

A Study of
Graduate Employability in
**Penang's
Labour Market**

By

PENANG
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making ideas work

Published in Malaysia in 2022 by Penang Institute

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Perpustakaan Negara Malaysia

Cataloguing-in-Publication Data

A Study of Graduate Employability in Penang's Labour Market /

by PENANG INSTITUTE.

ISBN 978-983-2221-16-6

1. Employability--Malaysia--Pulau Pinang--Research.

2. Labor market--Malaysia--Pulau Pinang--Research.

3. Graduate students--Employment--Malaysia--Pulau Pinang--Research.

I. Penang Institute.

331.11440720595113

Cover artwork and typesetting by

Nur Fitriah Binte Abdul Halim

This publication is available for download at: www.penanginstitute.org

This report was completed in December 2021.

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Acknowledgements

This report was put together by researchers from the Socioeconomics and Statistics Programme of Penang Institute.

The research team would like to express its gratitude to the management, lecturers and the career services centre of various institutes of higher learning in Penang, for their invaluable role in disseminating the graduate employment survey to their students and alumni, with some providing detailed information related to the impact of Covid-19 on students' admission and employability programmes. The institutes of higher learning who have assisted in the survey are (in alphabetical order):

Alumni and Student Affairs Development Centre, USM
Career and Placement Centre, UOW Malaysia KDU Penang University College
HEBAT Development Centre, USM
Registrar Office, Sentral College Penang

Lecturers who have helped administer the survey were from the following universities (in alphabetical order):

INTI International College Penang
Universiti Sains Malaysia
UOW Malaysia KDU Penang University College
Wawasan Open University

We gratefully recognise the help of the Social Security Organisation (SOCSSO), the Northern Corridor Implementation Authority (NCIA) and the Penang Career Assistance and Talent (CAT) Centre, InvestPenang which had respectively played their roles to disseminate the survey questionnaire to the jobseekers, retrenched workers and Penang Future Foundation (PFF) graduates. We truly appreciate their contributions.

Special thanks to Michelle Gui, previously from the Bahagian Perancang Ekonomi Negeri Pulau Pinang (BPENPP), who helped immensely by providing critical comments on the

study. We are also grateful to the distinguished members of the Penang Socio-Economic Recovery Consultative Council (PSERCC) for their constructive feedback and support; these include the Right Honourable Chief Minister, Mr Chow Kon Yeow, the Honourable Deputy Chief Minister II, Professor Ramasamy Palanisamy, Special Advisor to the Chief Minister, Dato' Seri Lee Kah Choon, NCIA CEO, Datuk Seri Jebasingam Issace John and President of Malaysia Semiconductor Industry Association (MSIA), Dato' Seri Wong Siew Hai.

Finally, the research team from the Penang Institute's Socioeconomics and Statistics Programme is immensely grateful to the numerous individuals and organisations that have contributed valuable feedback and ideas throughout this study.

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Abbreviations

4IR	The Fourth Industrial Revolution
A&F	Accounting and finance
AI	Artificial intelligence
AIC	Akaike Information Criterion
B&A	Business and administration
BKIP	Batu Kawan Industrial Park
BNM	Bank Negara Malaysia
BPO	Business process outsourcing
CAP	Career Advancing Programme
CIPE	Capital investment per employment
Covid-19	Coronavirus disease
CS	Computer science
CSP	Career search and progression
DOSM	Department of Statistics Malaysia
E&E	Electrical and electronics
EI	Macroeconomic initiatives
EIS	Employment Insurance Scheme
EPF	Employees Provident Fund
ES	Education and skills
FOS	Field of study/studies
GBS	Global business services
GDP	Gross Domestic Product
HI	Hiring Incentive
HRD	Human resource development
HRDF	Human Resources Development Fund
IAP	Industry advisory panels
ICT	Information and communication technology
IHL	Institution of higher learning
IMD	International Institute for Management Development
IoT	Internet of Things
IT	Information technology
LLC	Local large company

LMI	Labour market initiatives
LOE	Loss of employment
M&E	Machinery and equipment
MCO	Movement Control Order
ML	Machine learning
MNC	Multinational company
MOHE	Ministry of Higher Education
MoU	Memorandum of Understanding
MS	Microsoft
MSS	Mutual Separation Scheme
NCER	Northern Corridor Economic Region
NCIA	Northern Corridor Implementation Authority
NTEP	NCER Talent Enhancement Programme
OECD	Organisation for Economic Co-operation and Development
PDC	Penang Development Corporation
PISA	Programme for International Student Assessment
R&D	Research and development
R^2	Coefficient of determination
RM	Ringgit Malaysia
SME	Small and medium enterprise
SOCSSO	Social Security Organisation
STEM	Science, technology, engineering and mathematics
TVET	Technical and vocational education and training
UK	The United Kingdom
USA	The United States of America
VSS	Voluntary Separation Scheme
WMW	Wilcoxon Mann-Whitney

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Executive Summary

Chapter 1: Introduction

- As Malaysia grapples with supply chain disruptions and reduced business revenue, partially brought on by the Covid-19 pandemic, the employability of university graduates and retrenched employees has become a key concern for policy makers.
- Two worrying trends arise. First, fresh graduates may accept lower-skill jobs or positions that do not need a degree qualification, and second, experienced retrenched graduates face intense job competition especially in the travel and hospitality industries. Both of these may lead to underemployment, especially given the rise of gig opportunities.
- A twin situation of high unemployment and lack of suitable talent for hiring also exists. Higher unemployment occurs concurrent with a mismatch in graduate output in critical sectors such as semiconductor, semiconductor-related and electrical and electronics (E&E), and in other promoted sectors in Penang.
- This analysis of Penang's graduate profile builds on understanding graduates' own perception of current employment, career outlook and their future-career intentions. It also assesses employers' hiring preferences, recruiting challenges, skill match/mismatch and expected change in future jobs. Last but not least, multi-dimensional measures addressing graduate employability are discussed.

