

SKILL DEFICIENCIES AND GAPS: UPSKILLING INFRASTRUCTURE



This chapter focuses on Penang's education and upskilling infrastructure in relation to skill deficiencies and gaps. This infrastructure is sizeable and diverse, reflecting the skill issues pertaining to high-qualified labour, and how these are being addressed in multiple ways. We present a general framework of skills infrastructure where the primary, secondary and tertiary skill learning channels are discussed in detail in separate sections. Specifically, we cover :-

- Primary skill learning institutions and concerns surrounding their output and quality;
- Skill gaps of the secondary supply;
- The nature of these gaps, the role of upskilling taken by firms in different industries, avenues of upskilling and its impact; and
- Regional and local institutional initiatives to enhance high-qualified labour and skills.



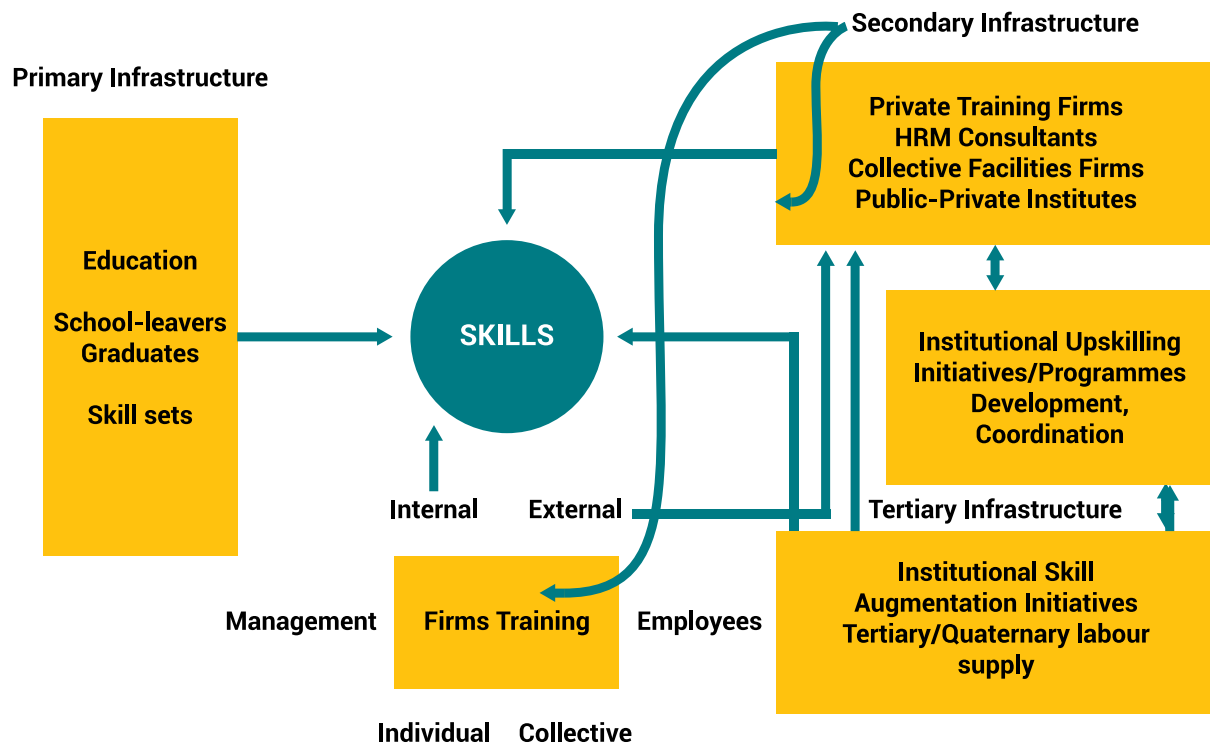
6.1 Framework

In Penang, the general structure of skill production consists of a primary, secondary and tertiary infrastructure. The first one – primary – consists of formal institutions of higher learning that equip diploma/certificate holders and graduates with skill-set to enter the labour market (Figure 6.1). Upskilling is the focus of a secondary infrastructure consisting of private training providers; HRM consultants, firms engaged in training, internal or external, individually or collectively. PSDC and FMM-run programmes are examples of collective arrangements. Public-private initiatives such as Malaysian-German Chamber of Commerce and Industry Training Programme (although in this case TVET targetted) are becoming larger in number.

A number of institutions such as NCIA have recently engaged in initiatives for development of training programmes; they are distinct from institutions that focus on skill augmentation, and have recently established a presence in Penang. As for the latter, the prime institution is TalentCorp, which through its programmes in an indirect way addresses deficiencies within the existing labour force through the avenue of mitigating shortages. We refer to institutionally developed and implemented programmes as the tertiary infrastructure that often uses (part of) the secondary infrastructure as implementation vehicle.

The secondary and tertiary infrastructure are sizeable. It is sometimes referred as unconventional, while the primary infrastructure is conventional.

Figure 6.1: Penang skills learning infrastructure



6.2 Primary skills learning infrastructure

The formal education system is the prime pathway of human capital building. Penang has a wide range of tertiary education institutions – colleges and universities – and programmes that cater to the needs of manufacturing and services industries. Altogether there are 27 private and eight public higher learning institutions offering tracks for certificate and diploma qualifications, bachelor degrees and postgraduate degrees. A listing of these institutions and available training programmes with accredited qualifications is presented in Appendix E.

As for certificate programmes, it is found that private higher learning institutions offer more tracks than public higher learning institutions. These include Social Sciences, Business & Law (Business IT, Human Resource Development etc.); Science, Mathematics & Computing (Hybrid System Technology, Computer System Administration, Computer Technology); Engineering, Manufacturing and Construction (Precision Machining Technology, Industrial Automation, Quality Assurance); and Services (Tourist Guide, Hotel and Tourism, and Cabin Crew Training). Penang has two public higher educational institutions offers certificate tracks, namely Institut Latihan Perindustrian Perai (in Welding & Gas Technology and Automotive Technology) and Institut Kemahiran Belia Negara Bukit Mertajam (Electronic Technology in Wiring).

Similarly, private institutions dominate the provision of diploma curricula. Those in Social Sciences, Business & Law offer most subjects, including Accounting, Business & Finance, Business Information Technology, Logistics Management, e-commerce & Marketing and so on. This is followed by Humanities & Arts (27 subjects); Science, Mathematics & Computing (20 subjects); Engineering, Manufacturing & Construction (19 subjects); Services (13 subjects); Health & Welfare (6 subjects); and Education (3 subjects). While public institutions have well-developed Social Sciences, Business and Engineering curricula, none of them offer subjects in Humanities & Arts (such as Digital Animation, and Graphic and Multimedia Design).

Universiti Sains Malaysia (USM) is the core provider for degrees as well as postgraduate programmes in the region. While most of the private institutions focus their degree programmes on Social Sciences and Business Studies (Accounting & Finance, Business IT, Commerce,

Business & Human Resources), public institutions such as USM and Wawasan Open University (WOU) have a broader range of programmes.

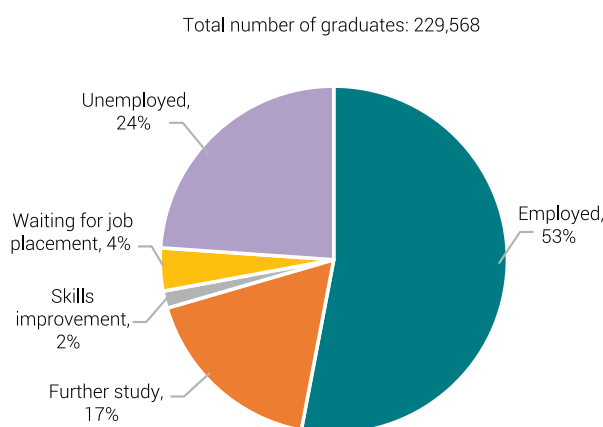
6.3 High-qualified entrants: Extent and causes of skill deficiencies

There is little evidence to argue that there is a substantial mismatch between curricula and industry demand. Therefore, the skill deficiencies can hardly be traced. There are, though, significant issues and challenges for the primary supply that contributes to an emergence and growth of unconventional sources of skills and modes of skilling. Three inter-related issues and challenges with regard to skill deficiencies are considered below.

6.3.1 Graduate employability

As delineated in the national Graduate Tracer Study 2015, while the majority of graduates are employed six months after graduation, nearly one-fourth of the total fresh graduates were not employed in 2015 (Figure 6.2). This means that unemployment could be high for this group of workforce despite the fact that the unemployment rates in Penang and Malaysia are relatively low.

