companies making use of JobStreet is responsible for half of all advertisements in the given period. This indicates that a small share of companies uses JobStreet intensively while a bigger share of companies only makes us of the portal spontaneously. Also, it is noteworthy that only a small amount of companies in the company survey database is making a use of JobStreet (only 369 out of about 1,2000 companies). Apparently, a great part of firms in the industries targeted by this study make use JobStreet to a lesser extent.

The next step was to delete job titles that recur across multiple mining's, which are assumed to be equivalent to unique job openings. This was done to not overemphasise job vacancies, which are re-advertised. For example, a job title advertised in mining 1, 2, 3 and 4 would (without deleting recurring job titles) be represented as four unique records in the aggregate mining's database while this actually refers to one job opening. The number of unique vacancies was estimated by filtering all identical combinations of company names, job positions and job titles. Using these criteria, there are 3,812 unique vacancies, with an average of 2.60 advertisements per vacancy and most unique vacancies being advertised thrice (table 4.5).

TABLE 4.5 *Descriptive statistics of unique job advertisements by companies within the scope of this study*

Advertisements per unique vacancy	
Mean	2.60
Median	2
Mode	2

Advertisements per unique vacancy	
Q1	2
Q3	3
Standard Deviation	2.09
Sample Variance	4.35
Range	31
Minimum	1
Maximum	32
Sum (number of advertisements corresponding to firm within scope of the study)	9,927
Count (number of unique vacancies)	3,812

This *'identifying strategy'* is not fool proof, as there are 16 *'unique vacancies'* with over 14 vacancies each. However, JobStreet does not provide us with a superior *'identifier'* to determine unique vacancies. An alternative identifier is the closing date of vacancies; however, this suffers from the drawback of being linked to a single advertisement and not necessarily a single vacancy. In considering the possibility that a vacancy could be re-advertised with a different closing date, advertisements with the same closing date are not classified as 'unique'.

The 369 companies and their 3,812 unique vacancies were used for further analysis, providing overall pictures of what fields of study, job positions, educational level and what type of skills are most frequently asked for.

Persistent vacancies

The following procedure was adopted to indicate which job titles could be classified as persistent vacancies. The vacancy dataset used consists of vacancy data from JobStreet across 14 mining's with a fortnight's gap (half month) between each mining, narrowed down to vacancies advertised by companies identified as being within the scope of the study. The literature does not provide an indicator of what threshold should be used to mark a vacancy as hard-to-fill, however we consider the use of 1.5 months, or 3 mining's, as the threshold above which a vacancy is assumed to be hard-to-fill. To measure whether a vacancy is hard to fill, one possibility is to sum the postings of a unique vacancy over the 14 mining's and identify them as persistent so long as they pass a certain threshold. However, the occurrence order of a unique vacancy presented in the table below will be identified as a hard-to-fill vacancy given a threshold

of 2 months (i.e. the maximum period yielded by 4 consecutive mining's). Across 14 mining's, the occurrence of the job posting sums to 4.

Mining's	**1**	2	3	4	**5**	6	7	8	**9**	10	11	12	**13**	14
No. of advertisements	**1**				**1**				**1**				**1**	

**(numbers 1-14 correspond to the mining number)*

However, it is unlikely that mining's 1, 5, 9 and 13 refer to the same job opening. To overcome this limitation of a simple summation, we employ the method documented below:

> *If the number of occurrence of advertisements for an identical vacancy between mining's 1-5 (period 1) exceeds 3 (i.e. 4 or 5), then the vacancy is regarded as persistent within said period. Repeat this exercise for mining's 2-6 (period 2) throughout mining's 10-14 (period 10). The vacancy is regarded as persistent if throughout any period the vacancy pops up more than 3*

This method returns 543 persistent vacancies. However, in a tabulation of unique job vacancies against mining's, there are 552 cells (or 5.94% of cells with values of 1 or more) which correspond with more than one vacancy. A naïve summation procedure used for each period (of 5 mining's) would classify the unique vacancy below as persistent, although the (maximum) length of a single job opening corresponding with this job title is only 1.5 months.

Mining's	**1**	**2**	**3**	4	5	6	7	8	9	10	11	12	13	14
No. of advertisements	**1**	**2**	**1**											

**(numbers 1-14 correspond to the mining number)*

Hence, there is a need to avoid the count of advertisements corresponding with each unique vacancy, so that if the count of advertisements is 1 or more (like in mining 2 presented in the table above), the value 1 is returned; else 0 is returned (we refer to this in the following tables as the advertisements dummy). Ruling out values above 1 reduces the number of persistent vacancies to 416. This means 11 percent of the unique vacancies can be classified as persistent.

The use of at least 4 of 5 advertisements throughout each period as a threshold is justified as follows: Consider period 1, which spans mining's 1-5 and pools job postings for the first 2.5 months covered in the dataset. The table below shows the minimum span of a vacancy classified as persistent, which corresponds with job advertisements for the same title posted for 1.5-2 months.

Mining's	1	2	3	4	5	6	7	8	9	10	11	12	13	14
No. of advertisements	1	1	1	1	0	0	0	0	0	0	0	0	0	0

**(numbers 1-14 correspond to the mining number)*

The occurrence pattern of a unique vacancy presented in the table below is also considered a unique vacancy, as it is likely that although the vacancy did not appear in mining 4, the re-posting of the vacancy in period 5 (a month later) is likely to correspond to the same vacancy.

Mining's	**1**	**2**	**3**	4	**5**	6	7	8	9	10	11	12	13	14
No. of advertisements	**1**	**1**	**1**		**1**									

**(numbers 1-14 correspond to the mining number)*

The unique vacancy, which recurs in period 6, is assumed to **not** correspond to a unique job vacancy, as there is a gap of roughly 1 month between mining 3 and 6. It is assumed here that it is likely this involves a new job opening for the same position.

Mining's	1	2	3	4	5	**6**	7	8	9	10	11	12	13	14
No. of advertisements	1	1	1			**1**								

**(numbers 1-14 correspond to the mining number)*

This procedure is repeated for the periods 2-10. For the table presented below, the period persistence dummy '0' will be returned for period 1 (mining's 1-5) and all other periods, whereas for period 2 (mining 2-6) '1' will be returned (see table below). As such, this unique job vacancy will be considered persistent, returning a persistence dummy value of 1.

Mining's	1	**2**	**3**	4	**5**	**6**	7	8	9	10	11	12	13	14
No. of advertisements		**1**	**1**		**1**	**1**								

**(numbers 1-14 correspond to the mining number)*

Period	1	**2**	3	4	5	6	7	8	9	10
Period persistence dummy	0	**1**	0	0	0	0	0	0	0	0

For the series of period persistence dummies presented in the table below, the value of the persistence dummy will also evaluate to 1.

Period	1	**2**	**3**	**4**	5	**6**	7	8	9	10
Period persistence dummy	0	**1**	**1**	**1**	0	**1**	0	0	0	0

Thus, this procedure yields a dummy variable, the *'persistence dummy'*, which indicates whether a unique vacancy is persistent in nature, and therefore *likely* to be hard-to-fill. The persistence dummy is only an indicator, as the following unique vacancy presented in the table below will also yield a persistence dummy value of 1 although the vacancy is clearly **not** hard to fill:

Mining's	**1**	**2**	**3**	**4**	5	6	7	8	9	10	11	12	13	14
Advertisements dummy	**1**	**1**	**1**	**1**										
Vacancy 1	**1**	**1**												
Vacancy 2			**1**	**1**										

**(numbers 1-14 correspond to the mining number)*

Suppose a Process Engineer leaves in the period corresponding with mining 1 and another in the same company at the same job position leaves in the period corresponding with mining 3. The job vacancy is advertised in mining 1 and filled by mining 3, following which it is advertised in mining 3 and filled by mining 5. While this vacancy is deemed persistent by our criteria, it is not hard-to-fill as it was filled within 0.5–1 month in both cases. It is thus impossible to disentangle whether the persistence dummy indicates that the position in question is hard to fill, or if it is indicative of a high turnover rate for the job position.

To find out what the job titles of 416 persistent vacancies are, it was necessary to classify them since the variety was so big. This was done by assigning key words (manually) to different job titles. For example, if the word engineer or engineering was frequently present in job titles the keyword engineer would be assigned. In this way the variety of job titles requested in persistent vacancies was narrowed down so a better overview could be created.

Most frequently asked job titles

The next step in the analysis was to find out what the most frequently asked job titles are. To do this it was also necessary to assign key words (manually). However, the variety in job titles and number of unique vacancies (3,812) are considerably bigger than the number of persistent vacancies (416). Because the key words had to be assigned manually, it was due to time constraints, necessary to apply another filter to narrow down this number and reduce the number of cases.

To get a representative variety of firms and a reasonable amount of vacancies to analyse the most frequently asked job titles, a formula was created to make this selection. The following formula was used:

```
Drop industry if NoCompanies = 0
If NoCompanies <= 10
        then all selected
else a = (NoCompanies*0.25) / NoUniqueFirmSize
        roundup(a)
        pick a firms in each firm size category with the most vacancies posted
```

The first rule is that if no companies were found in either one of the industries this one would be dropped. Second, if there are less than ten companies situated in one industry, all companies will be selected for analysis.

For all industries that contain more than ten companies the number of companies was multiplied by 0.25 (a quarter of the companies selected) and divided by the number of unique firm sizes appearing in the industry (this could range from one to seven since there are seven different company sizes classified by JobStreet). This provides us with the number of companies that have to be selected for each company size available in the industry. For example, if an industry contains 32 different companies with 4 different company sizes, following the procedure four companies should be selected, two of each firm size available ((32*0.25)/4). The selection of companies by firm size was done by looking at companies which had the most vacancies advertised in the given time period. So in case of the example, when three firms of 1-50 employees with 8, 11 and 14 vacancies advertised, the latter two will be selected for analysis.

After this selection procedure, 136 firms were selected putting up around 6,200 advertisements of which about 2,200 unique (not recurring) vacancies. The vacancies for each selected firm had to be extracted from the JobStreet database and transferred to a new excel file. After keywords were assigned to each job title an overview of the overall frequently asked job titles could be given as well as per individual industry.

4.3.4. Discussion and limitations

The macro level (statistical) data, obtained from secondary sources, should be handled with caution since there are several possible downfalls/shortcomings. As it turns out, data is often incomplete and/or unavailable/inaccessible which puts limits to the possibility of analysing. Sometimes data is only available on national level and cannot be disaggregated to state-level. Besides that, multiple measures from different data sets were used which can lead to different conclusions. Therefore, secondary data should be used and interpreted carefully (Veneri, 1999).

Furthermore, it is important to keep in mind what some measures can and cannot explain. When for example, employers advertise/have a lot of vacancies it does not necessarily mean they experience shortages (the company might be growing). Trends in vacancy data should therefore be evaluated together with other labour market indicators in order to understand the labour market conditions and dynamics.

Lastly, the vacancy data obtained from JobStreet is a new way of obtaining information on the demand side of the labour market. Although JobStreet is the biggest job portal in Malaysia it cannot be confirmed that it is representative for the entire labour market. Therefore, findings should be interpreted with caution and cannot be generalised. Besides that, this medium was never used before so procedures of filtering and analysing the data are totally new. No reference projects or examples could be used in the approach, therefore the full process and steps taken in the analysis procedure are completely subjective. Therefore, each step in the analysing process is explained extensively, so transparency is ensured. Still however, it is possible to put question marks on every step undertaken in the analysing process.

4.4. Meso-perspective

Following the macro perspective, skills shortages, deficiencies and gaps will be addressed from a meso-perspective. It is interesting to take this perspective as different skill situations are expected to exist across industries. Data and information on indicators used to measure skill shortages and skill deficiencies and gaps are derived from sources used at both macro- and micro-level. First, all relevant indicators will be described, and how they can be used to measure the different variables. Next the selection of industries is presented. Because the used data is obtained at micro- and macro-level, the procedures will not extensively be described in this paragraph. Descriptions can be found in paragraph 4.3.2 and 4.5.2. However, a selection of chosen industries will be put forward. Third, the method of analysing data will be outlined. Lastly, the paragraph will discuss the limitations of measuring variables from a meso-perspective.

4.4.1. Variables and indicators

Skill shortages and skill deficiencies and gaps can be experienced to a different extent within certain sectors and industries. As presented in table 4.6 different indicators of skill shortages and deficiencies can be used at meso-level. Although, data and information on these indicators is obtained at macro or micro level, they can still apply to different sectors and industries.

TABLE 4.6 *Meso-level variables, indicators and sources*

Scale	Variable(s)	Indicators	Sources
Sectors/industries	Skill shortages	1. Hard-to-fill-vacancies 2. Most frequently asked job titles	• Vacancy data analysis • Focus groups • Employer survey
	Skill deficiencies and gaps	3. Training 4. Skills that need most improvement	• Focus groups • Employers survey

Skill shortages

Skill shortages particularly experienced by firms in certain industries can be measured through the analysis of hard-to-fill vacancies. Hard-to-fill vacancies, as described in paragraph 4.3.1 are vacancies that prove to be hard to fill over time. It differs for industries what type of vacancies can be marked as hard to

fill as different activities are carried out across industries. Secondly, skill shortages can be measured with the help of *'most frequently asked job titles'*. Those job titles give an indication of what is high in demand among employers in different industries and can therefore function as a proxy for possible (skills) shortages.

Skill deficiencies and gaps

As mentioned in chapter two of this study, skill gaps refer to the internal labour market of a firm. Therefore, industries cannot experience skills gaps. However, skill gaps can be measured on meso-level by combining all experienced skills gaps of firms in a particular industry. The first indicator used for measuring skill deficiencies and gaps is training. Different types of training provided by firms in certain industries functions as an indicator for skill deficiencies across industries. Although firms often provide training individually, industry federations can also provide training activities for all firms within a particular industry. Yet, it can be hard to measure skill deficiencies using this indicator because not every firm within a certain industry wants to share their skill needs with other employers of the same industry (Accenture et al., 2013). Furthermore, skill gaps can be identified by the following indicator; *'skills that need most improvement'*. These skills will be compared for all firms within certain industries and used as an indication of skills deficiencies and gaps within various industries.

4.4.2. Selection of industries

As mentioned before, the manufacturing and service sector are the main sectors that contribute to Penang's economy, technological development and growth policies. Therefore, this study focuses upon 5 big sectors within the 22 different key-industries introduced in paragraph 4.1 (see also appendix A). It is assumed that these key-industries will play a major role in Penang's future developments. Out of the sectors and industries the following five sectors/industries have been selected for an in depth analysis:

1. Medical Tourism
2. Professional Business Services (KIBS)
3. Hospitality
4. Medical Devices
5. Electrical and Electronics industry (E&E)

4.4.3. Analysing data

This paragraph will provide an outline of all steps and procedures undertaken to analyse all the data that is used for the meso-perspective. First, the analysing method of the employer survey data will be described. Secondly, the use of data obtained during held focus groups will be put forward. Lastly the process of analysing JobStreet data is presented.

Employer Survey

Through the employer survey skill shortages and skill deficiencies and gaps are measured. The same method of analysis is used as described in paragraph 4.5.2 (analysing data on micro-level).

Focus groups

The focus groups also provide information about skill shortages and skill deficiencies and gaps experienced by employers. It is a useful way to find out about skill situations in certain industries. Therefore, quotes from the focus groups are used to support arguments and findings as for skill situations within certain industries.

JobStreet data

For the meso-perspective the JobStreet data was used to identify persistent vacancies and most frequently asked job titles per industry. The followed procedures to identify persistent vacancies and most frequently asked job titles are described in the previous paragraph 4.3.3. (analysing data: secondary JobStreet data).

4.5. Micro-perspective

In this paragraph a micro-perspective is taken regarding the measurement of skill gaps and shortages. First, indicators used to measure skill shortages and gaps are described. An explanation will be given on how different indicators represent both variables and how these indicators can be used. Next, the different procedures and sources through which data is obtained will be outlined. After that, the procedures

and steps that have been undertaken to analyse the data are described. Lastly, a discussion will be presented to point out several limitations of the data obtained and used.

4.5.1. Variables and indicators

Possible skill gaps existing within the labour force of a firm and skill shortages experienced by firms can be measured using different indicators. As mentioned before, skill gaps to a large extent depend on employer's perception. Therefore, mainly primary data is needed and was obtained through interviews and an employer survey. In paragraph 4.3.1, skill shortages are measured at macro-level by looking at the demand and supply of skills available in the Penang labour market. Also, skill shortages can be measured at micro level through the perception of employers. So, skill shortages can be measured at both micro- and macro-level. Table 4.7 provides an overview of the different indicators used to measure skill gaps and shortages at micro level.

TABLE 4.7 *Micro level variables, indicators and sources*

Micro	Variables	Indicators	Sources
Firms	Skill shortages	1. Hard-to-fill vacancies 2. Positions not filled up 3. Length of filling up vacancies 4. % applicants fully meet requirements 5. Labour poaching 6. Firms' recruitment standards 7. Labour turnover 8. Under hiring	• Employer survey • Focus groups
	Skill gaps	1. Skill proficiency level 2. % of employees fully skilled 3. Skills need most improvement 4. Preparedness employees' new tasks 5. Labour turnover 6. Training	• Employer survey • Focus groups

Skill shortages

Different indicators can be used to assess skill shortages on micro-level. In this study skill shortages experienced by firms are measured by using an employer survey.

Hard-to-fill vacancies

Like on other scale levels, hard-to-fill vacancies can also be used to assess skill shortages on micro-level. In the employer survey, firms are asked whether they experienced vacant high-qualified positions that proved to be hard to fill. If they did have hard-to-fill vacancies an indication of the position and level required was asked for.

Positions not filled up

Second, skill shortages can be assessed by looking at positions within firms that have not been filled. This indicator closely relates to the first indicator. Again, positions that are characterized by specific skills and high levels of experience are more likely not to be filled up than positions that require basic skills and less experience. Firms are asked whether they have positions which they cannot fill up

Length of filling up vacancies

Furthermore, the difference in the length of time filling up positions is used as an indicator. While using this indicator positions can be distinguished. Certain positions will take more time to fill than others. Skill shortages are likely to exist among very specific high-qualified positions because it is expected they take more time to fill up.

Percentage of applicants that fully meets requirements

The fourth indicator measuring skill shortages sees on the percentage of applicants that fully meets the requirements asked for. Skill shortages are more likely to exist when the percentage of applicants that fully meets the requirements is relatively low.

Labour Poaching

To overcome skill shortages firms also apply strategies that include labour poaching and pooling. Employers try to recruit employees from competitive firms by offering better incentives. Employers start poaching for various reasons; to fill up vacancies, to improve productively levels or to weaken competitors Poaching and pooling especially take place in tight labour markets where talent and/or skilled employees are scarce. Both indicators have been subject of many studies as measure to overcome skill shortages (Li

& Sheldon, 2010; Lindorff, 2011). As a result of poaching and pooling firms face higher levels of labour turnover. Therefore, labour turnover next to poaching and pooling can be regarded as an indicator for skill shortages. To measure labour poaching respondents are asked whether they directly approach persons employed in other companies who the requirements for the position.

Firms' recruitment standards

According to different studies, firms' recruitment standards have been used to determine to what extent skills gaps and shortages do exist in firms (Shah & Burke, 2003). Recruitment standards include educational qualifications, wage limits, fringe benefits, language level, etc. In their search for skilled employees, employers will mostly start recruiting internally before they become active in the external labour market. In a tight labour market characterized by high levels of demand, firms' recruitments standards are expected to decrease compared to markets with high levels of supply. In order to find a suitable candidate, one that possesses the right skills (language proficiency, educational qualification), employers might be obliged to adapt their recruitment standards by offering higher wages, interesting fringe benefits or lower qualification requirements. Firms that are willing to lower their recruitment standards are expected to face lower levels of skill shortages. The same can be expected for skills gaps. Firms that experience high levels of skills gaps apply different internal recruitment standards than firms that do not face skills gaps. Employers that offer employee's high(er) wages to switch positions within the firm can be a possible indication for skills gaps (Schlicht, 2005). To measure firm recruitment standards employers were asked whether they provide special incentives to hire a candidate who is possesses all the required skills and can choose between offers from different employers.

Labour turnover

Companies active in labour markets facing high levels of labour turnover are likely to experience skill shortages/gaps. Employees can choose between different employers because they are in high demand. A slight salary increase will make them hop to another employer. It is expected that firms in Penang, as consequence of shortages and gaps, will face higher levels of labour turnover. Labour turnover is therefore

a relevant indicator to measure skill shortages/gaps. Employers are asked what percentage of labour turnover they face on annually basis.

Under hiring

As a consequence of skill gaps or skill shortages, employers can be forced to hire employees that do not possess all the required skills. Therefore, companies can lower their hiring standards or hire under-skilled employees which points at existing skill shortages. Therefore, it was asked if firms hired applicants which did not full meet the requirements in the past two years.

Skill gaps

As mentioned earlier, the existence of skill gaps within firms depends on employer's perception regarding skills and competences possessed by their employees and their capacity to carry out their tasks according to the level required by the employer. Employees possess a certain skill-set, which consists of a number of skills. Certain skills of employees will be more developed than others. Also, certain skills will be more important to firm performance. Therefore, the existence of skill gaps will first be measured through the skill proficiency level of employees according to their employers. The skill proficiency level will be measured for a certain number of skills. If certain skills are not proficient according to employers, skill gaps are likely to exist. A second indicator, which closely relates to the skill proficiency level of employees, is the percentage of employees that can be regarded as fully skilled. This indicator focuses on the skill-set of employees rather than skills separately. A third indicator to measure skill gaps sees upon skills that need most improvement according to the employer. It can be argued that gaps exist when certain skills need more improvement. The preparedness of employees for new tasks/operation functions is a fourth indicator for skill gaps. The last indicator of skill gaps regards training of employees within firms. Employer's need, willingness and ability to invest in the improvement of employee's skills in literature is commonly used to measure skill gaps (Lindorff, 2011; Li & Sheldon, 2010). Firms that possess the resources are more likely to provide training to overcome skill gaps than those who do not possess the resources. Therefore, the absence of firm training does not mean that no skill gaps exist.

The way in which firms provide skill training to their workforce and the level of these trainings gives an indication about possible skills gaps within firms. Once again, skills gaps are referred to as a situation in which current employees lack the skills to perform their jobs which results in the compromised ability of a firm to meet business objectives' (Schwalje, 2012). In literature skill training and development can be regarded as a micro indicator used to measure skill gaps (Li & Sheldon, 2010; Lindorff 2011). Generally, training programs (internal and external) help firms to overcome skills gaps. Highly developed training programs existing within firms indicate that they experience high levels of skill gaps. Firms that provide none or less developed training programs might experience lower levels of skill gaps. Yet one must be careful, firms' involvement in training programs depends on various factors. MNC's are more likely to have budget for training programs compared to SME's. Next to that, activities within MNC's are more specific and therefore training programs are more usual. Training programs also depend on firm and industry performance. If business goes well more budget is available. Still, these factors depend on skills gaps existing within firms. By using the company survey, employers are asked whether they provide training to their labour force or not. If they do, it is asked whether this is done internally or externally and also what type of training (what kind of skill) is provided. The last question regarding training refers to factors that negatively impact investment in training.

4.5.2. Information and data sources

The population of firms to approach for participation in this study have been selected on the basis of the core activities they carry out within important industries for the Penang economy (appendix A). The selection procedure was realized with the help of company lists provided by different organizations based in Penang and Malaysia. They were acquired from multiple industry organizations, local authorities and recruitment agencies, an overview is given in table 4.8. Their help was very useful. However, this was unofficially delivered to the study and anonymity towards companies had to be guaranteed. To complete the overall company database, the worldwide web was used to search up additional relevant companies

(and contact details). Eventually a company database was set up, consisting of 1200 firms within the industry scope of the study.

TABLE 4.8 *Institutions that provided company lists*

Industry organizations	Local authorities	Recruitment agencies
• Federation of Malaysian Manufactures (FMM) • Malaysia BiotechCorp • Penang Foundry & Engineering Industries Association (PENFEIA) • Association of private hospitals of Malaysia (APHA)	• InvestPenang • TalentCorp • Malaysia Investment Development Authority (MIDA)	• Kelly Services • EPS Consultancy

After the population of firms was defined relevant contact details of firms had to be collected. By making use of different company lists, a database has been constructed in Microsoft Office Excel. This database includes contact details (Name HR manager, Tel. number, email, Fax) of firms.

All the firms in the company database were approached to participate in this study. Different methods have been used to approach firms from the company database. First a letter was sent to firms, via post, fax and email, to inform them about the study. The purpose of this introduction letter was to make firms familiar with the study in order to enhance their willingness to participate. To remind firms about the study they were also approached by phone in order to enhance their willingness to participate. A second approach was networking with employers during company meetings and conferences (e.g. SSO conference, JobStreet conference, FMM meetings). This turned out to be very effective. This approach resulted in valid contact details and new interview candidates. A third approach contained the so-called ‘snowball effect strategy’. The snowball effect implies that new contact details are gathered during interviews with HR managers of firms. During interviews HR managers were asked for contact details of HR managers from other firms. By making use of their network, new interviews appointments were set.

To gather relevant data regarding skill situations within firms, a survey was conducted online and via face-to-face interviews. Firms could either fill out an online questionnaire via PDF-escape (online form-

filler) or answer questions of the questionnaire during a face-to-face interview. Both instruments have been adopted to enhance the response rate.

Human resources managers and directors were regarded as the right persons for conducting the survey since they possess expertise on the labour force and skills situation within their firm. Face-to-face interviews were preferred because it enables interviewer to get a reliable sense of the skill situation within firms. Besides that, during a face-to-face interview, human resources managers could respond by asking questions and placing comments, which improves the quality and interpretation of collected data.

The composition of the questionnaire, which can be found in Appendix F, is designed with the help of two sources; a survey conducted in UK by the United Kingdom Commission for employment and Skills (UKCES, 2014) and a survey conducted in European countries by the European Centre of Development of Vocational Training (Cedefop 2013). The questionnaire consists of different sections (see below) that each touch upon various themes. In total it included 69 questions and takes 45 minutes to fill in.

A. Company particulars
B. Current employment and distribution positions/Occupations
C. Skills requirements current high-qualified workers and skills gaps
D. Impact of, and remedial measures towards, skill gaps
E. Labour recruitment, skill needs and shortages.
F. Responses to skills shortages
G. Views about the Penang Labour market and Policy

Prior to the survey a pilot survey has been conducted among three firms in order to overcome obstacles, obscurities and mistakes. The pilot survey was useful as it provided new insights on firms' interpretation of questions. The survey was adjusted according to these insights.

For 600 out of the 1,200 firms from the company database valid email addresses were obtained. Of these 600 firms, 51 firms participated in the survey; either online via PDF-escape or during in-depth face-to-face interviews. This equals a response rate of almost nine percent. Therefore, the representativeness is not fully sufficient and findings should be interpreted with caution and cannot be generalised. However,

the in-depth interviews with key players in different industries provide meaningful insights regarding skills situations within firms and industries.

An overview of all firms participating in the survey can be found in appendix G.

4.5.3. Analysing data

Data from the survey collected online and through face-to-face interviews was processed into a database in Excel. The database makes firm behaviour regarding skill gaps and shortages comparable. Due to the structured way of interviewing the data is structured by subject. By combining the information of surveys an overview of firm behaviour regarding skills gaps and shortages can be given. The recordings (when allowed) and notes of interviews conducted were collected in a folder. Quotes were used to confirm or explain observations and comparisons made with the data from the firm questionnaire. Also, recordings of focus groups are used to underpin certain arguments and conclusions made.

4.5.4. Discussion and limitations

The collection of relevant contact details of firms turned out to be hard. The contact details derived from the company lists were often out-dated. Also, it was hard to obtain valid email addresses of human resource managers and directors. General email addresses of firms were of less value because they often get ignored. As a consequence, a thorough review of contact details had to been done by phone or via internet. This review was only partly successful. A lot of valid email addresses of HR managers were gathered through networking.

The firm survey that is used in this study to map out the skill situation of firms within industries also has its challenges. Respondents may interpret questions differently and answer questions on the basis of their own interpretation of the question. Concepts, for example, can lack clarity and answers of respondents may represent different views. Also, respondents may not be thinking in the full context of a certain situation as their knowledge for certain issues may be limited (Bryman, 2012) The face-to-face interview also has its challenges. Firstly, there is a possibility that the interview process can be influenced by the biases of the interviewer. Secondly, the collection of data to a certain extent depends on the

interpretation of the interviewer. Also, oral interviews are regarded as time consuming. Therefore, it was hard to set appointments with relevant firms as they were reserved in their responses and availability.

The low responses of firms can be addressed due to different reasons that negatively influenced the willingness of firms to participate. Various firms rejected to participate in our study because they already participated in similar studies without receiving any results. These studies lack trusts as their contribution for firms is limited. Firms explained that they did not experience any changes or benefits of former similar studies. Next to that, Penang Institute is commissioned by state government and mistrust can exists towards studies which are funded by the government. Firms might assume that these types of studies are politically coloured to a certain extent. Also, the low response of firms can be explained due to restrained behaviour regarding recruitment strategies since they all compete for the same pool of talented labour.

5. Macro-perspective: The Penang Labour Market

This chapter provides an analysis of the Penang labour market from a macro-perspective. As outlined in paragraph 3.3 the Penang labour market must be characterized as constrained, where demand is not met by supply. As a result of this mismatches exist. The first paragraph of this chapter will elaborate on where these mismatches occur within the Penang labour market and wether they are quantitative and/or qualitative in nature. The second paragraph discusses in which compartments of the regional economy mismatches occur and to what extent. Finally, concluding remarks will be presented in the last paragraph.

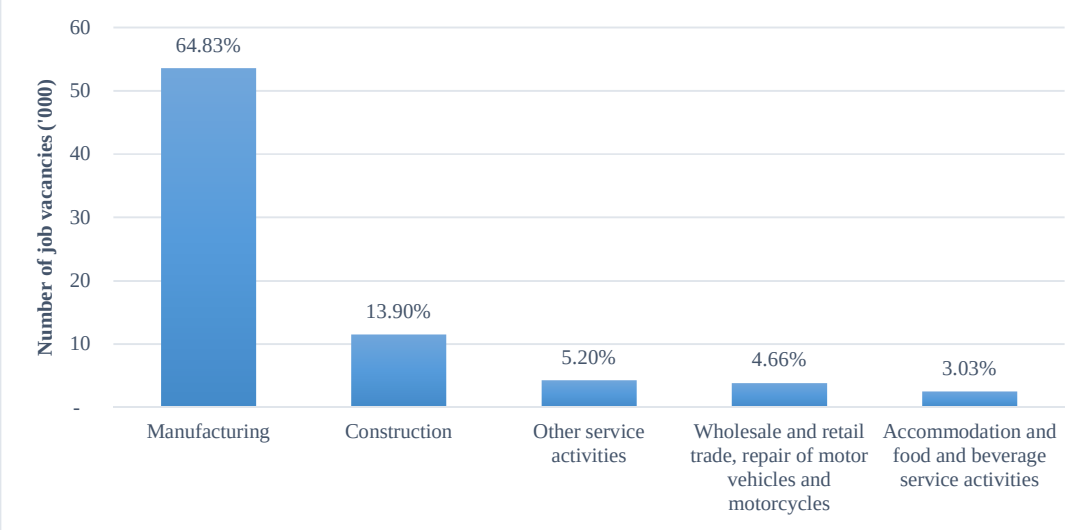
5.1. Mismatch Between Demand and Supply

Following paragraph 3.3, the next step is to identify where mismatches between demand and supply occur and if there only exists a quantitative shortage or also a qualitative shortage exists in terms of skills and qualifications.

5.1.1. Low-qualified labour

First of all, a distinction can be made between low- and high-qualified labour in the Penang labour market. Different recruitment agencies confirmed in interviews that demand for specifically low qualified labour outnumbers the supply. Although activities in the E&E industry evolved and companies moved up the value chain, firms still need low skilled workers to perform their low-tech manufacturing activities. Penang is still – although less – reliant on its low-tech-manufacturing industry, which is characterized by labour intensive activities, low wages, and unskilled work. This can be confirmed when looking at the number of job openings in different sectors. The majority of job openings in Penang reported by employers through the JobsMalaysia portal were in the manufacturing sector (figure 5.1). The manufacturing sector is followed by construction and lower segment service industries.

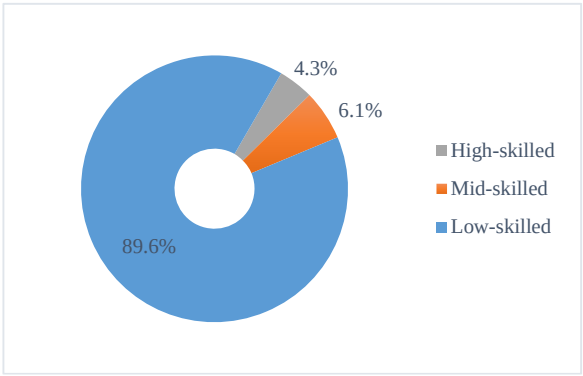
FIGURE 5.1 *Top 5 industries of vacancies reported by JobsMalaysia portal in Penang, 2015*



Source: Ministry of Human Resource Malaysia via the Department of Statistics Malaysia's Social Statistical Bulletin, 2015

In addition, the bulk of registered job openings reported in the JobsMalaysia portal were in low-skilled occupations[6] (figure 5.2).

FIGURE 5.2 *Share of vacancies reported by JobsMalaysia portal by occupations in Penang, 2015*

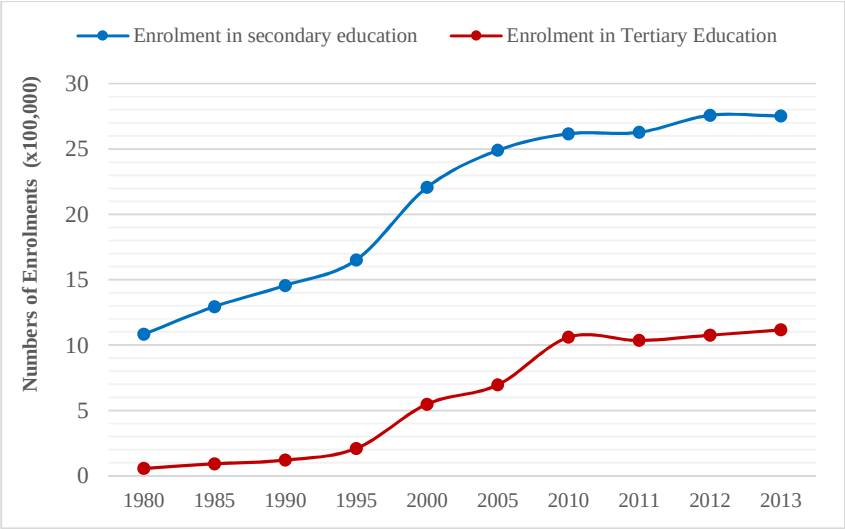


Source: Ministry of Human Resource Malaysia via the Department of Statistics Malaysia's Social Statistical Bulletin, 2015

[6] Occupations classifications are used from the **Malaysia Standard Classifications of Occupations** (MASCO, 2008). Occupation groups 1-3 (managers, professional and technicians and associate professionals) are classified as high-skilled, occupations groups 4-5 (clerical support workers and service and sales workers) as semi-skilled and occupation group 6-9 (skilled agricultural, forestry and fishery workers, craft and related trade workers, plant and machine-operators and assemblers and elementary occupations) as low-skilled.