Chapter 2: Data and methodology

- Qualitative and quantitative data have been collected from institutes of higher learning (IHLs), graduates and employers in Penang. A total of 420 graduates and retrenched workers participated in an online survey conducted through various university career and development centres and lecturers in Penang, with 94.3% (396) being fresh graduates while 5.7% (24) were employees who had experienced loss of employment in 2020 and 2021.

- From the labour demand side, online employers were interviewed on a set of questions covering employers' hiring conditions amid the pandemic and their perception of the characteristics of the graduate workforce. Email invitations were sent to more than 500 companies in Penang from mid-May to mid-July 2021. After a few follow-ups, the participation of a total of 23 companies was secured; these included small and medium, large local and foreign companies.
- Federal and state government agencies, industry associations and university career centres were engaged for their views on graduate employment, skills mismatch, and initiatives for career and skill development.
- Logistics regression models were used to examine factors affecting graduate employment.

Chapter 3: Characteristics of the graduate employment

- About three quarters of the 396 fresh graduates surveyed were employed during the survey while the remaining 24.7% were not. In terms of field of study (FOS), both science, technology, engineering and mathematics (STEM) and non-STEM graduates posed rather similar employment patterns. Non-STEM graduates had a relatively higher percentage of graduates unemployed compared to the STEM cohorts.
- STEM graduates are generally more employable than graduates with non-STEM degrees. Specifically, engineering and computer science (CS) had a relatively higher share of graduates being employed compared to other disciplines, with a majority of them working in the E&E sector followed by machinery and equipment (M&E); both representing 69.1% of engineering graduates and 61.8% of CS graduates where over 90% of them found a job within six months of graduation.
- However, not all STEM graduates experienced equal employment opportunities. Applied and pure sciences show lower levels of employability compared to engineering and CS graduates. Only about half of the pure sciences and applied sciences were employed during the survey. The lack of adequate employment opportunities in life sciences and pharmaceuticals in the state and the country in general may be contributing to these low levels of employability.

- Within the non-STEM degrees, graduates from accounting & finance (A&F) and business & administration (B&A) have greater employability compared to graduates from arts and social sciences, and food and hospitality. While the latter may be affected by the pandemic, A&F and B&A are highly sought-after degrees in Penang, underpinned by the state's development focus on global business services (GBS).
- Among the non-STEM disciplines, arts and social sciences generally have the lowest level of employability, with only about 56% of the surveyed graduates securing a job. These work in various industries, and 20% of them have joined education services. Additionally, the difficulty to secure a job is reflected by 43.5% of those in the education sector who spent more than six months getting employment.
- In terms of starting salary, STEM graduates earned an average monthly salary of RM3,022. The average monthly salary for engineering graduates is estimated at about RM3,096.10, followed by the CS (RM2,985.30) and construction (RM2,701.50). CS and engineering graduates make relatively higher salaries than other graduates in Penang due to a shortage of such talents in Penang.
- Academic results have a positive impact on employability. Graduates with second class lower and third class degrees were proportionately more likely to be unemployed as compared to those with first class and second class upper.
- A third of graduates from the pure sciences, applied sciences, arts, social sciences, mass communication and food & hospitality respondents reported being unemployed. While the unemployment for food & hospitality graduates is largely cyclical and was greatly affected by Covid-19, the unemployment of other FOS is associated with structural mismatches.
- The top barriers to employment were: (1) being unable to find relevant jobs; (2) a lack of suitable employment opportunities in Penang; and (3) being underqualified/overqualified for the jobs on offer.
- About 16% of 98 respondents, mainly from social sciences, applied sciences and pure sciences, highlighted the lack of suitable jobs in Penang. This led them to search for jobs in Kuala Lumpur and Singapore. Meanwhile, a number of engineering and A&F graduates with excellent academic grades are awaiting international travel restrictions to be lifted. For those who cited lack of skills needed by the market and being underqualified for jobs, most were engineering graduates.

- Among the retrenched graduates, out of 24 respondents, 79% or 19 remained unemployed during the survey; most of them were in their 30s. Nearly half of them had been unemployed for six to twelve months, and a large proportion of them were previously from airline and E&E industries.

Chapter 4: Skills issues and challenges of graduate employment

- Medical, dentistry and pharmacy graduates on average rated a high 4.5 (out of a maximum of 5) for job-skill relevancy followed by arts (4.1), mass communication (3.8), construction (3.8), A&F (3.5) and pure sciences (3.5). Meanwhile, engineering and CS graduates rated somewhat relevant for skills learnt in university and current jobs, at 3.3 and 3.4, respectively. In contrast, food & hospitality (3.2), B&A (3.1) and social sciences (3.1) rated the lowest.
- Industry-wise, the ratings for job-skill relevancy show a stark difference. Those in transport and health services rated job-skill relevancy at 4.0. Those in tax, audit and accounting, education services, and GBS rated job-skill relevancy between 3.5 and 3.8 while those in construction, M&E, financial services, IT and E&E rated it between 3.2 and 3.4. Finally, two sectors that had low ratings for job-skill relevancy were plastic and rubber products (2.9) and distributive trade (2.3).
- Furthermore, the relationship between the rating for job-skill relevancy and the share of the state's Gross Domestic Product (GDP) contribution suggests a strong need to bridge the gap between conventional courses, training and industry work demands. The E&E industry, as a major contributor to the state's GDP shows a relatively low rating for job-skill relevancy by graduates (below-average rating of 3.39).
- Underemployment is a structural issue in Malaysia. While the majority of the fresh graduates are employed in a job that matches their education level, 22.5% of them were in a skill-based underemployment situation. Specifically, pure and applied sciences had underemployment rates of about 50%, on top of their already low employment rates. This is due to the relatively low supply of suitable jobs and the correspondingly high number of graduates in these fields.
- In terms of challenges at work, 63% of the fresh graduates felt their current jobs were challenging, while 56.1% of those underemployed faced challenges at work, slightly

less as compared with those fit/overemployed (65.4%). We summarise the main challenges at work for graduates as follows:

1. Lack of knowledge to perform in their work;
 2. Lack of experience and guidance;
 3. Communication and soft skills need polishing up; and
 4. Multitasking and time management.
- Nearly 80% of employers opined that there is a mismatch (with varying degrees) between graduates' competence and job requirements. Lack of soft skills was the most cited skills gap, expressed in the lack of communication skills, followed by problem solving, critical thinking and presentation skills, and poor command of English.
 - Lack of technical competency was the second top issue mentioned. This includes the mismatch between university syllabus and industry requirements, and the need for employees to gain industry exposure. The required technical skills relate to software, digital, online marketing, e-commerce knowledge, and AI- and ML-related skills which are in line with the future of their businesses and operations. In terms of transversal skills, adaptability, critical thinking, analytical and communication skills are cited as the most needed skills.
 - Employees and jobseekers are generally aware of the importance of acquiring necessary skills, and are willing to do so. 67% out of 418 respondents expressed the need to upskill/reskill themselves in order to enhance their employability. At the same time, 87.9% of graduates surveyed are willing to learn relevant new skills.
 - Skillsets needed are converging across occupations. Digital literacy is important for STEM and non-STEM graduates where around 18% of respondents felt that programming and IT-related skills are important for their career paths. Most non-STEM graduates stated MS Office and IT/digital as courses beneficial to them, while STEM graduates wanted programming-related courses. In general, communication skill (transversal) (12.9% of respondents) is the top highlighted skill, followed by the technical skills of programming/coding (9.7%) and IT/digital (8.5%).
 - Postgraduates recorded significantly lower employment rates than the non-postgraduates, especially among the fresh graduates. There may be a lack of quality jobs for graduates in Malaysia, and this situation seems to be more prevalent among postgraduates (Lee, 2020 and Jamaludin et al.,2021).
 - In terms of skill-related underemployment, postgraduates were more likely to be

employed in jobs which had lower requirements than their qualifications. About 35% of the postgraduates were underemployed, as compared with 19.9% of the non-postgraduates. However, they did not possess an obvious advantage at work over the non-postgraduates. Moreover, the unemployed postgraduates tended to perceive themselves as overqualified.

Chapter 5: Penang's future graduate workforce

- A majority of Penang-born respondents enrolled in Penang's IHLs were more likely to work in Penang. Out of 396 graduates, 83.6% or 331 respondents graduated from IHLs in Penang. Of this, 41.1% were from other states and 56.2% were from Penang. About 72% were employed in Penang while 28% had obtained employment outside Penang.
- Of the 63 respondents who migrated to work in Penang, two-third of them were from the northern region, with Kedah and Perak registering the highest number. Of these, a large proportion of them studied engineering (41.3%) mainly working as E&E engineers, industrial and production engineers and mechanical engineers.
- On average, employed graduates rated (on a scale maximised at 5) the job outlook for the individual industry in Penang as vibrant and dynamic (mean=3.68, median=4); this is higher than among unemployed graduates (mean=3.39, median=3). They also rated "Penang has provided sufficient high-qualified job opportunities in general" (mean=3.34, median=3), higher than for unemployed graduates (mean=2.86, median=3).
- A majority of graduates rated positively working in engineering-related jobs (especially for the vibrant job outlook) and accounting and audit, which further reinforces the job variability offered by the high-tech manufacturing companies in Penang. In contrast, a majority of unemployed graduates who rated these statements lowly have the intention to explore work opportunities outside Penang.
- Irrespective of their state of birth, state of study or current state of work/residence, 75% of them intended to explore job opportunities outside Penang or Malaysia. As expected, Kuala Lumpur, Singapore and Selangor were the most preferred locations to explore further job opportunities. Australia was also preferred, followed by China, the USA and the UK.
- It is important to note that about 25% of graduates had no intention to leave Penang for other job opportunities and these prefer instead to develop skills in Penang before

considering opportunities outside Penang. Most of them held a degree in engineering, A&F and B&A.

- Salary growth is also a pull factor to retain and attract graduates. Out of 396 graduates, 31.1% were dissatisfied with the salary growth in Penang; 29.6% were satisfied with a mean satisfaction score hovering at 2.93 only (out of 5), with a lower rating for those who intended to explore opportunities outside Penang.
- Only those in the manufacturing sector had a marginally higher share for satisfaction with the salary growth (36.4% satisfied vs. 28.9% dissatisfied). Both construction (26.9% satisfied vs. 38.5% dissatisfied) and services (17.9% satisfied vs. 31.2% dissatisfied) were more dissatisfied than satisfied. The gap was largest for the services sector.
- Penang remains desirable for talent who wish to stay close to their families. About 40% of graduates had no intention, at least in the short term, to explore opportunities outside of Penang and were more inclined to stay close to their family (mean=3.83, median=4), as opposed to 22.7% who preferred to advance their career elsewhere.
- Respondents with positive perceptions on industry outlook are mainly related to the key growth sectors in Penang such as E&E manufacturing, financial, GBS, IT and education sectors. While 42.9% in the construction sector felt less confident about their industry's outlook, some were optimistic in light of the advent of digitalisation.
- For the future of work, manufacturing companies foresee changes in work nature towards flexible/remote mode, progression to higher value chain, and young demographics for future jobs. Big data analytics, artificial intelligence and machine learning (AI & ML), and robotics topped the technological changes and trends list. However, services sectors had slightly different views from their manufacturing counterparts, and voted AI & ML, cloud technology and Internet of Things as the future drivers.
- Respondents tended to think that more government initiatives to increase job opportunities are needed through facilitation for better salary rates; incentives to support hiring, salary and employees' benefits; and incentives to hire Malaysians. Almost 10% of respondents call for diversification in economic activities and technological development in the areas of electronics, renewable energy, biotechnology, and information technology industries.