Figure 6.2: Employment status of graduates six months after graduation in Malaysia, 2015

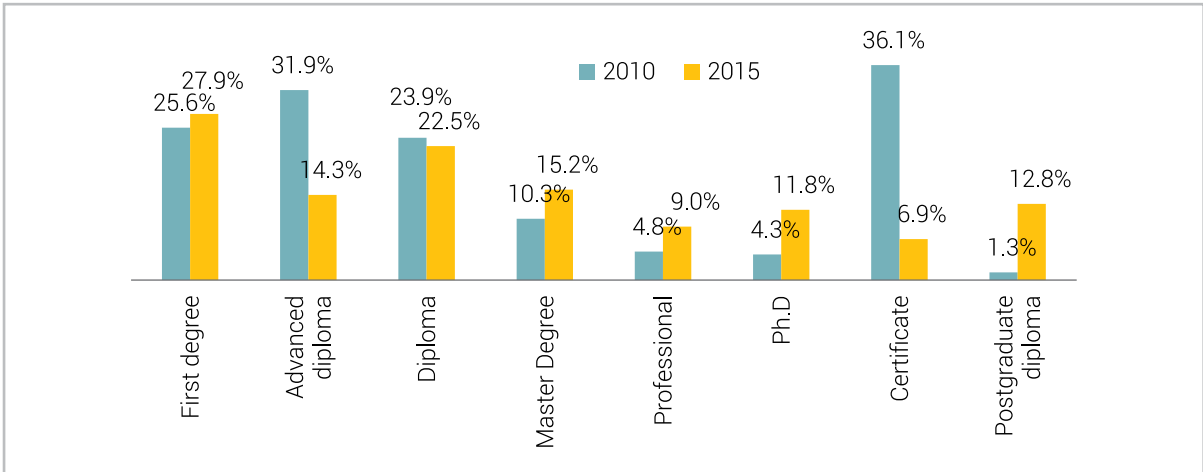


Source: Graduate Tracer Study, Ministry of Higher Education Malaysia (MoHE)

Within the group of graduates who had not found employment, nearly 28% were first degree holders; master's degree and Professional degree holders. PhD holders also constituted a fair share (Figure 6.3). This finding is corroborated by the Malaysian and Penang unemployment picture. Since 1990, unemployment has lingered around 2.4-3.4%; Penang even reaching a historic low of 0.7% in 1996 (Figure 5.4). It has consistently remained below the Malaysian average, recording at 3.4% against that of Penang at 2.1% in 2016. The Malaysian average has lingered at 3.0-3.5% throughout the 2010s.

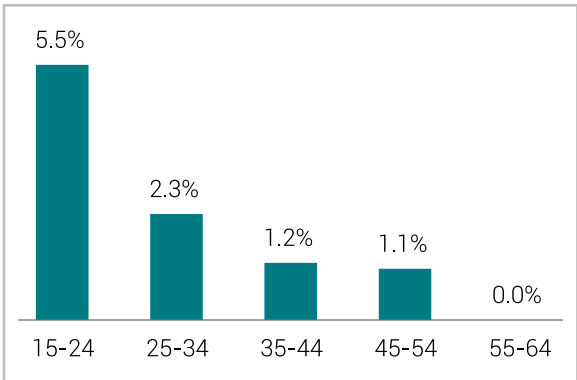
In contrast, between 2010 and 2015, the average unemployment rate among graduates with a first degree qualification climbed by 2.3%; unemployment among master' degree, PhD, or postgraduate diploma holders has escalated substantially by about 5% (Figure 6.3). Furthermore, Penang's youth⁵⁵ unemployment is disproportionately high even though it has dropped from 20% in 2005 to about 16% in 2015. The share is still disproportionately high compared with other age cohorts (Figure 6.4), and also the overall unemployment rate. Out of 18,100 unemployed persons, about 41% were youth registering at a rate of 5.5% in 2016. This partly reflects graduate unemployment in Penang.

Figure 6.3: Percentage of graduate unemployment by education level in Malaysia between 2010 and 2015 (%)



Source: Own calculations based on the Graduate Tracer Study Reports published by the Ministry of Higher Education Malaysia

Figure 6.4: Unemployment rate by age groups in Penang, 2016



Source: Own calculations based on Labour Force Survey Report 2016, DOSM

This result is likely due to the insufficient demand to absorb the growing number of tertiary educated workers, thus forcing them either to accept lower-skilled jobs, stay (voluntarily) unemployed, or move out of the labour market (migrate). This indicates a mismatch between the curricula of higher education and local market demands. Besides that, tertiary-educated workforce is insufficiently hired due to low employability, which implies that the workforce does not possess the required skills. Therefore, a dual process is suggested where mismatch between demand, supply, and skill deficiencies prompts some employees to leave the market or take up employment in less-qualified jobs despite their education qualifications. The 'learnt output' of curricula of higher education has two facets.

⁵⁵ Youth is defined as the age group of 15-24.

The first is the subject mix of graduates, in large part determined by their preferences. The second is the mix and quality of skills learnt.

6.3.2 Subject choices of entrants

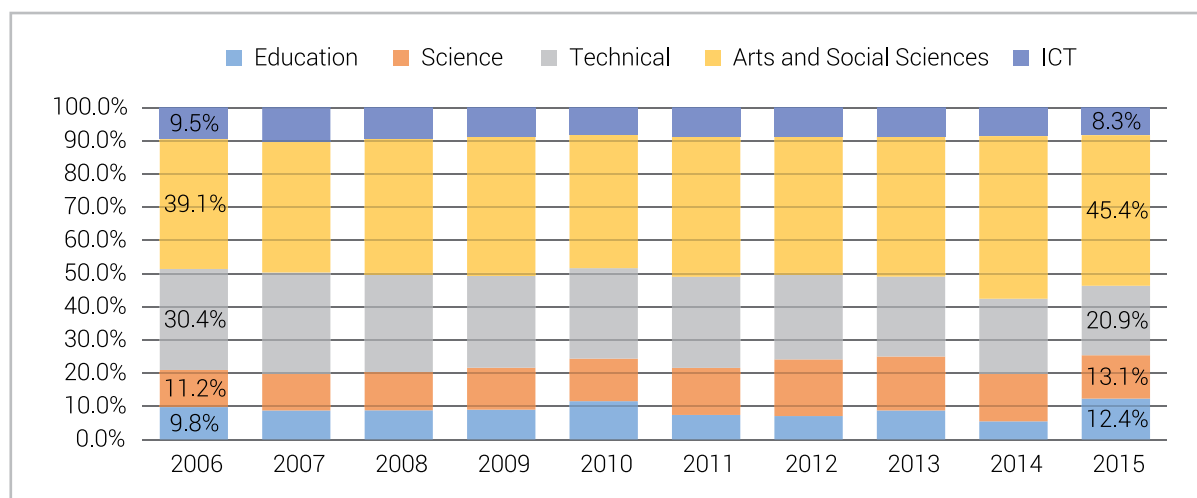
It is often asserted that a significant number of graduates in Malaysia choose their field of study without duly considering labour market demand. Figure 6.5 shows that the number of graduates opting for arts and social sciences fields have increased over time, while the share shows the opposite trend for technical, IT, or science related fields.

Figure 6.6 associates employment status (employed, further studies and unemployed) with graduates' major fields of study. While Arts and Social Sciences

graduates constitute the largest group among the employed persons, this is also the case among those staying unemployed six months after graduation. In 2015, nearly half of them had an Arts and Social Sciences background.

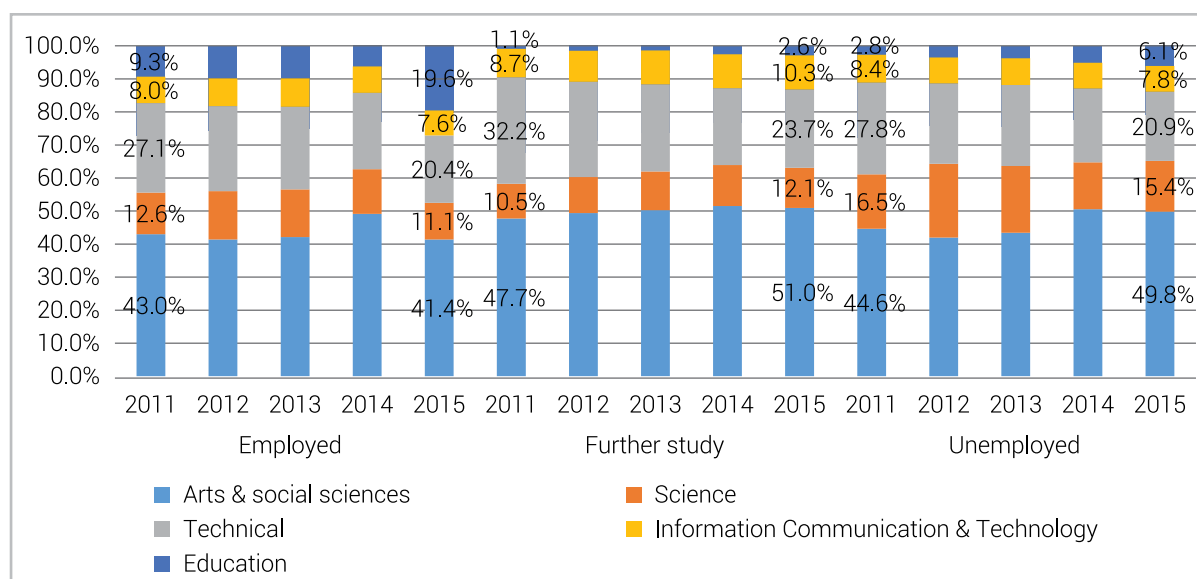
Social Sciences, Business, and Law remain as the favourite programmes among students originating from Penang. As shown in Figure 6.7, at least one-third of students from Penang graduating from public universities in Malaysia had pursued these programmes. While the fields of Engineering, Manufacturing and Construction produced the second largest number of graduates, the share has been shrinking over the years.