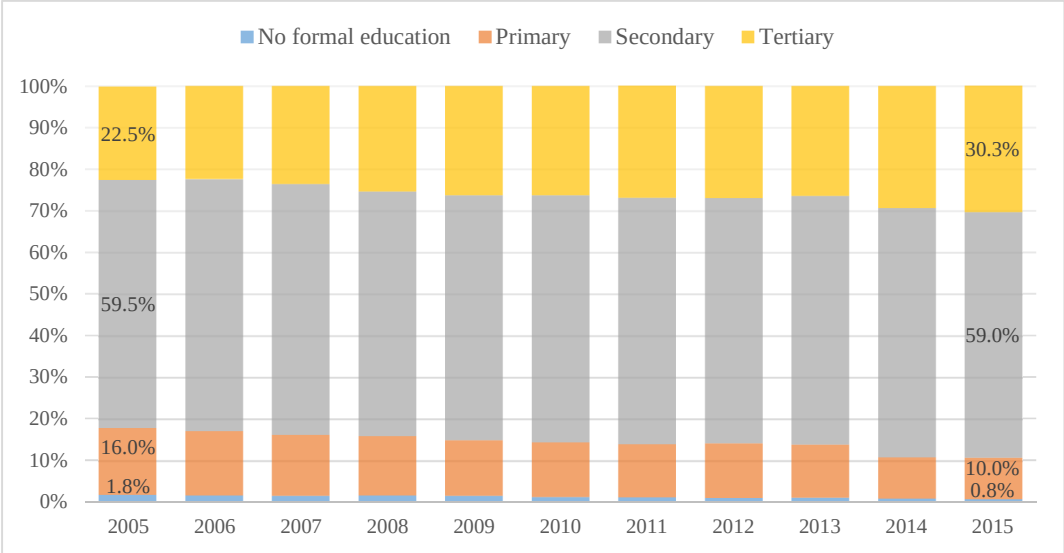
As enrolment numbers in higher education in Malaysia increase and the labour force in Penang becomes higher educated (figure 5.3 & 5.4), local employees no longer feel attracted to do this kind of work. This assumption was confirmed in interviews with recruitment firms, one stated: *"the biggest challenge is to find people for blue collar and lower paid jobs because everyone does not want to do those jobs anymore"*.

FIGURE 5.3 *Numbers of enrolment in secondary and tertiary education in Malaysia, 1980-2013*



Source: Department of Statistics Malaysia, 2015

FIGURE 5.4 *Labour force of Penang by educational attainment, 2005-2015*



Source: Department of Statistics Malaysia, 2015

Besides this, the living standard in Penang has increased and wages in the manufacturing sector did not rise accordingly. Therefore, people would rather choose other types of work or even stay voluntarily unemployed. Thus, labour shortages in the lower-tech and labour-intensive segment of the market are mainly caused by preferences of local workers which are now higher educated than before. It became evident from interviews with both recruitment firms and companies that shortages in this (low qualified) segment are mostly solved by firms importing migrants/foreign workers from low-income economies such as Nepal or Bangladesh.

5.1.2. High-qualified labour

Of particular interest for this study is high-qualified labour which is considered as crucial in making the transition to a high-income economy. For this kind of labour, the situation of supply and demand is different. Although total enrolment in secondary and tertiary education in Malaysia increased and the tertiary educational attainment in the Penang labour force has been growing (figure 5.3 & 5.4), the share of employed people in high-skilled occupations remained more or less the same over the past ten years (Figure 5.5).

FIGURE 5.5 *Employment by skill level of occupations in Penang, 2005-2015*

Source: Department of Statistics Malaysia, 2015

However, it appears that the absolute number of employed persons in high-skilled occupations have been increasing steadily in the past decade, aside from the financial crisis (2008-2011). This means that although the share of employment in high-skilled occupations remained the same, overall employment in high-skilled occupations increased, indicating an overall upgrade of the economy e.g. moving up the value chain, with higher demand for high-skilled occupations. At the same time, the increase in demand for high-skilled labour appears to be followed by aggregated supply of tertiary educated people; assuming that the majority of tertiary educated people end up in high-skilled occupations (figure 5.6). Since 2014 however, it looks like the supply of tertiary educated people, as well as the number of tertiary educated employed people, exceeds the number of employment in high-skilled occupations.

FIGURE 5.6 *Employment numbers of tertiary educated and high skilled occupations in Penang, 2005-2015*

Source: Department of Statistics Malaysia, 2015

The last observation can be explained from two different points of views. One possibility is that the demand is insufficient to absorb the growing number of tertiary educated people. Instead, it forces them to accept lower skilled jobs, stay (voluntarily) unemployed or move out of the labour market (migrate).

On the other hand, in the case of sufficient local demand for high-qualified labour, it indicates that there exists a mismatch between the curriculum of higher education and local market demands. In this case tertiary educated people are not taken up by the market due to low employability which means people do not possess the right skills and qualifications that are demanded.

Quantitative shortage of high-qualified labour

As mentioned before, if domestic demand for qualified labour could not keep up with growing number of tertiary educated people, the surplus of high-qualified labour will either accept lower skilled jobs or move outside the labour force. In Malaysia it seems that especially the latter is the case: It has to be noted that Malaysia is experiencing significant brain drain, meaning that talent (e.g. high-qualified labour) moves out of the labour market to seek opportunities overseas. According to a recently published book on brain drain in Malaysia it is mentioned that talents are leaving Malaysia for some time now (Jauhar et al., 2016).

> *"Malaysia suffers from an exodus of talent. Not only is our education system failing to deliver the required talent, we have not been able to retain local talent of all races nor attract foreign ones due to poor prospects and a lack of high skilled jobs"* (NEAC, 2010, p. 60).

A survey conducted at the start of 2015 among 2,553 job applicants by Hays (Quarterly Report, March 2015) revealed that 93 percent of the respondents would contemplate exiting Malaysia to work overseas. According to the World Bank (2011), the main factors that motivates Malaysian talents to move abroad include differences in earnings potential, career prospects, quality of life and quality of education. Also discontent with Malaysia's inclusiveness policies plays a key role; particularly among the non-Malay who make up the majority of the diaspora. Following this, the New York Times published an article called "Loss of Young Talent Thwarts Malaysia's Growth" stating that skilled workers or teenagers believe that Singapore offers higher salaries, is better in terms career advancement and provides better education systems (Gooch, 2010). In addition, numbers presented by the World Bank (2011) show that more than 50 percent of Malaysians brain drain population leaves for Singapore, followed by Australia (15%) and the

United States (10%). In addition, the number of Malaysian diaspora[7] and brain drain[8] has been growing in the period 2000-2010 (table 5.1). Brain drain from Malaysia to Singapore increased by more than 80 percent in the period 2000-2010.

TABLE 5.1 *Size of the Malaysian diaspora (age 0+) and brain drain (age 25+), by country of destination over time in numbers and % difference*

		Malaysian Diaspora (age 0+)			Malaysian Brain Drain (age 25+)		
	Country	2000	2010	% Difference	2000	2010	% Difference
1.	Singapore	303,828	385,979	27.0	66,452	121,662	83.1
2.	Australia	78,858	101,552	28.7	38,620	51,556	33.5
3.	United States	51,510	61,160	18.7	24,085	34,045	41.4
4.	United Kingdom	49,886	65,498	31.3	12,898	16,609	28.8
5.	Canada	20,420	24,063	17.8	12,170	12,807	5.2

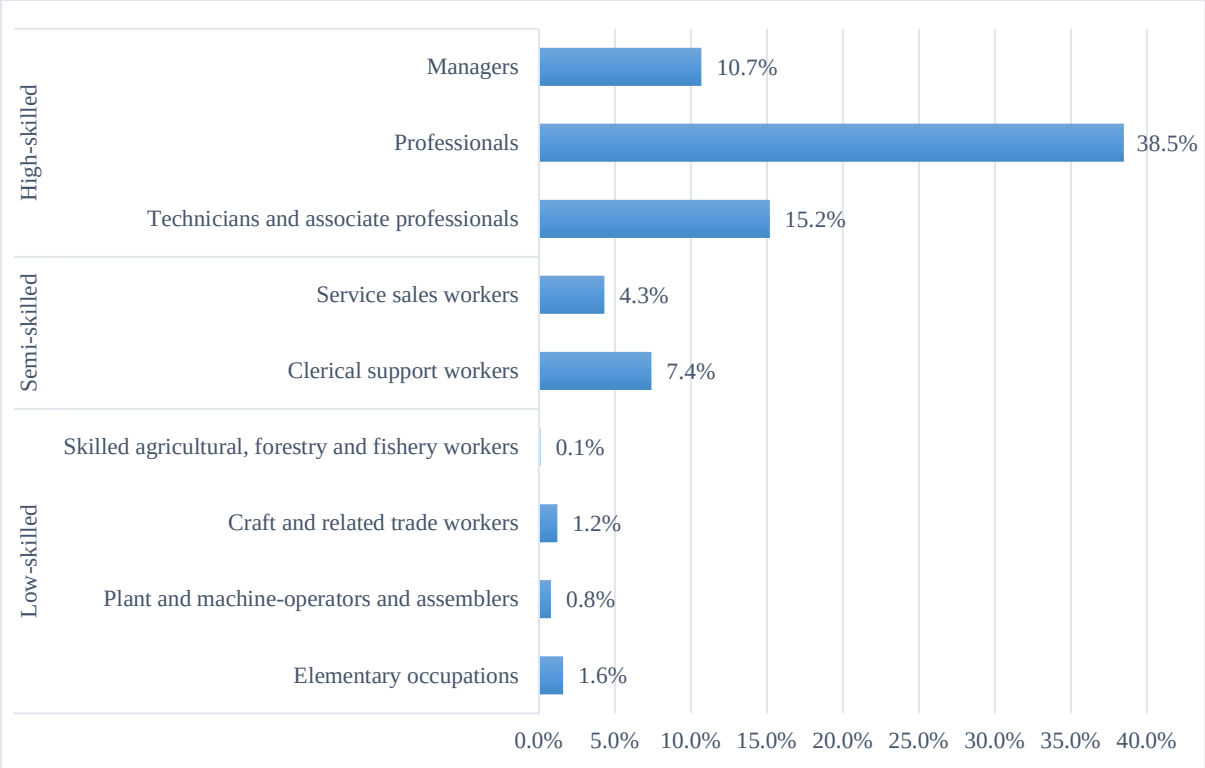
Source: World Bank, 2011, p. 98

A research done by Penang Institute (2016) concluded that brain drain in Malaysia (as expected) is most severe in the types of occupations which are classified as high-skilled (manager, professionals and technicians and associate professionals). The high-skilled occupations accounted, according to calculations done by Penang Institute, for more than 64 percent of the brain drain population in Malaysia (figure 5.7). Jauhar & Yusoff, 2011 argue that the demand for Malaysian professionals is considerably high because their environmental adaption is strong, they are multi-lingual and have a reasonably wage rate.

[7] Diaspora refers to the stock of Malaysian-born migrants, regardless of skill profile. Table 6.1 shows the diaspora numbers and percentage difference between 2000-2010 for those aged 0+.

[8] Brain drain refers to the stock of tertiary educated Malaysian-born migrants, aged 25+.

FIGURE 5.7 *Percentage of brain drain by occupation in Malaysia, 2014*



Source: Penang Institute, 2014, p. 38

Unfortunately, this data cannot be disaggregated to Penang state level but can still serve as an indicator for the patterns of migration outflow from Penang. Since the concept of brain drain mainly applies to tertiary educated (high-qualified) labour it is conceivable that the results of brain drain studies in Malaysia are to a big extent relevant to those states which include large numbers of tertiary educated people. Penang is one of those states. The count of tertiary educated people in the Penang labour force is above the average in Malaysia and the share of tertiary educated is ranked fourth among all states (table 5.2).

TABLE 5.2 *Top 5 states in Malaysia by number of tertiary educated people in the labour force, 2015*

	State	Labour force ('000)	Tertiary educated ('000)	% of labour force tertiary educated
1.	Selangor	3,212.0	1,257.7	39.1
2.	Johor	1,633.2	361.4	22.1
3.	W.P. Kuala Lumpur	882.6	359.6	40.7
4.	Sabah	1863.4	311.4	16.7
5.	Pulau Pinang	848.1	257.1	30.3

State	Labour force ('000)	Tertiary educated ('000)	% of labour force tertiary educated
Average of all states	**907.4**	**250.34**	**27.6**

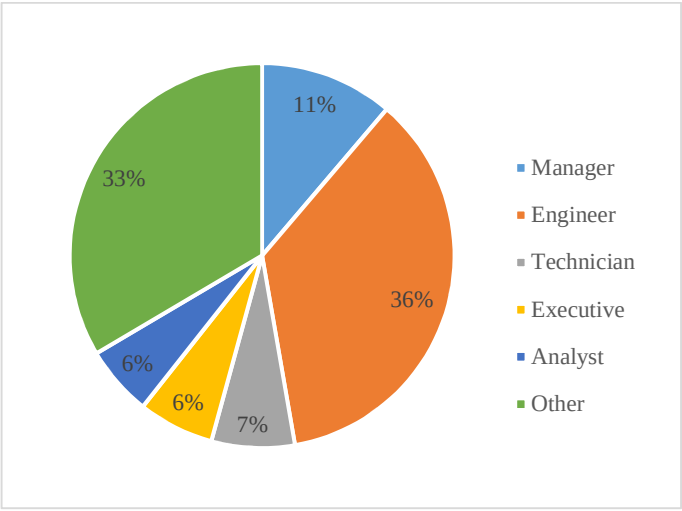
Source: Department of Statistics Malaysia, 2015

The depletion of talents can definitely have a huge negative impact on the scientific and technological competence of Penang and therefore a major stumbling block to make the transition towards a high income economy.

The presented developments and figures indicate that the number of tertiary educated people in the labour force have been growing rapidly over the past decade(s). Nevertheless, a significant amount of the high-qualified labour elects to go abroad resulting in labour shortages for high qualified positions.

These shortages become more evident when looking at JobStreet advertisements over the period December 2015 – June 2016. Data shows that around 8,700 unique vacancies for mainly high-qualified positions had been advertised which indicate that there is considerable demand for high-qualified jobs in the Penang labour market. Among 2,228 analysed unique job vacancies advertised on JobStreet (within the scope of this study) in the given period, the five job titles presented in figure 5.8 were most frequently requested by companies. It appears that especially engineers (36%) are high in demand among firms within Penang. Furthermore, managers (11%) and technicians (7%) are in demand among employers.

FIGURE 5.8 *Five most requested job titles in JobStreet advertisements, Dec. 2015 – June 2016*

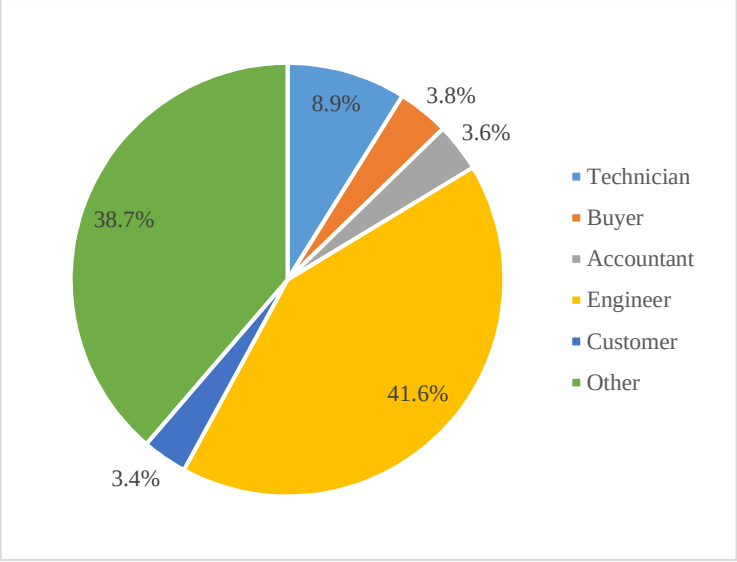


Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 2,228

In addition to the JobStreet vacancy data, an online survey has been conducted among companies that make use of JobStreet to gather information on what happens to the advertisements put up. As a result of this survey it turns out that more than 70 percent of the respondents stated that not all high-qualified positions could be filled. Following this, 11 percent of the 3,812 unique job vacancies advertised on JobStreet by companies within the scope of this study were advertised for a period of 1,5 months or longer and are considered as *'persistent vacancies'*. These persistent advertisements can be an indication of hard-to-fill vacancies. However, this indication should be interpreted with caution since several other reasons could be the cause of persistent vacancies (as mentioned in paragraph 4.3.3.).

Looking at all the (416) identified persistent vacancies, 68 different (groups of) job titles can be identified. The bulk of persistent job titles contains less than 10 vacancies. It appears that engineers and technicians are not only high in demand among companies within the scope of this study but vacancies for many of these job titles are also advertised for a considerable amount of time. Almost 42 percent of the persistent job vacancies consists of vacancies for engineers, for technicians this is almost 9 percent (figure 5.9). Also job titles such as accountants (3.6%) and buyers (3.8%) show persistent vacancies which corresponds with the upcoming professional business services in Penang.

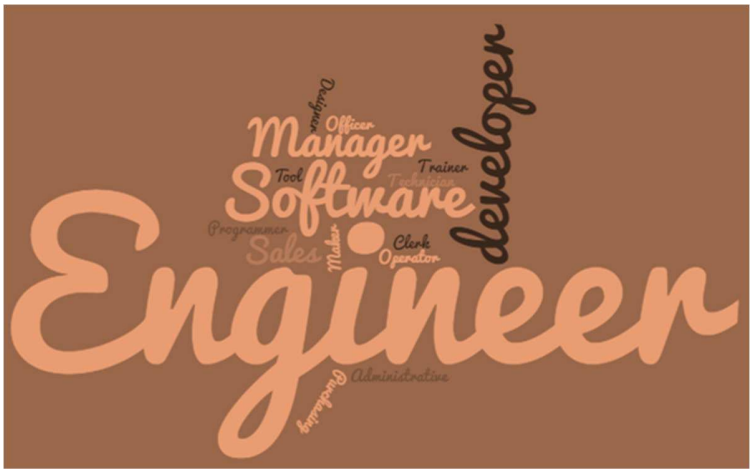
FIGURE 5.9 *Five most requested job titles in persistent vacancies advertised on JobStreet, Dec. 2015 - June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 416

As mentioned before, the longer 'opening time' for these job titles can have different reasons. One is that these job titles are simply hard-to-fill and therefore have a longer opening time than other job titles. This can be supported by the data obtained through the short survey, as companies indicated that mainly vacancies for engineers proved to be hard-to-fill (figure 5.10).

FIGURE 5.10 *Job titles that proved hard-to-fill among companies that advertise on JobStreet, Dec. 2015 - June 2016*

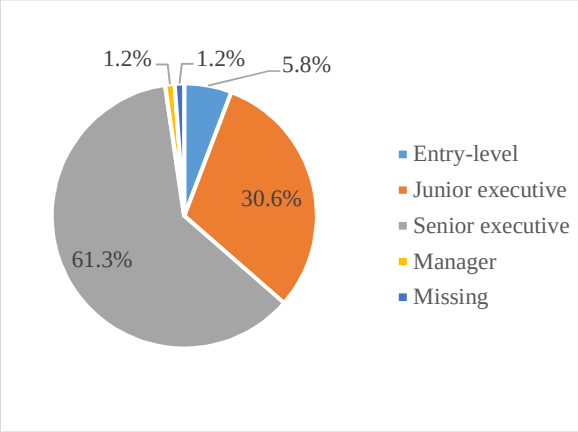


Source: JobStreet vacancy survey, 2016, N = 16

A second reason, in line with the previous one, is that companies tend to keep re-advertising these job titles since they can use them continuously, indicating a shortage. Several companies stated in interviews that they constantly keep advertisements online on JobStreet because they could always use those particular employees. A third possibility for these vacancies to be re-advertised is that turnover within these job titles is high and companies therefore constantly need to replace employees that leave the company.

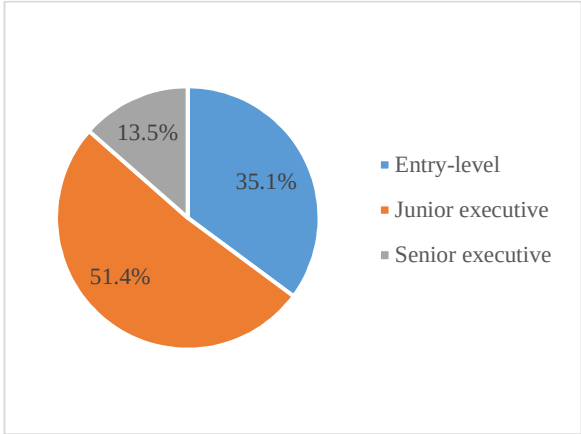
When looked at the job positions for engineers it becomes clear that the majority (almost 62%) involves senior executive job positions (figure 5.11). This indicates that especially experienced engineers are required and possibly hard to get. For technicians it turns out to be the other way around, especially lower level job positions (entry-level and junior executive) are required and possibly hard to fill (figure 5.12).

FIGURE 5.11 *Persistent engineer vacancies advertised on JobStreet by job position, Dec. 2015 - June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 173

FIGURE 5.12 *Persistent technician vacancies advertised on JobStreet by job position, Dec. 2015 - June 2016*



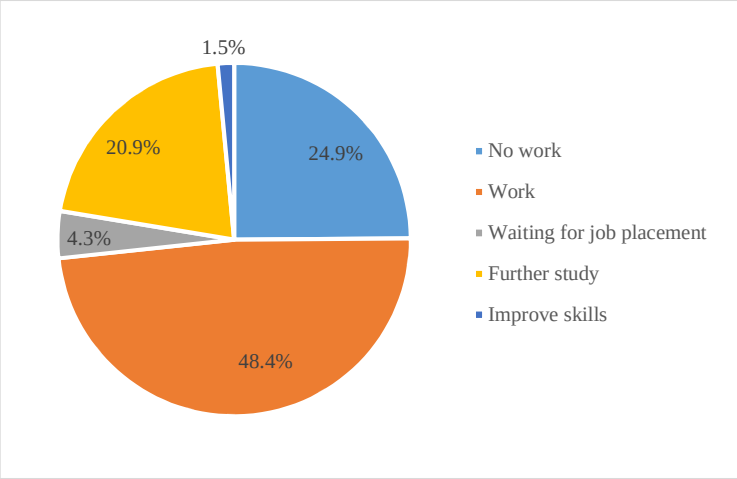
Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 37

Altogether, it can be stated that the supply in terms of high-qualified labour has been growing in the past decade(s). At the same time however, this type of labour has been moving overseas to a large extent, resulting in high-qualified labour shortages. This becomes more evident when looked at vacancy data obtained from JobStreet. The demand for high-qualified labour appears to be consistent and a significant share of companies cannot fill up all their high-qualified vacancies. This also results in longer opening times of certain vacancies (e.g. persistent vacancies). In conclusion, a quantitative labour shortage of high-qualified labour can be observed within the Penang labour market. The next paragraph will elaborate on the qualitative aspect of shortages.

Qualitative shortage of high-qualified labour

Aside from a quantitative shortage there also seems to exist a mismatch between demand and supply of skills (qualitative) in the Penang labour market. While high-qualified labour moves away, a considerable share of the remaining talents appear to experience difficulties finding jobs due to a lack of possessed skills and qualifications, in other words; low employability. Results of a graduate tracer study done by the Malaysian government in 2014 showed that almost 25 percent of the fresh graduates couldn't find a job within six months after graduating (Figure 5.13).

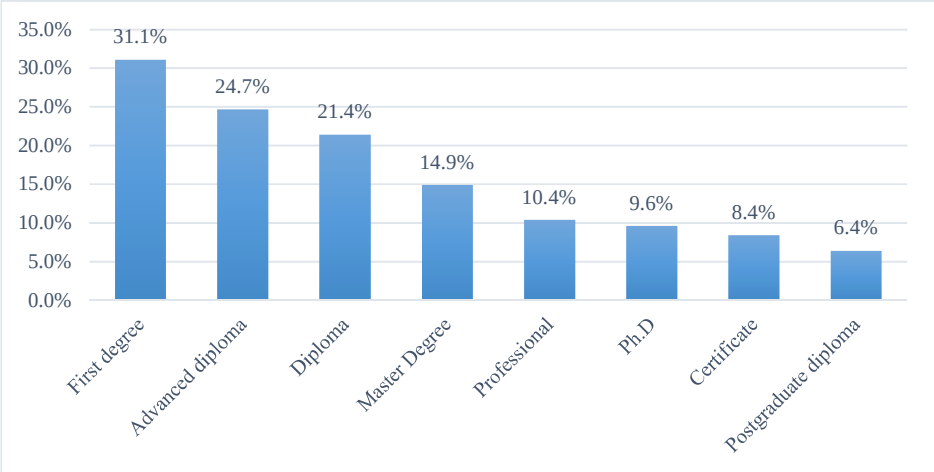
FIGURE 5.13 *Status of graduates in Malaysia within six months after graduating, 2014*



Source: Graduate Tracer Study via Ministry of Higher Education Malaysia, 2014

Within the group of graduates that did not find work, the largest share possessed a degree (more than 30%) (Figure 5.14).

FIGURE 5.14 *Share of unemployed graduates by level of education, 2014*



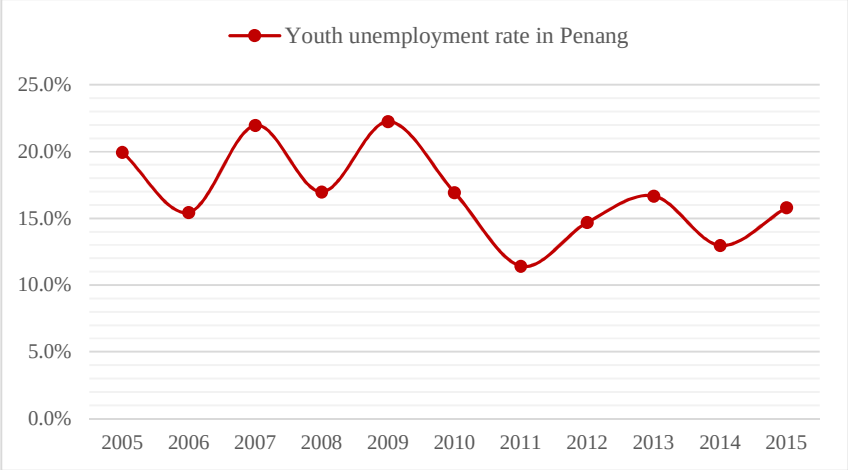
Source: Graduate Tracer Study via Ministry of Higher Education Malaysia, 2014

These findings can be supported by looking at the unemployment rate divided in age groups. It can be observed that Penang has a high unemployment rate among youth[9]. Even though it has dropped from 20 percent in 2005 to approximately 16 percent in 2015 (figure 5.15), it is still disproportionally high compared

[9] Youth is considered as the age group of 15-24 years old.

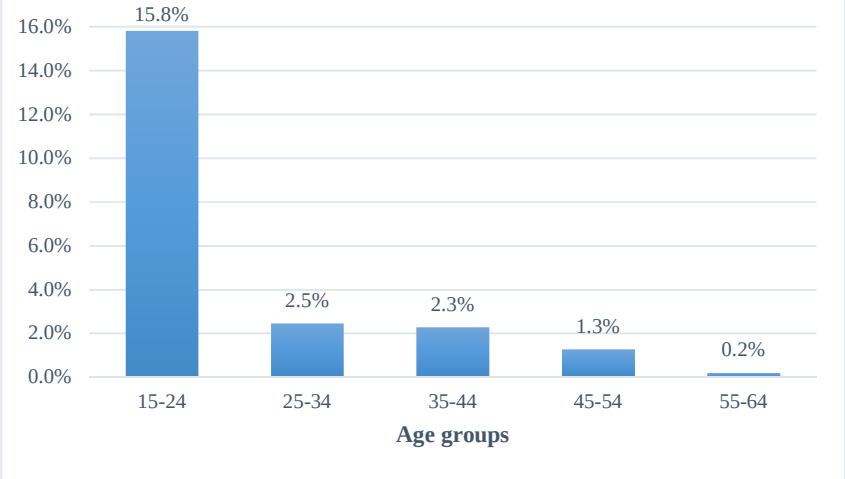
to other age groups (figure 5.16) and the overall historic low unemployment rate (1,6%). The share of unemployed youth to the total persons unemployed in Penang is more than 50 percent.

FIGURE 5.15 *Youth unemployment rate in Penang, 2005-2015*



Source: Department of Statistics Malaysia, 2015

FIGURE 5.16 *Share of unemployed persons divided by age groups in Penang, 2015*



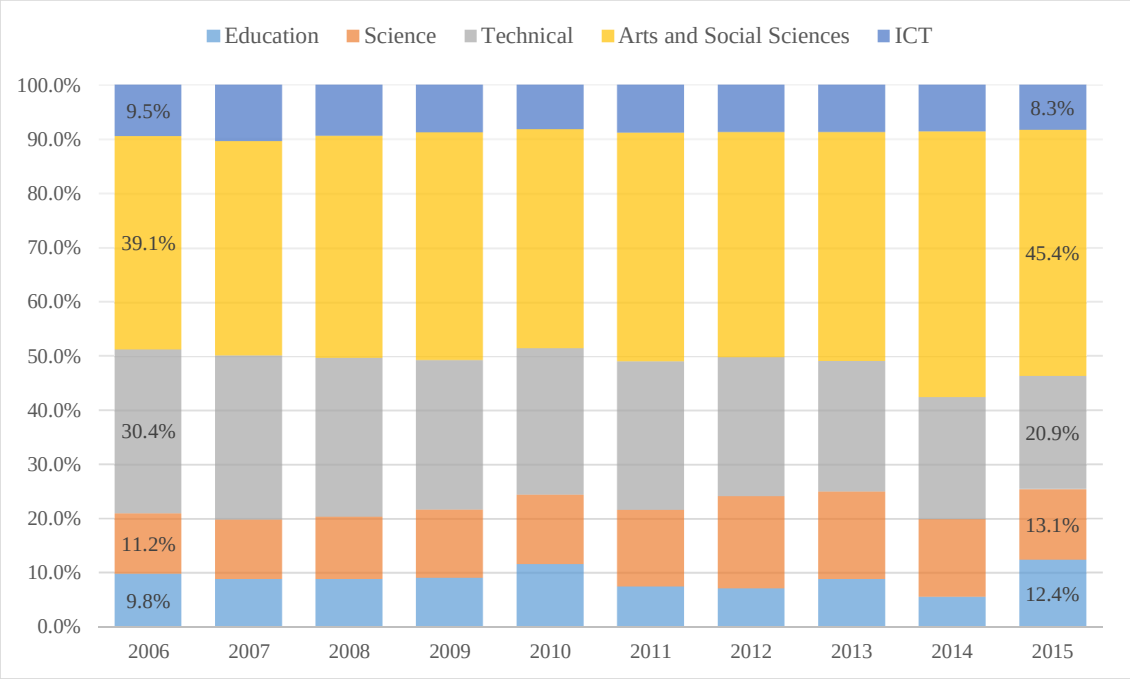
Source: Department of Statistics Malaysia, 2015

Wrong fields of study

The high unemployment rate among youth (and fresh graduates) can be explained from different point of views. One is that the majority of graduates in Malaysia choose ‘the wrong field of study’. Figure

5.17 shows that most students in Malaysia opt for the arts and social sciences fields and less people tend to pick technical, ICT or science related fields.

FIGURE 5.17 *Share of graduates by field of study in Malaysia, 2006-2015*

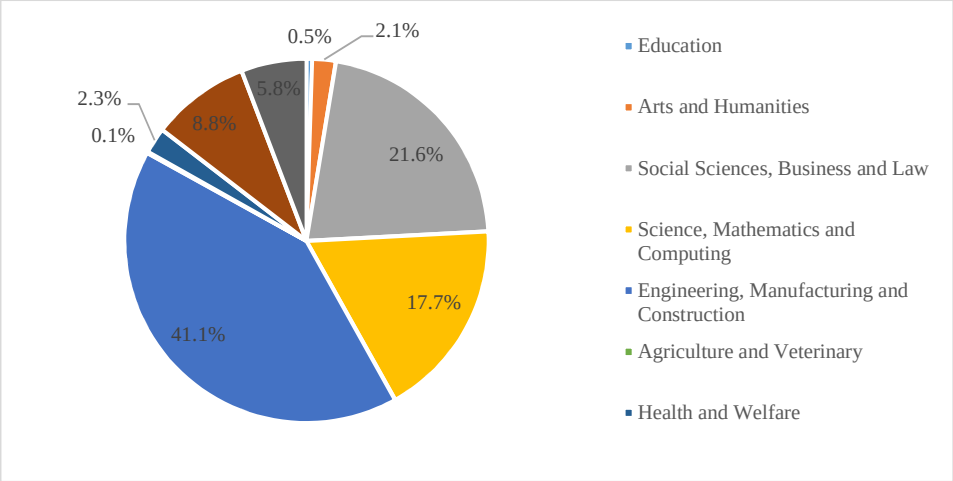


Source: Ministry of Higher Education Malaysia, 2016

When the labour market is not interested in these kind of graduates, this might be an explanation for the high unemployment among fresh graduates entering the labour market. According to an interview with one of the recruitment firms it is also a problem that people with the 'right field of study' not necessarily want to find work in that particular field: *"Many IT students do not prefer a programming job but rather work in a different sector"*.

The JobStreet vacancy data supports the idea of 'wrong fields of study' since the majority of advertisements require technical fields of study (e.g. engineering, manufacturing and construction) and the share of Malaysian graduates in these field of study is declining (Figure 5.17 and 5.18).

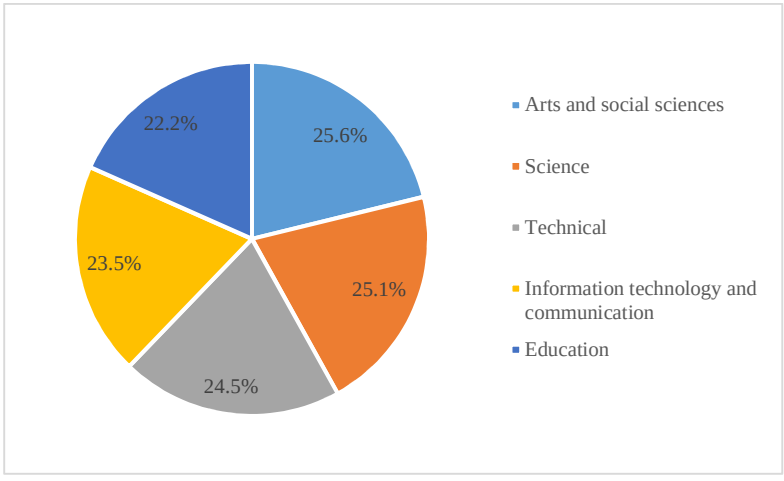
FIGURE 5.18 *Required fields of study in vacancies advertised on JobStreet, Dec. 2015 – June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 3,812

However, when looked at the results of the graduate tracer study, the share of unemployed graduates by different fields of study does not differ significantly. Although it shows that graduates with a background in arts and social sciences have the hardest time finding a job (almost 26% did not find a job within six months after graduating), the difference with graduates in sciences (25.1%) and technical (24.5%) fields of study are minimal (figure 5.19).