- Graduates also emphasised the importance of government support for upskilling/ reskilling opportunities. Employees and jobseekers are aware of the importance of possessing and upgrading skills in order to remain relevant. Fresh graduates, especially, also requested for more practical training in IHL courses that are relevant to industry requirements. Respondents also commented that Malaysia needs to improve its education system with regards to curriculum content and skills training.
- In terms of career support and progression, respondents felt that the government should increase support for employment programmes for fresh graduates, such as career fairs in IHLs and assistance in job search. Several respondents also promoted the idea of digital tracking and monitoring of graduates' employability with an efficient data monitoring and analytical system. Besides that, the government should also support internship programmes that benefit graduates in job search.

Chapter 6: Recommendations and conclusions

- Recommendations for addressing graduate employability are as follows:

Strategies	Proposed measures
1. Improving low job-skill relevancy	<ul style="list-style-type: none"> i. Career counselling and handholding initiatives specifically for graduates who are unable to secure a job ii. A unified database to allow job seekers to identify suitable initiatives iii. Apprenticeship programmes targeting hard-to-fill critical positions iv. A skill monitoring committee and an implementing unit for skill and re-skilling initiatives v. Support for industry players who provide vocational courses in initial foundation, scale up to serve target groups and improve accreditation of the courses

<p>2. Preparing a future-ready workforce</p>	<ul style="list-style-type: none"> i. Building an ecosystem for more holistic skills learning and development ii. Partnership with companies and external industry partners to narrow the gap on technical knowledge and skills iii. Industry associations and companies to offer and contribute in industry advisory panels (IAP) for feedback on most-beneficial modules to IHLs iv. Creating open synergistic platforms and avenues for companies to access IHL's target pool of talent; to allow more partnerships; for shared labs and equipment collaboration; and for industry-initiated research projects
<p>3. Improving the roles of university</p>	<ul style="list-style-type: none"> i. A career services centre in universities/colleges with satellite offices in each faculty ii. Improving the functionality of university career services websites, with job portals, internship and apprentice placements iii. Regular graduate development programmes iv. A career services centre to identify the skills gap by working closely with employers
<p>4. Talent attraction and retention</p>	<ul style="list-style-type: none"> i. Studies looking into living wage and workers' productivities in Penang ii. A consultative committee to facilitate the needs and talent demand outlook for industries in Penang iii. Advancements in the creation and expansion of higher-value jobs in Penang

<p>5. Improving the institutional roles</p>	<ul style="list-style-type: none"> i. Continued stakeholders' engagement with companies for infrastructure provision and talent support ii. Special establishment support should be offered to local industries with centres of excellence. This includes facilitation for premise space and handholding for necessary approval process; and distinctive accreditation in exchange for critical skills that are hard to be fulfilled by the university. iii. Periodic review and follow-up on ongoing initiatives iv. Increasing university-industry collaboration in curriculum content design, teaching & learning process and career advisory v. Lecturers' teaching methods to be periodically assessed by students, graduates, peers and industries. vi. More innovative teaching approaches that focus on student-centred learning
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Chapter 1

Introduction

1.1 Background

As the country grapples with the Covid-19 pandemic, graduate employability has become an ever greater concern for university graduates and future graduates and even experienced employees. This matter has no doubt often been debated among employers, industry players and policymakers. The present health and economic conditions have made the hiring activity more complicated while graduates now face new challenges in their search for employment. In the long run, this phenomenon will further deepen job competition, skilled underemployment and skills mismatch, and increase education disinvestment.

At the same time, the increase in the supply of graduates/skills will have an effect on wage moderation. Skilled workers occupy low-skilled jobs, signalling the presence of over-education/underemployment among university graduates (Muysken & Weel, 1999). This could be due to the absence of relevant jobs in the market, and this holds long-term implications for future graduates if serious changes are not made. Hence, the outlook is that more graduates will be unemployed upon graduation, or be employed in job positions unrelated to their field of study, perhaps in low-skilled gig sectors.

Meanwhile, cost-cutting measures resulting from the supply-chain disruptions and reduced business revenue have seen job redundancy increasing alarmingly. This trend has been worsened by the country's prolonged lockdown in 2020 and 2021. The affected workers may face difficulties getting reemployed. In contrast, those with skills required by industries that experience bullish performance amid the pandemic should be able to obtain new jobs more quickly than others. Going forward, fresh graduates may however face unprecedented challenges in their job search.

In 2020, retrenchment hit some 10,465 employees in Penang, a four-fold increase compared to 2019. This was primarily caused by business closures resulting from the Covid-19 pandemic.

Of this, only 15.7% lost their jobs under Voluntary Separation Scheme (VSS) or Mutual Separation Scheme (MSS). Nearly half of the employment loss was from the manufacturing sector, followed by professional and technical (15.1%), accommodation and food & beverage (9%) and wholesale and retail trade (8.2%). In terms of occupational groups, high-skilled occupations were responsible for 48.3% of Penang's total employment loss. These included professionals, managers, and technicians & associate professionals, while 27.3% of the retrenchments were among the plants & machine operators & assemblers.

At the same time, youth unemployment for 15-29 years old is set to deteriorate as more degree holders graduate during the pandemic. In 2020, Penang's youth unemployment rate rose to 10.3%, from 6.6% in 2019. Most importantly, youth made up more than one-third of total employment loss in Penang (36.9%), attributed by 37.5% graduates and 62.5% of non-graduates. This may be due to companies' "last in, first out" policies.

As new graduates struggle to find jobs alongside experienced retrenched workers, two serious concerns arise. First, employers may opt to recruit from the latter group to perform basic job functions. They may be able to reduce operational costs this way, as having experienced employees saves on training expenses. From the labour-economic point of view, experienced workers tend to be in underemployment while new graduates stay unemployed.

Second, fresh graduates may accept lower-skill jobs or positions that do not require a degree qualification, putting this group also into underemployment. For example, anecdotal evidence shows that gig employment has increased participation of youth. This condition may intensify due to tough competition from newly retrenched workers or from the fact that there are insufficient skilled jobs on the market which match the qualifications of graduates – as was reported in Bank Negara Malaysia (BNM)'s 2018 Annual Report.¹ It is therefore imperative that more knowledge be gathered about the contemporary labour market strategies being practised by employers at this critical time so that appropriate measures can be taken to strengthen the employability of new graduates.