Figure 6.5: Graduates by fields of study in Malaysia, 2006–2015 (%)



Source: Ministry of Higher Education, Malaysia

Figure 6.6: Graduates by fields of study and employment status in Malaysia, 2006–2015

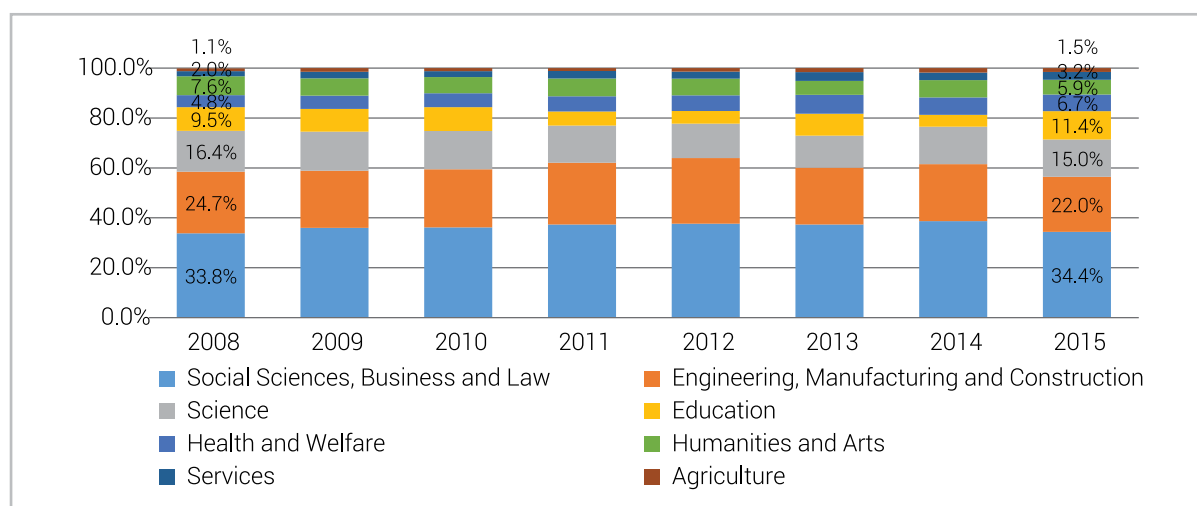


Source: Graduate Tracer Study, Ministry of Higher Education, Malaysia

On the other hand, the structure of graduates from Penang's public higher learning institutions – USM and UiTM – is dissimilar to that of Malaysia. These universities yield an average of 5,600 graduates yearly in the period 2008–2015. Over one-third of

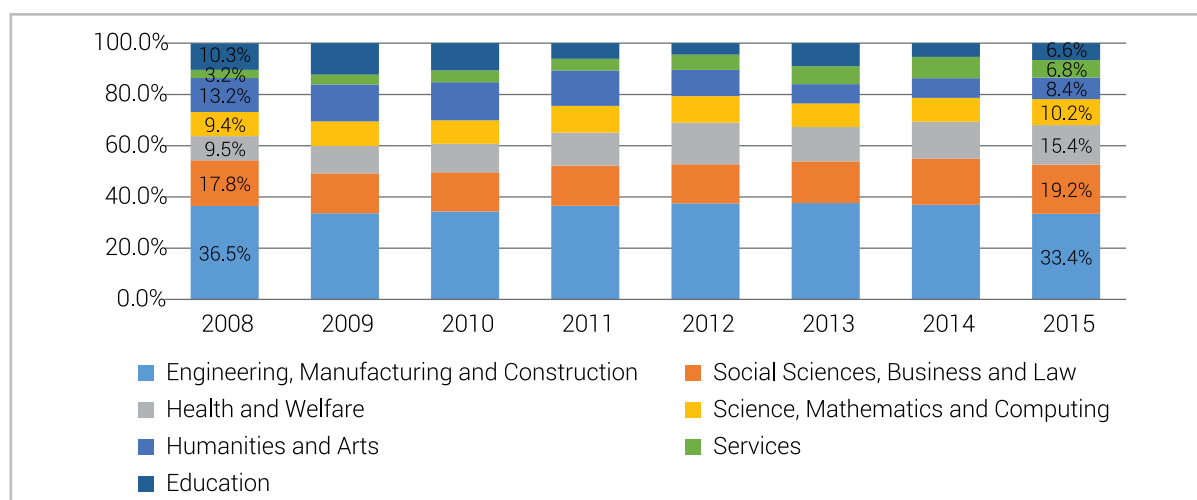
them graduated in Engineering, Manufacturing and Construction (Figure 6.8). Thus, graduates from Penang's public universities show a trend with more scope for synergy between university programmes and industry.

Figure 6.7: Fields of study in Malaysian public universities of graduates originating from Penang, 2008–2015



Source: Own calculations and Planning, Research, and Policy Coordination Division, Ministry of Higher Education, Malaysia

Figure 6.8: Fields of study of graduates in public universities in Penang, 2008–2015 (%)



Source: Own calculations and Planning, Research, and Policy Coordination Division, Ministry of Higher Education, Malaysia

It seems that students today are more interested in other fields of study than traditional fields such as business, engineering, IT, accounting, finance, entrepreneurship, hospitality and culinary arts. However, the lacklustre interest in sciences and engineering programmes remains problematic. Thus, employers continue to lament that graduates select wrong fields of study as the chosen programmes do not parallel with industry needs.

6.3.3 Skill deficiencies: Are graduates/school-leavers sufficiently prepared?

Looking at the number of graduates, it is estimated that the labour supply is able to fulfill the needs of Penang's firms if quality is met. In the World Bank's Enterprise Surveys, the fraction of firms reporting inadequate skilled workforce as major constraint was higher in Malaysia (2015: 12.2%) than in Thailand (2016: 2.1%), Philippines (2015: 3.5%) and Indonesia (2015: 10.8%). The high unemployment rate among high-qualified graduates can likely be explained in part by the lack of skills and knowledge from fresh graduates especially with low preparedness. Despite their qualifications, the skills acquired do not meet the standards required by employers.

Issues concerning low employability of fresh graduates can be supported by different international benchmarks.

Malaysian universities have dropped in international rankings despite generous public funding⁵⁶. It is often argued that work preferences and attitudes of graduates (in terms of salary demand and benefits) and preparedness (well-equipped to enter the labour market in terms of quantitative and qualitative skills) are in stark contrast. Such lack of sync has several aspects to it. First, in a constrained labour market, there is a general tendency to over-demand. The talent paradox is raising the stakes in the competition for critical talent, with organisations trying to outbid each other for a selected group of critical employees, and the skills they need to succeed. Next, over-demand does not concern price per se, but rather, fresh graduates' inability to meet the skills required by employers, leaving attitude(s) and demand(s) as part of the issues (see Box 6.1).

As for the level of employer satisfaction with new graduates, some 65% in the employer survey indicated that (fresh) graduates are partly or poorly prepared for the positions. This is mainly attributed to the lack of required hard skills, English and foreign language skills, soft skills and knowledge/work experience. Firms in advanced producer services and financial services rate preparedness of (fresh) graduates relatively poorer than firms in other industries. It may be noted here that the majority of firms in these two industries are MNCs. This is consistent with the higher than average skill requirement of MNCs.

⁵⁶ See World Bank (2007); Sharifah (2013)

Box 6.1: Graduates' attitudes and demands: Self- and employers' perceptions

All recruitment agencies interviewed agreed that salary and compensation packages are prime factors for fresh graduates to consider job offers. Working culture of the company and flexibility of working hours come next. Furthermore, training and career development opportunities are increasingly considered as self-evident, especially in the case of the millennials and Gen-Y.

Employers in many industries narrate such attitudes and often lament these, repudiating job-interviewees who appear only self-interested while showing lack of skill substance. This negatively impacts employability and actual hiring.

Insufficient training at colleges and universities is a concern expressed by stakeholders, among other recruitment companies. They comment that today's education system places too strong an emphasis on acquiring theoretical knowledge, and does not focus enough on teaching students to think critically and solve real world problems nor, collaborative enough in its approach to ensure students are equipped to succeed in a changing world. While internships are an excellent vehicle for exposure, too little is done and offered in this area. Industry and university should hold

closer dialogues to achieve an effective supply of high-qualified labour.

Universities and colleges in first instance necessarily focus on skills at a generic level; it is harder to cater to skills specifically for individual industries and even more so individual companies. Positions with high skill-specificity requirements present hiring difficulties. For example, IC designers require knowledge in Spice simulators, Spectre, and Analog Artist. These are job- and firm-specific requirements. In some instances, employers need to work closely with institutes of higher learning to cater to and improve the basic level of specific skills needed in the industry. Gaps are being filled by an increasing number of industry-university collaborations in the form of tailored programmes.

Unconventional skills training comes into the picture when the skills acquired from universities are insufficient to perform the given tasks effectively. It also responds to skill gaps in the secondary supply, or – more narrowly – of existing employees in firms. The existence of a sizeable upskilling infrastructure is an expression of the presence of gaps, and at the same time contributes to solving these. A tertiary infrastructure also constitutes part of the response to skill gaps (and shortages that convert into gaps once skill-deficient persons are hired by firms). Box 6.2 elaborates the issues and challenges faced by the higher educational institutions.