FIGURE 5.19 *Share of unemployed graduates within six months after graduating by field of study, 2014*



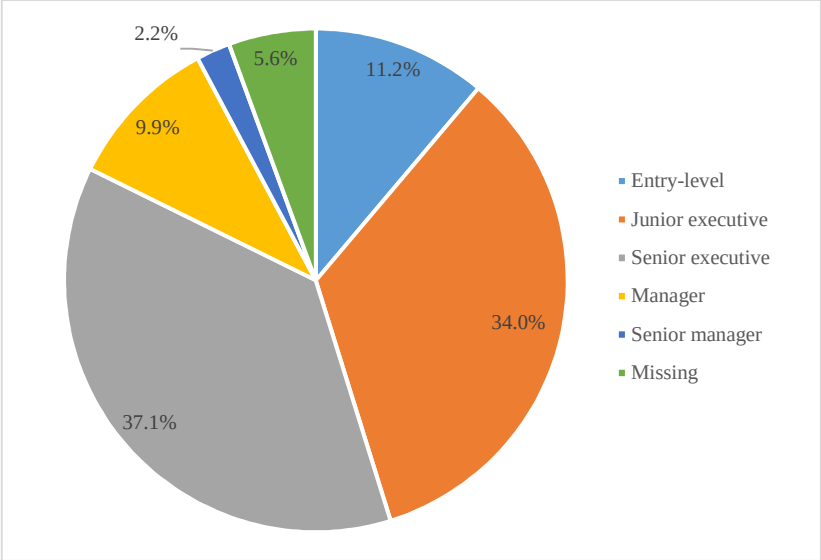
Source: Graduate Tracer Study via Ministry of Higher Education Malaysia, 2014

Skills demand and supply

A second explanation for the high unemployment rate among high-qualified graduates is that employees and especially fresh graduates are not well prepared and equipped to enter the working field (e.g. low employability). As mentioned before, qualifications/skills do not meet the standards that employers demand.

Looking at the 3,812 unique vacancies advertised on JobStreet by 369 companies (in the period December 2015 – June 2016) within the scope of this study, it appears that about 45 percent of these vacancies require lower level job positions (e.g. entry-level and junior executive job positions). Almost 50 percent requires higher level job positions such as senior executives, managers and senior managers (figure 5.20).

FIGURE 5.20 *Required job positions in vacancies advertised on JobStreet, Dec. 2015 – June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 3,812

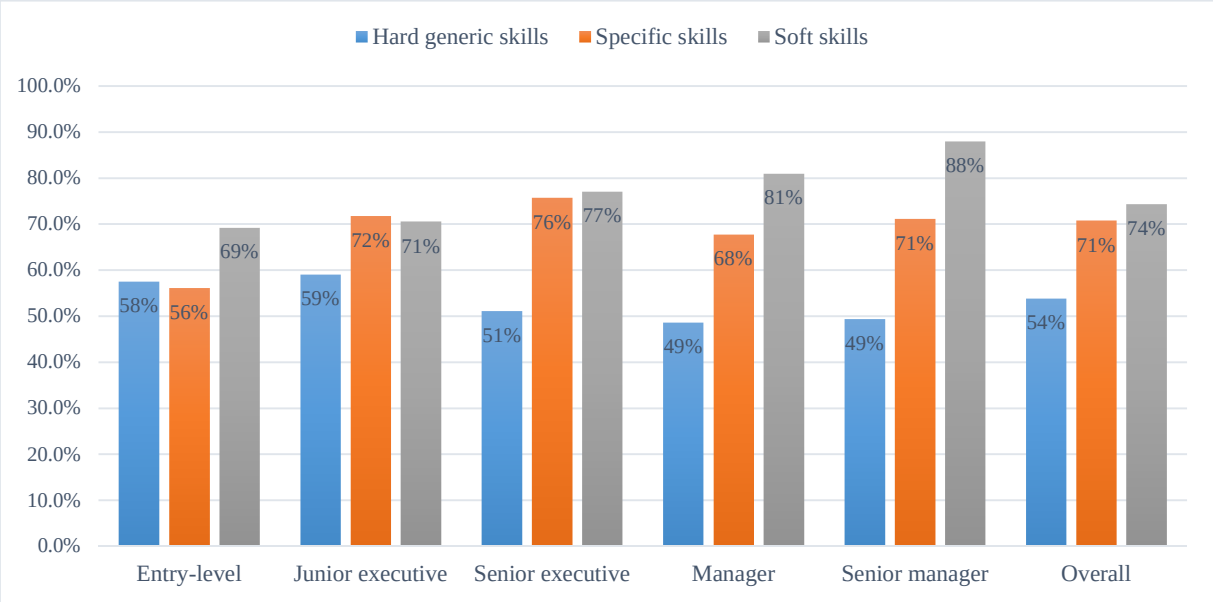
Within these 3,812 unique vacancies, it becomes clear that, soft skills are most frequently asked for (figure 5.21). This confirms the expectation two formulated in paragraph 3.4. However, the importance of soft skills cannot directly be attributed to the upcoming service sector.

As described in paragraph 2.1.1., soft skills refer to non-job specific skills that are related to individual ability to operate effectively in the workplace. In this study the following five (groups of) soft

skills are distinguished; (1) personal effectiveness, (2) relationship and service skills, (3) impact and influence skills, (4) achievement skills and (5) cognitive skills (see appendix E for a more comprehensive description of the different types of soft skills).

It appears that, the higher the job position required and the greater the firm size, the more important soft skills get (figure 5.21 and 5.22).

FIGURE 5.21 *Share of skill types required in vacancies advertised on JobStreet by job position, Dec. 2015 – June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 3,598

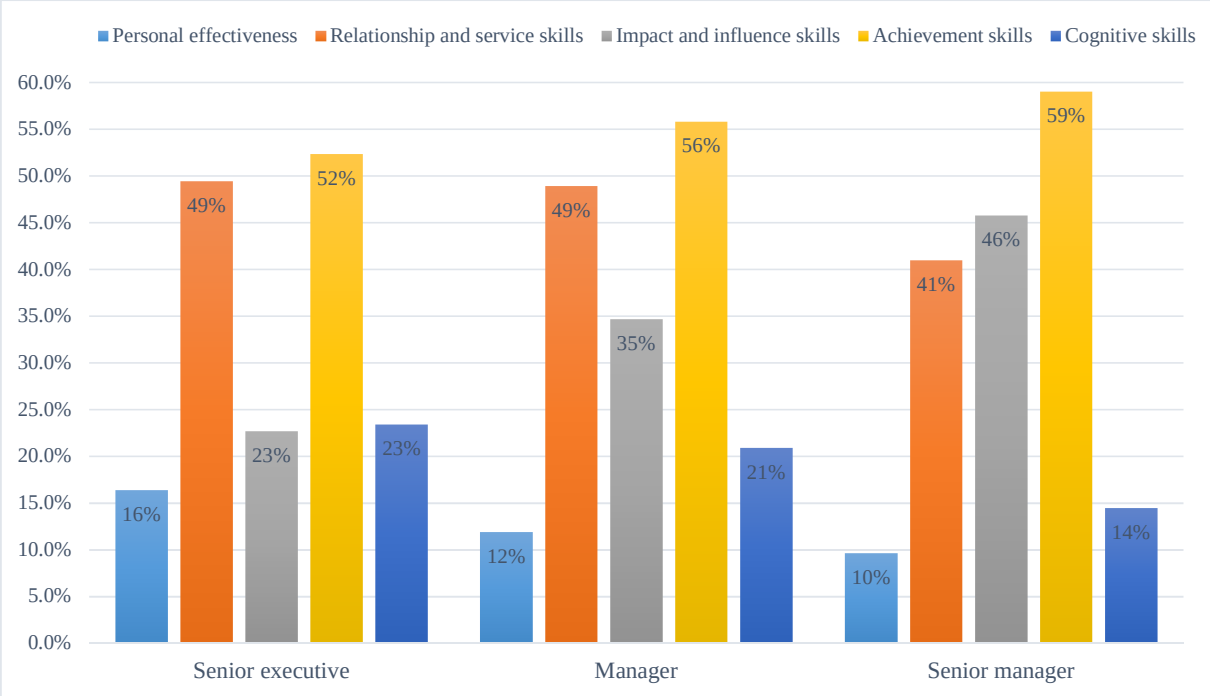
FIGURE 5.22 *Share of skill types required in vacancies advertised on JobStreet by firm size, Dec. 2015 – June 2016*

Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 3,613

Looking at job positions and required types of skills (figure 5.21) it appears that for the higher level job positions (e.g. senior executive, managers and senior managers) the most required soft skills are achievement skills (such as planning and organization, concern for order and problem solving) and relationship and service skills (such as interpersonal understanding, customer orientation and cooperation with others) (figure 5.23). This can be expected since higher job positions come with more responsibility, thus more organization and communication skills are need to give direction to other employees. In addition, it becomes evident that impact and influence skills (e.g. leadership), are increasingly requested for higher job positions.

Personal effectiveness and cognitive skills are less required for higher job positions. It can be assumed that companies expect that these skills are already fully possessed by the candidates applying for higher job positions since those job positions also require more relevant working experience.

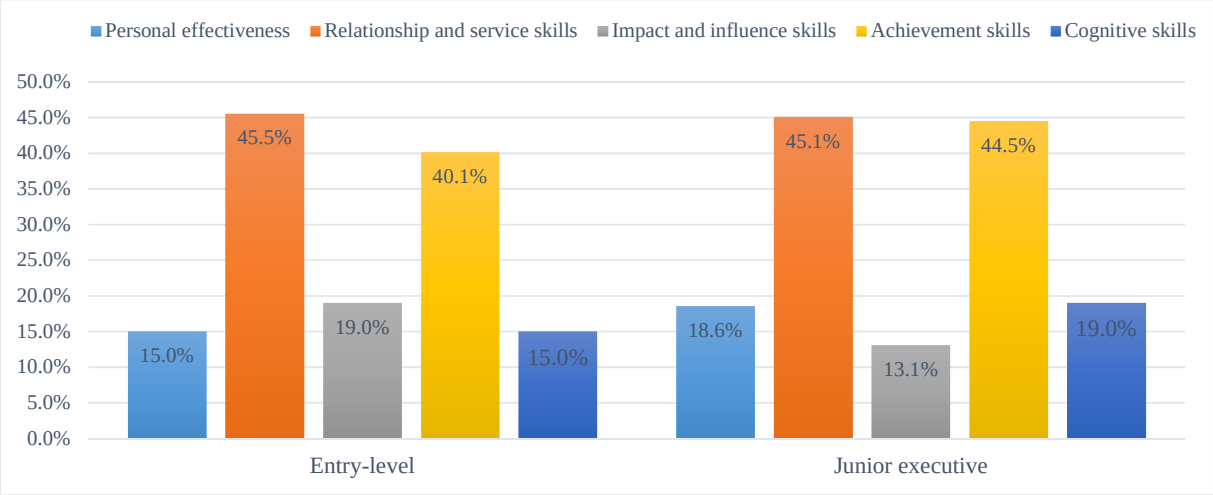
FIGURE 5.23 *Soft skills required in vacancies advertised on JobStreet for higher level job positions, Dec. 2015 – June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 1,875

Looking at figure 5.24, it appears that achievement- and relationship and service skills are less required for entry-level and junior executive positions. However, still almost half of them require relationship and service skills. Also, more than 40 percent of the vacancies for these job positions requires achievement skills.

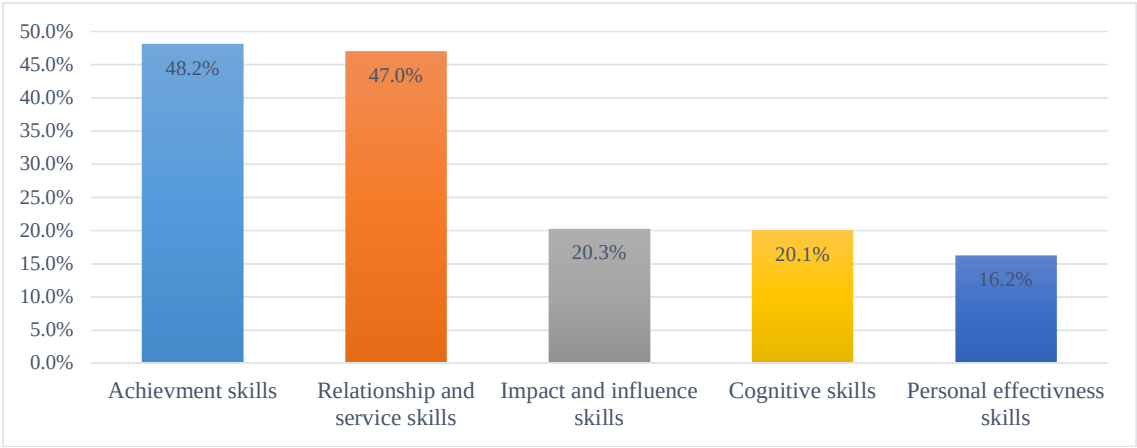
FIGURE 5.24 *Soft skills required in vacancies advertised on JobStreet for lower level job positions, Dec. 2015 – June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 1,723

Overall, it appears that in all 3,812 unique vacancies achievement skills (e.g. problem solving) and relationship and service skills (e.g. communication) are the most frequently required soft skills. Nearly, half of all unique vacancies advertised required those two type of soft skills (figure 5.25).

FIGURE 5.25 *Required soft skills in vacancies advertised on JobStreet, Dec. 2015 – June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016, N = 3,812

It however, becomes evident from interviews with both companies and recruitment firms that precisely achievement- and relationship and service skills are lacking within the labour market. Especially, when it comes to fresh graduates. One of the interviewed recruitment firms stated: *"Soft skills such as pro-active behaviour, initiative, and interpersonal skills are missing."* This was supported by one of the training centres which stated: *"Currently, students lack soft skills such as problem solving and critical thinking, they only learn their textbooks."*

The above shows that there appears to be a mismatch between demand and supply for these particular skills; both are high in demand and both are considered as lacking among the supply, especially fresh graduates. This is in line with expectation one formulated in paragraph 3.4: Due to a lack of skills that are demanded in the market a qualitative mismatch exist. In a focus group discussion with several education institutions it became clear that indeed more attention is needed for the development of soft skills in higher education. It was also noted that these type of skills can also be learned in an even earlier stage of life and should start with the upbringing of children and primary education.

Next to soft skills, specific hard skills are most required in vacancies advertised on JobStreet (figure 5.21, page 117). Specific hard skills can be defined as technical and job-specific abilities that are applicable in a small number of companies, occupations and sectors. They describe special attributes for performing an occupation in practice. Classification of these types of skills is very hard because employers' requirements are often too particular to be comparable. Therefore, it has been decided to simply put 'yes' when specific hard skill(s) are required in vacancies.

Looking at figure 5.21 (page 117), there does not seem to appear a clear relationship between job position and specific hard skills required in vacancies. However, a large share of about 70 percent of the vacancies in almost every job position require one or more specific hard skills. Only the share of vacancies for entry-level positions requiring specific hard skills is substantially less (58%). This can be expected since these positions often require more generic skills and less use of knowledge intensive practices and technologies.

When specific hard skills are set off against firm size (in headcounts) it appears that there is an increased demand of hard specific skills in especially smaller firms (figure 5.22, page 117). Specific hard skills in vacancies advertised on JobStreet by small companies (about 73%) are more requested than in medium and large companies, 72 percent and 69 percent respectively. A possible explanation for this is that smaller companies focus more on the technical parts of the process and therefore require less soft skills.

The importance of hard specific skills coincides with the developments described in chapter 2, paragraph 2.1.1: Due to rapid changes in use of technology and innovations more unique and specific hard skills are required. This finding coincides with expectation three, formulated in paragraph 3.4.

From a focus group discussion with education institutions it became evident that they struggle to provide their students with these specific hard skills required by the market. They are only capable to provide them with a 'general' skill set and can only 'specialise' up to a certain point. It is hard for them to provide something beyond this 'general package' of skills since their syllabus only allows them to make minor changes as for what they can and must teach their students. At the same time education institutions mentioned that it takes lengthy procedures and a lot of bureaucracy to get approval and implement a new course which makes it hard for them to adapt to industry needs. As a consequence, a time lag between what is demanded and what can be offered always exists.

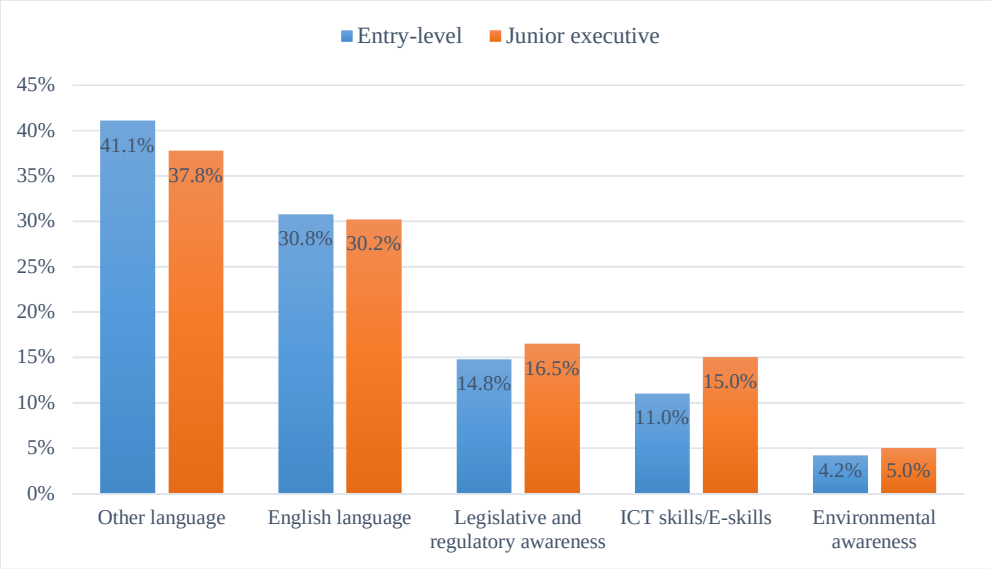
On top of this, a large number of courses is mandatory for them to provide to the students. According to education institutions, these numerous mandatory courses hinder them in providing in depth knowledge of specific subjects. Besides that, what some companies require is simply too specific and cannot be learned in school due to a lack of qualified lecturers and/or due to too a lack of interest among students, this is especially evident for private education institutions.

It became evident from a focus group held among companies operating in the life science industry that they have too specific requirements for students and accept they have to train their own employees. One company stated: *"We operate in a specific industry, so universities cannot provide us students. We have to train students ourselves to fit in the company."*

Hard generic skills are overall less required by employers (figure 5.21, page 117). As mentioned before, hard generic skills can best be described as technical and job-specific abilities, which can be applied effectively in almost all jobs, in a majority of companies, occupations and sectors and in personal life. This study distinguishes seven different types of hard generic skills; (1) economic awareness, (2) basic skills in science and technology, (3) environmental awareness, (4) ICT skills/E-skills, (5) English language proficiency and (6) proficiency in other language (see appendix E for a more comprehensive description of hard generic skills). It appears that, the higher the job position and the bigger the firm size (figure 5.21 and 5.22, page 117) the less hard generic skills are required. It can be assumed that companies expect that hard generic skills are already possessed by employees looking for job positions that require more experience. For entry level and junior positions hard generic skills seem to still play a key role, almost 60 percent of the vacancies in these job positions required one or more hard generic skills. Most requested hard generic skills are languages, especially other languages[10] aside from English language (figure 5.26). It is however illustrative that still English is mentioned so much in advertisements where one could've thought that this skill would be possessed naturally in a former British colony like Malaysia. However, due to continuous changes in the medium of instruction at schools and universities (Malay, Chinese or English) and a segmented education system, in which Chinese and Malays largely follow separate pathways through school and university, the English proficiency among fresh graduates overall is lacking. This is supported by different companies and recruitment firms, one of them stated that: *"A downward trend in English proficiency is noted in the last couple of years."*

[10] Other languages are defined here as any other language (including Bahasa/Malay) besides English.

FIGURE 5.26 *Most required hard skills for entry-level and junior executive positions in JobStreet advertisements, Dec. 2015 – June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016

Attitude and Generation-Y

Besides wrong fields of study, lacking skills of graduates, issues regarding attitude were frequently raised. In interviews and focus groups. Recruitment firms often highlighted the complaints of companies about the undesirable attitudes of fresh graduates, belonging to Generation-Y.

According to different recruitment agencies, the generation classified as Gen-Y demands high wages and fringe benefits despite meeting or knowing of the job (description). Many of the fresh graduates apply for jobs without knowing the requirements or job content, as the high average number of applicants of JobStreet advertisements suggests. When they do meet requirements, they often have high demands in fringe benefits and unrealistic expectations in terms of flexibility and working conditions. This behaviour can also be typical in a constrained labour market since there is an abundance of job opportunities. So, Gen-Y behaviour can be a cause for high unemployment rates among fresh graduates but also be a consequence of the tight labour market situation in Penang. Fresh graduates know there is high demand and therefore can afford themselves to behave in this way since jobs are abundant.

The issues concerning the low employability of fresh graduates can be supported by different international benchmarks showing that Malaysia's universities have fallen in international rankings despite generous public funding (World Bank, 2007; Sharifah, 2013).

Altogether, it becomes evident that there clearly exists a mismatch between demand and supply in terms of high-qualified labour. It seems that due to severe brain drain talents are leaving the labour market and talent that remains does not possess the right qualities/skills that are demanded. These findings can be supported by the initiatives done by the State Government in recent years, industry collaborations and growing number private institutions providing skills training. Demands by the market in especially quality are not met by the 'fresh' supply.

5.2. Compartmentalization of the Penang economy and the labour market

In addition to the different mismatches described in previous paragraphs, it has to be stated that the Penang economy can be divided in different clusters featured by different characteristics. Some homogeneous and others more heterogeneous as to firm composition.

As mentioned in chapter two, firms can be categorized into different compartments with specific characteristics. Groups of firms (e.g. compartments) can be differentiated by the following characteristics: foreign/local origin, large/small company size, manufacturing/services sector, technological level or sophistication of activity/operations ranging from high to low. Following these characteristics different groups of firms (compartments) in Penang can be situated within four quadrants presented in figure 5.27. In the upper left corner for example, large foreign establishments (MNC's) operating in the high-tech industry can be situated. On the opposite, small local SMEs which support and supply the large MNCs can be placed in the lower right corner of the figure. Across the four quadrants both MNCs establishments and local SMEs in a variety of industries constitute ecosystems according to industry groups and different levels of technological sophistication. An example of such an ecosystem is the E&E industry in Penang. One of the interviewed training centres mentioned that companies across the entire value chain in this industry are located in Penang. The whole process; front-end to back-end can be found. Within this ecosystem a great

variety of technologies is used and small local SMEs are supporting the large MNCs. Alongside the compartmentalization the Penang economy (as presented in figure 5.27) the labour market divides into different sub-markets, each characterized by different levels of attraction and retention of (qualified) labour (figure 5.28). Therefore, challenges concerning shortages as described in previous paragraphs – both quantitative and qualitative – may be of greater impact in certain sub-markets than in others.

FIGURE 5.27 *Compartmentalization of the Penang economy*

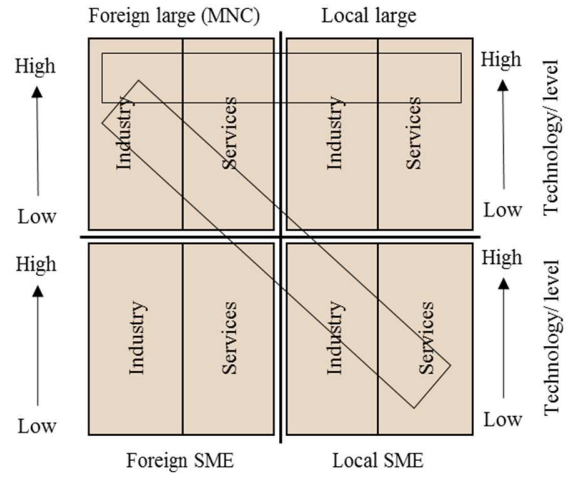
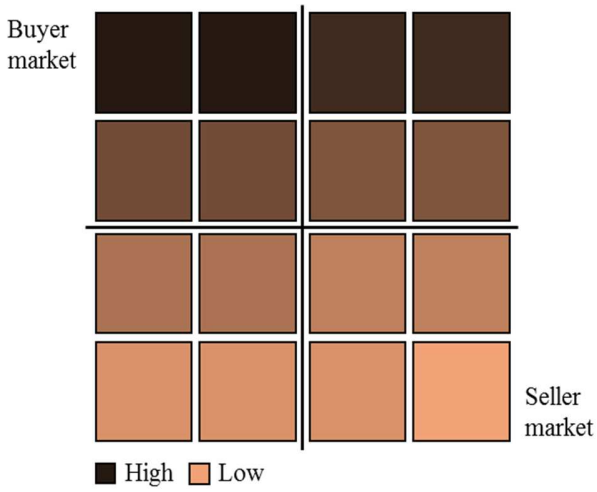


FIGURE 5.28 *Labour attraction and retention*



As described in the theoretical framework of this study, a distinction can be made between buyer- and seller markets. Firms in buyer markets can more or less dictate their requirements regarding new employees since they are preferred employers and therefore have abundant supply. On the other side, employees can influence the terms of employment (to a certain extent) in a seller market.

Looking at the list of Malaysia's 100 leading graduate employers showed that the majority (60%) of preferred companies among 14,000 students in Malaysia are MNCs (gradsmalaysia.com, 2015). Therefore, it is assumed that in the Penang labour market the companies situated in the upper left corner (large MNCs) are preferred employers, thus it is expected that figure 5.28 applies (can be connected) to figure 5.27 in the case of the Penang labour market.

These assumptions were confirmed in several interviews with both firms and recruitment agencies. According to one of the interviewed recruitment firms: *"MNCs are the big winners, they take all the best*

talents". Another recruitment firm stated: *"The model looks fair, MNCs are indeed high in demand among employees because of benefits and wages, SMEs are therefore having problems recruiting"*.

As already indicated by the last quote, it became also evident from interviews that among employees the most important aspects of jobs were salary and fringe benefits. One recruitment firm stated: *"all people prefer jobs in MNCs because of the benefits provided"*. These findings support the idea of MNCs being preferred employers since those companies, on average, have access to more resources than smaller companies and therefore can afford to provide high(er) wages and more fringe benefits. In addition, a study done by Ng et al. (2013) showed that career development and employer reputation have a significant relationship with job selection preferences among students in Malaysia. This was confirmed in interviews as well, both the status of MNCs as career opportunities are expected to be better in MNCs than in SMEs.

However, one of the interviewed SME companies mentioned that employees sometimes prefer SME companies over MNC's because job activities cover the full spectrum and do not focus on only one aspect of the job.

Following these findings, expectation four formulated in paragraph 3.4 is confirmed: Alongside the compartmentalization of the regional economy, differences in attraction and retention of labour exists between different groups of firms. Due to these differences it is likely that labour flow towards the compartment in the upper left corner and companies within this compartment are situated in a buyer market. Within the labour market, it seems like labour moves around quite freely/easily given the various statements on job-hopping and high turnover rates experienced by firms. No evidence for segmentation within the labour market was found.

As mentioned before, companies operating in buyer markets can more or less dictate the terms of employment. Recruitment problems that occur in this part of the schedule have less to do with quantity but more with the quality of applicants. Although MNCs attract most of the talented employees, their hunger for talent remains. Therefore, they expand their recruitment efforts to attract foreign talent. Overall, these companies are in a relatively luxurious position but still have complaints about the quality that is provided.

Several companies stated that a lot of training is needed to get their employees to the right level. One of the companies mentioned: *"six months of resklling and upskillsing is required for fresh graduates."*

However, one has to note that some training is required by companies because of company specific skills which, as mentioned before, cannot always be provided by education institutions.

The movement of labour towards the upper left corner in the labour market is enhanced by the constrained labour market in Penang which entails high labour mobility (figure 5.27). Employees tend to try their luck elsewhere by applying to many job advertisements aiming to improve their position. Due to the attractiveness and upward movement of employees' problems occur in other parts of the ecosystem(s), especially in a tight labour market where labour shortages exist. Within different ecosystem(s) (local) small and medium sized companies are less preferred amongst employees because they are considered as less attractive. They cannot compete with MNCs in terms of wages, fringe benefits and career opportunities. As a consequence of a constrained labour market, they do not only have to deal with a quantitative shortage of qualified labour but also end up with the employees that possess (even) less quality than those who start working at MNCs and thus do not meet their requirements. Since both a quantitative and a qualitative mismatch is experienced by these companies they are more or less forced to accept employees which do not fully meet their requirements and therefore have to lower their hiring standards. In addition, these new employees require a lot of training to get them on the level that is required. When the employees are at the right level it is often stated that the bigger firms poach these employees away and the cycle starts all over again. One of the interviewed institutions indicated that: *"SMEs experience pinching and see their trained fresh graduates leave to MNCs."*

It can be assumed that the SME companies are situated in a vicious circle and the gap between them and MNCs is growing. As a consequence, the Penang economy is heavily reliant on the big MNCs which makes the region vulnerable since MNCs are less involved in local interests and move out of the region quite easily if there are no prospects for them anymore.

5.3. Concluding Remarks

First of all, it has to be acknowledged that the Penang labour market is a constrained labour market where the number of supply does not meet the demand. It becomes evident that a labour shortage exists for low qualified labour which seems to be largely solved by the use of migrant labour. For high-qualified labour the situation is somewhat more complex.

The number of high-qualified labour has been growing steadily in the past decade. At the same time, there seems to be considerable demand for high-qualified labour and companies are having a hard time to fill up all their vacant high-qualified positions, indicating a shortage. This seems to be exacerbated by severe brain drain which is a serious threat to make the transition to a high-income economy.

Although shortages seem to exist, remaining talent is not taken in by the market which is supported by the high unemployment rate among fresh graduates and youth. It becomes evident that due to skill deficiencies, especially in soft and specific skills, supply does not meet the requirements of demand. As a consequence, the labour market is characterized by a lack of high-qualified labour and firms experience both labour and skills shortages.

These shortages are experienced by some firms to a greater extent than others. Within the Penang labour market different compartments can be identified each characterized by a different retention and attraction of labour. It becomes evident that the compartment characterized by large MNCs is preferred among employees due to a pealing brand, higher wages and more benefits offered. Therefore, labour tend to flow towards these kind of companies putting them in a rather luxurious position. They can dictate rules of employment and can pick the best candidates since the majority wants to work for them. However, there was still evidence found that the supply of applicants for these companies lacks certain skills and quality.

Due to these high attractiveness and upward movement of employees issues occur in other compartments, especially in a constrained labour market characterized by shortages. Since SMEs cannot compete with wages and benefits provided by MNCs they are less preferred employers. As a consequence, these companies have a hard time filling all their vacant positions. They are dependent on employees that could not get a job in a preferred compartment. Therefore, they experience both quantitative and qualitative

shortages causing them to lower hiring standards and employ people that do not meet their requirements. These employees require a lot of training and once they reach a certain level it often happens that they get poached by bigger firms.

SMEs are situated in a vicious circle and the gap between them and preferred MNCs is growing. As a consequence, the Penang economy is heavily reliant on the big MNCs which makes the region vulnerable since MNCs are less involved in local interests and move out of the region quite easily if there are no prospects for them anymore.

The general macro picture that is outlined in this chapter can highly differ on different scales within the labour market. It is conceivable that dynamics between different sectors and industries (meso) vary greatly because of differences in attraction and retention, labour mobility flows and heterogeneity within the economy. Even more variety in dynamics can be found on firm level (micro) due to both employee and employer preferences and specific firm characteristics. The next chapter will elaborate extensively on both of these aspects.

6. Micro-perspective: Firms and Skills

Following the macro perspective this chapter takes on a micro perspective. One of the main aspects of this study is to find out whether and to what extent skill gaps within firms exist and also whether firms experience skill shortages. The following paragraph describes the characteristics of firms that participated in this study. It will be described to which industries these firms belong, how their operations can be qualified, what the status of their establishment is and what their size is. The second paragraph goes into the identification of skill gaps, the effects of skill gaps on business performance and strategies that are applied by employers to overcome skill gaps. The same structure will be applied for the third paragraph of this chapter that focuses on skill shortages. Surveys, interviews and focus groups have been used as tools to identify possible gaps and shortages. Skill gaps and shortages are measured with the help of the following indicators (table 6.1).

TABLE 6.1 *Measurement of skill gaps and shortages*

Skill gaps	Skill shortages
• Skill proficiency of employees within firms • The percentage of employees that can be regarded as fully skilled • Skills of employees that need most improvement • Preparedness of employees to carry out new tasks/operations • Training	• Positions that over the past two years have not been filled up • Vacancies that proved hard to fill • The difference of time filling up vacancies for certain positions • The preparedness of fresh graduates and integration of experienced people in relation to business activities • Under hiring • Labour poaching

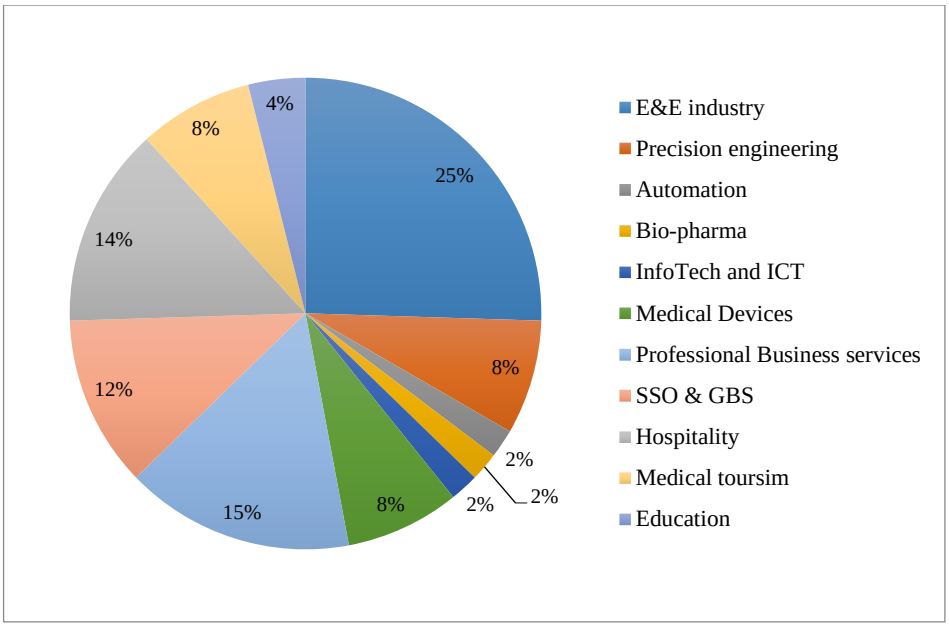
Source: Employer survey, 2016

6.1. Firms' characteristics

In order to be representative this study has conducted a survey among 51 firms across a selection of industries. This paragraph will describe the main characteristics of the firms that participated in the survey.

Firms belong to different industries as their activities are different and industry specific. Figure 6.1 presents an overview of the different industries participating firms are active in. From the figure it can be derived that the largest share of participating firms is involved in activities carried out in the electronics and electrical (E&E) industry (25%). Activities carried out by firms active in the E&E industry for example see upon the design & development and production of Light-Emitting Diodes (LEDs) that convert electricity into light and semiconductors, electrical manufacturing services (EMS), manufacturing and supplying memory and storage solutions and activities that see upon communication solutions. Furthermore, participating firms are most involved in activities carried out in the Professional business service industry (15 %) such as recruiting, auditing and taxation services, the hospitality industry (14 %) and the SSO and GBS industry (12 %).