In the era of the Fourth Industrial Revolution (4IR), skill shortages thus remain a key concern for Penang's industries. The quest for human capital continues to increase in accordance with the rise in high-tech, advanced manufacturing investment in the state. The shortages have also caused graduate unemployment in specific fields as a majority of demand for skilled workers

¹ Refer to a Box Article entitled "Are Malaysian Workers Paid Fairly?: An Assessment of Productivity and Equity" in Bank Negara Malaysia Annual Report 2018. Retrieved from <https://www.bnm.gov.my/-/bnm-annual-report-2018>

is centred around experienced graduates.² While competitive wages may be the root cause for talent migration, human capital flight tends to surge if there is a lack of job opportunities in Penang, pushed further by the pursuit of a better standard of living, quality of life, access to advanced technology, and political stability (Dodani & LaPorte, 2005).

Amid these challenging conditions, understanding Penang's graduate profile sheds light on the employment status of fresh graduates, and their preferences of work and location of work in future. Also, the concerns and challenges raised by firms and graduates provide a deep-dive analysis of the current and future graduate unemployment and skills mismatch and suggest measures to address graduate employability. A twin situation of high unemployment and lack of suitable talent for hiring already exists. The currently higher unemployment is worsened by a concurrent mismatch in graduate output in critical sectors such as semiconductor, semiconductor-related and electrical and electronics (E&E) sectors and other promoted sectors in Penang.

1.2 Objectives of the study

The objectives of this study are:

- i. To assess the characteristics of job seekers who graduated between January 2019 and March 2021;
- ii. To investigate the determinants of graduate employability;
- iii. To explore perceptions of employers concerning the characteristics of the graduate workforce;
- iv. To explain future graduate unemployment;
- v. To assess employers' hiring activities during the pandemic;
- vi. To explore the hiring choices/preferences of employers during this challenging time; and
- vii. To propose measures to address graduate employability and talent attraction and retention in Penang.

² Penang Institute (2017). Penang Skilled Workforce Study. Retrieved from https://penanginstitute.org/wp-content/uploads/jml/files/pg-skilled-workforce-study/Chapter1-10b_Low%20Res.pdf.

1.3 Research questions

The key research questions of this study are:

- a. How has the pandemic changed the labour demand in Penang?
- b. What is the employability situation of fresh graduates in Penang in relation to fields of study (FOS), length of job search and salary? Are science, technology, engineering and mathematics (STEM) graduates more employable than non-STEM graduates? Are life sciences graduates less employable than graduates in the physical sciences?
- c. What are the root causes of graduate unemployment?
- d. For employed fresh graduates, are they overqualified, underqualified or a good fit for the job functions? Do these jobs match their educational backgrounds?
- e. What are the expectations of fresh graduates and employers in terms of skills demand and labour market initiatives (LMI)?
- f. How has the pandemic changed the hiring of retrenched workers? What are the employers' opinions on the hiring of retrenched workers for a position that requires a degree holder?
- g. What are the challenges faced by employers in recruitment?
- h. What are the perceptions of employers on the characteristics of fresh graduates?
- i. How has Penang been able to attract and retain talent, especially those who graduated from Penang-based universities and colleges?
- j. What are the policy solutions in addressing issues related to graduate employability and talent attraction and retention?

1.4 Structure of the report

Chapters 2 and 3 record the methodology of data collection and a profile description of respondents respectively, while Chapter 4 discusses issues of skills among graduates, including the mismatch between skills and the industry's expectations, as well as the challenges faced by graduates at work. Chapter 5 discusses the extent to which Penang can attract and retain graduates in Penang by looking into graduates' responses to their current work and future intentions. Finally, Chapter 6 proposes actionable recommendations.