Box 6.2: The voice of educational institutions: Issues and challenges

Educational institutions are aware of the negative perception of the market in regard to skills proficiency, employability, and industry readiness of graduates and school leavers. According to the attendants of the focus group on local educational institutions, there still exist gaps between industry needs and technical skills as well as soft skills taught in the curriculum. Programmes offered are not always producing industry-relevant graduates. They are aware that exposure to international experience, innovation, individual creativity, critical thinking, communications, and collaboration are necessary elements for student development. We highlight key issues and challenges faced by educational institutions below.

- While curricula have evolved in regard to the types of skills taught and learnt, there are important limitations and impediments. Time constraints of courses do not allow '21st century skills' to be incorporated to the desired level.
- Attitudes of many students are such that exposure to skills learning beyond what is being assessed or formally examined is not rightly valued. It is rather difficult to change the attitudes.

- Rules and regulations are such that devising and implementing curriculum changes are extremely cumbersome and time-consuming. The same applies to setting up industry-university collaborations (comprising internships, practical trainings in companies) and joint programmes with overseas educational institutions. The need for private colleges to comply with regulations, specifically Malaysian Qualification Agency (MQA) requirements, means that any curriculum change is subject to a lengthy process of approval. This creates great uncertainties for institutions in tailoring programme adjustments.
- Another issue brought up is that – while educational programme planning must necessarily be long-term in view of institutional factors – long-term needs of the economy are in fact not easy to forecast in terms of quantifying labour needs.
- Besides, it appears that skill shortages are more acute in niches of the economy and labour market. It is difficult for a large educational institution to cater to all these niches.
- As such, the industry cannot expect the educational field to be able to cater to the full range of industry needs, including a full set of soft skills.
- The industry could be more forthcoming in providing opportunities for internships and practical periods. It will remain difficult to create enough opportunities for students if this does not take place.
- Given the constraints faced by educational institutions, it is logical that a substantial secondary infrastructure – a web of (semi-)private skill providers – has developed. This development is not entirely adverse to the upskilling infrastructure as long as there is sufficient synergy between primary and secondary infrastructure. Nevertheless, there is little communication between skills training providers in responding to the market needs.
- While there is one in rudimentary form, the institutional structure for industry-university dialogue should be improved. The industry scope should be widened to encompass new and growing industries; dialogue should be carried out more frequently and be deepened with a view to establishing a well-functioning industry-education collaboration.
- On the other hand, curricula gearing towards industry needs and overall development of students should be maintained. The growing of human capital serves a deeper function than industry needs of the day. And it's also about long-run personal development.
- In sum, systemic changes in the educational field can substantially contribute to the needed flexibility (and perhaps) more autonomy of individual institutions of higher learning.

6.4 Secondary supply: Skill gaps

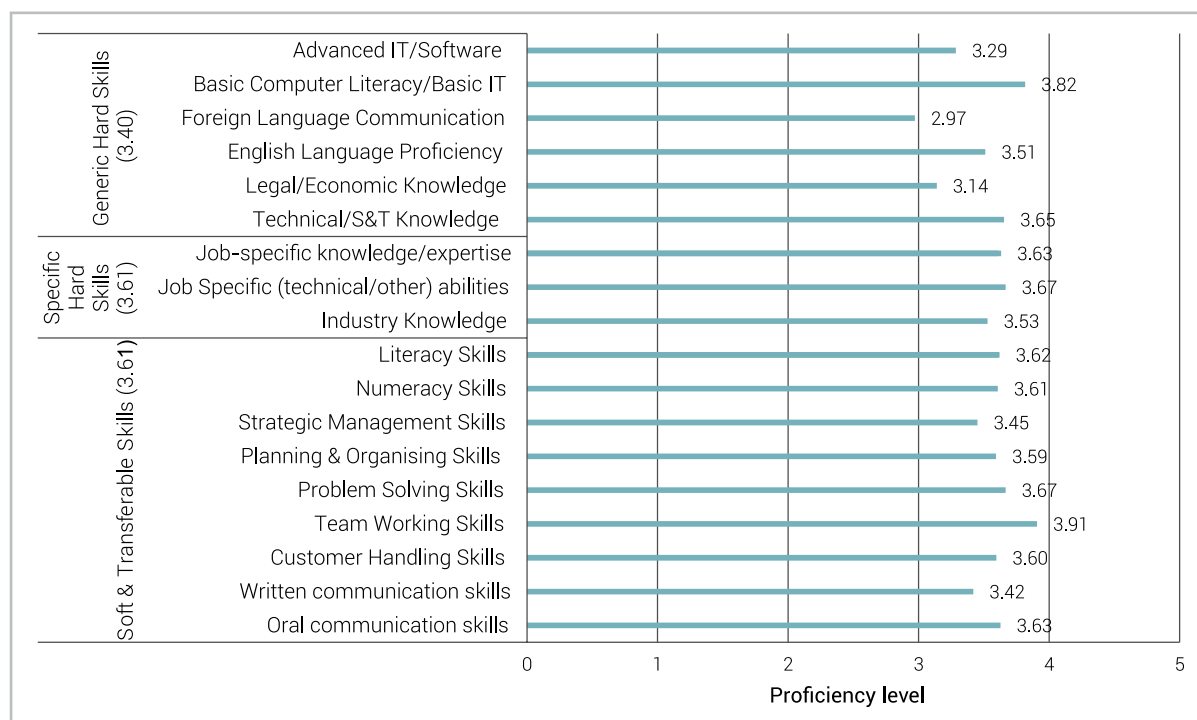
As discussed in Chapter 2, skill gaps refer to a situation where there is a mismatch in the skills being acquired and the skills required in the labour market, resulting gap between what the employers need and what jobseekers can offer. It is an internal skill deficiency. The gap exists within the firm's workforce. To a certain extent, skill gaps are unavoidable given the dynamics of operations of firms. However, the situation can be alarming when the gaps result in firms having difficulty meeting business objectives. The following sections discuss the indicators of skill gaps based on the results of the employer survey.

6.4.1 Skills proficiency of current employees

Skills proficiency is defined as employees who possess the skills, are able to apply these skills, as required by the establishments. To examine the skill gaps within the establishment, we asked employers to indicate the level of proficiency of current high-qualified employees in regard to generic hard, specific hard, soft and transferable skills.

Figure 6.9 depicts the average rating of skills proficiency of current employees. Employers could rate from very low (1) to high (5) proficiency. Specific hard skills, soft, and transferable skills score an average rating of 3.61 while the average score for generic hard skills is slightly lower at 3.4. The latter derives from relatively

Figure 6.9: Firm rating of skills proficiency level of current employees by specific types of skills



Note: 1=Very low proficiency; 2=Low proficiency; 3=Satisfactory; 4=Proficient; 5=High proficiency
Source: Employer survey

low scores on foreign language and IT skills as well as specific economic/legal knowledge. The rating of these skills contrasts with the rating of other generic skills, which is satisfactory. Surprisingly, English language proficiency is not rated as deficient as anecdotes suggest. Nevertheless, the ratings are hardly comforting. Generic hard skills are associated with the training provided at institutes of higher learning. The ability to use English language, IT and S&T knowledge are skills that should have been acquired in universities and/or colleges in the respective fields of study. These again raise the concern about the efficacy of tertiary education institutions in generating competences of high-qualified workers that match expectations of employers.

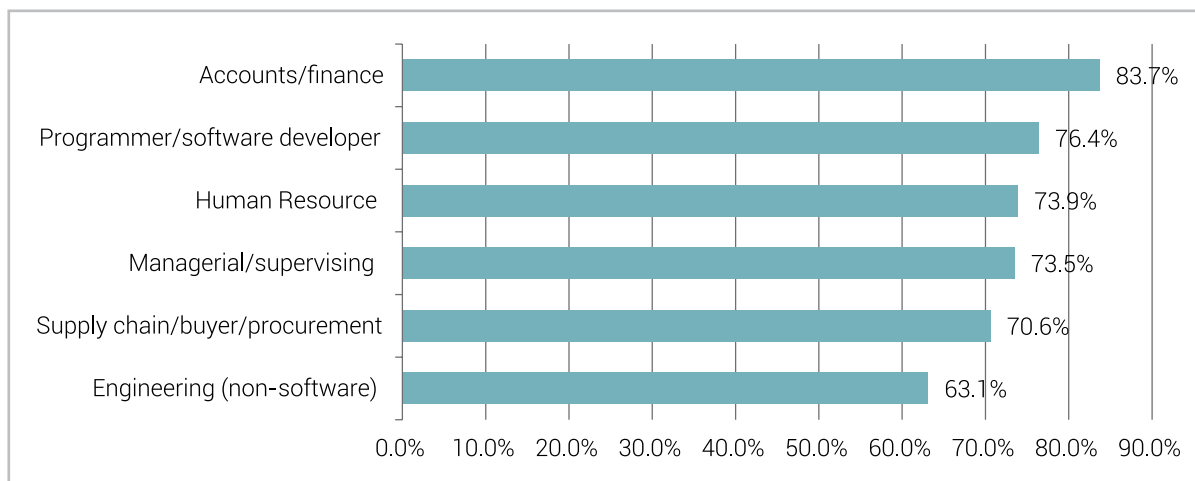
Specific hard skills, on the other hand, stand slightly above generic hard skills. Being job- and industry-specific, scarcity in the market is compensated by skill training. Employers are most willing to invest in these as they are crucial and least transferable. It may thus reflect the investment in training.