FIGURE 6.1 *Share of firms per industry*



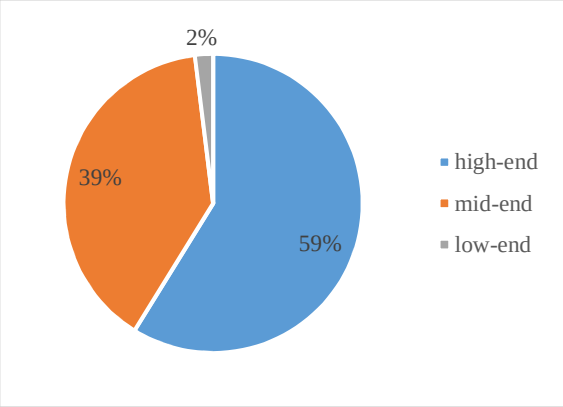
Source: Employer survey, 2016, N = 51

Besides the various activities firms carry out, the participating firms differ regarding qualification of the establishment operations, status of establishment, country of origin and firm size.

Qualification of establishment operations

The operations of participating firms can be classified into three categories; low-end, mid-end and high-end operations. Low-end operations include for example simple assembly activities. Although, many assembly operations have moved to low-cost labour countries firms in Penang still carry out these assembly activities. However, low-end operations not anymore are the main activity of the participating firms. Often assembly activities are a side activity next to other firm activities such as design & development. As figure 6.2 shows firm operations to a very low extent depend upon low-end operations (2 %). Of the respondents 39 percent carry out mid-end operations. These operations among other things include hospitality services, certain manufacturing operations and activities in the professional business industry. The main activities of participating firms see upon high-end operations such as R&D, Design & development, programming, financial activities or clinical operations (59 %).

FIGURE 6.2 *Level of firms' operations in %*



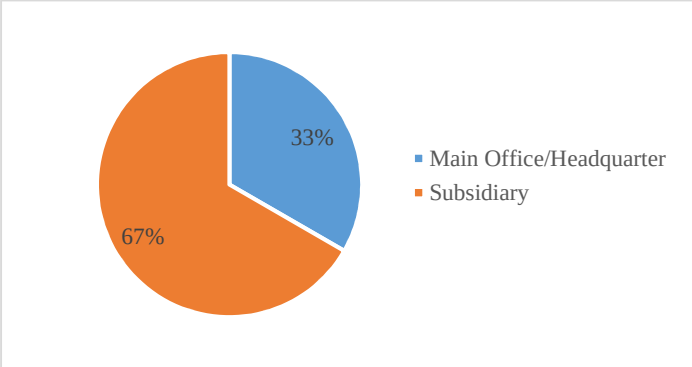
Source: Employer survey, 2016, N=51

Status of establishment

Penang is a manufacturing hub represented by many foreign MNC's that are carrying out activities for over decades. The firms that participated in the survey to a large extent are subsidiaries of MNC's (67 %) and to a lesser extent have their main office/headquarter in Penang (33 %) (figure 6.3). As argued earlier, often subsidiaries of MNC's are more footloose than national companies and move away quicker when other regions are more attractive. Also activities subsidiaries carry out highly depend on mandate they

receive from headquarters. This makes them more vulnerable loosing certain operations or activities. Therefore, Penang should seek to rely more on national companies than on MNC's.

FIGURE 6.3 *Status of establishment by %*



Source: Employer survey, 2016, N = 51

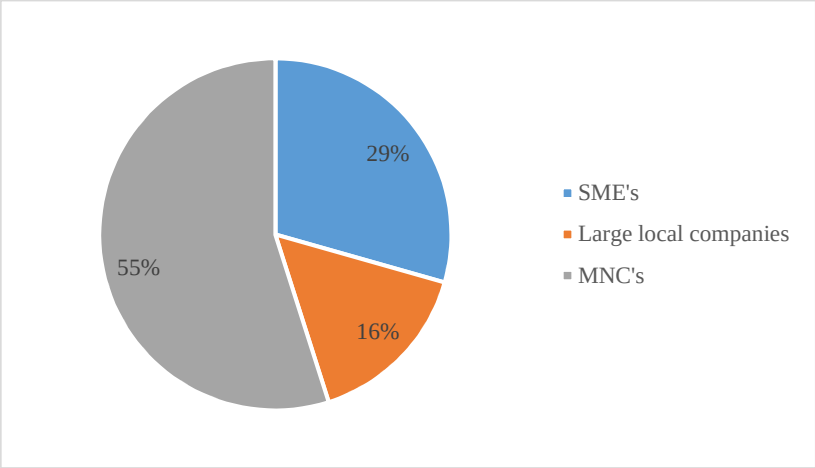
Size of firms

As mentioned earlier firms differ in size. Firms of different sizes experience different difficulties regarding obtaining employees possessing the right skill set. The participating firms can be distinguished into three sizes: Small and Medium-sized Enterprises (SME's), Large Local companies (LLC's) and Multinational Corporations (MNC's). The classification of these three types of firm sizes can be described as follows. In the manufacturing sector a firm is thought to be a SME if revenue does not exceed 50 RM million or the company does not possess more than 200 full times employees. For firms in the service sector and other sectors can be regarded as an SME if revenue does not exceed 20 RM million or the number of employees is not exceeding 75[11]. Of the respondents 29 percent are SME's such as Piktochart, EPS consultants, Cincaria Sdn. Bhd. and Ren I Tang guesthouse. Of the participating firms 55 percent can been seen as MNC (figure 6.4). MNC are enterprises that carry out activities in multiple countries[12]. Many MNC's are contributing to Penang's economy. Participating MNC's for example are Motorola, B Braun, Adventist Hospital and Wilmar. Firms are believed to be LLC's if requirements of being a SME are exceeded and they not carry out activities in multiple countries. Sixteen percent of the participating firms

[11] Development Finance and Enterprise Department (2013) Circular on New Definition of Small and Medium Enterprises (SMEs) [Online] <http://www.bnm.gov.my/files/2013/sme_cir_028_1_new.pdf>
[12] http://www.businessdictionary.com/definition/multinational-corporation-MNC.html

turn out to be large local companies. These include firms such as ViTrox, Alliance contract manufacturing, Ain Medicare, Island hospital and Ixora hotel.

FIGURE 6.4 *Types of firm size in %*



Source: Employer survey, 2016, N = 51

6.2. Skill Gaps

As mentioned in paragraph 2.4.3., skill gaps refer to 'a situation in which current employees lack the skills to perform their jobs which results in the compromised ability of a firm to meet business objectives'. They exist within the firm's labour force and their existence highly depends on the interpretation of employers. The following paragraphs, each try to indicate possible skill gaps within firms of the Penang region.

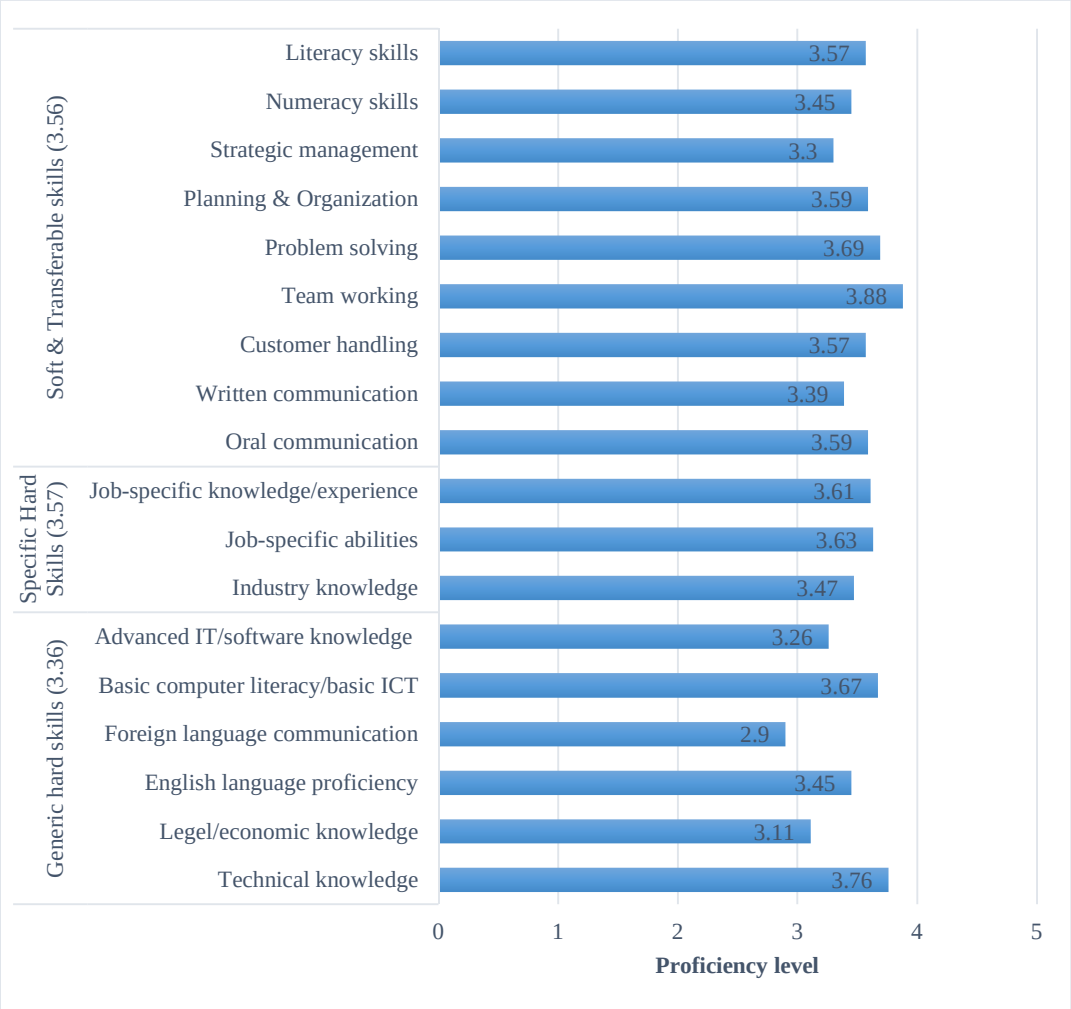
Skill proficiency level of employees

The level of skill proficiency functions as a first indicator for possible skill gaps. As said earlier, in this study proficient is defined as; *possessing and being able to apply the skill as required by the establishment to achieve quality/business objectives*. Employers were asked to rate employees' proficiency level for eighteen skills that have been selected as being important for firm performance. Those eighteen skills can be grouped into three categories (figure 6.5).

Figure 6.5 presents the skill proficiency level of employees for eighteen skills that considerably contribute to firm performance. Firms could rate employees' proficiency level on a scale from 1 to 5; 1:

Very low proficient, 2: Low proficient, 3: Satisfactory 4: Proficient and 5: Highly proficient. Except for the generic hard skill 'foreign language communication', employers on average are satisfied with the proficiency level of the 18 skills high-qualified employees possess. This outcome seems likely; firms need a descent workforce in order to carry out activities reasonably. If employers are not satisfied about their workforce it can be expected that firms perform under average and do not survive. Yet, it is interesting how the proficiency levels vary between certain skills.

FIGURE 6.5 *Skill proficiency level for 18 skills*



Source: Employer survey, 2016, N = 49

The average skill proficiency level was rated highest for 'team working', 'technical knowledge' and 'problem-solving' skills and was rated lowest for 'foreign language communication', 'legal/economic

knowledge' and 'advanced IT/software knowledge. Overall, the proficiency level of 'soft & transferable' (3.56) and 'specific hard' (3.57) skills were rated slightly higher than 'generic hard' (3.36) skills. According to these outcomes firms are more satisfied with the proficiency level of specific hard skills and soft & transferable skills than generic hard skills. However, one should be careful with the interpretation of these outcomes. It can be expected that certain skills contribute to firm performance in a lesser extent than others. As became clear during interviews, right levels of soft skills become more important carrying out firm activities as these activities become more knowledge intensive. The proficiency level of skills functions as a first indicator of skill gaps. Skill gaps are thought to exist if skills of employees are rated lower than proficient. So, this first indicator shows that skill gaps exist. For none of the 18 skills the proficiency level is rated proficient or highly proficient. Therefore, skills of employees within firms need improvement to enhance optimal firm performance

The percentage of employees that are fully skilled

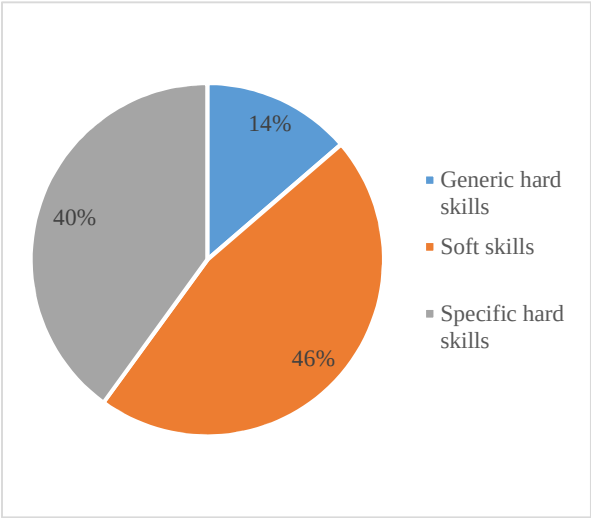
A second indicator of possible skill gaps relates to the percentage of employees that can be regarded as fully skilled. Fully skilled in this context is equivalent to having all the skills in the ideal skill set of employees. Ideal skill sets vary for certain positions. Therefore, positions have different skill-sets. On average employers consider 74 percent of their employees fully skilled. Although it is arguable if employees can be 100 percent fully skilled there is definitely room for improvement in respect to the skill-set of employees.

Skills that need most improvement

In addition, skill gaps within firms can be derived from employers' perception on skills of employees that need most improvement. The respondents were asked which skills needed most improvement. Due to the great variety of skills three types of skills have been distinguished: soft skills, generic hard skills and specific hard skills. The last one is split up into business and technical skills (figure 6.6 & 6.7). The most mentioned type of skill that needed improvement was soft skills (46 %). Soft skills important to employers include; communication (writing and speaking), attitude, motivation,

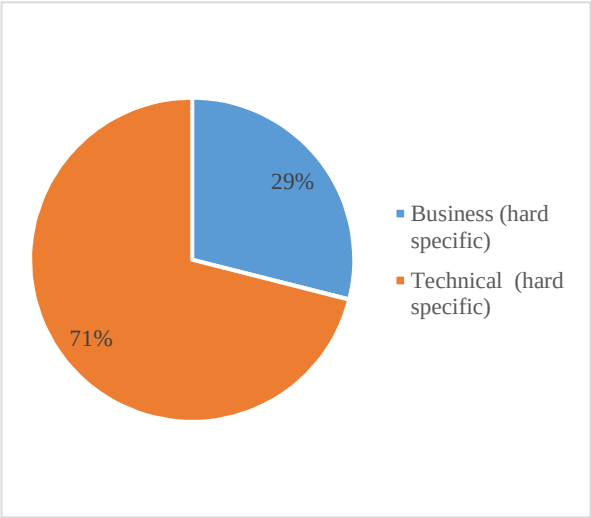
problem solving, critical thinking and presentation skills. This result is somewhat contradictory to the findings about the proficiency level of soft skills earlier on whereby proficiency levels of soft skills were rated quite high. Yet, this can indicate that employers attach great importance to soft skills and specific hard skills and less importance generic hard skills. During interviews it became clear that soft skills of employees indeed are very important to employers. To them soft skills are the bases of successful employees. This corresponds to the results presented in chapter five, soft skills are the most required skills in vacancies. One of the participants stated: *"It all starts with communication, if we do not understand each other how can we perform?"*

FIGURE 6.6 *Skills need most improvement*



Source: Employer survey, 2016, N = 43

FIGURE 6.7 *Specific hard skills that need most improvement*



Source: Employer survey, 2016, N = 43

Generic hard skills (14 %) that considerably need improvement have to do with English language proficiency skills. English skills at the same time can be regarded as soft skills because they are used while communicating (writing and speaking). After soft skills, most mentioned skills for improvement are specific hard skills. Within this type of skill, a difference can be made between business (30 %) and technical skills (70 %). Business skills referred to by respondents primarily include finance, sales and marketing skills. Technical skills most commonly mentioned by respondents include skills in respect to engineering, design, programming, and software development. According to employers, these specific hard skills are crucial in

order to carry out firm activities. During interviews it indeed became clear that most activities of firms are firm specific which require specific hard skills such as knowledge on firm operations.

When distinguishing skills that need most improvement by types of firm size the following conclusions can be drawn. First, for all three types of firm size soft skills need most improvement. The share of soft skills that need improvement is largest for LLC's (70 %) and the least for SME's (46,7 %). As mentioned earlier soft skills are getting more important while preforming more knowledge intensive activities. For example, assembly activities require low levels of soft skills compared to recruitment activities or the design and development of products. Overall generic hard skills of employees within the three types of firm sizes need the least improvement compared to the three other types of skills. An interesting finding regards the improvement of specific hard business skills. This type of skills needs most improvement within SME's (20 %) after soft skills. The percentage regarding specific hard business skills of SME's is high compared to LLC's (0 %) and MNC's (1.9 %). This can be explained by different arguments. First, firms in Penang involved in business activities (recruiting, auditing etc.) are mostly SME's which requires more hard business skills compared to other industries. Second, MNC's often outsource business specific activities or these kinds of activities only make up a small part of firm's operations. However, over the last decade activities of MNC's regarding shared services (accounting, taxation, sales etc.) increased significantly. Technical hard skills for firms in all three sizes need improvement (26.6, 20.0 and 30.2 %). As mentioned earlier these kinds of skills are very important to firm operations but difficult for employees to obtain before entering the firm. Because these skills to a large extent are firm specific it is hard for educational institutions teaching them.

TABLE 6.2 *Skills that need most improvement by firm size in %*

Types of skills	SME's	LLC's	MNC's
Generic hard skills	6.7%	10.0%	15.1%
Specific hard: Technical skills	26.6%	20.0%	30.2%
Specific hard: Business skills	20.0%	0.0%	1.9%
Soft skills	46.7%	70.0%	52.8%
Total	100.0%	100.0%	100.0%

Source: Employer survey, 2016, N=42

An overview of skills that need most improvement is presented in figure 6.8. The importance is based on the frequency of skills mentioned by employers. The larger the skill presented the more it was mentioned by employers. It again turns out that soft skills such as (English) communication, problem-solving, leadership and critical thinking need most improvement.

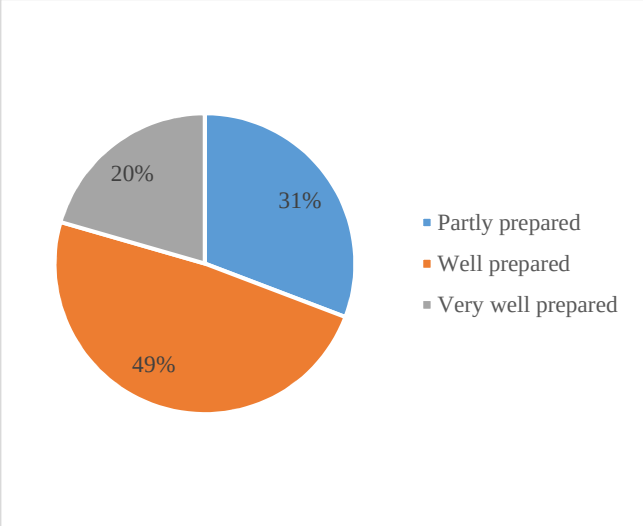
FIGURE 6.8 *Skills that need most improvement*

Source: Employer survey, 2016, N = 43

Preparedness of employees for new tasks

A fifth indicator of possible skill gaps relates to the preparedness of employees to carry out new tasks. Most of the respondents are positive as for the preparedness of employees in carrying out new tasks and operations. Of the respondents, 20 percent thought employees were very well prepared and 49 percent considered their employees to be well prepared for new tasks and operations that emerged over the last two years (figure 6.9). These results seem reliable because as a consequence of evolving technologies, expanding business activities and increasing competition new operations and tasks within firms occur. Firms are aware of these constant changes and therefore it can be expected that employees in general are prepared for new operations.

***FIGURE 6.9** Preparedness of employees for new tasks*



Source: Employer survey, 2016, N = 39

However, of the respondents, 31 percent thought their employees were only partly prepared to carry out new tasks and operations. This outcome can be an indication for possible existing skill gaps within firms. Employees are only partly prepared and therefore do not possess the right skill-set to adapt to certain changes. This means that a substantial proportion of the workforce within participated companies clearly lacks skills.

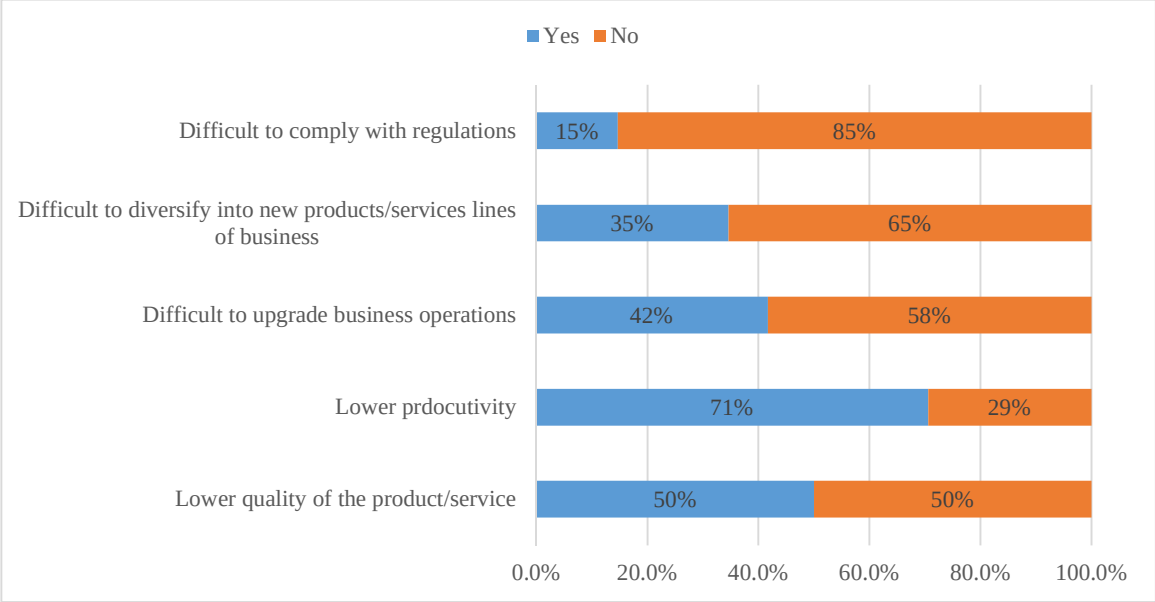
Effect of skill gaps on business

As mentioned in paragraph 2.4.3. on the causes, consequences and strategies of skill gaps, different effects of skill gaps can be recognized. Skill gaps can negatively influence business performance, employee behaviour, lead to increasing operating costs and affect firm's adaptability towards new technologies. Business performance as a consequence of skill gaps can be affected in various ways.

- Lower quality of the product/services
- Lower productivity
- Difficult to upgrade business operation
- Difficult to diversify into new products/services
- Difficult to comply with regulations

Of the respondents 68 percent experienced negative impacts on business operations and output as a consequence of skill gaps. Effects of skill gaps therefore have to be taken seriously as they seriously harm business operations. In order to come up with solutions to mitigate negative effects a closer look is needed as for what those effects precisely inhale. Figure 6.10 presents the main negative impacts experienced by employers.

FIGURE 6.10 *Negative effects on business per reason*



Source: Employer survey, 2016, N = 50

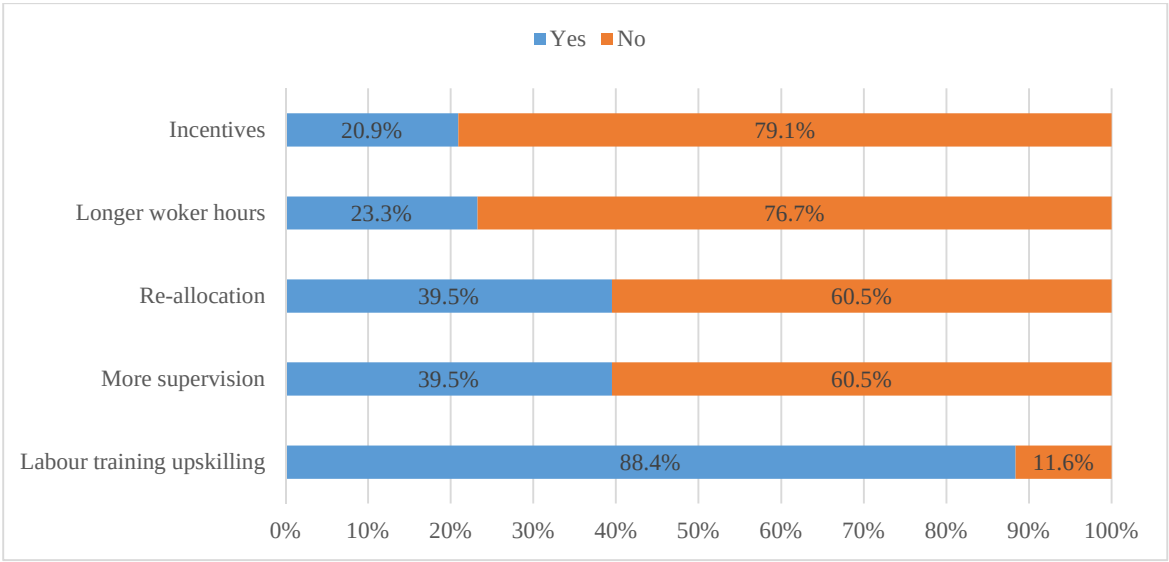
Most experienced negative impact of skill gaps by respondents concerned a lowering of productivity (71 percent of the respondents). It indeed can be expected that skill gaps lower the efficiency of employees and therefore lower productivity. 52 percent of the respondents faced lower quality of the products, 42 percent had difficulties upgrade business operations and 35 percent experienced difficulties diversifying into new products/services because of skill gaps. These findings were confirmed during interviews with firms. One of the participants stated: "*Skill gaps can cause potential delays in meeting customer commitments, or even the quality of the output. In some instances, efficiency is impacted as the experienced associates have to work harder to compensate for those lacking in competencies.*" To a lesser extent firms face negative effects as for complying with regulations.

Thus, skill gaps do exist and seriously influence firm performance. Mitigating skill gaps could increase productivity, improve the quality of products and services and also contributes considerably to the upgrading of business operation.

Strategies applied to overcome skill gaps

Firms apply different strategies in order to decrease negative impacts of skill gaps. Of the respondents 16 percent did not apply any measures to mitigate skill deficiencies. This can be explained due to the fact that some respondents did not face any skills gaps/deficiencies and therefore did not have to apply measures. Also, firms can consider themselves as not being able to mitigate skill gaps because of insufficient funds or lacking organizational capabilities. Yet, 84 percent of the respondents did take measures to reduce skill gaps. The strategies they applied are presented in figure 6.11.

FIGURE 6.11 *Strategies applied by firms to overcome skill gaps*



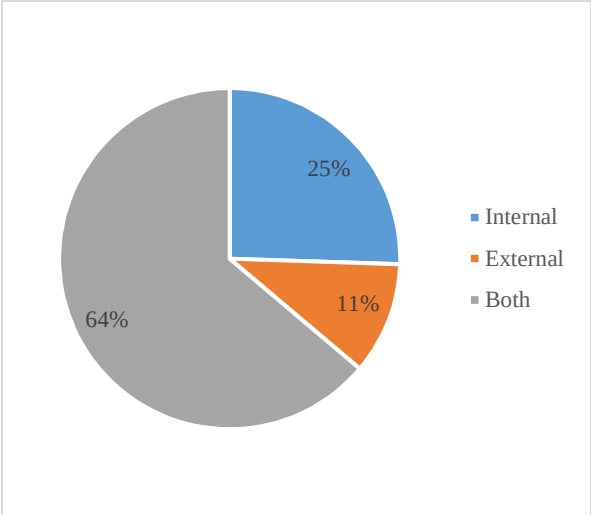
Source: Employer survey, 2016, N = 39

Figure 6.11 makes clear that most of the respondents (88,4 %) are involved in labour training and upskilling programs. Training of the internal labour force has proven to be very valuable to firms, as applicants do not possess firm specific skills. One of the participants stated: *"It is important to provide training. My company should invest more in training. However, we cannot train constantly as employees*

have to work and produce as well." This statement reveals a downside of providing training, as it simply requires time to train employees and therefore costs money

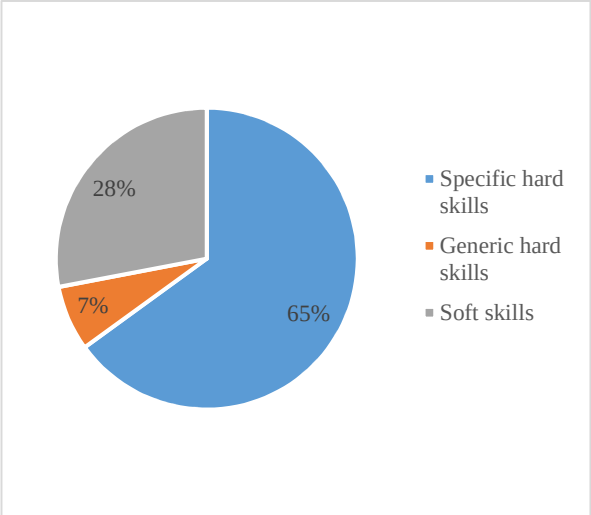
Labour training and upskilling of employees can help firms to operate more effectively. Also new methods and technologies can be taught to improve the quality of products and the productivity of firm operations. Training can be given either internal or external. Internal training includes for example on-the-job training, mentoring and coaching while external training sees upon training outside the firm (skill development centres, online courses etc.). External training providers in Penang are for example; Penang Skills Development Center (PSDC) and Dream catcher (specific engineering programs). Most of the respondents (64 %) provide both internal and external to their employees (figure 6.12). This indicates that the training industry in Penang is an industry where a lot of firms make use of in order to upgrade skills of their employees.

FIGURE 6.12 *Type of training provided*



Source: Employer survey, 2016, N = 38

FIGURE 6.13 *Types of skills provided*



Source: Employer survey, 2016, N = 38

The types of training provided, both internally and externally mainly focus on specific hard skills (65 %) and soft skills (28 %) (Figure 6.13). During oral interviews with respondents it became clear that many of them provide training courses to their employees before employees will start carrying out business activities. This is because business operations of firms within Penang are very firm specific and require a broad introduction of work-practices. This especially applies to MNCs where more complex products and

services are developed. For example, B. Braun is a MNC that manufactures highly specialised medical tools and devices. The skills to manufacture these medical tools are highly firm specific and therefore new employees have to undergo training sessions in their training centre before entering the workplace. One of the respondents stated: *"Our products are firm specific and therefore we have to provide intensive training to our employees"*

The reasoning above explains the outcomes of figure 6.13, whereby 65 percent of training is focussed on specific hard skills, which for a large part are covered by specific firm skills. Many firms within the Penang region produce different products while using various technologies. This results in many firm-specific skill needs.

However, as a consequence of a constrained labour market, labour turnover is high and poaching is a serious threat. This can be a disincentive for employers providing training to employees. Many respondents indeed acknowledge that employees leave the firm for better wages or career opportunities after having obtained training. Although employers know about these negative factors, 84 percent of the respondents declared not being influenced by negative factors. Most employers realise labour turnover is, up to a certain level, a natural process and consider it their duty to train employees. One of the participants stated: *"Eventually we have no choice but to train our employees, it is our duty to train them."* Other participants stated: *'Although we know that employees leave we are not afraid to provide training.' and 'If we not train we cannot upgrade our activities."* However, some participants were influenced by negative influences in providing training. During a focus group with SME's one of the participants stated the following: *"If I invest in my people and they leave and it's a waste of time."* and "*We don't have enough people for backup when people are sent for training."* It indeed can be expected that SME's experience more negative influences than larger firms in providing training.

Other strategies used by employers to overcome skill gaps are; increasing levels of supervision of managers on employees (40 %), the reallocation of employees to positions within the firm that are critic for firm optimal performance (40 %). Also, skill gaps can be mitigated by simply let qualified employees make longer working hours. Yet, this strategy is only used by 23 percent of the respondents. A fifth measure to

overcome skill gaps can be realized through incentives. By providing incentives employers try to reduce turnover rates and retain profcicient workers. This is the least popular strategy among employers (21 %). This is probably due the fact, that firms already are providing incentives and cannot afford to strain financial resources.

6.3. Skill Shortages

Beside skill gaps, firms experience skill shortages. As mentioned earlier, skill shortages, firms experience skill shortages. As mentioned earlier, skill shortages apply to the external labour market of a firm. In chapter 6 (skill) shortages are identified from a macro perspective. As turned out there exists both a quantitative and qualitative shortage for high-qualified labour within the Penang labour market. Therefore, the following paragraphs will provide a view on (skill) shortages from a firm (micro) perspective. From table 6.1 it follows that different measurements have been used in this study in order identify skill shortages.

Succeeding filling up all the vacant high-qualified positions

A first indicator for possible (skill) shortages can be found through vacant high-qualified positions that are not filled up by firms. Of the respondents 51 percent succeeded in filling up all the vacant high-qualified positions and 49 percent did not manage to fill up all positions. This substantiates the findings of chapter six, which stated that there exists a quantitative shortage for high-qualified labour in the Penang labour market. This study grouped all different vacancies, which were not filled up, in the following three categories (occupations); Managers, Professionals and Associate professionals. Managers comprise for instance chief executives, senior officials, commercial and service managers. Professional include for example; engineers, and associate professionals cover technicians, nurses and business administrative associate professionals.

For the three different categories of occupations quantitative and qualitative reasons exist for not filling in vacant positions. These two types of reasons can be subdivided into the six reasons presented in table 6.3. First, manager occupations within firms have not been filled due to high levels of competition from other firms (25 %), skills asked for are too specialized (25 %), insufficient qualification of applicants

(25 %) and to a certain extent to applicant's lack of experience (17 %). As for professional occupations, not filling up vacancies is mainly due employer's demand for skills is too specialized (39 %). These professional occupations mainly consist of engineers and to a lesser extent to business professionals (finance, sales, marketing). Job titles within engineering are for example; electrical-design-engineers, process-engineers, IT-engineers but include also software developers and programmers. Employees in these technical occupations have to possess technical-specific skills such as; IC design skills, programming skills, IT skills and skills in HTML and CAD. Also, high demands of applicants (18 %) and high levels of competition (22 %) are reasons for not being able filling in the vacant positions for professionals. Firms that try to fill up vacancies for associate professional occupations (e.g. junior recruiter, nurses, support engineers and chefs) face problems because of high levels of competition (54 %) and to a lesser extent for due to the demand of specialized knowledge/skills (15 %).