Chapter 2

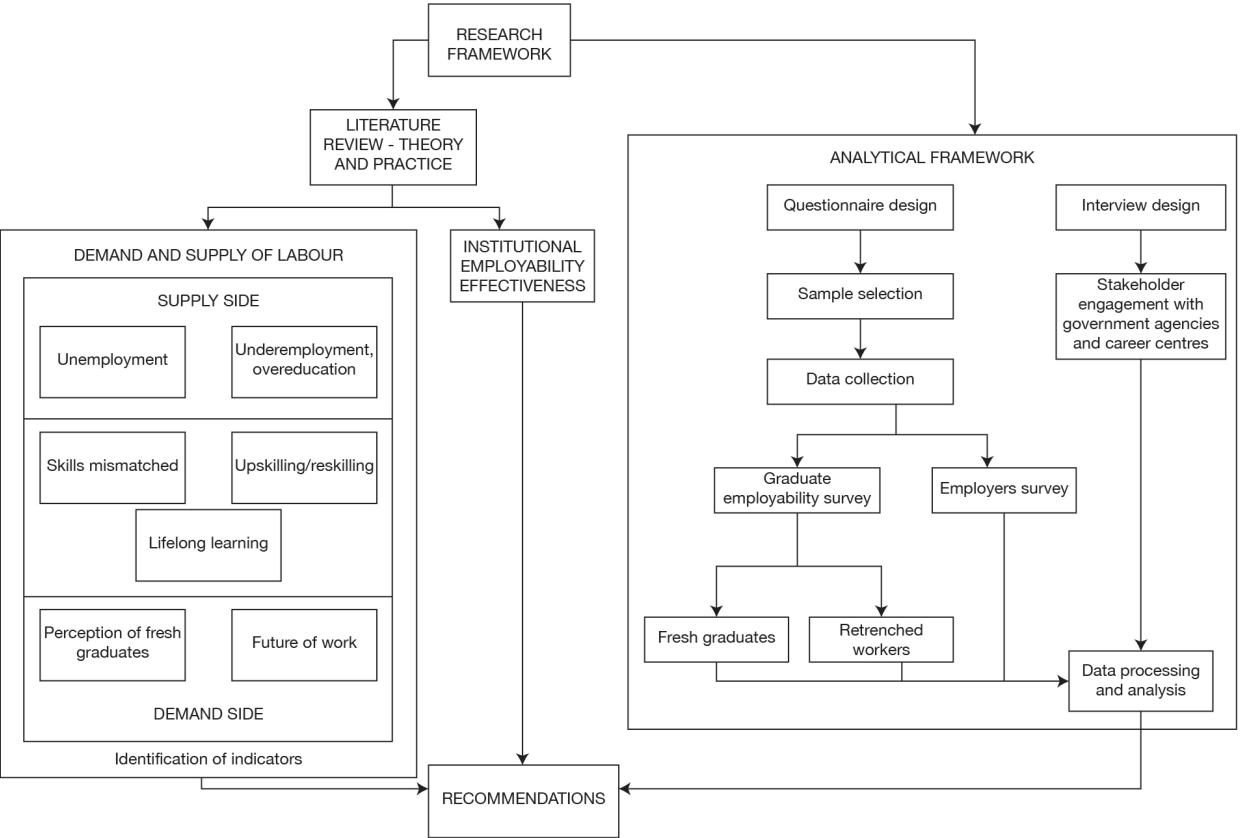
Data and Methodology

This chapter discusses the study's research framework and provides a detailed explanation of the data collection and the research methodology. This includes the sample selection, data cleaning procedures and empirical methods (Chi-square test and logistic regression). The research hypotheses are presented, and the indicators used to measure the graduate employability are identified for both demand and supply sides of the labour market. The chapter ends with a summary of the profile of respondents from the graduate survey undertaken by Penang Institute.

2.1 Research framework

The study was divided into five phases: literature review, questionnaire and interview design, sample selection, data collection and analysis. After a comprehensive literature review had been conducted, a survey targeted to fresh graduates for January 2019-March 2021 and retrenched workers (due to the pandemic) was conducted to collect information related to education background, employment status, employment history, employment conditions, and perceptions on skills, career and industry outlook. Subsequently, towards the end period of the employees' survey, an employers' survey was conducted to gather information on the current labour hiring landscape, the characteristics of talent supply, the future of work, the skill match/mismatch, and suggestions of policy measures.

Figure 2.1 Research framework



2.2 Research hypotheses

Below are the hypotheses for the respective actors:

A. Graduate perspective

Hypothesis 1: Fresh graduates are underemployed during the pandemic.

Hypothesis 2: Non-STEM graduates take a longer time to get hired by employers than STEM graduates.

Hypothesis 3: STEM graduates have higher employability compared to non-STEM graduates.

Hypothesis 3a: Life sciences graduates are less employable compared to physical sciences graduates.

Hypothesis 4: STEM graduates have better income than non-STEM graduates.

Hypothesis 4a: Engineering and computing graduates earn more than other STEM graduates in Penang.

Hypothesis 5: Fresh graduates tend to occupy jobs that are not related to their fields of study.

B. Employer perspective

Hypothesis 1: New employment opportunities are largely for experienced graduates.

Hypothesis 2: Employers are more likely to hire experienced retrenched workers than fresh graduates.

Hypothesis 3: Skills mismatch between graduates' competencies and employers' requirements is prevalent, especially for technical competencies.

Hypothesis 4: Hiring activity remains strong during the pandemic.

Hypothesis 5: Technological changes and automation will affect the displacement of jobs over the next five years.

2.3 Measuring graduate employability

Indicators measuring the graduate employability are summarised in Table 2.1. These are divided into the supply and demand sides of graduate employability where the primary sources were the graduate employability survey and the employer survey, while secondary data were obtained from Social Security Organisation (SOCSO) and Department of Statistics Malaysia (DOSM).

Table 2.1 Measuring graduate employability

Variables	Indicators	Sources
Supply side		
1. Unemployment	Fields of study	Graduate employability survey
	Duration before finding a job	
	Expected salary	
2. Employment	Fields of study	
	Duration before finding a job	
	Monthly salary	
	Underemployment	
3. Labour force	Labour force by education level	Labour Force Survey, Department of Statistics Malaysia (DOSM)
4. Labour shortage	Types of labour	Employer survey
Demand side		
1. Employment market	Employed people by gender, occupational group, education level and industry	Labour Force Survey, DOSM
	Job placement	MYFutureJobs, Social Security Organisation (SOCSO)
	Job vacancy	
	Loss of employment	

2. Perceived fresh graduates' attitude	Issues with job applicants	Employer survey
	Preferences for fresh and experienced graduates	
3. Job hiring pattern	Most-in-demand jobs for fresh graduates and experienced graduates	
	Most-in-demand jobs for non-graduates	
	Reasons for recruitment	
	Most difficult-to-fill jobs	
	Recruitment difficulties	
	Challenges for hiring local skilled/unskilled workers	
	Reasons for hiring foreign skilled/unskilled workers	
4. Skills mismatch	Match/mismatch between graduates' competencies and employers' requirements	
	Essential and highly desirable specific technical and transversal skills	
5. Future of work	Effects of technological change and automation on future jobs	

2.4 Data collection

This study employed a three-pronged approach. The data collection for each approach is described as follows:

a. Graduate employability survey

An online survey was used to collect employment-related information from fresh graduates who graduated between 2019 and March 2021 in Penang. A set of questionnaires was developed employing open-ended and closed-ended questions, and then disseminated to fresh graduates through the career and development centres and lecturers at public and private institutions of higher learning (IHLs) in Penang. The data collection was carried out between 12 March and 26 May 2021. The questionnaire was available in English and the approximate length to answer it was 30 minutes.