With respect to soft and transferable skills, the average proficiency level of current employees across the individual skills ranges between 3.42 and 3.91. While all score above the satisfactory level, communication and strategic management skills are rated the lowest (or below average). Interestingly, ratings given by firms in services sector (especially Global Business Services and Hospitality Services in the large local and foreign establishments) are more favourable than those given by firms in the manufacturing sector.

6.4.2 Ideal skill-set and how this requirement is met

Given the skills proficiency level of current employees, employers were also asked to specify the ideal skill-set for employees in diverse functions as well as the percentage of employees in core functions meeting this requirement. Ideal skill-set refers to the skills, knowledge and competencies necessary to perform a job. Ideal skill-set for a range of functions are described in full in Appendix D. It obviously varies across job

Figure 6.10: Average share of employees in top five high-qualified job positions that are fully skilled



Source: Employer survey

positions. Fully skilled in this context is equivalent to having all skills in the ideal skill-set. Respondents have shared their estimates for core job functions of their establishments. The average fully skilled score for the top five high-qualified positions based on firm responses are presented in Figure 6.10. Accounts & finance top in the list where firms have rated an average of 83.7% of employees as fully skilled. This implies that current employees working in accounts & finance positions have high likelihood to fulfill the ideal skill-sets required by employers compared with other high-qualified positions. The ideal skill-set includes knowledge of tax systems, accounting software and corporate regulations.

Programmers and software developers come next where firms considered an average of 76.4% of employees to be fully skilled. These positions are rather specific and require cutting-edge technical skills that encompass programming languages (Javascript, Python, C++, mobile app, etc.) or web design skills (user-interface and user-experience). With only 63.1% of employees thought to be fully skilled, non-software engineering functions score the least favourable, lower than functions in supply chain management, management and human resources.

6.4.3 Skills that need the most improvement

Skill gaps can also be derived from employers' perception pertaining to skills that need most improvement within the establishments. Table 6.1 presents skills that need most improvement in terms of generic hard skills, specific hard skills (technical and business skills) and soft skills, as expressed by different types of firms. Specific technical skills and soft skills clearly emerge as skills that need improvement. Of 34 SMEs, more than half cite specific technical skills as needing the most improvement. LLCs on the other hand, regard soft skills as needing the most improvement compared with other skills. This is expressed by about half of SMEs but by less than 40% of MNCs. MNCs also view the importance of specific technical skills improvement.

The specific technical skills include engineering, programming, design and software development while soft skills include communication (spoken and written), problem-solving, critical thinking and presentation skills. This is primarily explained by either lack of training and experience or recent hiring by company. With technology evolving rapidly in high-tech manufacturing firms, it is difficult for employees to keep pace. This is the most frequently mentioned reason for the poor performance in specific technical skills.

Table 6.1: Skills that need most improvement by firm size (%)

Types of Skills	SME	LLC	MNC	Not Available (Firm size undetermined)
Generic Hard Skills	0.0	12.0	13.2	50.0
Specific Hard: Technical Skills	53.1	20.0	39.7	50.0
Specific Hard: Business Skills	0.0	4.0	7.4	0.0
Soft Skills	46.9	64.0	39.7	0.0
Total	100.0	100.0	100.0	100.0

Source: Employer survey

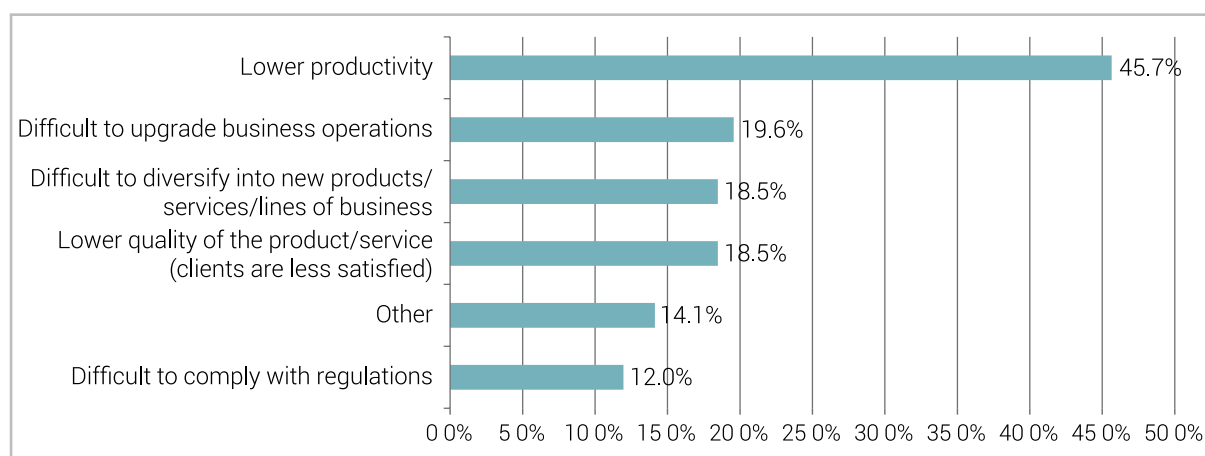
Although not always used as consideration in recruitment – as seen earlier – in view of general availability, the findings here still confirm the increasing relevance of specific hard and soft skills in the functioning of higher-qualified employees, illustrating again the specific dynamics of skill demands as firms and industries change.

6.4.4 Negative effects of skill gaps

Skill gaps can negatively affect business performance of an establishment. It will increase business operating costs, and affect firm's capacity to absorb new technologies. The surveyed firms generally agreed on the main consequences of skill deficiencies. As shown in Figure 6.11, about 46% indicated that this situation lowers firms' productivity; about one-fifth of firms are

affected in diverse areas: making it difficult to upgrade business operations, and/or difficulties in diversifying business activities into new products and services, and/or leading to lower quality of products and services. The low productivity appears to have the most impact on LLCs; second on SMEs, and then MNCs. Overall, difficulty complying with regulations is the least cited by surveyed firms.

The findings are in line with feedback from employers where skill gaps can potentially cause delays in meeting customer commitments, or compromise the quality of output. In some instances, proficient employees are required to work more to compensate for those lacking in competencies. Hence, measures mitigating skill deficiencies are crucial to improve business efficiency.

Figure 6.11: Impacts of skill gaps of current employees (%)

Note: Three respondents did not respond to this question.
Source: Employer survey

6.5 Overcoming issues and skill gaps

6.5.1 Firm responses

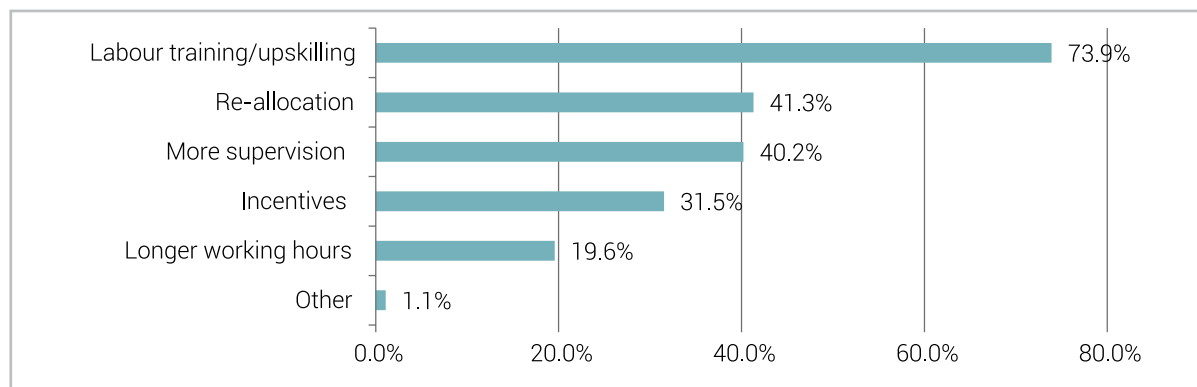
Many establishments have already adopted an array of measures to mitigate skill deficiencies. The most common measure taken by nearly three-quarters of those affected is to provide labour training or upskilling (Figure 6.12). Employers are more likely to attract and retain good employees if organisations offer training and development initiatives. This, in turn helps businesses run better. Likewise, experienced employees are also given training on firm-specific skills and knowledge.

Re-allocation of skilled employees to assist those with skill deficiencies is the second ranked measure to improve performance. The majority of the large MNCs

in high-tech manufacturing addressed skill deficiencies using this method. This can be explained by the fact that large MNCs have adequate resources to re-arrange their manpower. Less proficient employees require more supervision – this method is also frequently used (40.2%), while long working hours (for proficient employees) appears less favourable and practical for obvious reasons.