TABLE 6.3 *Reasons not filling in vacant positions by occupation; Manager, Professionals, Associate professionals*

Nature of reason	Reasons not filling in vacant positions	Managers	Professionals	Associate professionals
Quantitative	Too much competition	25%	22%	54%
	Too specialized knowledge/skills	25%	39%	15%
Qualitative	Applicants not sufficient qualified	25%	7%	7%
	Applicants lack experience	17%	7%	8%
	Applicants lack generic hard skills	8%	7%	8%
	Applicants too demanding	0%	18%	8%
	Total	**100%**	**100%**	**100%**

Source: Employer survey, 2016, N = 21

When focussing on firm size regarding positions not filled up as for different occupations the following conclusions can be drawn. Table 6.4 shows that firms, in all three types of firm sizes, have most problems filling up professional occupations. This was expected because being a professional requires experience and a comprehensive skillset. Requirements for being a manager are even more extensive but managers are much less needed compared to professionals. Table 6.4 reveals that of the three firm sizes, SME's face most problems filling up positions at manager level (33.3 %). As argued earlier, for SME's it

is harder to retain employees with experience. Career opportunities and financial incentives are expected to be more attractive in larger companies such as LLC's and MNC's. This can explain why it is hard for SME's to find managers. Occupations such as technicians and service support workers prove to be less hard to fill up by firms compared to professionals and managers. LLC's experience most difficulties filling up associate professional occupations (30.8%) but have less problems filling up professional occupations compared to SME's and MNC's.

TABLE 6.4 *Positions not filled up by occupation for SME's, LLC's and MNC's in %*

Occupation	SME's	LLC's	MNC's
Managers	33.3%	23.0%	8.7%
Professionals	44.4%	38.5%	56.5%
Technicians	0.0%	7.7%	4.3%
Associate professionals	16.7%	30.8%	21.7%
Service support workers	5.6%	0.0%	8.7%
Total	**100.0%**	**100.0%**	**100.0%**

Source: Employer survey, 2016, N = 21

Other interesting findings obtained regarding reasons for not filling up positions when comparing different types of firm sizes. Table 6.5 shows that reasons for not filling up positions for MNC's to a large extent have to do with quantitative reasons (79,2%) rather than qualitative reasons (20,8 %). This outcome can be explained by the successful acquirement by MNC's of top talents from universities. As mentioned before, MNC's are more attractive to fresh graduates (talents) as they can offer higher salaries, more interesting fringe benefits and possess a strong brand name. This enables them to be first in picking out talent. This argument was confirmed by one of the MNC's during an interview: *"The absolute number of talent available is the biggest problem, once you hire fresh graduates you can train and shape them."* Furthermore, employers stated that financial incentives, career opportunities and the brand of company are very important to fresh graduates. SME's and LLC's seem to face difficulties most because of qualitative rather than quantitative reasons. This reasoning is confirmed by table 6.5 where difficulties not filling up positions for SME's and LLC's most occur because of qualitative reasons (58.8% and 64.7%). This finding

indicates, that besides a quantitative shortage in the Penang labour market, the quality of fresh graduates is lacking.

TABLE 6.5 *Reasons not filling up positions by firm size in %*

Reasons	SME's	LLC's	MNC's
Qualitative	58.8%	64.7%	20.8%
Quantitative	41.2%	35.3%	79.2%
Total	**100.0%**	**100.0%**	**100.0%**

Source: Employer survey, 2016, N = 21

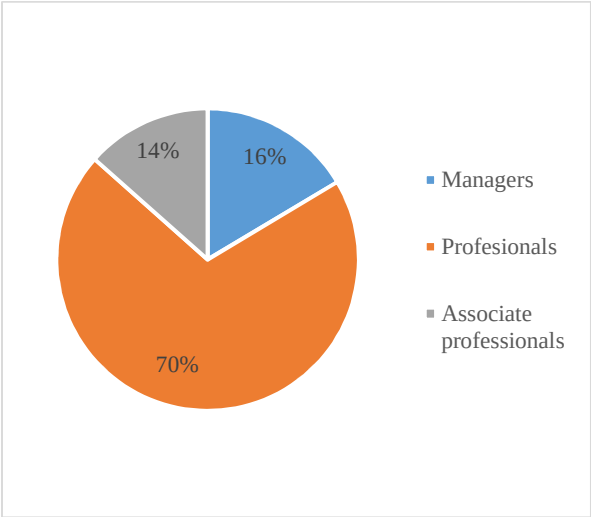
Vacancies that proved to be hard to fill over the past two years

A second indicator that closely relates to the indicator just described can be derived from the number of positions that proved to be hard to fill over the past two years. However, due the great variety of job titles, they are categorized into different occupation groups (according to MASCO, 2008). Figures 6.14 and 6.15 show the occupation and the job position of vacancies that proved to be hard to fill. Among respondents, vacancies that include professional occupations are most hard to fill (66 %). This result seems very likely as professionals are of great importance influencing firm performance and therefore are high in demand. As mentioned earlier, professionals possess a skillset that is very much specialized and requires much expertise. For employees it takes time and experience to obtain such a skill-set. This makes hiring professionals less easy compared to occupations that require lower levels of skills such as technicians or, associate professionals. Also, professionals make up a large part of firms' high-qualified positions. Because of the specific skill set required one would expect managers to full fill a larger part of figure 6.14 (16 %) as their skillset is even more specialized and a lot more experience is required. However, the number of managers needed within firms is limited. You only need one manager to be in charge of a certain part of firms' workforce.

Figure 6.15 provides information on job positions of hard to fill vacancies. It becomes clear that junior and senior executive vacancies prove to be most hard to fill, respectively 30 and 37 percent. Also job positions at manager level proved to be hard to fill (21 %). Vacancies at entry level and senior manager

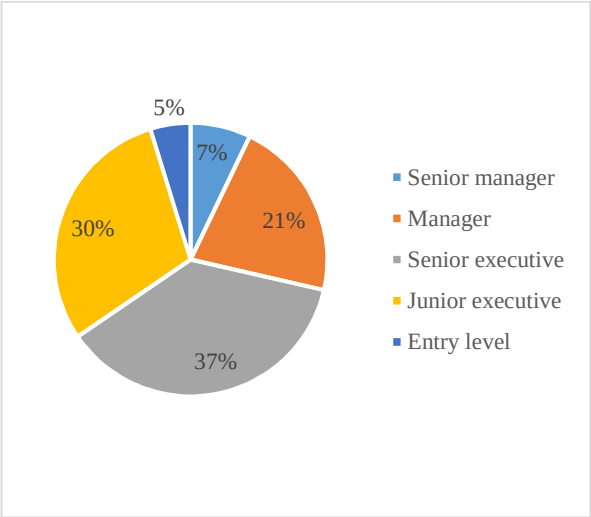
level proved to be less hard to fill, 5 and 7 percent. These high percentages can be explained due the fact that these levels are most needed within firms. The major part of firm's workforce consists of employees working at junior, senior or manager level.

FIGURE 6.14 *Hard to fill vacancies by occupation*



Source: Employer survey, 2016, N = 28

FIGURE 6.15 *Hard to fill vacancies by position*



Source: Employer survey, 2016, N = 28

Figure 6.16 reveals a more detailed outline of the type of occupations and job titles that proved to be hard to fill. The size of the positions displayed depends on the number of firms for which the positions proved to be hard to fill. Occupations and job titles that proved to be hard to fill are for example; engineers (various types), technicians, nurses and hotel-managers.

FIGURE 6.16 *Hard to fill positions*

Source: Employer survey, 2016, N = 28

Length of filling up vacancies

Skill shortages experienced by firms, can also be indicated through the time of filling up job positions. Within firms' certain job positions can take more time to fill up than others. It might be harder to find a candidate for job positions that require experience and specialized skills like IC design skills or programming skills. Of the respondents, 80 percent indeed experienced differences across job positions as for time filling up vacant positions. It turned out that vacancies for junior positions and job positions with a low entry-level take less time to fill up compared to senior positions. Of course one can foresee that it is harder to attract people with job-experience than people without since it can be expected that most of these experienced people already have a job. Also, employers face more competition in attracting experienced people because employees with experience are assumed to contribute to higher levels of human capital and thus influence firm performance more positively.

An interesting finding observed, in relation to time filling up vacant positions, has to do with the occupations and job titles. It turns out that business related job titles such as marketers, salesmen and accountants take less time to fill up compared to technical job titles such as technical engineers, software developers and IC designers. As stated in chapter five, social sciences business related studies are more popular among students in Malaysia than technical studies. This was acknowledged during the focus group with educational institutions. One of the participants stated: "*More and more students choose business related studies over technical studies, as technical studies are considered challenging and possess a boring image.*" The supply of graduates in business related studies is therefore higher compared to graduates involved in technical studies. This can be an explanation for the differences in length of filling up certain vacancies.

Requirements of applicants & preparedness of graduates

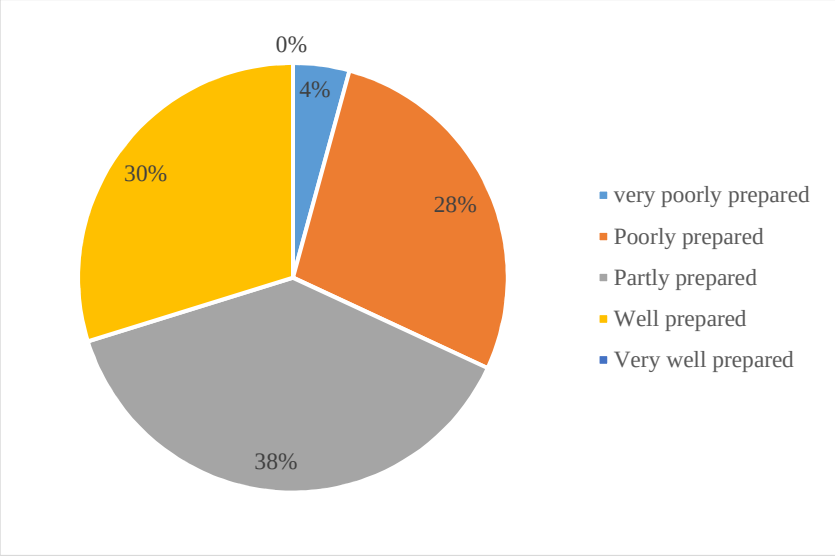
In their search for ideal candidates, firms cannot always find employees that fully meet requirements asked for. Findings show that of the respondents 85 percent does not fill up high-qualified positions with applicants that fully met the requirements asked for in the advertisement. This supports the idea of an existing skills shortage in the Penang labour market as described in the previous chapter. Also,

it can be an indication for recruitment difficulties experienced by firms. On the other hand, firms might include unrealistic requirements in their advertisements. Furthermore, firms were asked what percentage of applicants does meet most of the requirements as stipulated in the advertisements. On average, 57 percent of the applicants did meet most of the requirements.

Another indicator for skill shortages relates to the preparedness of graduates. Figure 6.17 shows that according to employers only 30 percent of the graduates are 'well prepared' to start carrying out activities within the firm. Among respondents 38 percent believed graduates were partly prepared and 28 percent thought they were poorly prepared. These outcomes show that employers are not satisfied with the preparedness of graduates. Skill shortages are therefore likely to exist among graduates in the labour market. This was confirmed in chapter five. Figure 6.18 presents reasons for (very) poorly prepared fresh graduates. Respondents believed that these kinds of graduates were not prepared due to a lack of soft skills (20 %), specific hard skills (19 %) and the lack of English (hard) skills (19 %). As for soft skills, respondents were worried about the level of English of graduates. Also it is believed that poorly prepared graduates miss the right attitude and do not have a strong personality to carry out firms' activities (17 %). During interviews a lot of respondents complained about the generation Y mentality and confirmed the lack of skills among fresh graduates as just mentioned. During a focus group with recruitment agencies firms stated the following: "*fresh graduates have the right qualification but lack soft skills.*" and "*generation-y generally does not know what they want, do not show up for interviews and have unrealistic demands.*"

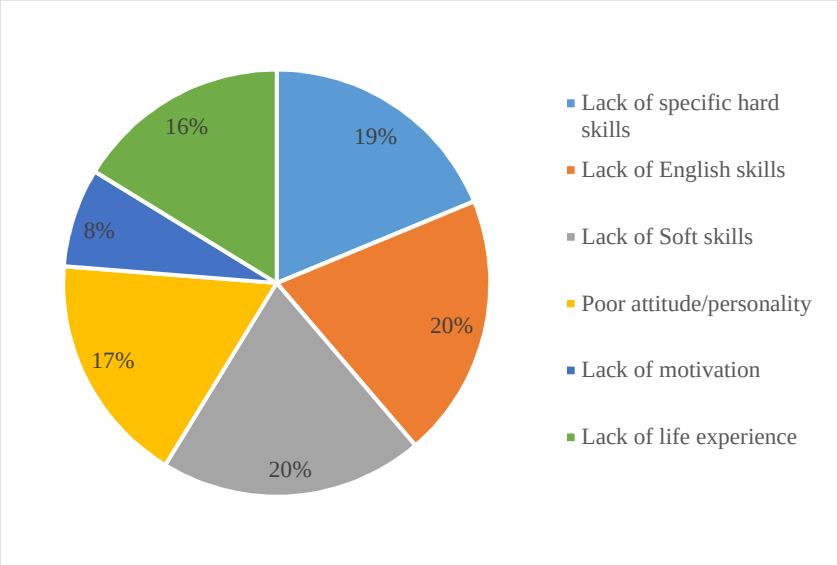
As mentioned in chapter five, Gen-Y is often characterized as being spoiled, not motivated to work and having high-demands. Next to that, 16 percent of the respondents believed that graduates miss life experience in order to start working in a firm. From these findings it can be concluded that skill shortages do exist in the labour market among graduates. Especially regarding soft and hard skills.

FIGURE 6.17 *Preparedness of fresh graduates*



Source: Employer survey, 2016, N = 47

FIGURE 6.18 *Reasons for very poorly prepared fresh graduates*

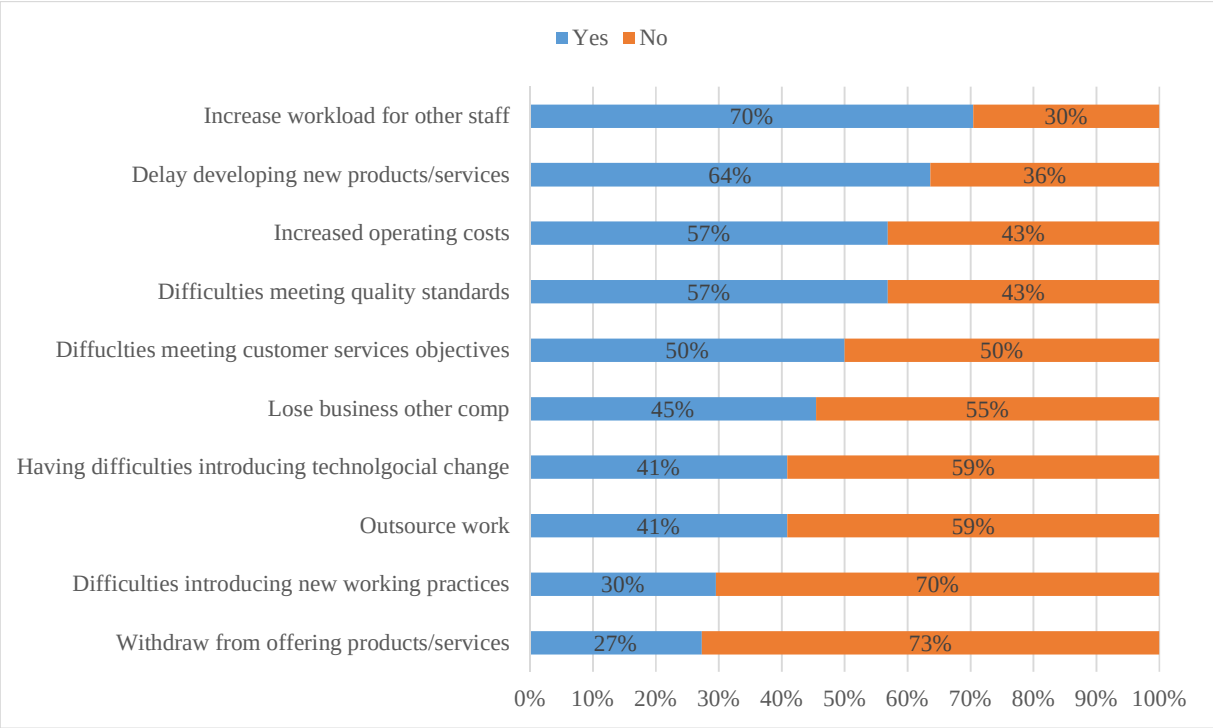


Source: Employer survey, 2016, N = 47

The impact of skill shortages and recruitment difficulties

What becomes clear from chapter 6 and previous paragraphs is that firms experience skill shortages prevalent in the Penang labour market. As mentioned in chapter 2, these skill shortages and recruitment difficulties affect firm operations negatively. In figure 6.19 ten possible impacts have been summed up.

FIGURE 6.19 *Impacts of recruitment difficulties and skill shortages*



Source: Employer survey, 2016, N = 44

The figure shows how employers within the Penang region experience negative effects of skill shortages and recruitment difficulties. The results emphasize that skill shortages have to be mitigated to improve performance of firms in the Penang region. Most respondents faced an increase in workload for other staff because of skill shortages and recruitment difficulties (70 %). Firms operate on continuous basis and absence of employees possessing the right skills in the labour market in some way has to be compensated in order to keep business operations running. This was acknowledged by one of the participating firms: *"Because of absence of sufficient labour available employees have to work harder to meet firms' targets."*

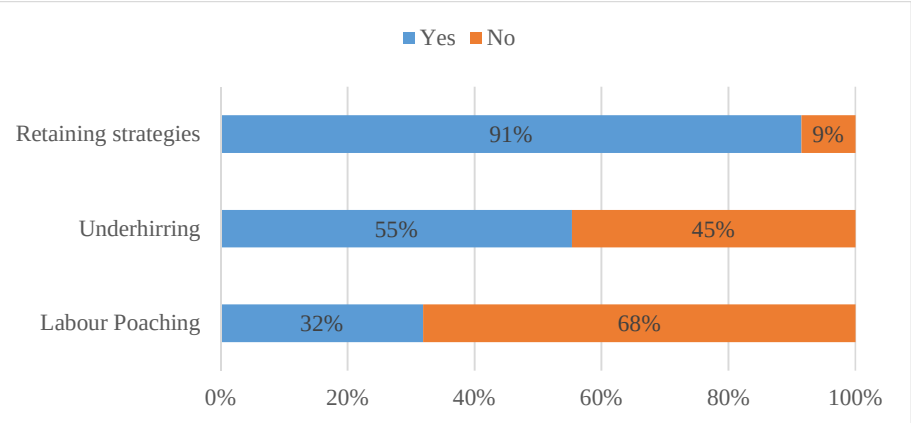
Other impacts experienced by the majority of employers have to do with a delay in developing new products/services (64 %), increased operating costs (57 %) difficulties meeting quality standards (57 %). To a lesser extent shortages have an impact introducing new working practices (30 %) and the withdrawal of offering products and services (27 %). Skill shortages and labour recruitment therefore considerably

influence firm operations in a negative way. Strategies to mitigate these impacts can significantly contribute to better firm performance.

Strategies to overcome skill shortages

In order to overcome experienced skill shortages firms can apply different strategies. As mentioned in chapter 2, strategies commonly used by firms include labour poaching, under-hiring and retaining strategies. Figure 6.20 shows the strategies applied by the respondents. The figure reveals that retaining strategies are used by 91 percent of the respondents. Strategies to retain recently hired employees see upon the offering of interesting remunerations, work conditions, working location and fringe benefits, bonding measures and career development opportunities. From the survey it becomes clear that firms apply a combination of these strategies in order to retain recently hired employees. One of the participants stated: *"Incentives to retain employees could be in terms special outcome/project based bonus and/or restricted share offering. There is also a performance based yearly bonus."* Retaining strategies are used to counter labour poaching activities of other firms and can be seen as defensive strategies but are applied particularly to please employees by providing them career opportunities and future prospects.

FIGURE 6.20 *Strategies to overcome skill shortages*



Source: Employer survey, 2016, N = 47

Of the respondents 55 percent makes use of under hiring strategies. By making use of this strategy firms adapt to the proportions of skills available in the labour market. Under hiring will negatively affect firm performance because firms cannot rely on optimal skill sets needed for optimal results. When hiring

under skilled people, firm's most of the time apply training programs that improve their skill-set and make them familiar with firm specific operations. Especially smaller firms make us if this strategy as they are not able to compete with MNC's in respect to attractiveness, wages and fringe benefits (see paragraph 1.1). During a focus group with SME's the participants stated they were forced to under hire: "*Cream of the crop will be taken by MNC's"* and *"I have to hire under skilled labour, because I have to run my business."*

A third strategy presented in figure 6.20 is labour poaching. By poaching, employers directly approach employees of other firms and try to convince them of a career switch by offering interesting benefits and career opportunities.

The figure reveals that only 32 percent of the respondents are involved in labour poaching activities and that the largest part (64 %) of the respondents does not make use of labour poaching. The reason such a large share is not involved in this activity may be found in the nature of this strategy. Labour poaching is considered as an aggressive measure and therefore is not preferred by many firms. Although many firms consider labour poaching as 'not done', they sometimes feel forced to start poaching as other firms directly approach their employees as well. However, some participants have no problems being involved in poaching activities. One of them stated; *"Labour poaching is part of the game."* As mentioned before, MNC's can rely on more resources compared to SME's and therefore are more likely to succeed in labour poaching activities.

When distinguishing labour strategies by firm size new insights appear. Table 6.6 shows that SME's to a lesser extent are involved in labour poaching activities (15 %) compared to LLC's and MNC's of which 37.5 percent and 34.6 percent is involved in labour poaching activities. During interviews it was acknowledged that larger companies more often are involved in labour poaching activities as they possess more resources and to many are more attractive and therefore could offer employees of other firms interesting offers. During interviews it also was stated that poaching threats were experienced by SME's mostly. From table X it becomes clear that retaining strategies to a large extent are applied by all three sizes of firms, especially for SME's (100 %). The extensively use of retaining strategies by firms, especially SME's corresponds with their negative experiences regarding labour poaching but also has to do with

employees leaving for better career opportunities. From interviews it is derived that most firms are aware of the ambitions of employees. Although firms to large extent apply retaining strategies, most of them see employees leaving for new career opportunities as a natural process. Another interesting finding provided by table 6.6, is the high percentage of under hiring among firms. At least half of the firms make use of under hiring strategies. Under hiring is mostly done by SME's (61.5 %). As argued earlier, in a tight labour market firms that can offer employees not as much as others and in certain ways are less attractive than others are expected to experience more difficulties in acquiring employees possessing the right skills. This might explain the high percentage.

TABLE 6.6 *Strategies to overcome skill shortages by firm size in %*

	Labour poaching		**Under hiring**		**Retaining strategies**	
	Yes	**No**	**Yes**	**No**	**Yes**	**No**
SME's	15.4%	84.6%	61.5%	38.5%	100.0%	0.0%
LLC's	37.5%	62.5%	50.0%	50.0%	87.5%	12.5%
MNC's	34.6%	65.4%	53.8%	46.2%	88.5%	1.5%

Source: Employer survey, 2016, N = 47

6.4. Concluding Remarks

The aim of this chapter was to identify possible skill gaps within firms and shortages experienced by firms. Using different indicators skill gaps and shortages were identified.

First of all, it became clear that skill gaps indeed do exist within firms in Penang. Skill gaps within firms mainly exist because employees lack soft and specific hard skills. During the interviews it became clear that soft skills of employees are of great importance to employers especially because firms are moving towards higher-value added activities, which are complex and require high levels of soft skills. Soft skills frequently mentioned by respondents include; communication, problem solving, creative and critical thinking and leadership. Also specific hard skills of employees are of great value to employers. These kinds of skills primarily consist of industry-, job- and firm specific knowledge. These findings to a certain extent

confirm expectation five formulated in paragraph 3.4. Besides soft skills, skill gaps exist regarding specific hard skills.

Furthermore, skill gaps negatively affect firm performance. According to firms, gaps lower productivity of employees within firms, the quality of products/services and hinder upgrade of business operations. A strategy applied by firms most frequently to overcome skill gaps is training. Training is provided to employees both internally and externally and primarily covers specific hard skills and soft skills. Other measures include reallocation of employees and increasing levels of supervision.

Beside skill gaps, skill shortages experienced by firms were identified. Many respondents were not able to fill up all the high-qualified positions within their firm. This primarily had to do with high levels of competition faced from other employers and high-skills level requirements for positions. Also it turned out that professional occupations are high in demand among respondents, specifically in junior, senior and manager positions. Negative effects that occur within firms because of skill shortages mainly see upon an increase workload of other staff, delay of producing products/services, increasing operating costs and difficulties meeting quality standards. Firms undertake action to mitigate these experienced shortages by applying retaining strategies and under-hiring. Also, firms to a certain degree are involved in labour poaching. Especially MNC's as they offer more interesting benefits. These findings confirm expectation six, stated in paragraph 3.4 as many firm's experience skill shortages. However, expectation seven is only partly confirmed. The majority of firms is not involved in labour poaching but does apply retaining strategies.

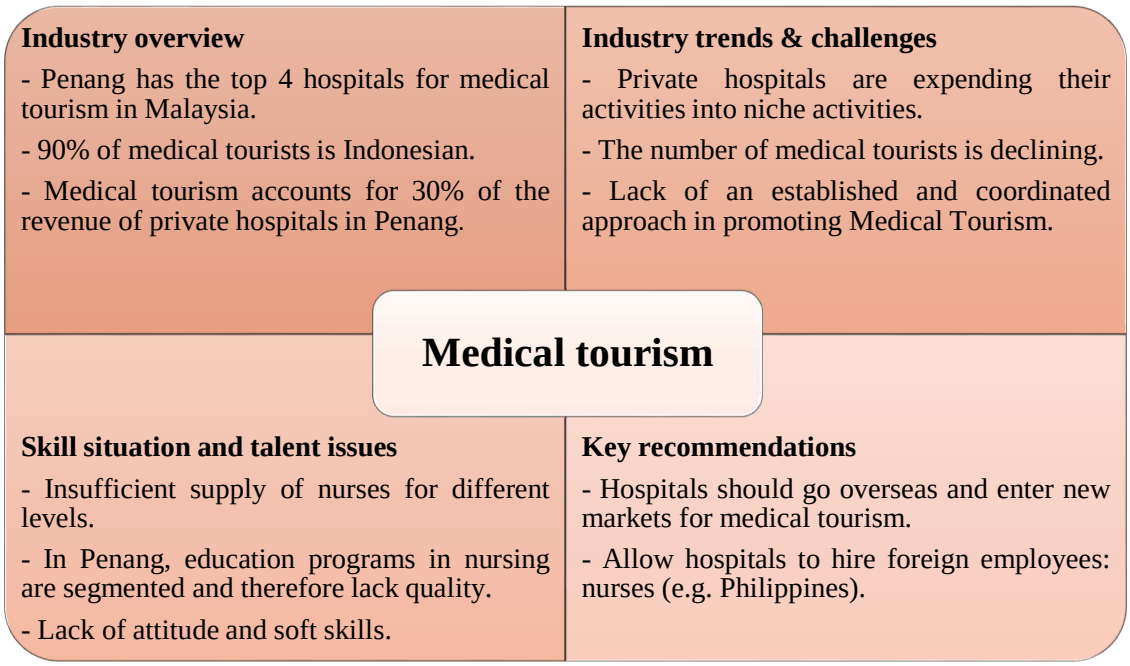
Firms across Penang's industries are moving up the value chain to higher-value added activities. The existence of gaps and experienced skill shortages reveal that firms in Penang are looking for high-qualified labour to carry out firm activities. However, the quantity and quality of supply of high-qualified labour seems to be insufficient. Talent is structurally lacking since applicants do not possess right levels of soft and hard specific skills. Now the question is, how to realize increasing numbers of high-qualified labour possessing the right skillsets in the Penang region.

7. Meso-perspective: Differences Between Sectors and Industries

After having described labour and skill shortages on macro-level and micro-level this chapter focuses on skill gaps/deficiencies and shortages at meso-level. By taking a meso-perspective this study can elaborate on skills situations within certain industries. Previous chapter focussed on the skill situation regarding all participating firms together. In this chapter findings are more specific as it presents skill situations for a certain number of firms that collectively are part of an industry. As set out in paragraph 4.4.2, five industries that significantly contribute to Penang's economy will be examined in more depth. These industries include; medical tourism, professional business services, hospitality, medical devices and the electrical and electronic (E&E) industry. Because the E&E industry in the Penang region is comprehensive a certain sub-industry (semiconductor) will be highlighted. The chapter provides an overview of industry trends, challenges, skills situations and talent issues for each individual industry. Also, key recommendations for each industry will be outlined. The findings are based on existing literature, interviews, focus groups and the analysis from JobStreet data.

7.1. Medical Tourism

FIGURE 7.1 *Characteristics of the medical tourism industry*



Source: Own draft, 2016

Over the last decade Penang has positioned itself as the premier medical tourism hub in Malaysia. Penang accounted for 60 percent of all foreign medical tourists (583,296) visiting Malaysia in 2011. Healthcare providers in Penang are known for offering high quality medical care for reasonable prices compared to other developing and developed nations. Penang has the intention to become even more attractive in providing healthcare by reducing inequalities regarding health care access in terms of income and geography and has established a reputation across Southeast Asia providing quality healthcare (Penang Institute, 2015). It can be argued that the medical tourism industry is in a mature phase characterized by a low number of firms (private hospitals) that provide specific services that require high levels of technologies. According to the industry life cycle model (figure 2.6) presented in chapter two, a next possible phase is the declining phase. Therefore, caution has to be exercised. In order to avoid the declining phase firms should focus on diversification and innovation of services. Due to an aging population in the Asian pacific

it is expected that demand for medical and retirement care will continue to grow. Therefore, growth opportunities are still available for the industry.

The number of foreign medical visitors over the past decades has grown heavily. However, since 2015 the number of foreign patients is declining. During interviews it was mentioned that the decline was caused by the upgrading of healthcare activities in Indonesia. One should take into account that 90 percent of Penang's foreign medical tourists are Indonesian. This high percentage causes Penang's medical tourism industry to be vulnerable. Although, healthcare costs are low compared to Singapore and even Thailand it still faces strong competition from these countries. Both countries provide better customer-service than hospitals in Penang. The healthcare industry in Singapore attracts medical tourists by providing the most innovative technologies and the ability to carry out highly complicated procedures. Thailand on the other hand is popular for its non-urgent aesthetic treatments (Penang Institute, 2015). Another challenge for the Penang healthcare industry is the talent that moves away to countries that can pay double or even triple wages. From interviews it became evident that many nurses go to Singapore and Arabian because of the attractive financial benefits.

During interviews with main healthcare providers in Penang it became clear that skill shortages mainly exist for nursing positions. In general, the demand for nurses is much greater than the supply in Penang. All interviewed healthcare providers admitted that they experienced shortages of nurses, especially senior nurses. The labour market of Penang does not supply enough senior nurses with specific skillsets and experience as they already have a job or work abroad. The demand for this group of nurses is huge among healthcare providers in Penang. Also, demand for junior nurses exceeds supply. The supply of fresh graduates on annually basis does not fulfil industry needs. This shortage of nurses could not be supported by JobStreet. However, this was in line with expectations since many of the interviewees indicated that they rarely used JobStreet for advertising vacancies.

Aside from shortages, it was stated that fresh graduates lack quality. Most of them lack English proficiency skills, which are crucial while communicating with foreign patients. Furthermore, many fresh graduates miss attitude and passion to work as a nurse.

Healthcare providers are as a consequence of skill shortages forced to hire fresh graduates and train them first. Within the Penang healthcare Industry, Adventist Hospital provides upskilling programs in its nursing college. They offer a 15-month conversion program to convert the existing nursing aides to assistant nurses. Healthcare providers acknowledged that their existing nurses attend these upskilling programs in order to upgrade their skills. Skill gaps existing in the workforce of healthcare providers are to a large extent related to soft skills such as interpersonal skills, communication skills and interpersonal skills. Those skills are regarded as important because nurses spend a lot of time with patients. Also, the English proficiency skills turn out to be insufficient. Poor levels of English affect the ability to communicate in a proper way and negatively influences the exchange of thought and ideas with doctors and patients.

Recommendations obtained from interviews aim to overcome industry challenges and experienced skill shortages and skill deficiencies. First of all, the quality of nursing education has to improve. It is argued that nursing education should not be carried out by a broad range of institutions. This widespread of nursing courses across all kinds of institutions negatively affects the quality standards for nursing. Certain qualified institutions should provide nursing education instead. Furthermore, government should allow healthcare providers to attract foreign nurses to fill up (skill) shortages (e.g. Philippines). According to interviewees this improves the quality of medical care significantly and makes Penang's healthcare providers more competitive. To realize growth of foreign patients, healthcare providers in Penang should enter new markets. With help of the state government Penang should be promoted as a healthcare hub providing quality medical care for reasonable prices.

7.2. Professional Business Services

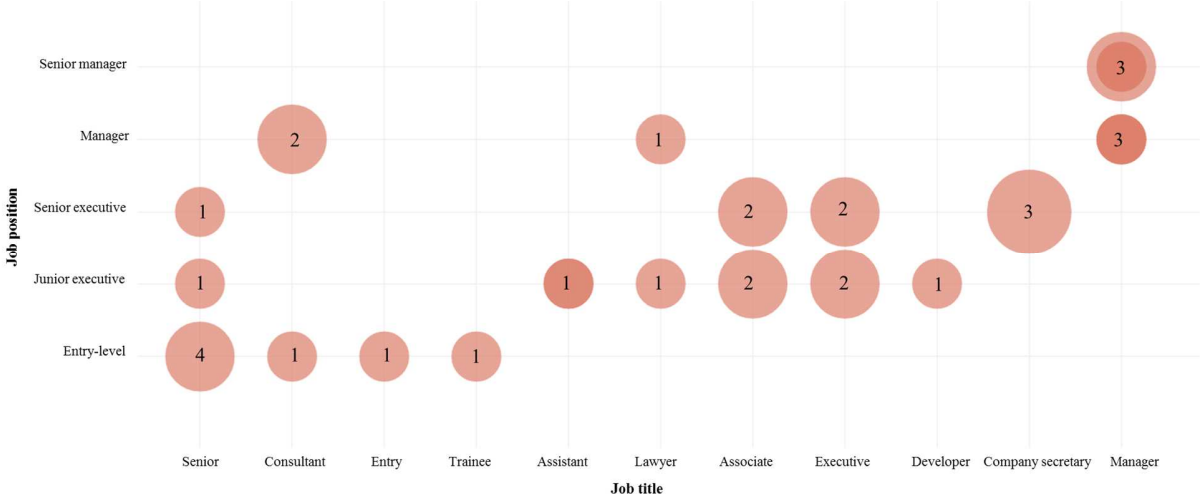
FIGURE 7.2 *Characteristics of the professional business services industry*

Source: Own draft, 2016

The professional business service industry experienced high levels of growth over the last two decades. The industry consists of more than 200 companies that carry out various activities such as auditing, accounting, taxation, recruitment and consulting. Together with the manufacturing sector the business service industry is one of the major contributors to Penang's GDP. Certain parts of the industry are facing high levels of competition others face competition to a lesser extent. Recruitment firms stated that recruiting is a lucrative business but at the same time a competitive market. On other hand, consulting agencies experienced low competition, possibly due to the fact that they operate in niche markets. The industry is still growing; new types of business services are carried out by companies such as shared service outsourcing and global business services. However, these new services can be carried out on different levels and can therefore not always be considered as professional services. Fitting this industry in the life cycle model, it can be argued that the professional business service industry finds itself in a growing phase characterized by many entrants and exits of firms that carry out various activities for different markets. The

variety in activities can also be seen in the variety of most frequent job titles requested by companies in the professional business services industry (figure 7.3).