A similar set of questionnaires was also employed to gather employment status and related information from those retrenched from 2020 to May 2021. The data collection was assisted by the SOCSO Penang branch and Northern Corridor Implementation Authority (NCIA). SOCSO was engaged to disseminate the online questionnaire to job seekers and retrenched individuals while NCIA assisted in administering the online questionnaire to fresh graduates and retrenched individuals who had participated in the Northern Corridor Economic Region (NCER) Talent Enhancement Programme (NTEP) and Jomkerja@NCER.

A total of 718 samples were gathered through a snowball sampling technique. Out of 718 respondents, about 80% or 575 passed the screening questions.³ Of this, about 73% or 420 of them passed the data cleaning procedures (see Section 2.5) and were used as the final sample in this study. Of these, 94.3% or 396 were fresh graduates while 5.7% or 24 respondents were workers who experienced loss of employment

³ Screening questions targeted at the fresh graduates and retrenched were: 1) whether they were tertiary graduates graduated between 2019 and March 2021, and 2) whether they lost their employment after January 2020 (exclude voluntary resignation), respectively.

(LOE)⁴ due to the pandemic (direct and indirect). The sampling error for the fresh graduates is about 5%. The confidence level of 95% suggests that this sample is close to that of the population.⁵

b. Employer survey

An employers' interview was conducted using qualitative questions via email invitation. This was to ensure efficiency and to maximise flexibility for representatives of the companies to respond given expected delays due to the ongoing pandemic and Movement Control Order (MCO). This interview sought to gather employers' perceptions of the characteristics of the graduate workforce and to understand their hiring strategies during the pandemic. Using Penang Institute's own database and other databases from InvestPenang and information from public companies, an invitation to participate was sent to more than 500 companies in Penang from mid-May to mid-July 2021.

The interview schedule consisted of five sections. The first section asked about the demand of workforce and hiring strategies during the pandemic, while the second section gathered the employers' feedback on the supply of graduates. Questions about the skills match and mismatch among fresh graduates were included in the third section, and the expected change for the future of work in the industries followed. The last section enquired for employers' input on the proposed policy directions.

After a few follow-ups, a total of 23 companies ranging from small and medium companies to large local and foreign companies responded to the survey invitation.⁶

4 According to PERKESO, the definition of LOE includes (1) normal retrenchment and redundancy, (2) VSS/MSS (Voluntary/Mutual Separation Scheme), (3) closure of the company due to natural disasters, (4) bankruptcy or closure of the company, (5) constructive dismissal, (6) resignation due to sexual harassment or threats made in the workplace, and (7) resignation after being ordered to perform dangerous duties that are not within the job scope. Additionally, some of the following are not considered LOE: dismissal due to misconduct by the employee, voluntary resignation, retirement, and expiry of a fixed-term contract.

5 According to the 2020 Graduate Tracer Study, there were 15,888 graduates residing in Penang. This number was used as a proxy for the population of fresh graduates in Penang since the number of graduates from IHLs in Penang was unavailable.

6 The poor responses may be due to the ongoing lockdown measures and the administration of vaccination initiatives undertaken in the companies.

c. Stakeholder engagement

Federal and state government agencies, industry associations and university career centres were engaged for their views on graduate employment, skills mismatch, and initiatives for career and skill development.

2.5 Sample selection

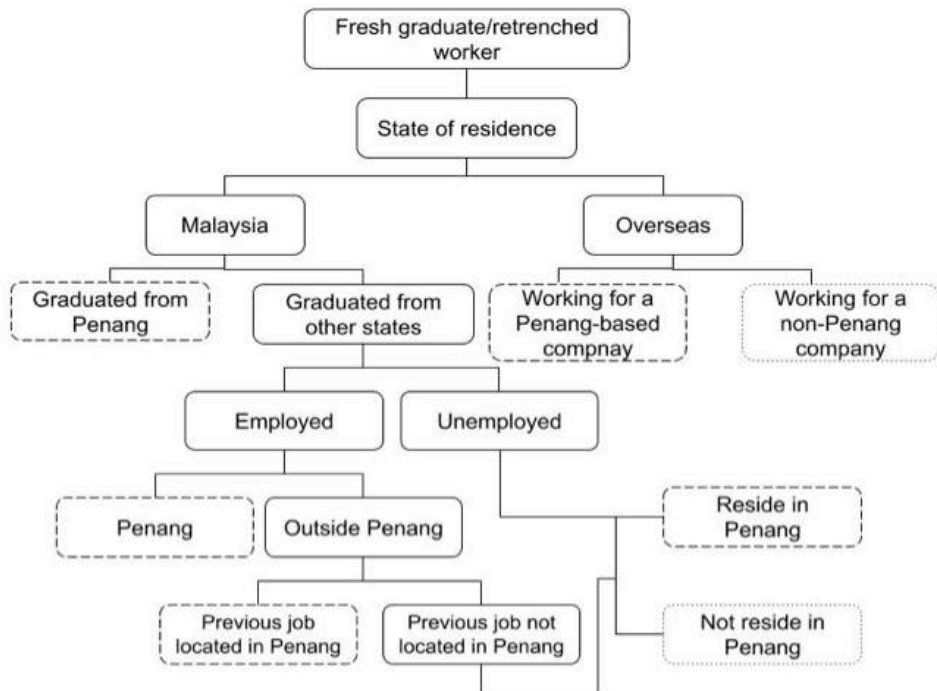
The survey data was collected using a snowball sampling technique. The online graduate employability survey was first disseminated to career and development centres of the respective public and private IHLs in Penang. The career and development centres then assisted the research team to share the survey form with all graduates for the academic sessions 2019, 2020 and 2021. To increase responses, the same survey was emailed to lecturers in these institutions after their contact details were scrapped from the university webpage. A favourable response was received from lecturers for sharing the survey link with their students who had graduated. As a token of appreciation, a RM20 Lazada voucher was awarded to each respondent who completed and provided valid answers to the survey questions.