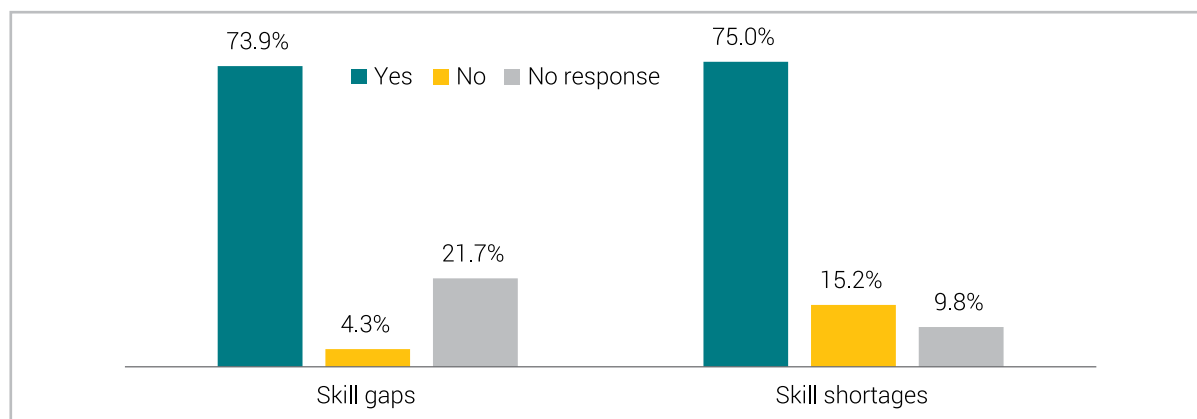
Three-quarters of firms provide labour upskilling to current employees and new hires (Figure 6.12). Likewise, almost all establishments in each industry provide skills training to their employees. However, foreign establishments (originating from Germany, Japan, Singapore and the United States) are more inclined to offer skills training to their employees than local establishments.

Figure 6.12: Measures taken to address skill deficiencies



Source: Employer survey

Figure 6.13: Share of employers' responses to training/upskilling for addressing skill gaps and skill shortages



Source: Employer survey

Firms also embark on skills training when the required skills are not available in the market (Figure 6.13). As employers deem certain skills to be very crucial to business operations, an extended period of vacancy advertisements is undesirable. Therefore, firms opt to under-hire and upskill new hires.

In order to address skill gaps, firms offer training programmes that are taught in schools and universities. For instance, upskilling/training on English communication and writing skills, and foreign language skills is often offered by employers. Such competences are also learnt in educational institutions. It is difficult for employers to entirely focus on upgrading the skills of existing employees on cutting-edge technologies and practices. A large majority of surveyed firms conduct training continually, only a small number provides training to new hires. This suggests that many establishments choose continual skills training to sustain business operations. Although the return on investment is slow, the long-term gains associated with employee training will make a difference.

6.5.2 The modes of skills training

There are two basic modes to skills training: internal and external. Internal training includes on-the-job training, mentoring and coaching, while external training is carried out outside the establishment (in skills development centres or training providers). The latter has become more prominent. As collectively organised and managed facilities such as the Penang Skills Development Centre (PSDC) has only recently started to widen its scope to offer programmes for higher-qualified employees, the skills formation void was previously filled by private training providers that currently constitute the core of the secondary skills training infrastructure. These offer courses in a range

of fields for class attendance-based and online. Box 6.3 provides some insight into the extent and scope of the training provider web. Training/upskilling is no longer confined to employees but is also targeted to management. This is the domain of an increasing number of management/HRM consultancy firms with *Xtrategize* being a typical case. Public-private arrangements are gaining significance in the areas of employee and management training.

The employer survey reveals that about 74% of firms use skills training as a measure to close the widening skill gaps. As for skills that are not available in the market, about 75% of firms offer training programmes to resolve skill shortages (Figure 6.13). Internal training is most common in large companies where resources are available and expatriates can be brought in for knowledge transfer purposes. As part of the retention policy, large foreign companies also send local high-qualified employees to the headquarters for skill upgrading.

Small establishments, especially those in advanced producer services, financial services and information technology, favour internal over external training for cost and efficiency reasons. At times, these establishments bring in trainers. Some SMEs shun external skill training for two reasons. First, frequently all personnel are needed for the workload. Tasks will not be completed according to schedule if employees are sent for skill training externally. Agreements with clients cannot be complied with. Second, employers may face the difficulty to recover the costs of investing in external training programmes as the risk of employees leaving the company is particularly high. In view of such retention difficulties, small establishments are more inclined to capitalise on in-house training, specifically on-the-job training.

Box 6.3: Secondary skills training and management development infrastructure

A. Private training providers: DreamCatcher

Penang has a range of private providers offering hard and soft skills training to high-qualified employees to improve their competences at the workplace (see Appendix E for the listing). They complement the roles of the conventional education infrastructure by providing skill enhancement courses. Most of these skills serve the specific needs of certain industries and individual firms.

As employers promote hard and soft skill development to enhance the effectiveness of professional staff, upskilling programmes are offered by private skill enhancement centres that have developed substantial links with the manufacturing

and services industries in the region. USAINS Holding, The Coding House and Dream Catcher are examples of private skill training set-ups employers frequently connect to for employee upskilling. They provide leading edge programmes such as Advanced ESD, EMI/EMC, Linux Shell Programming, Programming and Interface ARM Cortex-M Microcontrollers and Python Programming. Apart from technical competences, business hard and soft skill courses are also offered by skill training providers. Business Development, Leadership and Management, Project Management, Communication and Business Analytics are instances of courses offered. Dream Catcher is briefly discussed here as a case being used to fill important skill gaps for a specific set of firms.

Founded in 2002, DreamCatcher is another training centre that provides technical training courses for the E&E industry, initially focusing on wireless technologies. It has since diversified its focus and industries, the latter to encompass Life Sciences (Instrumentation, Pharmaceuticals and Medical Devices); ICT and GBS (Software development, ITO); and Oil & Gas (Offshore Engineering). The company now offers more than 500 technical courses to cater to the critical needs of these industries in a large range of fields. Since 2005, it has trained more than 25,000 engineers and scientists. The portfolio of courses is specifically designed to serve the complete value chain of technical development within the targeted industries. These include: professional training (short courses targeting experienced engineers), Certification Programmes (structured programmes lasting 1–6 months, targeting new engineers) and University Courseware (comprehensive coverage of electronics and telecommunication engineering curriculum for tertiary education).

The staff consist of a large number of industry consultants and experts with intimate knowledge of latest technologies, allowing customised training for clients. The company works with a range of private firms as technology partners to ensure industry-leading tools are used to enhance learning experience. This enables the company to integrate a significant number of technology platforms in training. Dreamcatcher is considered by the industry as a top training provider in the market.

B. Management Consultancy: Xstrategize

Management-oriented consultancy cum training firms is equally a growing sector as management skills need improvement too. Upskilling of management staff to acquaint them with new management philosophies and practices is less likely to be carried out internally. One case of a local management consultancy firm is highlighted here, namely Xstrategize.

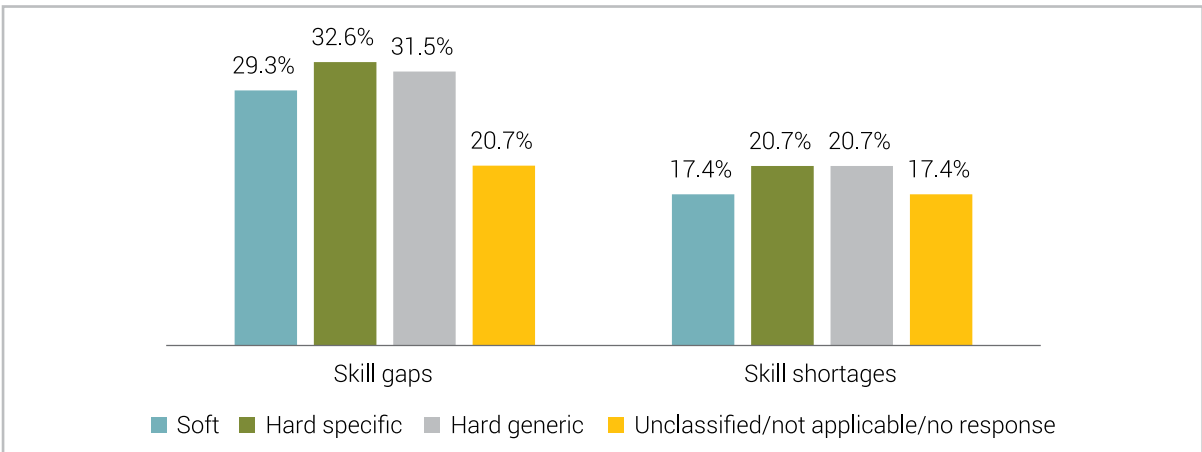
Xstrategize advertises itself as Digital & People Enablers for organisations and people to realise their professional and human potential using state-of-the-art technology to drive, sustain and enhance competitive edge. The company focuses on advisory, design and execution of digital strategies, assisting customers to define the online presence of their brand and how to have social impact or make money via digital and technology solutions. The main concern is the big picture of company identity, brand design and execution. For this purpose, the company offers strategy, technology, creativity, monitoring and project management services, which weave together to provide a one-stop niche service for clients. Its specialities are digital branding, strategy consulting, technology advisory, programme management, custom development, value engineering, socially impacting projects, education, mentoring & coaching, creative design & identity, roll-outs & internationalisation and social media.