FIGURE 7.3 *Most frequently asked job titles within the professional business services industry on JobStreet, Dec. 2015 - June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016

Overall firms in the professional business services industry experience labour and skill shortages to a lesser extent than other industries. Yet, it became evident from interviews that senior positions are more in demand and are harder to fill than junior positions. This can also be confirmed when looking at JobStreet data. Figure 7.3 presents the job titles and job positions that were advertised for two months or longer (e.g. persistent vacancies) which can be an indication for hard-to-fill job titles and positions. The size of the bubbles indicates how many persistent vacancies there were in those titles and positions. It appears that persistent vacancies are more concentrated in senior positions (senior executives and managers).

FIGURE 7.4 *Persistent vacancies posted on JobStreet within the professional business services industry, Dec. 2015 - June 2016*

Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016

Furthermore, it became clear from interviews that it is hard to find accountants, auditors, recruiters and consultants at senior and manager level that possess the right skills (leadership, management and experience). This can also be supported by the JobStreet data presented in figure 7.4.

The industry in general experience almost no difficulties in attracting talents and fresh graduates. However, the quality of these fresh graduates according to many is insufficient. Fresh graduates lack job specific skills, English language skills and soft skills such as problem solving skills and communication skills. Also, fresh graduates' demands are high regarding work conditions and they do not have a realistic view on working life.

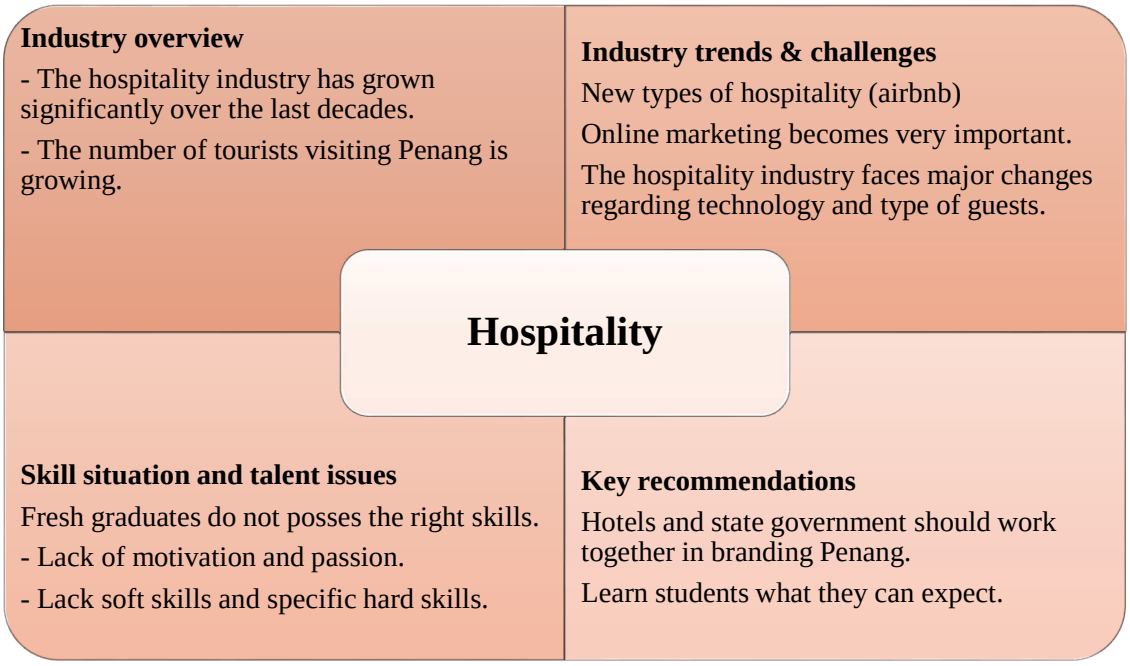
During the interviews it became clear that all firms were involved in training programs. It is important to shape talent to firms' working practices as fresh graduates often lack attitude. This is done through mentoring and coaching programs. Many firms within the industry also provide job-specific training such as accounting and auditing training, training in relation to new regulations and sales training. Also soft skills such as communication and leadership are trained in the industry.

The professional business services industry is growing industry with high levels of competition. Interviewee's recommendations see upon an upgrade of educational institutions in terms of soft skills

among students. Also it is recommended to increase place marketing for Penang to attract more companies to Penang. This will enhance business as professional services highly depend on other industries.

7.3. Hospitality

FIGURE 7.5 Characteristics of the hospitality industry



Source: Own draft, 2016

The hospitality industry in Penang has grown steadily over the last decades. In 2008, the George Town area was enlisted as one of the World Heritage sites which positively affected tourism. As a consequence, the number of tourists visiting Penang increased. An indicator for increasing tourism is the number of international passengers that arrived in Penang airport, in the period 2007-2015 the number of international passengers increased with more than 70 percent (from 1,469,938 international passengers to 2,524,449 passengers). The effect of increasing tourism has a positive effect on the hospitality industry. This effect can be measured by the growing number of hotels and hotel rooms. Between 2011 and 2014 the number of hotels increased from 120 to 172 and the number hotel rooms from 12,302 to 15,137 (Penang Institute, 2015). It can be argued that the hospitality industry in Penang over the last decades reached a mature phase with a certain number of familiar hotels responsible for the supply of accommodation.

However, the industry is evolving towards new types of hospitality. Within the industry new types of hospitality start to rise. The traditional hotels experience increased competition from Airbnb and a growing number of heritage and budget hotels. According to the industry life cycle model; traditional hotels based in Penang for decades are vulnerable to enter the declining phase. New technologies (online booking, marketing) and increasing levels of competition of new types of hospitality force them to change concepts. On the other hand, increasing numbers of tourists make the need to change less necessary. However, when the number of tourists starts declining problems can occur for industry players that not have adapted to current developments.

During interviews it became clear that the industry faces challenges regarding changing guest behaviour and evolving technologies. Guests have different preferences than ten years ago and the type of guests varies now more than ever. Nowadays most people book their hotel via online booking sites. In order to be found online hotels have to work on their brand through online marketing. Because they grow fast, booking sites increasingly start to get control of the market. Hotels do not anymore control flow of guests and therefore become more dependent on online booking sites.

The responses of interviewees as for labour and skill shortages and talent issues were varying. Shortages are experienced to a low extent by 4 and 5 star hotels and to higher extent by 3 star hotels and less. Most shortages are experienced in lower segment jobs and less in higher segment jobs due to the relative number needed. Hotels attract foreign workers to overcome shortages in the lower segments. For mid-end and high-end jobs, the quantity of fresh graduates is available in Penang. In addition, the amount of vacancies found in the hospitality industry on JobStreet was very low. However, this may also be due to way JobStreet is used by the hospitality industry, many interviewees also stated that they do not make use of JobStreet extensively. Following this, almost none persistent vacancies were found in this industry on JobStreet for the period Dec. 2015 – June 2016.

Although the hospitality industry does not face quantitative shortages, yet again, the quality of fresh graduates is lacking. During interviews it was stated that many graduates miss the motivation and attitude to work in a hotel. Also expectations of fresh graduates are misplaced. They expect to be a manager after

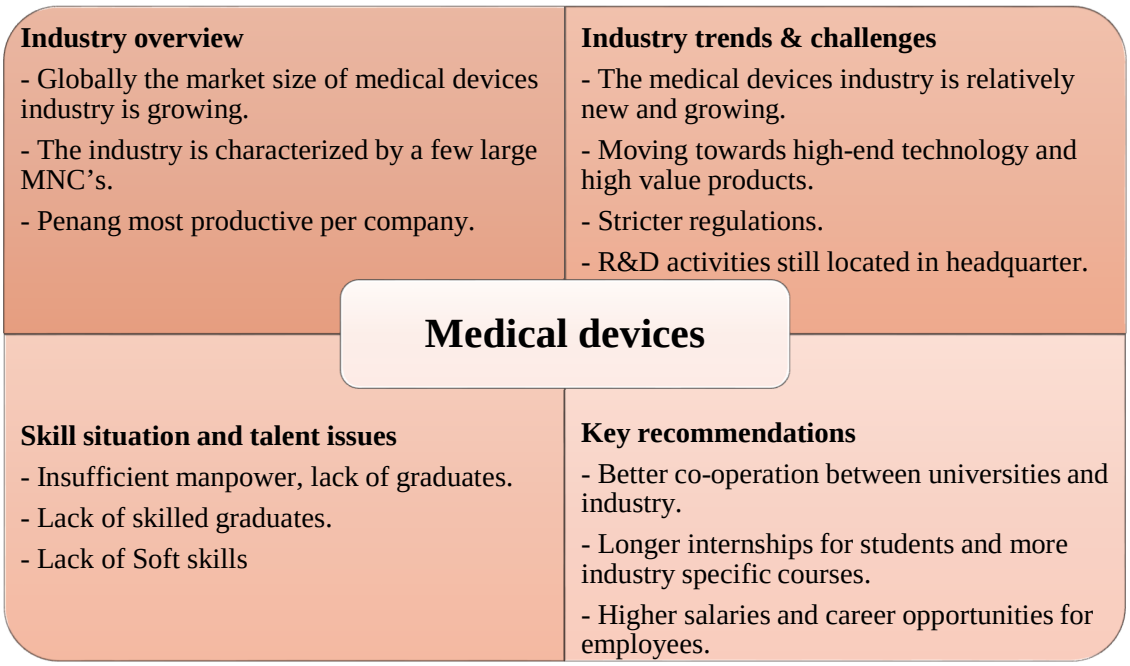
half a year and have high salary demands. Also they leave the hotel industry to work in more financial attractive industries. Shortages for high-qualified positions experienced by hotels include technicians, chefs, managers (F&B, Front office) and marketers. Overall it is hard to find high-qualified people with experience because of high level of competition between industry players.

Within the hospitality industry interviewed firms all provide training to their workforce. Guests are top priority and therefore soft skills are very important. Skill gaps experienced by firms mainly include soft skills such as communication and customer-handling skills and also motivation and passion. As to skill gaps for certain positions, management skills for managers, culinary skills for chefs and customer handling for front office employees can be improved. All interviewed firms provide both internal and external training to their employees. Internal training often includes mentoring programs and training of soft skills. External programs mainly consist of online courses, which focus on hotel practices and safety training.

From the interviews it could be observed that the hospitality industry will be running as long tourists keep coming. Recommendations of interviewees refer to the city branding of Penang. The state government should improve Penang as a brand. The number of direct flights to and from Penang airport can be increased to enhance the number of tourists. Also, state government can contribute to quality of life in Penang by organizing festivals and maintaining the cultural heritage site. According to interviewees education institutions have to prepare students on what it is like to work in a hotel. Students have to realize that they have to work hard and in order to get promotion they have to prove themselves over a longer period of time.

7.4. Medical Devices

FIGURE 7.6 *Characteristics of the medical devices industry*



Source: Own draft, 2016

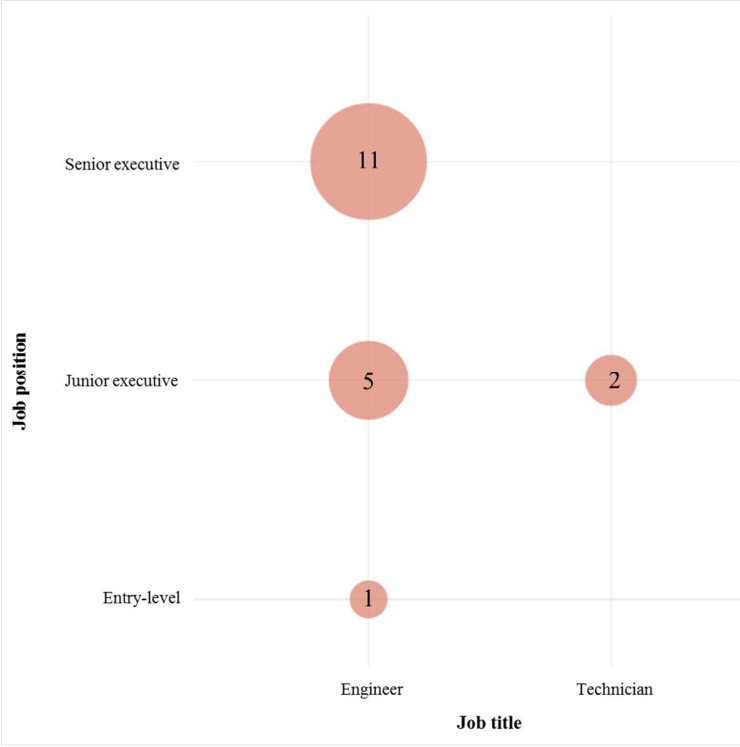
The medical devices industry is relatively young in Penang. The industry consists of around 40 firms and is home to some key medical devices manufacturers that have a lot of experience and are responsible for a large share of the output. (B. Braun, St. Jude Medical and Agilent Technologies). Globally the market for medical devices is growing and so does the industry in Penang. The Penang medical devices industry is upgrading its activities towards more high-end technologies and areas such as orthopaedics and digital imaging devices. However, the main activity carried out in this industry is still labour intensive manufacturing. Also, this industry is heavily invested in, for example in 2009 the industry faced its highest investments each valued at more than RM 100 million (Hutchinson & Saravanamuttu, 2012). To a large extent the industry composition and characteristics corresponds with the growth phase in the industry life cycle, characterized by evolving technologies with many firms that start to experience a 'shake out process' and a high number of investments. Because many MNC's over the last decade settled down in Penang it is expected that this shake out process will not harm the presence of MNC's as they already have more

experience in this industry, carefully decided to locate in Penang and possess the resources to face competition.

Unfortunately, a lot of R&D activities are still located in the headquarters of MNC's. Therefore, a lack of R&D activities exists in this industry. Furthermore, stricter regulations for registration of devices make it harder for companies to carry out activities in Penang. These regulations aim to increase patient safety but complicate firms' operations. Also entry barriers for new companies' increase (Hutchinson & Saravanamuttu, 2012).

During interviews with MNC's it became clear that the medical device industry experiences a lack of skilled technicians and professionals such as engineers and managers. Looking at JobStreet data support this finding. The data shows that that especially engineers (in all job positions) and technicians (in junior executive positions) show vacancies which are posted for a longer period of time (two months and longer) (figure 7.7). This could be an indication of hard-to-fill job titles and positions.

FIGURE 7.7 *Persistent vacancies posted on JobStreet within the medical devices industry, Dec. 2015 - June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016

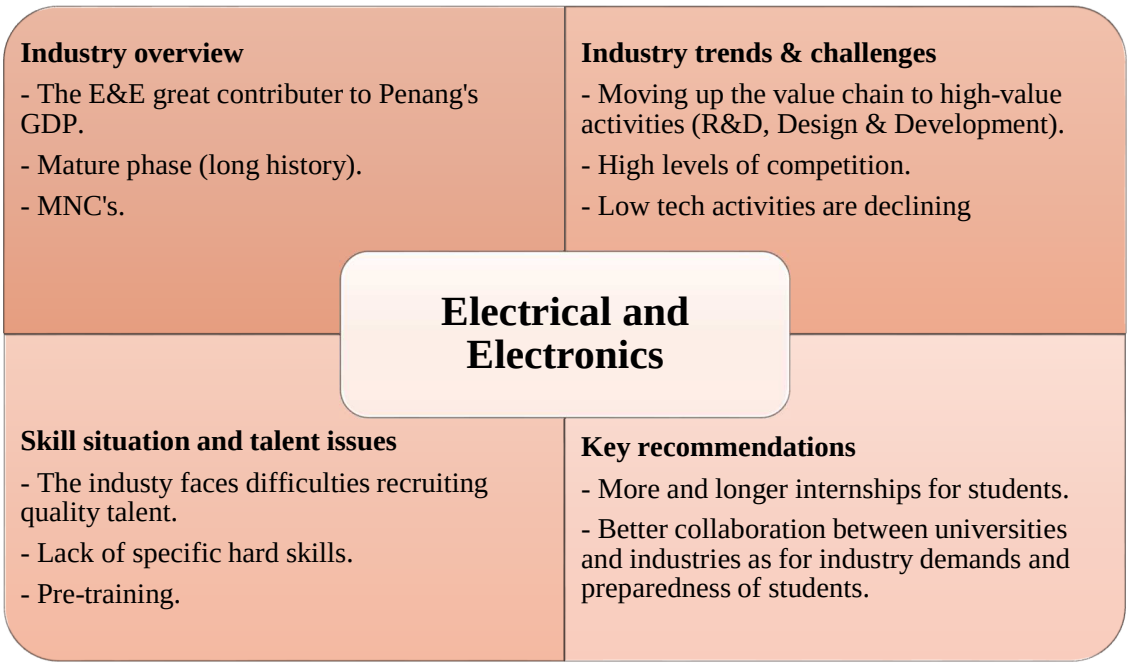
Especially, hard specific skills such as knowledge on high technology medical equipment and machine handling skills are not sufficient available in Penang's labour market. These skills are crucial for companies in order to move up the value chain. Also, it turned out that fresh graduates do not possess the skills to start carrying out firm activities. According to employers they lack specific hard skills (technical skills/knowledge), English skills and soft skills. Applicants that possess skills asked for are often very demanding or choose to work in a different industry.

MNC's interviewed provide training to employees before entering the company and after that on regular basis. Applicants often do not possess the right skill-set to start carrying out firm activities. Skill gaps that exist within firms see mainly upon a lack of English skills, communication and problem solving skills and specific technical skills. The English language proficiency is, as outlined before, an issue experienced by many industries. This especially applies for fresh graduates as the level of English in universities, as shown before, has considerably dropped. Entry-level graduates do not possess technical skills such as machine handling and understanding of operations.

To overcome challenges interviewed persons came up with several recommendations. First of all, they emphasize that the link between industry and universities should improve. Increasing coordination could resolve talent issues and skill shortages. This can be realized through longer internships or modifying the syllabus conform industry skill needs. Firms themselves can provide better wages and career opportunities to overcome talent and skills shortages. This makes it more attractive for future students to study technical courses. A large part of firms' budget is spent on training investments. However, one has to realise that these technical skills are quite firm specific and therefore it is difficult to teach them in higher education institutions already.

7.5. Electrical and Electronics Industry

FIGURE 7.8 *Characteristics of the electrical and electronics industry*



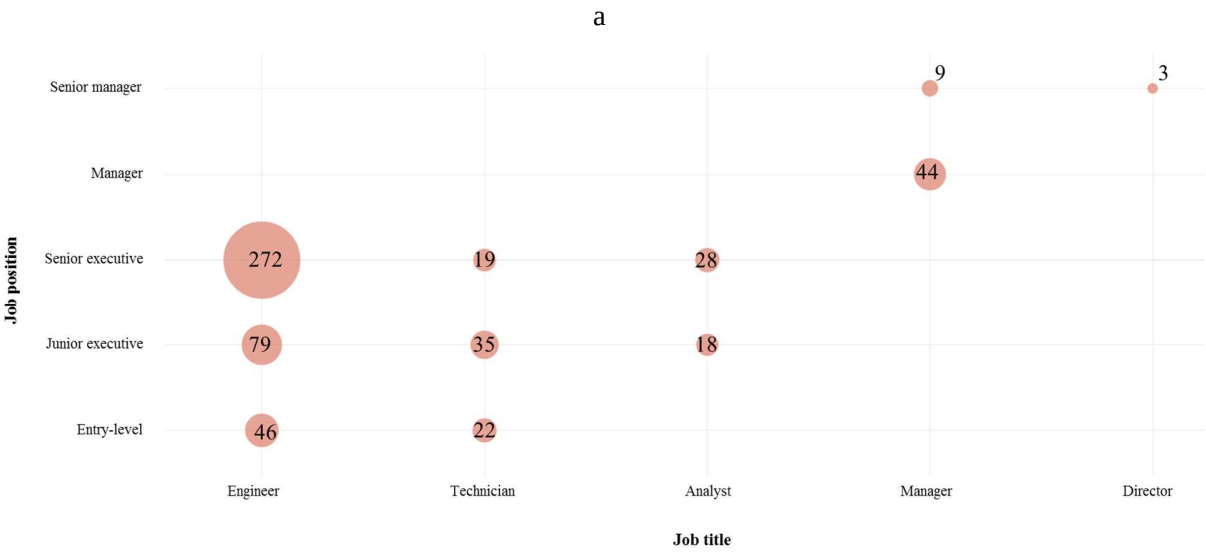
Source: Own draft, 2016

The electrical and electronics industry (E&E) is a main contributor to Penang's manufacturing sector. As mentioned in chapter three the manufacturing sector is next to the service sector responsible for Penang's GDP. The E&E industry has a long history in Penang since E&E firms started to establish in the earlier 1970s. The industry in Penang consists of the following sub-industries: Industrial electronics, semiconductors, computer hardware, consumer electronics, data-/telecommunication, opto-electronics, Light Emitting Diodes (LEDs), magnetic optical recording and Electrical Manufacturing Services (EMS). Over the last four decades' activities within the industry have evolved from low-tech manufacturing activities towards more high-tech manufacturing activities. It can be argued that the E&E industry has reached a mature phase in the industry life cycle with large MNC's carrying out activities that are characterized by economies of scales. The industry is experiencing high levels of competition from other Asian countries. Already, to some extent low-tech manufacturing activities have moved to low-income countries. Therefore, it is important that firms in Penang's E&E industry keep upgrading to high-value

added activities such as R&D and design & development. If they do not, the E&E industry might enter a declining phase.

In order to enhance attracting high-value added activities towards Penang it is important that enough talent is available in the labour market which can contribute to these activities. As becomes evident from figure 7.9, the most frequently asked job titles posted by companies (in the E&E sector) on JobStreet are engineers and technicians.

FIGURE 7.9 *Most frequently asked job titles within the electrical and electronics industry on JobStreet, Dec. 2015 - June 2016*

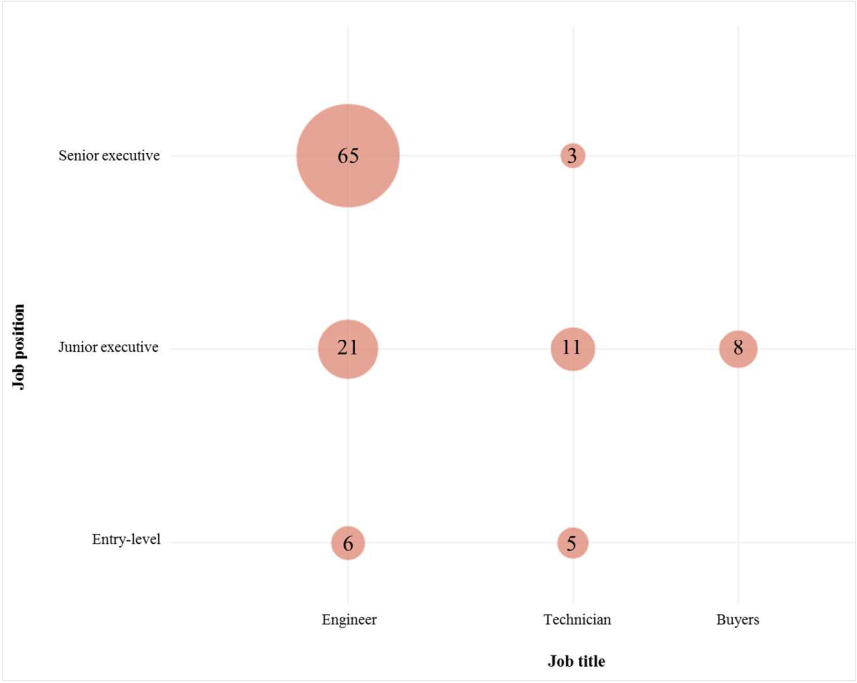


Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016

In order to meet this demand, different initiatives such as CREST (Collaborative Research in Engineering, Science and Technology) aim to support talent development and match talent to positions in the E&E industry. Yet, upgrading into high-value added activities seems difficult as the supply of talent is insufficient. Figure 7.9 points out that the most frequently asked job titles (engineers and technicians) in vacancies also seems to be open for a considerably long time. Companies within the E&E industry advertise most persistent vacancies for engineers and technicians on JobStreet, especially for senior executive positions (figure 7.10). Persistent vacancies can indicate that these positions are hard-to-fill. This is supported by interviews with different companies which stated that there is especially a lack of electrical

engineers in R&D engineering and product development engineering which is problematic for upgrading the industry.

FIGURE 7.10 *Persistent vacancies posted on JobStreet within the electrical and electronics industry, Dec. 2015 - June 2016*



Source: Authors analysis of obtained JobStreet data, Dec. 2015 – June 2016

Next to that, the labour market lacks well-trained and skilled talent. During interviews it turned out that fresh graduates often lack hard skills; basic technical skills, computer science skills and specific hard skills: programming, engineering (chemical, process), design skills and process development skills. Those that possess the right skillset are likely to go for international opportunities, as there exists worldwide demand for technical engineers.

Before fresh graduates start to carry out activities in the company they undergo a training period where hard and specific hard skills are trained. Skill gaps identified during interviews with firms include specific hard skills such as technical skills and design skills and soft skills like problem solving and interpersonal skills. Training is provided by all firms interviewed and to a large extent exists both internally and externally. Both see mainly upon technical training. Important external training providers are PSDC (public) and Dream catcher consultants (private).

In order to overcome industry challenges different solutions were put forward. Because high-value activities within firms require specific hard skills it is proposed to intensify internships of students. This enables them to become more familiar with industry and firm working practices. Also education institutions (universities) and firms active in the industry should increase co-operations to enhance the preparedness of fresh graduates. As said before, one has to realise that these technical skills are quite firm specific and several education institutions stated that they experience several difficulties in learning those skills demanded by the industry.

Semiconductor industry

A large sub-industry within the E&E industry is the semiconductor industry. This industry includes some large MNC's that carry out technically advanced activities. As mentioned in chapter 3, over the last decades simple assembly operations evolved into high-value added activities such as design & development of products and R&D. In the semiconductor industry different activities of key players can be identified (table 7.1).

TABLE 7.1 *Firms active in the semiconductor industry*

	Company	Activities
1.	Osram	• Development and manufacturing of Light-Emitting Diodes (LEDs) • LED package development • LED wafer fabrication
2.	Intel	• IC test development • IC package development
3.	Lumileds lighting	• Development and manufacturing of Light-Emitting Diodes (LEDs)
4.	Globetronics	• Manufacturing of Light-Emitting Diodes (LEDs)

Various MNC's that have carried out activities in the semiconductor industry left Penang because other regions where more attractive in respect to labour costs (e.g. Fairchild). Yet, MNCs stated above decided to upgrade their activities towards higher value added activities. For these firms it is difficult to leave Penang as operations are highly integrated. During an interview with Osram it became clear that design & development and production regarding LED lasers are closely linked. Therefore, their production operations cannot simply move to low-cost countries. The knowledge intensive operations these companies

carry out require high levels of human capital. In interviews with participants it was mentioned that the supply of technicians and engineers is insufficient. In order to continue the evolution of activities firms need employees with specific skills such as: IC designing, programming, software developing and engineering (e.g. product and process) skills.

The absence of these kinds of skills in the Penang labour market makes it harder for firms to upgrade activities subsequently. As a consequence, firms might lose authority and mandate to carry out certain activities. This became clear in an interview with Intel. The Penang branch of Intel is slowly moving away from activities as for the production of semiconductors. In 2001 Intel cut off a large part of its production operations. Although these operations have to be qualified as low-end it discourages the evolution into more value added activities. Instead Intel decided to implement SSO activities that now make up one third of the activities carried out in the Penang branch. Developments like these should be alarming to Penang's State Government. SSO activities are easily transferable to other branches of companies worldwide. The ecosystem that is created over decades regarding the semiconductor industry is one of Penang's unique selling points. In order to retain this quality Penang should undertake action in respect to the supply and quality of talents available.

7.6. Concluding Remarks

Based on the in-depth analysis of the above five industries different conclusions can be drawn. First of all, firms in all industries need employees with experience at senior or managerial level. For especially these positions supply is lacking. Second, some industries face skill shortages and talent issues to a greater extent than others. According to literature skills shortages are occupation and industry specific (MAC, 2008). Industries active in the service sector in general face less difficulties filling up positions compared to industries in the manufacturing sector. For example, the professional business services, hospitality and the healthcare industry do not experience big recruitment challenges compared to the E&E and medical devices industry. For a large part this can be explained by the supply of fresh graduates and the attractiveness of firms within certain industries. As outlined before, students nowadays prefer social,

economic studies over technical studies. As a consequence, the supply of fresh graduates is lager for industries in the service sector than for industries in the manufacturing sector. Another factor influencing the supply of labour is attractiveness of industries. As mentioned in chapter two, employees are attracted to certain firms and industries (Turban et all, 2001). The professional business industry is such an attractive industry because it consists of firms with status (Deloitte, KPMG etc.) which offer attractive working conditions. During an interview with PwC (PricewaterhouseCoopers) it was acknowledged that firms within the professional business services industry have the image of a vibrant industry where promotion and salary raises are very common. These factors influence employees' preferences. On the other hand, an industry within the service sector such as the healthcare industry does not possess this vibrant image of high salaries and famous firm brand names. By interviewees it was stated that fresh graduates feel less attracted to industries in the manufacturing, because they possess a more 'boring' image. Being a technician or engineer is not considered as 'sexy'. Also, within the manufacturing sector itself, certain firms also have higher levels of attractiveness than others, the next chapter will elaborate further on these differences. A third factor that can explain that services industries face lower levels of skill shortages and talent issues can be explained by transferable hard and soft skills. During an interview with a recruitment firm it was mentioned that for consultancy positions within the firm an employee with specific industry knowledge and soft skills was preferred. High-qualified employees from the E&E industry were attracted to improve the industry knowledge base of the internal labour force. So, in attracting skilled labour, firms within the professional business services industry also attract labour from the manufacturing sector. Specific industry knowledge of employees working in the E&E industry is essential for consultancy agencies to be competitive. At the same time, it is less likely that firms in the E&E industry attract consultants from the service sector to fill up shortages in engineering. Therefore, it is easier for certain industries to attract labour as a wider variety of skill sets can be of value than industries which are heavily reliant on industry-specific skills. In literature it is argued that especially in tight labour market labour mobility between industries is higher for jobs that are skill-related. Skill relatedness can stimulate mobility between certain

industries/occupations and can be determined based on cross-industry labour flows (Wixe & Andersson, 2015). Therefore, expectation eight, as stated in paragraph 3.4, is confirmed.

A third finding concerns the importance of different type of skills across industries. Firms experience different skill gaps and needs across different industries. In literature it is indeed acknowledged that skill gaps differ across industries (Lindorff, 2011). Findings in this study show that industries within the service sector are to a large extent reliant on soft skills compared to industries in the manufacturing sector where specific hard skills are more important. For example, health care providers need nurses who possess soft skills that are of great importance in providing medical care. In the business services industry skills gaps are mainly experienced for soft skills such as communication, customer handling and leadership. On the other hand, skill gaps in the E&E and medical devices industry are more related to specific hard skills such as technical skills and different kind of engineering skills. This is in accordance with in literature. In paragraph 2.3 it is acknowledged that service activities contain higher levels of heterogeneity than products manufactured in the E&E industry. Therefore, employees in service sectors are more dependent on the soft skills than employees in manufacturing industries (Buckley, 1992). Also employees in service industries are more in contact with clients than employees in manufacturing industries, which requires mainly soft skills.

8. Conclusion and Recommendations

This study focuses on the labour market of Penang. The aim is to find out whether Penang and its businesses possess the right level of human capital to make the transition out of the middle-income-trap into a high-income economy. Subsequently, the following research question was formulated:

> ***To what extent does the state of Penang and its businesses possess the right level of human capital, and can they contribute to make the transition out of the middle-income-trap into a high-income economy?***

Over the last decades' low-tech manufacturing activities of firms in Penang started to diversify into higher value-added activities such as R&D and design and development. Besides the evolution of activities in the traditional manufacturing sector, firms in other industries started to settle down in Penang and to carry out knowledge intensive activities (SSO activities, professional business services etc.). In order to carry out activities firms need right levels of human capital. An important aspect of human capital entails skills of employees. The right skillset of employees determines, to a great extent, the performance of firms.

As mentioned before, the labour market of Penang is viewed on three different levels; macro-, micro- and meso-level. Therefore, this study answers the research question from three different perspectives. Alongside this trichotomy, different sub-questions were formulated and together constitute an answer to the research question. The corresponding sub-questions are presented and answered below.

Macro-perspective

1. *How can the current labour market dynamics/conditions in Penang best be described?*
2. *Do there exist skills shortages in the Penang labour market?*
3. *What are the types of skills that are high in demand in the Penang labour market?*
4. *Do particular compartments within the regional economy experience labour and/or skills shortages to a larger extent than others?*

From a macro-perspective it has to be stated that the Penang labour market can be characterized as an overall constrained labour market where demand outstrips supply and labour shortages exist. Shortages in low qualified labour are for a great part solved by the use of migrant labour.

The supply of high-qualified labour has been growing steadily over the past decade. At the same time, demand remains high and firms are not able to fill up all their high-qualified vacant positions, indicating a labour shortage for high-qualified labour. This shortage seems to be exacerbated by severe brain drain, which can be considered as a serious threat to make the transition to a high-income economy. Whereas talent migrates overseas for better job opportunities, remaining talents appear to have difficulties finding a job given the high unemployment rate among graduates and youth. This seems to be the result of low employability, wrong fields of study and attitude. It appears that in addition to labour shortages also qualitative shortages exist due to skill deficiencies, especially soft- and specific hard skills are lacking among employees. At the same time, it becomes evident that precisely these types of skills are most requested in vacancies advertised by companies within in the scope of this study. As a consequence, the Penang labour market is not only characterized by labour- but also skills shortages.

Some firms experience shortages to a greater extent than others. Within the regional economy different compartments can be identified each characterized by a different retention and attraction of labour. It becomes evident that large MNCs are considered as preferred employers among employees due to a pealing brand, higher wages and better benefits offered. Therefore, labour tends to flow towards these kinds of companies putting them in a rather luxurious position. Although they absorb most of the talents within the market their (mainly quantitative) needs are still not fully meet. Therefore, MNC’s also look for talent from abroad. This is also due to a lack of quality and skills supplied to them.

As a consequence of high attractiveness and upward movement of employees, issues occur in other compartments, especially in a constrained labour market characterized by shortages and high labour mobility. Since SMEs cannot compete with wages and benefits provided by MNCs they are less preferred employers. Therefore, these companies experience labour and skills shortages to a larger extent than the preferred employers. They are mainly dependent on ‘left over’ employees that could not get a job in a preferred company which forces them to lower hiring standards and employ people that do not meet their requirements. These employees require a lot of training and once they finally reach a certain level it often happens that they get poached by bigger firms.

Micro-perspective

5. *Do firms experience skill gaps and shortages?*
6. *What (recruitment) strategies do firms apply to overcome possible skills shortages?*

From a micro-perspective, this study shows that most firms, although to different extents, experience skill shortages and skill gaps. Many firms are not able to fill up all their vacant positions, especially senior and manager positions. Occupations that turn out to be most hard to fill relate to professionals and manager positions. Technical job-titles in engineering and programming are high in demand. Following this, skill shortages experienced by firms mainly relate to specific hard skills such as IT skills (HTML, CAD), design skills (IC design) and engineering skills (software, electrical). Furthermore, job-titles such as nurses (soft skills) and technicians (specific hard skills) are in high demand. Strategies applied by firms to overcome these skills shortages mainly see upon retaining strategies: offering certain benefits and providing career opportunities. Also under hiring is a commonly used strategy. To a lesser extent labour poaching strategies are applied to overcome skill shortages. As for skill gaps the following is observed: Skill gaps within firms exist mainly because of a lack in soft skills and specific hard skills. These soft skills include communication, problem solving, creative thinking and leadership skills. Specific hard skills see upon industry knowledge and firm and job specific skills such as technical skills. In order to overcome skills gaps firms provide training. Training is provided internally and often externally as well. Also the re-allocation of employees and an increase of supervision are used to mitigate skill gaps. Experienced gaps and shortages hinder firms upgrading their activities and technologies. It is therefore very important that the quality and supply of fresh graduates improves. If this does not happen companies may decide to move their activities to establishments in different regions that do possess right levels of human capital.

Concluding, activities of firms within the Penang labour market are evolving into higher value-added activities. While firms in established industries such as the E&E and healthcare industry upgraded towards more knowledge intensive activities, firms in new industries (e.g. medical devices, Shared service outsourcing) started to settle down. At first hand, it seems that Penang indeed is moving into a high-income

economy. However, this study found out that a human capital gap exists. At three different perspectives it is demonstrated that skill shortages exist in the Penang labour market. Also skill gaps are experienced by firms across industries. This means that both the quantity and quality of talent have to improve in order to move towards a high-income economy. Up to this point, firms in Penang received right levels of human capital that enabled them to upgrade their activities and firms across promising industries perceived opportunities to continue exploiting competences. However, in order to continue this process higher levels of human capital are needed. To realize this, Penang needs more competent graduates that are able to carry out these activities. The root of success is education. However, the quality of education throughout whole Malaysia is not sufficient. The results in this study show that both the quantity and quality of graduates are not meeting the requirements. Collective action from key players is required to improve both the quantity and quality of talent. The next paragraph will propose recommendations in respect to talent available and the upgrading of Penang's economy to continue making the transition into a high-income economy.

Meso-perspective

7. *To what extent do firms in different industries experience skills gaps/deficiencies and shortages?*

At industry level a in-depth-analysis has been carried out for five industries that largely contribute to Penang's economy. Experienced skill shortages and gaps indeed differ across industries. However, senior and managerial positions are in demand across all industries. Skill shortages are especially experienced in manufacturing industries. This is mainly due to a mismatch of supply and demand regarding engineering occupations. Fresh graduates in these industries lack specific hard skills and sometimes even hard skills. However, skill needs of firms within these industries are often firm specific and therefore hard to be taught by educational institutions. Findings in this study reveal that firms within service industries experiences labour and skills shortages to a lesser extent. These industries have less difficulty acquiring the right numbers of fresh graduates since more students choose fields of study that enables them to work in these industries. Besides that, it is easier for these type of industries to attract labour from other industries since required skill-sets are less specific. Still the quality of supply is insufficient. Fresh graduates lack soft skills

such as communication, and problem solving. More talent issues exist regarding the skills-set of fresh graduates as for attitude, passion and motivation. Difficulties regarding attitude are evident in all industries, it is hard to find candidates that have the right attitude, true passion and are highly motivated. This problem, for a large part, can be attributed to characteristics of Gen-Y.

8.1. Recommendations in addition to current initiatives and training infrastructure

Both the State government of Penang and the federal government of Malaysia are aware of the challenges regarding the quantity and quality of talent available and the existing human capital gap. Different measures already have been implemented. The "Returning Experts Programme" (REP) was set up in 2001 to address the issue of brain drain. In 2011 the government formed a new organization responsible for (re)attracting high-qualified labour, known as TalentCorp. Since then, TalentCorp succeeded in doubling the numbers of returning talents (2,500) than in the ten years before. However, this number is only a fraction compared to the number of talent that leaves the country (see table 5.1). Furthermore, existing organizations, such as Penang Skilled Development Center (PSDC) established in 1989, expended their programs in order to improve skills of employees across firms.

In addition to these initiatives of Penang State Government, companies within industries have joined forces to overcome skills deficiencies. For example, the Federation of Malaysian Manufacturers (FMM, Penang branch), which represents over 300 manufacturing, companies in Penang. As their website state: *"Today, as the largest private sector economic organisation in Malaysia representing over 2,800 manufacturing and industrial service companies of varying sizes, the FMM is the officially recognised and acknowledged voice of the industry."* (FMM, 2016). The FMM not only represents, but also provides all kinds of training to their members.

Aside from State Government and industry initiatives, various private training institutions/firms have emerged in the past years. These businesses provide a variety of external training programmes ranging from soft- to specific hard skills to firms. For example, Dreamcatcher provides very specific training to

engineers in various companies within the manufacturing industry. Another example is a company called Xtrategize, which, among others, provides training for soft skills.

Despite these various initiatives the human capital gap remains. Coordination between all initiatives seems to be lacking and everyone aims to address their own problems instead of working together to overcome the bigger challenge. Next to that, additional measures have to be taken in order to bridge the human capital gap. During interviews, many respondents made suggestions regarding the improvement of education within Penang and actions Penang State Government should undertake. According to respondents universities must update their syllabuses to industry demands. Also, it was proposed to teach students skills that are industry related, extend the duration of internships and intensify relationship between industries and educational institutions. Furthermore, respondents emphasized that universities should focus on English and soft skills more instead of hard skills. Respondents do know however that Penang state government does not have authority on education matters, as this under Federal Government's control.

Yet, Penang State Government can undertake action. First of all, Penang can try to become a regional education hub by attracting branches of foreign universities. As a consequence, students do not have to go overseas in order to obtain an international recognized degree. This could mitigate the outflow of Malaysian students leaving the country and therefore the quantity of students available will increase. Also the quality of education is expected to be higher as these branches have their own education methods and are not bound to decisions made at federal level. As a consequence, the quality of students will improve. Also, these foreign branches might attract foreign talent to Penang.

Second, the State Government can function as intermediary improving the industry-universities linkages. Especially in respect to the E&E industry as this niche market contributes significantly to Penang's economy. Students should become more familiar with this industry by gaining first-hand experiences and more intensive internships.

Third, Penang State Government should keep trying to diversify its economy (e.g. move towards SSO industries and professional business services that can support the manufacturing industry). This makes the region less vulnerable to so called industry 'shocks'. At the same time, it should focus and improve its

niche markets within the E&E industry, (medical) tourism and medical devices as they are unique, and provides competitive advantages, over other regions. In cooperation with private universities (as they have more authority compared to public universities) State government should encourage universities to provide more industry related courses. The development of more industry-relevant courses enable students to enter the workforce more prepared which makes it more attractive for firms to keep carrying out their activities in Penang. Firms might receive more mandates to carry out knowledge-intensive activities because of high quality talent. Furthermore, educational institutions should be encouraged by the State Government to provide training for students to master English and communication skills, thereby providing students with the ability to acquire further industry knowledge as well as to function effectively in modern industry where English-language skills, human interaction skills are crucial.

Lastly, PSDC should continue to improve its industry training of employees by focussing on a wider range of skills. Besides engineering skills, it should focus on skills relevant for higher-level services so that the workforce in the Penang state possess skills that are asked by industries in a globalized world.

9. References

Abbott, M. G., & Beach, C. M. (1994). Wage changes and job changes of Canadian women: evidence from the 1986-87 labour market activity survey. *Journal of Human Resources*, *29*(2), 429-460.

Accenture, Burning Glass Technologies, & Harvard Business School. (2013). *Bridge the gap: Rebuilding America's middle skills*. Retrieved from http://www.hbs.edu/competitiveness/Documents/bridge-the-gap.pdf

Acemoglu, D., & Autor, D. (2001). *Lectures in Labor Economics*. Cambridge, United States of America: MIT Press.

Acemoglu, D., Gancia, G., & Zilibotti, F. (2012). Competing engines of growth: Innovation and standardization. *Journal of Economic Theory*, *147*(2), 570-601.

Ahlan, A. R., Arshad, Y., Suhaimi, M. A., & Hussin, H. (2010). The Malaysia IT Outsourcing industry skill-sets requirements of future IT graduates. *WSEAS Transactions on Computers*, *9*(7), 738-747.

Andrews, M. J., Bradley, S., Stott, D., & Upward, R. (2008). Successful employer search? An empirical analysis of vacancy duration using micro data. *Economica*, *75*(299), 455-480.

Ashton, D. N., Green, F., James, D., & Sung, J. (1999). *Education and Training for Development in East Asia : The Political Economy of Skill Formation in Newly Industrialised Economies*. London, The United Kingdom: Routledge.

Ashton, D. N., & Sung, J. (2002). *Supporting workplace learning for high performance working*. Geneva, Switzerland: International Labour Organization.

Athukorala, P. C. (2014). Growing with global production sharing: The tale of Penang Export Hub, Malaysia. *Competition & Change*, *18*(3), 221-245.

Audretsch, D. B., & Feldman, M. P. (1996). Innovative clusters and the industry life cycle. *Review of industrial organization*, *11*(2), 253-273.

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of management*, *17*(1), 99-120.

Barnow, B. S., Trutko, J., & Piatak, J. S. (2013). *Occupational Labor Shortages: Concepts, Causes, Consequences*. Kalamazoo, United States of America: W.E. Upjohn Institute.

Barro, R. J. (1991). Economic growth in a cross section of countries. *Quarterly Journal of Economics*, *106*(2), 407-443.

Beblavý, M., Akgüc, M., Fabo, B., & Lenaerts, K. (2016). *What are the new occupations and the new skills? And how are they measured? State of the art repor* (Working paper, Leuven, InGRID project, M21.6). Retrieved from https://inclusivegrowth.be/downloads/output/m21-6-state-of-art-report-ceps-eind.pdf

Benhabib, J., & Spiegel, M. (1994). The role of human capital in economic development: evidence from aggregate cross-country data. *Journal of Monetary Economics, 34*(2), 143-173.

Bennett, J., & McGuinness, S. (2009). Assessing the impact of skill shortages on the productivity performance of high-tech firms in Northern Ireland. *Applied Economics, 41*(6), 727-737.

Berry, C. R., & Glaeser, E. L. (2005). The divergence of human capital levels across cities. *Papers in Regional Science, 84*(3), 407-444.

Bowles, S., & Gintis, H. (1975). The Problem with Human Capital Theory--A Marxian Critique. *The American Economic Review, 65*(2), 74-82.

Bresnahan, T. F., Brynjolfsson, E., & Hitt, L. M. (2002). Information Technology, Workplace Organization, And The Demand For Skilled Labor: Firm-Level Evidence. *The Quarterly Journal of Economics, 117*(1), 339-376.

Bryman, A. (2012). *Social Research Methods* (4th ed.). New York, United States of America: Oxford University Press Inc..

Buckley, P. J., Pass, C. L., & Prescott, K. (1992). The internationalization of service firms: a comparison with the manufacturing sector. *Scandinavian international business review, 1*(1), 39-56.

Cantwell, J., & Narula, R. (2001). The eclectic paradigm in the global economy. *International Journal of the Economics of Business, 8*(2), 155-172.

Cedefop (European Centre for the Development of Vocational Training). (2012). *Skills Supply and Demand in Europe Methodological Framework.* (Research Paper No. 25). Retrieved from http://www.cedefop.europa.eu/en/publications-and-resources/publications/5525

Cedefop (European Centre for the Development of Vocational Training). (2013). *User guide to developing an employer survey on skill needs* (Research Paper No. 35). Retrieved from http://www.cedefop.europa.eu/en/publications-and-resources/publications/5535

Coff, R. W. (2002). Human capital, shared expertise, and the likelihood of impasse in corporate acquisitions. *Journal of Management, 28*(1), 107-128.

Cohen, M. S. (1995). *Labor Shortages: as America Approaches the Twenty-first Century*. Ann Arbor, United States of America: The University of Michigan Press.

Cohen, M. S., & Zaidi, M. A. (2002). *Global Skill Shortages*. Cheltenham, United Kingdom: Edward Elgar Publishing Limited.

Collins, C. J., & Stevens, C. K. (2002). The relationship between early recruitment-related activities and the application decisions of new labor-market entrants: A brand equity approach to recruitment. *Journal of applied psychology, 87*(6), 1121-1133.

Cooke, F. (2005). Vocational and enterprise training in China: Policy, practice and prospect. *Journal of the Asia Pacific Economy*, *10*(1), 26-55.

Dutton, J. E., & Dukerich, J. M. (1991). Keeping an eye on the mirror: Image and identity in organizational adaptation. *Academy of management journal*, *34*(3), 517-554.

Ehrenberg, R. G., & Smith, R. S. (2011). *Modern Labor Economics: Theory and Public Policy* (10th ed.). Boston, United States of America: Prentice Hall.

Ericson, R., & Pakes, A. (1995). Markov-perfect industry dynamics: A framework for empirical work. *The Review of Economic Studies*, *62*(1), 53-82.

ESCO. (2016, September 15). European Skills/Competences, qualifications and Occupations (ESCO). Retrieved from http://ec.europa.eu/social/main.jsp?catId=1042

Fagerberg, J., & Verspagen, B. (2000). Productivity, R&D Spillovers and Trade. In B. Van Ark, S. K. Kuipers, & G. H. Kuper (Eds.), *Productivity, technology and economic growth* (pp. 345-360). New York, United States of America: Springer US.

Fleming, D., & Søborg, H. (2012). *Malaysian skills development and the middle-income trap*. Paper presented at 16th ILERA World Congress, Philadelphia, USA. Retrieved from http://ilera2012.wharton.upenn.edu/RefereedPapers/FlemingDaniel%20HenrkSoborg%20ILERA.pdf

Florida, R., Mellander, C., & Stolarick, K. (2008). Inside the black box of regional development—human capital, the creative class and tolerance. *Journal of Economic Geography*, *8*(5), 615-649.

FMM (Federation of Malaysian Manufacturers). (2016, September 21). About FMM. Retrieved from http://www.fmm.org.my/About_FMM-@-About_FMM.aspx

Freiling, J. (2004). A Competence-based Theory of the Firm. *Management Revue*, *15*(1), 27-52.

Freyens, B. (2006). Measures of training costs in Australia. *Management Research News*, *29*(8), 495-511.

Froy, F. (2013). Global policy developments towards industrial policy and skills: skills for competitiveness and growth. *Oxford Review of Economic Policy*, *29*(2), 344-360.

Gennaioli, N., Glaeser, R. L., Lopez-de-Silanes, F., & Shleifer, A. (2011). *Human capital and regional development* (No. w17158). Retrieved from https://repositori.upf.edu/bitstream/handle/10230/19929/1286.pdf?sequence=1

Gooch, L. (2010, October 01). Loss of Young Talent Thwarts Malaysia's Growth. *The New York Times*. Retrieved from http://www.nytimes.com/2010/10/02/business/global/02brain.html

Gradsmalaysia.com. (2015). Malaysia's 100 Leading Graduate Employers... as voted for by students and graduates! Retrieved from http://malaysias100.com/ranking/ranking.aspx

Green, F., Machin, S., & Wilkinson, D. (1998). The Meaning and Determinants of Skills Shortages. *Oxford Bulletin of Economics and Statistics*, *60*(2), 165-187.

Green, K., Miozzo, M., & Dewick, P. (2005). *Technology, Knowledge, and the Firm: Implications for Strategy and Industrial Change*. Cheltenham, United Kingdom: Edward Elgar Publishing Limited.

Hall, R. E., Gordon, A., & Holt, C. (1972). Turnover in the labor force.. *Brookings Papers on Economic Activity*, *1972*(3), 709-764.

Harrison, B., & Sum, A. (1979). The Theory of "Dual" or Segmented Labor Markets. *Journal of Economic Issues*, *13*(3), 687-706.

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., & Martin, C. (1993). The Causes of Skill Shortages in Britain. *Oxford Economic Papers*, *45*(4), 573-588.

Hays. (2015). First quarterly report of 2015. Retrieved from http://www.hays.com.my/

Healy, J., Mavromaras, K., & Sloane, P. J. (2015). Adjusting to skill shortages in Australian SMEs. *Applied Economics*, *47*(24), 2470-2487.

Hutchinson, F. E., & Saravanamuttu, J. (2012). *Catching the Wind: Penang in a Rising Asia*. Penang, Malaysia: Penang Institute.

Iammarino, S., & McCann, P. (2013). *Multinationals and economic geography: Location, technology and innovation*. Cheltenham, United Kingdom: Edward Elgar Publishing Limited.

Isely, P., & Roelofs, M. R. (2004). Primary market and aftermarket competition in the bicycle component industry. *Applied Economics*, *36*(18), 2079-2102.

Jackofsky, E. F., & Peters, L. H. (1983). Job Turnover Versus Company Turnover: Reassessment of the March and Simon Participation Hypothesis. *Journal of Applied Psychology*, *68*(3), 490-495.

Jauhar, J., Ghani, A. B. A., & Islam, R. (2016). *Brain Drain: Propensity for Malaysian Professionals to Leave for Singapore*. Singapore, Singapore: Springer Singapore.

Jauhar, J. B., & Yusoff, Y. M. (2011). Brain drain: Propensity to leave by Malaysian professionals. *International Journal of Innovation, Management and Technology*, *2*(2), 119-122.

JobStreet. (2015). *Job Market Statistic 2013-2015 Northern Region*. Retrieved from www.JobStreet.com

JPMorgan Chase & Co.. (2014). *Closing the skills gap: Preparing New Yorkers for high growth, high-demand and middle-skill jobs.* Retrieved from https://www.jpmorganchase.com/corporate/Corporate-Responsibility/document/54841-JPMC-GAP-REP-AW6.pdf

Katz, E., & Ziderman, A. (1990). Investment in general training: The role of information and labour mobility. *The economic journal*, *100*(403), 1147-1158.

Kharas, H., & Kohli, H. (2011). What is the middle income trap, why do countries fall into it, and how can it be avoided? *Global Journal of Emerging Market Economies*, *3*(3), 281-289.

Kharas, H., Zeufack, A., & Majeed, H. (2010). *Cities, people, and the economy: A study on positioning Penang* (Washington, DC: World Bank). Retrieved from http://documents.worldbank.org/curated/en/802841468331912672/Cities-people-and-the-economy-a-study-on-positioning-Penang

Klepper, S. (1997). Industry life cycles. *Industrial and corporate change*, *6*(1), 145-182.

Kor, Y. Y., & Leblebici, H. (2005). How do interdependencies among human-capital deployment, development, and diversification strategies affect firms' financial performance? *Strategic Management Journal*, *26*(10), 967-985.

KPMG. (2009). *Exploring global frontiers: The new emerging destinations*. Retrieved from http://www.kpmg.com/Ca/en/IssuesAndInsights/ArticlesPublications/Oi/Documents/Exploring-global-frontiers.pdf

Lall, S. (1999). *Competing with labour: Skills and competitiveness in developing countries*. Geneva, Switzerland: International Labour Office.

Lee, T. W., & Mitchell, T. R. (1994). An alternative approach: The Unfolding Model of Voluntary Employee Turnover. *Academy of Management Review*, *19*(1), 51-89.

Leontaridi, M. (1998). Segmented labour markets: theory and evidence. *Journal of Economic Surveys*, *12*(1), 103-109.

Li, Y., & Sheldon, P. (2010). HRM lives inside and outside the firm: Employers, skill shortages and the local labour market in China. *The international journal of human resource management*, *21*(12), 2173-2193.

Lindorff, M. (2011). Skills gaps in Australian firms. *Journal of Vocational Education and Training*, *63*(2), 247-259.

Lloyd, S. (2002). Branding from the inside out. *Business Review Weekly*, *24*(10), 64-66.

Loveridge, R., & Mok, A. L. (1979). *Theories of labour market segmentation*. Hingham, United States of America: Kluwer Boston Inc..

MAC (Migration Advisory Committee). (2008). *Review of Labour Shortages, Skill Shortages and Skill Gaps*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/257231/yorkreview.pdf

MAC (Migration Advisory Committee). (2008). *Identifying skilled occupations where migration can sensibly help to fill labour shortages*. Retrieved from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/343325/Migration-shortage.pdf

Makhija, M. (2003). Comparing the resource-based and market-based views of the firm: empirical evidence from Czech privatization. *Strategic management journal*, *24*(5), 433-451.

Malerba, F. (2005). Sectoral systems of innovation: a framework for linking innovation to the knowledge base, structure and dynamics of sectors. *Economics of innovation and New Technology*, *14*(1-2), 63-82.

Mankiw, G. D., Romer, D., & Weil, D. (1992). A contribution to the empirics of economic growth. *The Quarterly Journal of Economics*, *107*(2), 407-457.

Marijs, A. J., & Hulleman, W. (1997). *Meso-economie en bedrijfsomgeving* (5th ed.). Groningen/Houten, The Netherlands: Noordhoff Uitgevers B.V..

Marsili, O., & Verspagen, B. (2002). Technology and the dynamics of industrial structures: An empirical mapping of Dutch manufacturing. *Industrial and Corporate Change*, *11*(4), 791-815.

MASCO. (2008). *Malaysia Standard Classification of Occupations.* Retrieved from http://static.jobsmalaysia.gov.my/html/jobsm/masco/en/MASCO_BI_master.pdf

Mehra, A. (1996). Resource and market based determinants of performance in the US banking industry. *Strategic Management Journal*, *17*(4), 307-322.

Melguizo, A., & Perea, J. R. (2016). *Mind the skills gap! Regional and industry patterns in emerging economies* (Working Paper No. 329). Retrieved from http://www.oecd-ilibrary.org/docserver/download/5jm5hkp7v145.pdf?expires=1477132191&id=id&accname=guest&checksum=50A05F31711372736A2BAE99E6B51BBE

Metcalfe, J. S. (1995). Technology systems and technology policy in an evolutionary framework. *Cambridge Journal of Economics*, *19*(1), 25-46.

Moen, E. R., & Rosén, (2004). Does poaching distort training? *The Review of Economic Studies*, *71*(4), 1143-1162.

NEAC (National Economic Advisory Council). (2010). *New Economic Model for Malaysia – Part 1*. Retrieved from http://www.jcci.or.jp/NEM%20for%20Malaysia%20-%20Part%20I_0.pdf

Nelson, R. (1995). Recent evolutionary theorizing about economic change. *Journal of Economic Literature*, *33*(1), 48-90.

Ng, L. C., Chong, H. O., H'ng, C. K., Khor, P. H., & Ng, S. V. (2013). *Factors affecting job selection preferences of accounting students in Malaysian universities* (Doctoral dissertation, UTAR). Retrieved from http://eprints.utar.edu.my/1013/1/AC-2013-1003339.pdf

Nonaka, I., Toyama, R., & Nagata, A. (2001). A firm as a knowledge-creating entity: A new perspective on the theory of the firm. *Industrial and corporate change*, *9*(1), 1-20.

Overview of ETP. (2016, September 15). Retrieved from http://etp.pemandu.gov.my/About_ETP-@-Overview_of_ETP.aspx

Pauw, K., Oosthuizen, M., & Van Der Westhuizen, C. (2008). Graduate unemployment in the face of skills shortages: A labour market paradox. *South African Journal of Economics*, *76*(1), 45-57.

Penang Institute (Ed.). (2015). *The Penang Paradigm: The framework for creating an international and intelligent state*. Georgetown, Malaysia: Penang Institute.

Penang Institute. (2016, February). Brain drain in numbers. Retrieved from http://penangmonthly.com/brain-drain-in-numbers/

Penrose, E. T. (1959). *The theory of the growth of the firm*. Oxford, United Kingdom: Blackwell.

Ponnu, C. H., & Chuah, C. C. (2010). Organizational commitment, organizational justice and employee turnover in Malaysia. *African Journal of Business Management*, *4*(13), 2676-2692.

Rauch, J. (1993). Productivity gains from geographic concentration of human capital: evidence from the cities. *Journal of Urban Economics*, *34*, 380-400.

Reich, M., Gordon, D. M., & Edwards, R. C. (1973). A theory of labor market segmentation. *The American Economic Review*, *63*(2), 359-365.

Richardson, S. (2007). *What is a skill shortage?* (National Centre for Vocational Education Research (NCVER)). Retrieved from https://www.ncver.edu.au/__data/assets/file/0019/7282/what-is-skill-shortage-4022.pdf

Roy, R., Henson, H., & Lavoie, C. (1996). *A Primer on Skill Shortages in Canada* (Rev. ed.). Hull, Canada: Human Resources Development Canada, Applied Research Branch, Strategic Policy.

RPIC-ViP. (2011). *Transferability of Skills across Economic Sectors: Role and Importance for Employment at European Level*. Retrieved from http://ec.europa.eu/social/BlobServlet?docId=7124&langId=en

Schlicht, E. (1978). Labour Turnover, Wage Structure, and Natural Unemployment. *ournal of Institutional and Theoretical Economics*, *0*(0), 337-346.

Schlicht, E. (2005). Hiring standards and labour market clearing. *Metroeconomica*, *56*(2), 263-279.

Schultz, T. (1961). Investment in human capital. *American Economic Review*, *52*(1), 1-17.

Schwalje, W. S. (2012). *Rethinking How Establishment Skills Surveys Can More Effectively Identify Workforce Skills Gaps* (Working Paper No. 37192). Retrieved from https://mpra.ub.uni-muenchen.de/37192/1/MPRA_paper_37192.pdf

Shah, C., & Burke, G. (2003). *Skills shortages: concepts, measurement and implications* (Working Paper No. 52). Retrieved from http://www.monash.edu.au/education/non-cms/centres/ceet/docs/workingpapers/wp52nov03shah.pdf

Sharifah, H. (2013). The national and institutional impact of university rankings: the case of Malaysia. In P. T. M. Marope, P. J. Wells, & E. Hazelkorn (Eds.), *Rankings and accountability in higher education: Uses and misuses* (pp. 187-196). Paris, France: UNESCO Publishing.

Sheldon, P., & Li, Y. (2013). Localized poaching and skills shortages of manufacturing employees among MNEs in China. *Journal of world Business*, *48*(2), 186-195.

Sheldon, P., & Thornthwaite, L. (2005). Employability skills and vocational education and training policy in Australia: An analysis of employer association agendas. *Asia Pacific Journal of Human Resources*, *43*(3), 404-425.

Shervani, T. A., Frazier, G., & Challagalla, G. (2007). The moderating influence of firm market power on the transaction cost economics model: an empirical test in a forward channel integration context. *Strategic Management Journal*, *28*(6), 635-652.

Simon, C. (1998). Human capital and metropolitan employment growth. *Journal of Urban Economics*, *43*, 223-243.

Steedman, H., & Wagner, K. (1987). A Second Look At Productivity, Machinery and Skills in Britain and Germany. *National Institute Economic Review*, *122*, 84-106.

Stevens, M. (1996). *Transferable training and poaching externalities*. Cambridge, United Kingdom: Cambridge University Press.

Stevens, P. A. (2007). Skill shortages and firms' employment behaviour. *Labour Economics*, *14*(2), 231-249.

Sutherland, J. (2010). *Skills Gaps and Hard to Fill Vacancies at Establishments in Scotland* (Working Paper 25). Retrieved from http://www.gla.ac.uk/media/media_157722_en.pdf

TalentCorp. (2016). *The Pilot Critical Occupations List Report 2015/2016*. Retrieved from http://talentcorpbucket.s3-website-ap-southeast-1.amazonaws.com/assets/contentms/img/template/editor/COL%20Report%2025032016.pdf

Tan, D. (2016, October 17). Penang's SME Village ready by 2019. *The Star*. Retrieved from http://www.thestar.com.my/business/business-news/2016/10/17/penangs-sme-village-ready-by-2019/

Teece, D., & Pisano, G. (1994). The dynamic capabilities of firms: An introduction. *Industrial and corporate change*, *3*(3), 357-556.

Teijeiro, M., Rungo, P., & Freire, M. J. (2013). Graduate competencies and employability: The impact of matching firms' needs and personal attainments. *Economics of Education Review*, *34*, 286-295.

Teixeira, A. (2002). *On the link between human capital and firm performance* (FEP Working Paper no. 121). Retrieved from http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.194.7744&rep=rep1&type=pdf

The Economic Planning Unit, Prime Minister's Department. (2010). *Tenth Malaysia Plan 2011-2015*. Retrieved from https://www.pmo.gov.my/dokumenattached/RMK/RMK10_Eds.pdf

The Economic Planning Unit, Prime Minister's Department. (2015). *Eleventh Malaysia Plan 2016-2020: Anchoring Growth on People*. Retrieved from http://rmk11.epu.gov.my/book/eng/Elevent-Malaysia-Plan/RMKe-11%20Book.pdf

The Penang Paradigm. (2016, September 15). Retrieved from http://penangparadigm.com/about-penang-paradigm

Tirole, J. (1998). *The theory of industrial organization* (10th ed.). Cambridge, Massachusetts, United States of America: MIT Press.

Trutko, J. W., Barnow, B. S., Chasanov, A. B., & Pande, A. (1993). *Labor Shortage Case Studies* (Administration Research and Evaluation Report Series 93-E). Retrieved from https://ia902205.us.archive.org/7/items/ERIC_ED372262/ERIC_ED372262.pdf

Turban, D. B., & Greening, D. W. (1997). Corporate social performance and organizational attractiveness to prospective employees. *Academy of management journal*, *40*(3), 658-672.

Turban, D. B., Lau, C. M., Ngo, H. Y., Chow, I. H., & Si, S. X. (2001). Organizational attractiveness of firms in the People's Republic of China: A person–organization fit perspective. *Journal of Applied Psychology*, *86*(2), 194-206.

UKCES (United Kingdom Commission for Employment and Skills). (2014). *UKCES Employer Skills Survey 2013*. Retrieved from https://www.gov.uk/government/collections/ukces-employer-skills-survey-2013

Veneri, C. M. (1999). Can Occupational Labor Shortages Be Identified Using Available Data. *Monthly Labor Review*, *122*(3), 15-21.

Wernerfelt, B. (1984). A resource-based view of the firm. *Strategic Management Journal*, *5*(2), 171-180.

Wickramasinghea, V., & Zoyzab, N. D. (2009). An assessment of managerial competency needs: Empirical evidence from a Sri Lankan telecommunication service provider. *The International Journal of Human Resource Management*, *20*(12), 2547-2567.

Wixe, S. & Andersson, M. (2015). Which Types of Relatedness Matter in Regional Growth? Industry, Occupation and Education. *Regional studies*, 1-14.

World Bank. (2007). *Malaysia and the Knowledge Economy: Building a World-Class Higher Education System* (Report No. 40397). Retrieved from http://documents.worldbank.org/curated/en/193361468774848408/pdf/403970MY0Knowl1white0cover01PUBLIC1.pdf

World Bank. (2009). *Can Malaysia Escape the Middle-Income Trap? A Strategy for Penang* (Policy Research Working Paper No. 4971). Retrieved from http://documents.worldbank.org/curated/en/743561468283149014/pdf/WPS4971.pdf

World Bank. (2011). *Malaysia Economic Monitor: Brain Drain*. Retrieved from http://documents.worldbank.org/curated/en/282391468050059744/pdf/614830WP0malay10Box358348B01PUBLIC1.pdf

World Bank. (2012). *Stuck in the Middle? Human Capital Development and Economic Growth in Malaysia and Thailand* (Policy Research Working Paper No. 6283). Retrieved from http://documents.worldbank.org/curated/en/603811468049817155/pdf/wps6283.pdf

World Bank. (2013). *How to Avoid Middle-Income Traps? Evidence from Malaysia*. Retrieved from http://siteresources.worldbank.org/EXTPREMNET/Resources/EP120.pdf

World Bank. (2015). *Malaysia Economic Monitor: Immigrant Labour*. Retrieved from http://documents.worldbank.org/curated/en/102051468087840532/pdf/679440WP0P12750c0Monitor0April02012.pdf

World Economic Forum. (2015). *Bridging the Skills and Innovation Gap to Boost Productivity in Latin America*. Retrieved from http://www3.weforum.org/docs/WEF_Competitiveness_Lab_Latin_America_15.pdf

Yeow, T. C., & Ooi, C. I. (2009). *The Development of Free Industrial Zones–The Malaysian Experience*. Retrieved from http://share.nanjing-school.com/dpgeography/files/2012/10/info.worldbank.org-s9hsat.pdf

Yusuf, S., & Nabeshima, K. (2009). *Tiger Economies Under Threat: A Comparative Analysis of Malaysia's Industrial Prospects and Policy Options*. Washington DC, United States of America: The World Bank.

10. Appendices

10.1. Appendix A: Key industries

TABLE 10.1 *List of key industries selected for this study*

	Electronics and electronical industry	Industry code
1.	Industrial electronics	01
2.	Semi-conductor devices	02
3.	Computer (hardware, including components)	03
4.	Consumer electronics, including gaming devices and other video	04
5.	Data-/telecommunication and IT products (hardware)	05
6.	Opto-electronics & LED	06
7.	Magnetic and Optical Recording/Storage Media, other digital storage	07
8.	Electronic Manufacturing Services (EMS)	08
9.	Precision engineering/Tooling/Tool and Die	10
10.	Automation	11
11.	Bio-pharma/pharmaceutical	20
12.	Aerospace components/parts	30
	Bio/Agro/Life-sciences	**Industry code**
13.	Biotechnology	50
14.	Life-sciences/medical devices	51
	Creative industry	**Industry code**
15.	Info tech (information and communication) and ICT, including software design and production	40
16.	Multimedia production (including film, animation, computer games)	41
17.	Advertising, graphic design, media/web design	42
	Services	**Industry code**
18.	Professional business services (KIBS)	61
19.	Shared services (SSO/Global Business Services)	62
20.	Hospitality services	63
21.	Health care (facilitating medical tourism)	64
22.	Education services	65

10.2. Appendix B: Topic list recruitment firms

General questions

1) Can you describe your current function and position within this company?
2) How long have you been working for this organisation?
3) Can you give a description of the core activity of this company?
    a) Are your services specialized in particular industries?
4) What kind of companies and or recruit anent do you mainly cater for?
5) How many clients (e.g. job seekers) are there roughly registered at your company?
    a) What are the characteristics of these clients (what education level, specific sectors? Etc.)
6) Are most of your clients (employees) currently employed or unemployed?
    a) If employed, are they a client of your company because they are looking for a better (paid) job?
    b) If yes, what job positions do they have?
7) What are possible search functions for your corporate clients?

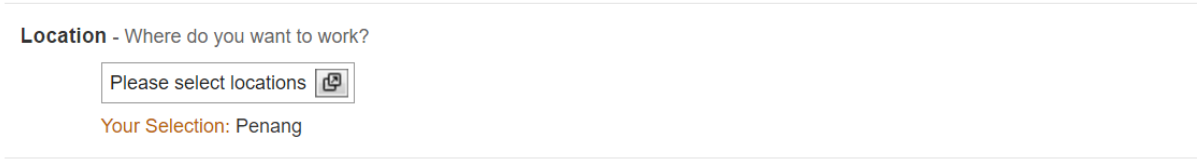
Penang Labour Market

1) What is your view on the current status of the Penang labour market?
    a) Do you believe Penang has a constrained labour market (e.g. is there enough supply for the current demand)?
        i) If yes, why do you think so? Do you have evidence or is it based on your own experience?
2) Do you have a lot of contact with the companies that are linked to your firm (with HR manager or departments for example?)
3) Do you hear companies often having troubles finding the right type of labour in Penang?
    a) If yes, is it the number of available workers that is the problem or the qualifications that are lacking?
4) Are there specific types of companies (MCNs or SMEs) that have bigger problems finding the right people than other companies?