6.5.3 Orientation of training programmes

Most of the MNCs use internal and external channels to upskill their employees. This is particularly prevalent in high-tech manufacturing and GBS establishments. Upskilling is directed mostly to technical and soft skills, and addresses skill gaps more than skill shortages. As for skill gaps, Figure 6.14 shows more emphasis on

specific hard skills (32.6%), followed by hard generic skills (31.5%) and soft skills (29.3%). Upskilling for specific and generic hard skills involves IC design, GST, programming and soft applications, while soft skill training includes leadership, problem solving and communication. Mitigating skill shortages through training is mostly directed to hard generic and specific skills.

Figure 6.14: Nature of skills training by type of skill situations



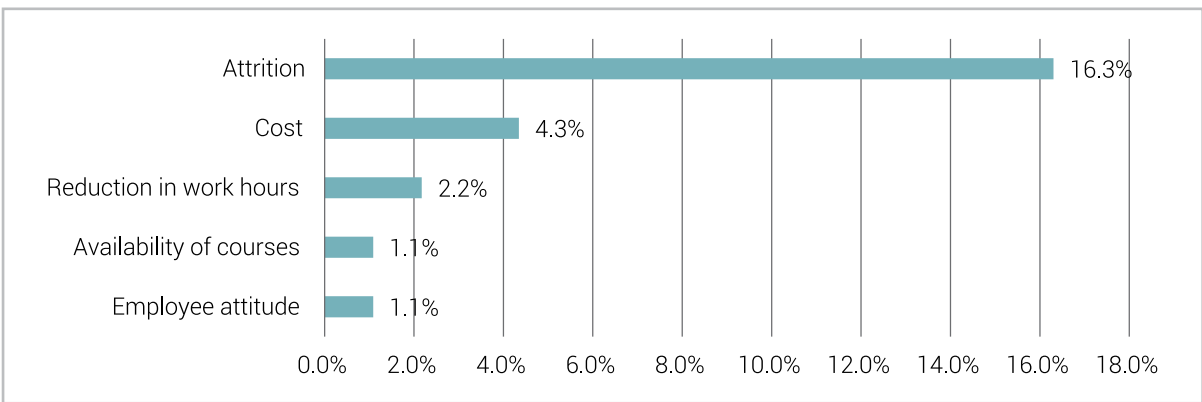
Source: Employer survey

6.5.4 Impact of investment in skills training

While staff turnover is a grave concern in regard to investment in skills training in light of the high mobility in Penang's labour market, just over a quarter of firms believe that investment in skills training has negative impacts. Labour turnover comes as a high cost to recruitment of replacements and administrative hiring. Use (or waste) of resources in this way is over-ridden by the importance of training/upskilling, which is essential to the achievements and operations of a business

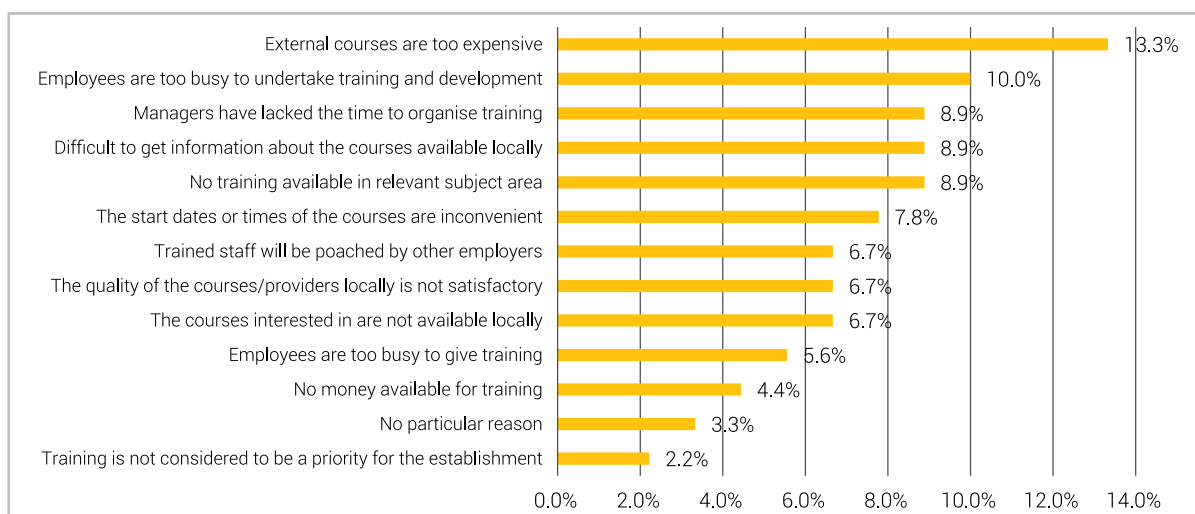
to stay competitive and for employees to develop the potential and capabilities, and hence, increasing productivity and skill-set. Yet, there is a limit to the costs incurred. In fact, as shown in Figure 6.15, such costs are the second most mentioned negative implication although the proportion of firms mentioning this is small. The costs of external courses and the difficulty to release employees for training are impediments and negative factors expressed by firms, preventing them from offering upskilling to address skill shortages and skill gaps (Figure 6.16 and Figure 6.17).

Figure 6.15: Factors negatively impact investment in training



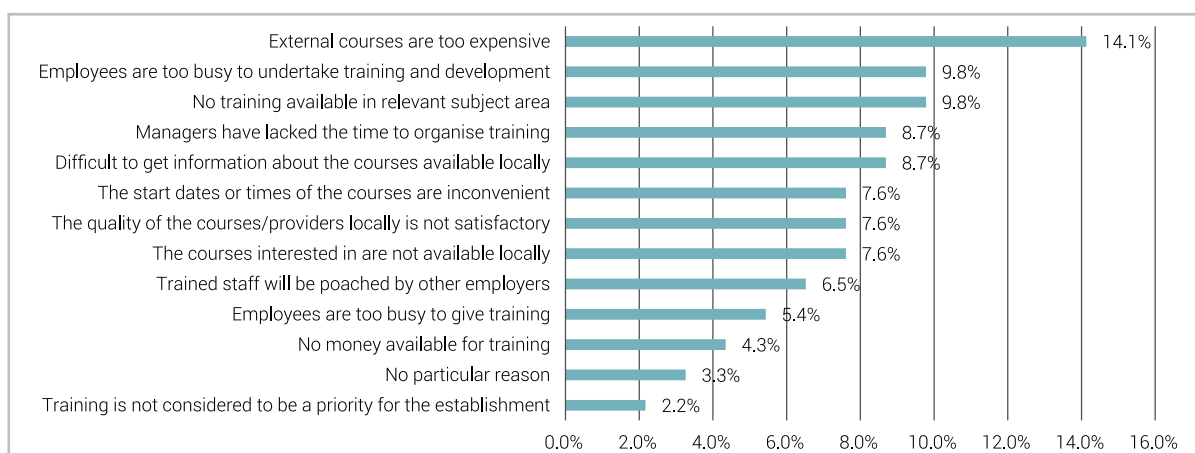
Source: Employer survey

Figure 6.16: Reasons preventing organisations from providing skills training to remedy skill shortages



Source: Employer survey

Figure 6.17: Reasons preventing organisations from providing skills training to remedy skill gaps



Source: Employer survey

6.6 Regional and local institutional initiatives to enhance human talent

To conclude the analysis in this chapter, tertiary infrastructure is briefly considered. Institutional initiatives constitute two types: upskilling and skill augmentation, both coordination and implementation of programmes. Skill augmentation focuses on stimulating a tertiary and quaternary labour supply.

6.6.1 The initiatives of Northern Corridor Economic Region (NCER)

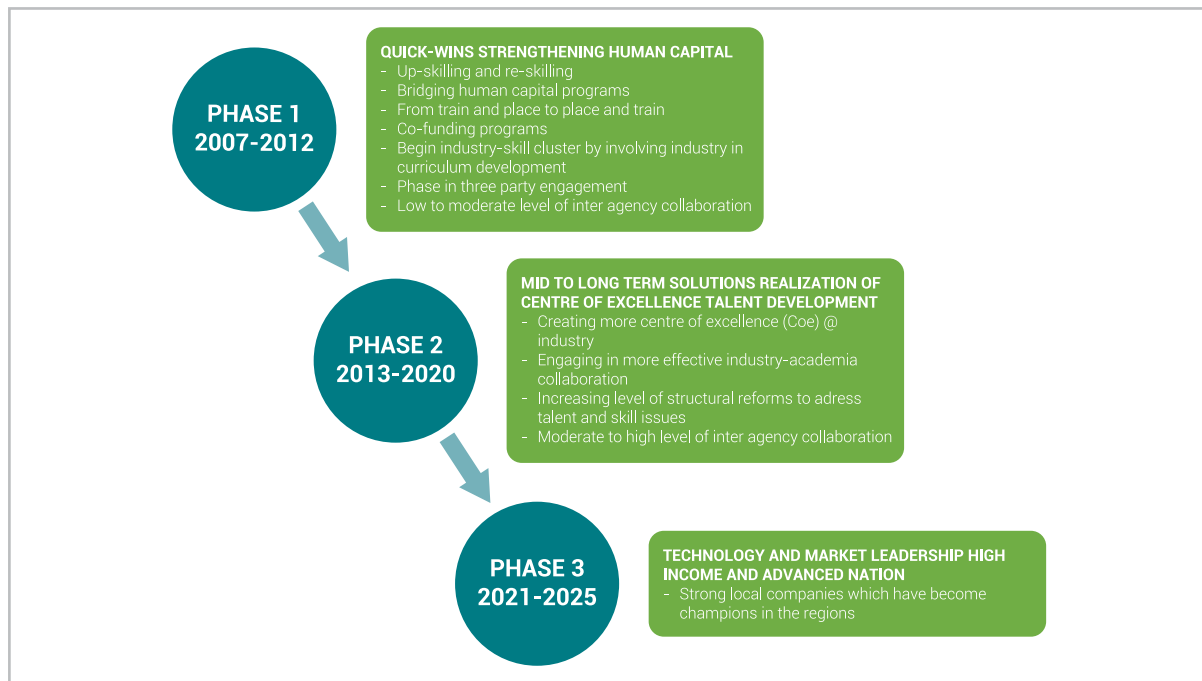
The Northern Corridor Implementation Authority (NCIA) has become more active in co-developing and coordinating upskilling programmes. The NCIA recognises the necessity to ensure the supply of semi-skilled and high-qualified labour is equipped with the right skills to meet market demands. It is working towards a deepening of industry linkages towards human capital development, with a focus on three economic sectors: agriculture, manufacturing and

tourism. Human capital investment is envisaged to grow in several areas. Those in education include, first, establishing sector-specific tertiary institutions for hospitality industry (tourism), business management, high-tech manufacturing, and agriculture; and second, expanding vocational programmes. Investment is also made in research centres for agriculture, biotechnology

and high-tech manufacturing, as well as in programmes that apply the latest technology and globally recognised standards in conventional industries.

The strategies are implemented through a number of phased programmes. The three phases are shown in Figure 6.18.

Figure 6.18: The NCER human capital development plan



Source: Northern Corridor Implementation Authority (NCIA) retrieved from http://www.koridorutara.com.my/www_3_edu_strategies.html

6.6.2 Initiatives by Penang government and private sector

The Penang Science Cluster (PSC), Karpal Singh Penang Learning Centre and Penang Science Café are initiatives subsidised by the Penang state government to create a climate that stimulates interest of and engage the young generation in science, technology, engineering and mathematics (STEM). These are public-private initiatives in which MNCs participate by sharing expertise with schools and university students while the centres link students with the industries. Through these initiatives, students become more acquainted with the practical use and value of science and technology.

Apart from schools and university students, fresh engineers can also take advantage of these initiatives in several ways. They can become hands-on mentors for students, applying what they have learnt through

the questions raised by school pupils and students visiting the learning centres. A two-way learning process not only helps students to understand science better, but also assists fresh engineers to apply and improve communication skills, in particular spoken English. Second, the Science Cluster provides a base for enterprising young engineers with new ideas by inspiring start-ups. These receive further institutional support from PSC.

Since 2012, PSC has annually organised new innovation-oriented programmes in sPICE. The Penang Lego Robotics Programme and Penang International Science Fair are examples of these large events. Through these, MNCs and universities disseminate scientific knowledge to the public. The Penang Science Café is established as part of the Penang Science Cluster. Its function is to provide facilities for workshops, meetings, presentations, discussions and another learning platform for the public.

The Karpal Singh Penang Learning Centre, as one of the innovation initiatives (see Table 4.4 in Chapter 4), adds another curriculum for students who are interested to learn more about Science, Technology, Engineering and Mathematics (STEM). The learning centre also provides a platform and facility for them to engage and interact with firms in several industries, and to practise English communication skills. The state government intends to establish a similar learning centre in each district in Penang by 2025. These centres can help students to be competent and employable in the workplace of the future.

6.6.3 The Penang Future Foundation Fund

To stem the tide of brain drain and to accelerate the building of Penang as a hub for talent, the state government has introduced the Penang Future Foundation Fund in January 2015. The focus is to nurture talent and retain them in the state. The RM40 million fund has been endowed by a generous benefactor; application of a scholarship is open to all Malaysian students regardless of race, religion, gender and state of residence, although preference will be given to those from Penang. This is important as the accumulation of talent will help Penang to attract even more talent and ultimately achieve the status of an intelligent and international city.

The criteria for award are based first on merit with additional regard for the potential for future leadership. As such, applicants need not only be high-performing but also have a good record of extra-curricular activities. The minimum academic achievement is 3.0 CGPA in Sijil Tinggi Pelajaran Malaysia (STPM), matriculation, or diploma. Awarding also takes into consideration financial needs in light of own (family) resources. For this purpose, applicants' background is screened and means-tested so that scholarships can be awarded to talented and deserving students from low- and middle-income households. Finally, scholarships will only be awarded to students pursuing (undergraduate) degrees in science, technology, engineering, or accountancy.

The fund aims to award RM10 million every year to undergraduate students who have gained entry to public and private universities in Malaysia, as well as foreign universities with campuses in Malaysia. A selection committee is set up, which consists of distinguished individuals from the state government agencies and industry players. The scholarship covers full tuition fees for the selected courses, provided the

total fees do not exceed RM100,000. It also offers an allowance of RM12,000 per annum. To elevate Penang towards a hub for talent, scholarship holders need to serve a bond in either private or public organisations in Penang.

The scholarship is currently awarded to local undergraduate degree students in the aforementioned disciplines. In future, the Penang Future Foundation Fund hopes to receive additional donations from philanthropists so that the scheme can be extended to benefit those who pursue studies in top universities overseas or those pursuing post-graduate studies.

6.7 Skill augmentation initiatives

6.7.1 Tertiary labour supply

Tertiary supply refers to the unconventional labour supply in the workforce. Well-qualified housewives and handicapped persons who have been out of the labour force for a period of time are likely to face challenges in closing the skill gap. Therefore, training programmes need to be provided to ensure that the knowledge of re-entrants is relevant to market needs. Government can play a part in this by providing lifelong training and assistance platforms, thus continuously encouraging this labour force to resume employment after child rearing or other career break.

Women leave the workforce may be because of the lack of childcare support, marriage or relocation of spouse. While above the national average, the recent increase in female workforce is an encouraging sign. In Penang, since the establishment of a local TalentCorp office, programmes are brought to the state aiming to enhance tertiary supply. The programmes seek to reduce impediments to re-entry into the workforce, thus tapping more into the unconventional pool of high-qualified labour. TalentCorp has introduced the 3R approach – Return, Retain and Rise. The approach entails bringing women on a career break back into the workforce through a Career Come-back Programme; retain women in the workforce through implementation of a work-life balance programme; and to increase female representation in senior management positions. The career come-back grants enable employers to offer work-life integration via flexible work arrangements and family facilities such as mentoring programmes, flexi-hours and so on, which are co-funded by TalentCorp.

6.7.2 Quaternary labour supply

This supply refers to the sourcing of human talent from abroad to complement skills that are not available in the local market. It forms part of the measures taken by employers to bridge the widening skill shortages by hiring potential talented candidates with the right skills outside their backyard. This has been supported institutionally through TalentCorp programmes and incentives for some time.

There are two categories in quaternary supply. The first is to bring in expatriates to the country for the purpose of technology and knowledge transfer. Work engagement can be either short-term or long-term. For instance, TalentCorp introduces the Residence Pass-Talent (RP-T) scheme to attract highly qualified expatriates to live and work in Malaysia for up to 10 years. This is a retention scheme offering foreign talent more flexibility to switch employer without having to renew the pass. It also facilitates the application process of top foreign talent passes including spouses to work in Malaysia without the need to apply for an employment pass. Applications of more than 3,900 expatriates have been approved from 2011 to 2015.

In Malaysia, highly qualified expatriates centre around business services, oil & gas and energy, communication, education and financial services. India tops the list of nationalities of expatriates under this scheme, followed by Australia, Japan, the United Kingdom and the United States. As presented during TalentCorps' E&E Sector-Focused Dialogue in Penang on 22 August 2016, more than 70% of the expatriates are C-suites (top

management) and technical experts earning a monthly salary of RM20,000 and above; over 90% of them have at least 10 years of global working experience; and more than 85% hold a Bachelor's degree or above.

As for the second category, TalentCorp reaches out by assisting employers to connect with Malaysian students and professionals abroad. Facilitation of the return of Malaysian professionals abroad is provided under the Returning Expert Programme (REP). Professional returnees are entitled to a 15% flat tax rate on taxable income from employment for a period of five consecutive years. They are also exempted from car duty/taxes for up to a maximum of RM150,000 when purchasing one locally manufactured Complete Knocked Down (CKD) or bringing back a fully imported Complete Built-up (CBU) car per application, while foreign spouses and children will be granted Permanent Resident (PR) status.

The average age of returnees under REP is 38 years old with the majority of them holding tertiary qualifications. They earn an average salary of RM30,000 per month. The E&E sector is one of the top five sectors employing REP returnees, alongside oil & gas, energy, financial services, business services, and communications sectors. Many of them have returned from Australia, China, Singapore, the United Kingdom and the United States. An added incentive for return will be the benefits extended to families of the returnees under the REP. Among programmes that reach out to professionals are the Summer Break Programme, Employability Sessions and Career Fairs, which target Malaysian students living abroad.