5) Are there common skills or certain occupations that are always hard to find in the Penang labour market?
    a) If yes, what type of skills and/or occupations?
6) Are there specific types of companies preferred among employees?
    a) If yes, which type and why?
7) Do companies have particular vacancies they always keep open for applicants? (e.g. hard-to-fill-vacancies)
8) In what industries do firms experience most problems finding skilled workers?
9) Is there a specific type of vacancies that companies advertise the most?
10) Do you think firms have lowered their standards expectations and hire under skilled employees?
11) What are strategies of firms for recruiting people?
12) What are strategies of employees/jobseekers to find new (better) jobs?

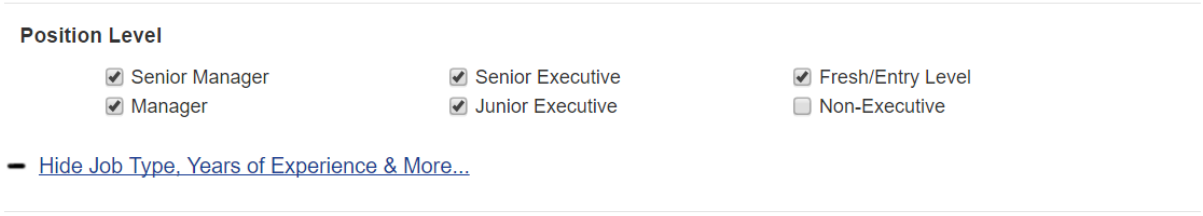
10.4. Appendix C: Advanced search on JobStreet

Step 1: Select location

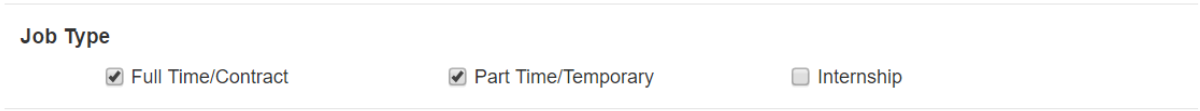


Step 2: Select job specializations

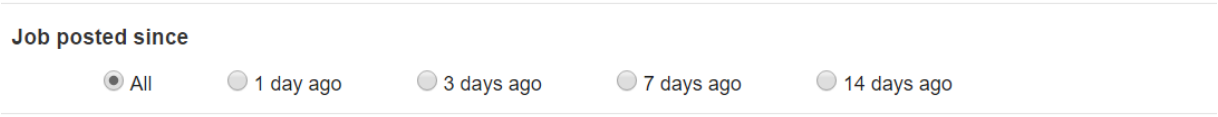
Step 3: Select position levels



Step 4: Select type of contract



Step 5: Select all the jobs posted since



Step 6: Search jobs

10.5. Appendix D: Obtained characteristics from JobStreet advertisements

TABLE 10.2 *Vacancy characteristics collected from JobStreet advertisements*

Vacancy characteristics		Description	Code
1.	Date advertised	DD/MM/YYYY	-
2.	Closing date	DD/MM/YYYY	-
3.	Job position	Senior manager	SMAN
		Manager	MAN
		Senior executive	SEXE
4.	Job title	-	-
5.	Industry	Accounting/Audit/Tax Services	-
		Advertising/Marketing/Promotion/PR	
		Aerospace/Aviation/Airline	
		Agricultural/Plantation/Poultry/Fisheries	
		Apparel	
		Architectural Services/Interior Designing	
		Arts/Design/Fashion	
		Automobile/Automotive Ancillary/Vehicle	
		Banking/Financial Services	
		Biotechnology/Pharmaceutical/Clinical research	
		Call Centre/IT-Enabled Services/BPO	
		Chemical/Fertilizers/Pesticides	
		Computer/Information Technology (Hardware)	
		Computer/Information Technology (Software)	
		Construction/Building/Engineering	
		Consulting (Business & Management)	
		Consulting (IT, Science, Engineering & Technical)	
		Consumer Products/FMCG	
		Education	
		Electrical & Electronics	
		Entertainment/Media	
		Environment/Health/Safety	
		Exhibitions/Event management/MICE	
		Food & Beverage/Catering/Restaurant	
		Gems/Jewellery	
		General & Wholesale Trading	
		Government/Defence	
		Grooming/Beauty/Fitness	
		Healthcare/Medical	
		Healthcare/Medical Healthcare/Medical	

Vacancy characteristics		Description	Code
5.	Industry	Heavy Industrial/Machinery/Equipment	
		Hotel/Hospitality	
		Human Resources Management/Consulting	
		Insurance	
		Law/Legal	
		Manufacturing/Production	
		Marine/Aquaculture	
		Mining	
		NGO	
		Non-Profit Organisation/Social Services/NGO	
		Oil/Gas/Petroleum	
		Others	
		Polymer/Plastic/Rubber/Tyres	
		Printing/Publishing	
		Property/Real estate	
		R&D	
		Repair & Maintenance Services	
		Resources Management/Consulting	
		Retail/Merchandise	
		Science & Technology	
		Security/Law Enforcement	
		Semiconductor/Wafer Fabrication	
		Sports	
		Stockbroking/Securities	
		Telecommunication	
		Textiles/Garment	
		Transportation/Logistics	
		Travel/Tourism	
		Utilities/Power	
		Wood/Fibre/Paper	
6.	Company name	-	-
7.	Company size	1-50 employees	SMALL
		51-200 employees	SMALL
		201-500 employees	MEDIUM
		501-1000 employees	MEDIUM
		1001-2000 employees	LARGE
		2001-5000 employees	LARGE
		>5000 employees	LARGE
8.	Required educational level	PhD/Doctor	DO

Vacancy characteristics		Description	Code
		Master's	MD
		Bachelor	BD
		Diploma	DI
		Certificate	CE
		Primary school	Primary
		Higher secondary	Secondary
		SPM	SPM
		STPM	STPM
9.	Required education field	Accountancy	ACC
		Any field	ANY
		Arts/Creative/Graphics	ART
		Automotive	AUT
		Biomedical	BIO
		Business & Management Administration	BMA
		Computer science IT	COMP
		Economics	ECO
		Education	EDU
		Electrical/Electronics	ELC
		Engineering	ENG
		Finance	FIN
		Food technology/nutrition	FTN
		Human Resource Management	HRM
		ICT	ICT
		Journalism	JOU
		Law	LAW
		Logistics	LOG
		Mass Communication	COM
		Medical	MED
		Multimedia	MM
		Nursing	NUR
		Occupational Safety & Health	OSH
		Pharmacy	PHA
		Physiotherapy	PTY
		Psychology	PSY
		Radiotherapy	RAD
		Science	SCI
		Physics	SCI
		Mathematics	SCI
		Telecommunication	TEL

Vacancy characteristics		Description	Code
		Tourism/hospitality	TOU
		Zoology	ZOO
10.	Required working experience	1-2 years	JUNIOR
		2-4 years	MEDIOR
		>4 years	SENIOR
11.	Required generic hard skills	Legislative and regulatory awareness	LRA
		Economic awareness	EC
		Basic skills in science and technology	TECH
		Environmental awareness	ENV
		ICT skills/E-skills	ICT
		English language	LAE
		Other language	LAO
12.	Required soft skills	Personal effectiveness	PE
		Relationship and service	RS
		Impact and influence	IS
		Achievement skills	AS
		Cognitive skills	CS
13.	Required specific skills	Yes/No	-

10.6. Appendix E: Skills taxonomy

For the purpose of classifying skills required in JobStreet vacancies, this study adopted a skills taxonomy from RPIC-ViP (2011). In this taxonomy a distinction is made between three groups of skills; soft skills, generic hard skills and specific hard skills. Skills can be placed under these groups:

- **Soft skills** are non-job specific skills that are related to individual ability to operate effectively in the workplace. Usually they are described as perfectly transferable. The following 22 soft skills can be identified and divided in five different clusters:
  1. **Personal effectiveness skills:** *Self-control and stress resistance; Self-confidence; Flexibility; Creativity; Lifelong learning.* These skills reflect some aspects of an individual's maturity in relation to himself/herself, to others and to work. They are related to performance of an individual when dealing with environmental pressures and difficulties.
  2. **Relationship and service skills**: *Interpersonal understanding; Customer orientation; Cooperation with others; Communication***.** These skills enable people to understand the needs of others and to cooperate with them. Communication skills are linked to all clusters and they are included in this one because of their important role in relationship building and communication with others.
  3. **Impact and influence skills**: *Impact/Influence; Organisational awareness; Leadership; Development of others.* Skills in this cluster reflect an individual's influence on others. Managerial competencies are a special subset of this cluster.
  4. **Achievement skills**: *Achievement orientation, efficiency; Concern for order, quality, accuracy; Initiative, proactive approach; Problem solving; Planning and organisation; Information exploring and managing; Autonomy***.** The essence of this cluster is a tendency towards action, directed more at task accomplishments than impact on other people.
  5. **Cognitive skills**: *Analytical thinking; Conceptual thinking***.** These two skills reflect an individual's cognitive processes how a person thinks, analyses, reasons, plans, thinks critically, identifies problems and situations and formulates explanations, hypotheses or concepts.

The five clusters of soft skills presented above are used to classify requirements found in vacancies on JobStreet to see if soft skills were required for the vacant positions put up at JobStreet.

- **Generic hard skills** are described as technical and job-specific abilities, which can be applied effectively in almost all jobs, in a majority of companies, occupations and sectors and in personal life and thus perceived as highly transferable. The following seven (including a separation of communication in foreign languages) generic hard skills can be identified:
  1. **Legislative and regulatory awareness** is the ability to understand basic legislative terms and acts and the ability to apply it in order to solve a range of problems in everyday situation.
  2. **Economic awareness** refers to the ability to understand basic economic terms and concepts like for instance taxes, insurance, bank account, debts, loans, etc. and the ability to apply it in order to solve a range of problems in everyday situation. A necessary knowledge in economics includes also basic mathematical skills.
  3. **Basic skills in science and technology** refer to the ability and willingness to use the body of knowledge and methodology employed to explain the natural world, in order to identify questions and to draw evidence-based conclusions. Competence in technology is viewed as the application of that knowledge and methodology in response to perceived human wants or needs. Skills in science and technology involve an understanding of the changes caused by human activity and responsibility as an individual citizen. It also includes the ability to understand, use and reflect on written texts as well as ability to handle numbers and other mathematical concepts in order to achieve one's goals ot to develop one's knowledge and potential.
  4. **Environmental awareness** skills should enable individuals to better understand the human advances and its impact on the natural world. It should motivate individuals to be interested in our planet and environment protection and to improve our life. These skills have an increasing importance in the coming era of *"low-carbon economy"*.
  5. **ICT skills/E-skills** involve the confident and critical use of Information Society Technology (IST) for work, leisure and communication. It is underpinned by basic skills in ICT: the use of computers

to retrieve, asses, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet. This includes knowledge of main computer applications, communication via electronic media and interconnection ICT tools.

6. **Communication in foreign languages** broadly shares the main skill dimensions of communication in the mother tongue. It is based on the ability to understand, express and interpret concepts, thoughts, feelings, facts and opinions in both oral and written form in an appropriate range of societal and cultural contexts according one's wants or needs. Ability to use foreign languages requires knowledge of vocabulary, functional grammar and an awareness of the main types of verbal interaction and registers of language. For the purpose of this study a distinction is made between *English language* required or an*other language* required.
    - *English language*
    - *Other language*

The seven generic hard skills presented above are used as reference to see whether hard skills were requested in the vacancies extracted from JobStreet.

- **Specific hard skills**, i.e. technical and job-specific abilities that are applicable in a small number of companies, occupations and sectors (possibly one company only), can be specified negatively as hard skills not belonging among the generic ones. They describe special attributes for performing an occupation in practice, whereas required specific hard skills are mostly expressed by employers or schools. They are constituted as a mix of knowledge and abilities used during the practical process. The classification of these types of skills is very hard since employer's requirements were too particular to be comparable. Therefore, it has been decided to put **yes** or **no** when specific hard skills were required in vacancies extracted from JobStreet.

10.7. Appendix F: Employer survey

PENANG SKILLED WORKFORCE STUDY

Company Survey Schedule

Initiated by:

Pejabat Setiausaha
Kerajaan Negeri Pulau Pinang
Unit Perancang Ekonomi Negeri
Tingkat 26, KOMTAR,
10503 Pulau Pinang.
Tel: 04 650 5175/5176

Conducted by:

PENANG INSTITUTE
making ideas work

Penang Institute 10,
Jalan Brown, 10350
Pulau Pinang. Tel:
04 228 3306
Fax: 04 226 7042

Background: Penang Institute is commissioned by the Economic Planning Unit of Penang State Government to undertake a research entitled 'Penang Skilled Workforce Study'. The objective of this study is to identify the types of skills available and types of skills required in selected manufacturing and services sub sectors in Penang. It also aims to contribute a strategic human capital plan for the Penang State Government. Therefore, your response will be invaluable in understanding your needs in terms of skills, training and employment. Please complete this questionnaire and email/fax it back to us by 1 August 2016. All information provided is treated in the strictest confidence.

A. Company particulars

1. Company name: ……

2. Company address: ……

Name of respondent: …… Position: ……

3. Industry code: …….. (Will be filled in by Penang Institute)

4. Year of establishment: …… 5. Country of origin: ◯ Malaysia ◯ Foreign, please specify …….

6. How many establishments do(es) your company have? ◯ One (go to Q8) ◯ More than one (go to Q7)

7. What is the status of this establishment in the company?
   - ◯ Subsidiary (go to Q8)
   - ◯ Main Office/Headquarter (go to Q9)
   - ◯ other, specify …… (go to Q9)

8. Where is your company headquarter located? ……

9. Business activity: what is the main product or service of this establishment? (E.g. Semiconductor)

……..

10. Operational: what operations are carried out (what is made or done) in this establishment? (E.g. Research & Development)

……

11. Qualification of the establishment operations: ☐ Low-end ☐ Mid-end ☐ High-end

B. Current Employment and Distribution Positions/Occupations

1. Current headcount in this establishment (incl. proprietor/MD/CEO):
a. Headcount: ..... b. Male: ....% Female: .....%
c. Junior: ....%
Mid-level: .....%
Senior: .....%

2. Number of **high-qualified*** employees: .....

Note *: High-qualified is defined as employee with a tertiary diploma, certificate or higher qualification (such as bachelor degree).

C. Skills requirements current high-qualified workers and skills gaps

*The following questions pertain to the **current** employees in this establishment.*

1. For each position of high-qualified workers, please indicate the *ideal* skill**-set required to do the work well and the percentage of workers/employees that are fully skilled***.

** *Skills include knowledge/expertise in a specific field needed to do the work well.*
*** *Fully skilled is equivalent to having all the skills in the ideal set.*

Position	Ideal skill-set	% employees fully skilled
e.g. Software programmer	*CAD/CAM design skills; database programming*	*60*

2. For high-qualified workers, have new tasks/operations emerged (related to functional/operational changes) over the past two years?

◯ Yes (go to a. and b.) ◯ No (go to Q3)

a. Please state three (3) newly emerged tasks.

i. .....
ii. .....
iii. .....

b. Please rate how prepared your employees were in carrying out these tasks *according to the desired/required outcomes*?

○ Very well prepared ○ Well prepared ○ Partly prepared ○ Poorly prepared ○ Very poorly prepared

3. For each of the following, please √ one box to show the level of skill proficiency**** of high-qualified employees.

**** *Proficient is defined as possessing and being able to apply the skill as required by the establishment to achieve quality/business objectives*

Skill	1 Highly Proficient	2 Proficient	3 Satisfactory	4 Low Proficient	5 Very Low Proficient	6 Not applicable
Generic hard						
Technical/S&T knowledge	○	○	○	○	○	○
Legal/Economic knowledge	○	○	○	○	○	○
English language proficiency	○	○	○	○	○	○
Foreign language communication (e.g. Mandarin, French, German)	○	○	○	○	○	○
Basic computer literacy/basic IT	○	○	○	○	○	○
Advanced IT/software knowledge	○	○	○	○	○	○
Specific hard						
Industry knowledge	○	○	○	○	○	○
Job-specific (technical/other) abilities	○	○	○	○	○	○
Job-specific knowledge/expertise	○	○	○	○	○	○
Soft & transferable						
Oral communication skills	○	○	○	○	○	○
Written communication skills	○	○	○	○	○	○
Customer handling skills	○	○	○	○	○	○
Team working skills	○	○	○	○	○	○
Problem solving skills	○	○	○	○	○	○
Planning & organising skills	○	○	○	○	○	○
Strategic management skills	○	○	○	○	○	○
Numeracy skills	○	○	○	○	○	○
Literacy skills	○	○	○	○	○	○
Others (specify)	○	○	○	○	○	○

4. For what positions which skills need the most improvement?

Positions	Skill(s) most needs improvement

5. The reason(s) for *low/very low* levels of proficiency of required skills:

- ☐ We hired workers with mismatch in terms of qualifications and actual skills
- ☐ Proficient employees leave the company to work with other companies (labour turnover)
- ☐ Lack of experience/new to the company or area of business operations
- ☐ Employees have not had enough on-the-job training yet
- ☐ Technology changes fast and difficult to keep pace
- ☐ Employees are not motivated enough
- ☐ We had to hire less-proficient workers in the past due to institutional reasons
- ☐ Others, please specific ……

6. What is the high-qualified employee turnover rate in this establishment? ____ %

7. Which categories of high-qualified workers (in terms of positions) have the highest turnover rate?

……

Please elaborate the reason(s)……

8. Over the next 12 months, do you expect that any of your current high-qualified employees will need to acquire new skills or knowledge as a result of newly emerging tasks related to the following? If so, which position(s) will be impacted?

Reasons	**Yes**	**No**	**If yes, what positions will be impacted?**
i. The development of new products and services	○	○	……
ii. The introduction of new working practices	○	○	……
iii. The introduction of new technologies or equipment	○	○	……
iv. New legislative or regulatory requirements	○	○	……
v. Increased competitive pressure	○	○	……
vi. Other, please specify ……	○	○	……

9. **Future** requirement trends

Please indicate the prospective skills needed in the future

Skills needed	**Ability to meet future needs**	
	Yes	No
……	○	○
……	○	○
……	○	○
……	○	○
……	○	○

D. Impact of, and remedial measures towards, skill gaps

1. Do skill deficiencies of *current* employees in **high-qualified positions** negatively impact the business operations and output of this establishment?

◯ Yes

- ☐ Lower quality of the product/service (clients are less satisfied)
- ☐ Lower productivity
- ☐ Difficult to upgrade business operations
- ☐ Difficult to diversify into new products/services/lines of business
- ☐ Difficult to comply with regulations
- ☐ Other, please specify ……

◯ No

2. Measures mitigating skill deficiencies

a. Has your establishment adopted measures to mitigate skill deficiencies in current employees in **high-qualified positions**?

◯ Yes (go to b.) ◯ No (go to question c)

b. Please indicate which of the following measures apply to this establishment?

	Yes		**No**
Labour training/upskilling	◯	(go to c.)	◯ (go to d.)
More supervision of staff	◯		◯
Re-allocate proficient employees for better performance	◯		◯
Use proficient workers more productively (longer working hours)	◯		◯
Incentives to decrease turnover/retention of proficient employees	◯	(go to e.)	◯

Other, please specify ……

c. Labour training/upskilling

i. Organisation: ☐ Internal ☐ External, please specify ……

ii. What type of training? ……

iii. Are there any factors that negatively impact investment in skills-training? (e.g. employees leave the company after training for better paying job)

……

d. Please √ the reason(s) for the absence of labour training/upskilling.

- ☐ No training available in relevant subject area
- ☐ The courses interested in are not available locally
- ☐ The quality of the courses or providers locally is not satisfactory
- ☐ Difficult to get information about the courses available locally
- ☐ The start dates or times of the courses are inconvenient
- ☐ No money available for training
- ☐ External courses are too expensive
- ☐ Managers have lacked the time to organize training
- ☐ Employees are too busy to give training
- ☐ Employees are too busy to undertake training and development
- ☐ Training is not considered to be a priority for the establishment
- ☐ Trained staff will be poached by other employers
- ☐ Other
- ☐ No particular reason

e. If incentives to enhance retention of skill-proficient employees in high-qualified positions:

i. What incentives does this establishment provide?

……..

ii. What career opportunities are available in this establishment for high-qualified employees?

……..

E. Labour recruitment, skills needs and shortages

1. In the period December 2015- June 2016 how many advertisements has this company advertisements has this company advertised on jobstreet for various high-skilled positions;

0-10 ☐ 10-20 ☐ 20-30 ☐ 30-40 ☐ 40-50 ☐ 50+ ☐ None (go to Q3) ☐

2. What other avenues besides Jobstreet advertisement does this company use to recruit new employees for high-qualified positions?

- ☐ Unsolicited applications
- ☐ Advertisements (newspaper)
- ☐ Boards/banners
- ☐ Employment agencies
- ☐ Other, please specify……
- ☐ Other Online advertisement (other employment websites)
- ☐ Employees network: colleagues, family/friends
- ☐ Presentation at educational institutions (open days etc.)
- ☐ Internal recruitment

3. Where does this establishment recruit labour?

☐ Penang ☐ Other states in Malaysia ☐ Abroad

4. As to the high qualified positions advertised, can you indicate what percentage arose for the following reason:

- ☐ expansion of existing company activities ..... %
- ☐ replacement employee who has left the company new ..... %
- ☐ focus in company activities ..... %
- ☐ strategic reorientation of company ..... %
- ☐ other (specify ……) ..... %

5. As to the applications that the company has received for the advertised high-- qualified positions, can you indicate the average number of responses/applicants: .....

6. As to recruitment for high-qualified positions, has this establishment (targeted to) hire(d):

- ○ Applicants with sufficient experience*
- ○ Applicants who are fresh graduates/school-
- ○ leavers 1 Both

* sufficient experience = work experience > 2 year

7. a. Did your company succeed in filling all the vacant high qualified positions?

○ Yes (go to Q8) ○ No (go to b.)

b. If no, which position(s) were not filled and for what reason?

Possible reasons:

1 = No/insufficient applicants; too much competition from other employers
2 = No/insufficient applicants; position too specialised knowledge/skills-requirements
3 = No/insufficient applicants; company not preferred with jobseekers
4 = Applicants not sufficiently/wrongly qualified (educational background)
5= Applicants not enough experience
6 = Applicants not proficient enough in generic skills (hard)
7= Applicants not proficient enough in soft skills
8 = Applicants too demanding (salary, etc.); terms and conditions offered
9= Applicants not right attitude (too little motivated; not serious)
10 = Applicants do not fit the preferences of the establishment
11= Location of establishment not good (enough)
12 = Other, please specify .....

Position	Reason	Position	Reason
.....	☐	.....	☐
.....	☐	.....	☐

8. Are there differences between specific positions in terms of length of time to fill a vacancy?

○ Yes

i. What positions take the least time? .....

ii. What positions take the most time? .....

○ No

9. Those high qualified positions that have been filled, did your company manage to fill them with a person that fully met the job requirements as mentioned in the advertisement?

◯ Yes, all positions ◯ Not all positions ◯ None of the positions

10. If fresh graduates/school-leavers are hired, how prepared were they for working in the position offered?

◯ Very well prepared ◯ Well prepared ◯ Partly prepared ◯ Poorly prepared ◯ Very poorly prepared

Please indicate the reasons for poorly/very poorly prepared graduates/school-leavers.

☐ Lack required hard skills or competencies (e.g. technical or job specific knowledge/skills, IT skills)
☐ Lack required English language skills
☐ Lack required soft skills (problem solving skills, team working skills, literacy/numeracy skills)
☐ Poor attitude / personality
☐ Lack of motivation (e.g. poor work ethic, punctuality, appearance, manners)
☐ Lack of working world / life experience or maturity (including general knowledge)
☐ Other, please specify……

11. If experienced applicants are hired, what is the experience of this establishment as to their integration in the establishment?

◯ very good ◯ good ◯ satisfactory ◯ bad ◯ very bad

Please indicate the reasons for bad/very bad integrated applicants.

☐ Lack required hard skills or competencies (e.g. technical or job specific knowledge/skills, IT skills)
☐ Lack required soft skills (problem solving skills, team working skills, literacy/numeracy skills)
☐ Poor attitude/personality
☐ Lack of motivation (e.g. poor work ethic, punctuality, appearance, manners)
☐ Too demanding, relative to what they can bring
☐ Lack of working world/life experience or maturity (including general knowledge)
☐ Other, please specify ……

12. Overall, what percentage of applicants for high-qualified positions **do** meet most of the requirements as stipulated in the advertisement(s) of the position?

	%

Please elaborate on your answers? ……..

13. Over the past two years, has your company had (other) vacant high qualified positions that proved to be hard to fill?

◯ Yes (go to next Q.) ◯ No (go to Q.15)

14. For those that proved to be hard to fill, can you indicate the positions and level(s) required.

Positions	Level (e.g. junior executive, senior executive, manager etc.)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	

15. In the next 2 years, how much manpower is needed for the different high-qualified positions?

Position	**Number of additional manpower needed**
……	……
……	……
……	……
……	……
……	……

F. Responses to skills shortages

1. Please elaborate on the experience of this establishment as to behaviour of/demands by prospective applicants.

……

2. Does this establishment provide special incentives to hire a candidate who is proficient in required skills and can choose from offers by different employers (e.g. pay salary above the market rate)?

◯ Yes

What incentives are provided? .....

◯ No

3. How often does this establishment go along with high candidate-demands?

Never ◯ Hardly ever ◯ Sometimes ◯ Quite often ◯ Often ◯

What is the reason for this? ……

4. In this establishment, do labour recruitment difficulties (if occurring) have any impact on the following?

Impacts	**Yes**	**No**
Lose business or orders to competitors	◯	◯
Delay developing new products or services	◯	◯
Have difficulties meeting quality standards	◯	◯
Experience increased operating costs	◯	◯
Have difficulties introducing new working practices	◯	◯
Increase workload for other staff	◯	◯
Outsource work	◯	◯
Withdraw from offering certain products or services altogether	◯	◯
Have difficulties meeting customer services objectives	◯	◯
Have difficulties introducing technological change	◯	◯
No impact	◯	◯
Other, please specify.....	◯	◯

5. Over the past two years, has this establishment hired applicants that actually did not meet requirements (in full)?

◯ Yes (go to i. and ii.) ◯ No (go to Q6)

i. Which requirements were not met (most encountered/important deficiency)?

……

ii. Does this have negative implications on the performance in the position? Please elaborate.

……

6. Does this establishment employ newly hired persons for high-qualified positions on a contract/ temporary basis first (before considering permanent engagement?

◯ Yes

What is the usual period of temporary employment? ……

◯ No

7. Is this establishment trying to differentiate itself, with regards to labour recruitment, from other companies in the same sector?

◯ Yes ◯ No

If yes, how is it differentiating?

☐ Starting wages ☐ Working conditions
☐ Fringe benefits ☐ Terms of contracts
☐ Career prospects ☐ Other, please specify ……..

8. As part of recruitment practice, does this establishment directly approach (groups of) persons employed in other companies who have the qualifications, skills and experience for the new positions?

◯ Yes, please elaborate……
◯ No

9. Has this establishment adopted any strategies/measures to retain recently hired employees?

◯ Yes (go to a. and b.) ◯ No go to Q.10

a. What are these strategies?

☐ Remuneration ☐ Working conditions Skills
☐ Fringe benefits ☐ development (firm-specific)
☐ Location/office building development ☐ Promotion/career
☐ Bonding ☐ Other, please specify ……

b. If opportunities are career development/advancement/promotion, what are these opportunities?

……

10. In relation to high-qualified positions and skills (non-)available in the market, does this establishment engage in labour skilling/training programmes?

◯ Yes (go to a., b. and c.) ◯ No (go to d.)

a. How is it organised?
☐ Within establishment/company
☐ External, entire industry
☐ External, please state ……..
☐ Individually
☐ Collectively by industry/employers
☐ federation Private-public Partnership
☐ Other, please specify……..

b. When is it organised?
☐ Before employees start working in this company/establishment
☐ Continuously

c. What is the nature of the training? ……..

d. Why does the establishment not engage in any labour skilling/training programme? (You may √ more than one box)

Reasons	
No training available in relevant subject area	☐
The courses interested in are not available locally	☐
The quality of the courses or providers locally is not satisfactory	☐
Difficult to get information about the courses available locally	☐
The start dates or times of the courses are inconvenient	☐
No money available for training	☐
External courses are too expensive	☐
Managers have lacked the time to organize training	☐
Employees are too busy to give training	☐
Employees are too busy to undertake training and development	☐
Training is not considered to be a priority for the establishment	☐
Trained staff will be poached by other employers	☐
Other, please specify ……..	☐
No particular reason	☐

G. Views about the Penang Labour Market and Policy

Do you have any suggestions as to how government policy should change to improve he employability of high qualified persons in the labour market and alleviating recruitment difficulties of firms?

……

……

Thank you for your cooperation!

Should you have any queries, please contact Thomas (thomas@penanginstitute.org) at 04 228 3306 ext. 218; Jesse (jesse@penanginstitute.org) at 04 228 3306 ext. 211; or Wooi Leng (wooileng.ong@penanginstitute.org) at 04 228 3306 ext. 216.

SUBMIT

10.8. Appendix G: Overview of companies participating in the study

	Company	Person	Job title	Date	Interview	Online survey
1.	B. Braun	Joshi H.	Head of Government Affairs & Market Access	08-04-2016	X	
2.	Altera	Osman S.	Managing Director	08-04-2016	X	
3.	Malaysia International Chamber of Commerce (MICCI)	Dawson, P.	Branch Executive	14-04-2016	X	
4.	CAT Centre	Ch'ng E.	Manager	18-04-2016	X	
5.	Adecco Personnel Sdn Bhd	Chew J.	Branch Manager	20-04-2016	X	
6.	All Staff Outsourcing Sdn Bhd	Samantha T.	Manager	21-04-2016	X	
7.	Kelly Services	Choo A.	Client Solution Manager	21-04-2016	X	
8.	Penang Labour Department (Jobs Malaysia)	Latifah P.	Manager	21-04-2016	X	
9.	Carreer Channel	Wong V.	Branch Manager	04-05-2016	X	
10.	PricewaterhouseCoopers (PwC)	Kang J.	Executive Director Human Resources	10-05-2016	X	
11.	B. Braun	Tertel J.	Senior Vice President Human Resources	17-05-2016	X	
12.	Hotel Neo+	Rahidah Binti R.	Human Resources Manager	31-05-2016	X	
13.	Red Rock Hotel	Lee, T.	Human Resources Executive	03-06-2016		X
14.	EPS consultants Sdn Bhd	Ng, G.	Senior Manager	07-06-2016	X	
15.	Intel Microelectronics	Mi Mi H.	Talent Acquisition Manager	08-06-2016	X	
16.	JS Soo & Co	Foo, K.F.	Partner	13-06-2016		X
17.	Penang Skills and Development Center (PSDC)	Mydin M.A.H.	Chief Executive Officer	13-06-2016	X	
18.	Kelly Services	Choo A.	Client Solution Manager	20-06-2016	X	
19.	Paramit	Crombrugge van M.	Country Manager	27-06-2016	X	
20.	EPS consultants Sdn Bhd	Ng, G.	Senior Manager	28-06-2016	X	
21.	Ixora hotel	Cheng D.	Human resources Manager	28-06-2016	X	

	Company	Person	Job title	Date	Interview	Online survey
22.	Malaysian Dutch Business Council	Benoist D.	Director	29-06-2016	X (via Skype)	
23.	Lexi Consulting	Lakshmanan, V.	Director	29-06-2016		X
24.	Talent Corporation Malaysia Berhad	Lee L.	Product specialist	01-07-2016	X	
25.	Boardroom Corporate Services	Ong T.	Human Resources Manager	11-07-2016	X	
26.	DreamCatcher	Hoe K.	Director	11-07-2016	X	
27.	Lumiled Lighting	-	-	11-07-2016		X
28.	Hotel Jen	Weightman G.	General Manager	12-07-2016	X	
29.	Shangri-La Raya Sayang Resort	Ramesh J.C.	Human Resources Director	13-07-2016	X	
30.	Motorola Solutions	Hari N.	Managing Director	14-07-2016	X	
31.	Piktochart	Shen D.Q.	Human Resources Manager	15-07-2016	X	
32.	National Instruments	Azian P.N.	Chief of operations	22-07-2016	X	
33.	Globetronics	Tan S.	Human Resources Executive	22-07-2016		X
34.	Cincaria Sdn. Bhd.	Janice	Human Resources Manager	01-08-2016	X	
35.	Keysight Technologies	Tang M.	Human Resources Manager	01-08-2016	X	
36.	Wawasan University	Shuib S.B.	Human Resources Manager	04-08-2016	X	
37.	Ren I Tang Hotel	Uma. A.	Director	09-08-2016	X	
38.	UWC Group	NG J.	Operating Manager	10-08-2016		X
39.	Green Point Precision	Yap E.L.	Human Resources Manager	10-08-2016		X
40.	AT Precision Tooling	Song T.B.	General Manager	10-08-2016		X
41.	Tai Ohm Electronic	Wang	Human Resources Manager	11-08-2016		X
42.	Plexus	Lee G.C.	Manager	11-08-2016	X	X
43.	Hong Kong Ban Kah Chai Medical	Tan B.	Human Resources Manager	11-08-2016		X
44.	Han Chiang College	-	-	12-08-2016		X
45.	Bayview Beach Hotel	Komathi G.	Human Resources Manager	12-08-2016	X	
46.	Amphenol TCS	Lee T.	Regional Manager	15-08-2016	X	

	Company	Person	Job title	Date	Interview	Online survey
47.	Jabil Global Business Centre	Teh G.	Human Resources Manager	15-08-2016	X	
48.	Northern Corridor Implementation Authority	Hashim P.J.	Director	16-08-2016	X	
49.	G-Tek Electronics	Norfaizura A.B.	Human Resources Officer	16-08-2016		X
50.	Smart Modular Technologies	Ng S.P.	Section Manager	16-08-2016		X
51.	Atmel Corporation	Chuah J.	Senior Director	16-08-2016	X	
52.	Penang Science Café	Leong D.C.	Advisor	17-08-2016	X	
53.	Thomson Reuters	Lin T.E.	Human Resources Manager	19-08-2016	X	
54	Ain Medicare	Hasbullah A.B	Manager	19-08-2016		X
55.	Cypress Semiconductor	Jin G.C.	Managing director	22-08-2016	X	
56.	OSRAM Opto Semiconductors	Mueller R.	Managing director	23-08-2016	X	
57.	Uni-Vessel Engineering	Jesslyne	Human Resources Manager	23-08-2016		X
58.	Wilmar	Oh M.	Human Resources Manager	26-08-2016	X	
59.	Alliance Contract Manufacturing	Kek K.L.	Human Resources Manager	26-08-2016		X
60.	Agilent Technologies	Toh S.C.	Human Resources Manager	01-09-2016	X	
61.	Vitrox Corporation Berhad	Eng Y.S.	Human Resources Manager	02-09-2016	X	
62.	Dell	Goh C.T.	Human Resources Manager	02-09-2016	X	
63.	Island Hospital	Muniswar M.	Human Resources Manager	07-09-2016	X	
64.	Adventist Hospital	Khim C.Y.	Human Resources Manager	08-09-2016	X	
65.	Gleneagles Penang	Loh I.	Director	08-09-2016	X	
66.	Info-Kinetics	Lim G.B.	Human Resources Manager	08-09-2016	X	