The data cleaning procedures are listed in the following order:

1. Fresh graduates who did not graduate between January 2019 and March 2021 were excluded.
2. Retrenched workers who resigned voluntarily or had no working experience were excluded.
3. The respondents are Penang-related (Figure 2.2) based on the following criteria:
 - a. Those neither staying nor working in Malaysia were excluded;
 - b. Respondents who fulfilled at least one of the following were included:
 - i. graduated from Penang's IHLs;
 - ii. working in a company operating in Penang;
 - iii. residing in Penang; or
 - iv. have worked in Penang in his/her last employment.
4. Respondents with significant missing responses were omitted.

5. Respondents who claimed they were employed but would begin the service of work after the survey date were excluded.⁷
6. Respondents who were unemployed and did not intend to look for a job for reasons such as further study and not being interested in work were excluded.
7. Other invalid responses (based on the research team's judgement) were excluded.

Figure 2.2 Selection criteria for graduates who passed the screening questions of the graduate survey



Notes: Samples excluded from this study.

----- Samples were filtered further for valid responses.

⁷ Considering some of them may have secured a job but would start working later, respondents who would begin the service of work within three months after the survey date were included in the sample.

2.6 Empirical methods

In this report, several hypothesis tests were conducted to compare the means of two or more independent samples and to test whether two variables were associated at all. With regards to the main interest of this study – graduate employability, the logistic regression was applied to examine factors associated with it.

Three statistical tests used, namely Chi-square test of independence, Wilcoxon Mann-Whitney (WMW) U-test and Kruskal Wallis test, were briefly explained. It was followed by the model specification for the logistic regression.

The significance level (or alpha) used in this study is 0.05. The statistical software used is R.

Chi-square test of independence

The Chi-square test of independence is used to find out whether two categorical variables are associated. For example, this tests whether experience is associated with employment, whether the academic result is associated with employment, etc. The null hypothesis states that the two variables are independent or not correlated with each other. Hence, a p-value of less than 0.05 rejects the null hypothesis, thus suggesting that the two variables are significantly associated.

Wilcoxon Mann-Whitney (WMW) U-test

The WMW U-test is a nonparametric test used to compare the differences between two independent groups where the dependent variable is either ordinal or continuous. This test is usually used as an alternative to the two-sample t-test when the distributions of the two groups are not normally distributed.

Kruskal Wallis test

Kruskal Wallis test is also a nonparametric test which is used when there are more than two independent groups and when the dependent variable is not normally distributed. It is used to determine if there are significant differences in the ordinal or continuous dependent variable between two or more groups of an independent variable. For example, this is used to understand whether there is a difference in expected salary based on the period of unemployment (categorical variable).

Logistic regression

Besides the exploratory analyses which use hypothesis testing to explore the relationship between variables, this study aims to identify factors associated with graduate employment (dependent variable or y in this study).

Since the dependent variable is dichotomous, the logistic regression is used. In our case, employed is coded as 1 while unemployed is coded as 0.

Specifically, we wished to find out if education qualification, academic result, experience and field of study (FOS) are correlated with graduate employment. Demographic variables such as age, gender and marital status are added as control variables.

Experience is explored in three different ways, namely two in categorical manner and one in continuous scale. The two classifications used are based on whether they had working experience (regardless of the duration) and whether they had at least a one-year experience. For the continuous scale, length of experience in months is used.

The FOS is classified into six groups, with four main FOS, “Other STEM” and “Other Non-STEM” fields. The explanatory variables (independent variables or x ’s) are shown in Table 2.2.

Usually, the logistic regression models the log odds ratio⁸ of y , instead of the y itself. Hence, the initial model is shown as follows:

$$\begin{aligned} \text{logit}(\text{employed}_i) &= \log\left(\frac{\text{employed}_i}{1 - \text{employed}_i}\right) \\ &= \beta_0 + \beta_1 \text{qualification}_i + \beta_2 \text{academic result}_i + \beta_3 \text{experience}_i \\ &\quad + \beta_4 \text{FOS}_i + \beta_5 \text{age}_i + \beta_6 \text{gender}_i + \beta_7 \text{marital}_i, \end{aligned}$$

where the coefficient (β) is interpreted as the change in log odds of y when there is one unit change in the corresponding x (qualification, academic result, experience, FOS, age, gender, marital), holding other variables constant, and experience can be referred to the person having had experience or not, at least one-year experience or not or length of experience. For ease of interpretation, the coefficients are transformed to odds ratio by taking the exponential ($\exp(\beta)$).

⁸ Odds ratio is the ratio of probability of employed and probability of unemployed.

Table 2.2 Description of independent variables involved in the study

Independent variable	Description and coding scheme^a
Qualification	The qualification is grouped into a binary variable: 1) Non-postgraduate (Bachelor's degree and below) - 0 2) Postgraduate (Master's degree and above) - 1
Academic result	The graduate's academic result is grouped into four categories: 1) Second class lower and below - 0 2) Second class upper - 1 3) First class - 2 4) Postgraduate's research - 3
Experience	Two different cutoffs are explored: 1) whether they are experienced 2) whether they had at least a one-year experience ^b In both cases, there are two categories: 1) Inexperienced/Less than one year - 0 2) Experienced/At least one year - 1 Months of experience - a continuous variable
FOS	The FOS is grouped into six categories: 1) Other Non-STEM - 0 2) Other STEM - 1 3) Accounting & Finance - 2 4) Business & Administration - 3 5) Computer Science - 4 6) Engineering - 5
Age	A continuous variable
Gender	1) Female - 0 2) Male - 1
Marital	1) Married - 0 2) Single - 1

Notes:

1. ^a The variable coded as zero is used as the reference category.
2. ^b The duration of work experience is derived from their last employment only. Therefore, those with experience of less than one year may actually have more than that; but given that they are fresh graduates, this proxy is considered reasonable.

2.7 Profile of respondents

A total of 420 graduates who passed the screening questions and provided valid answers were included in this study. Of this, 94.3% (or 396 respondents) were fresh graduates⁹ while the remaining 5.7% (or 24 respondents) were retrenched workers. The demographic distribution of fresh graduates and retrenched workers are respectively described as follows. The descriptive statistics of this profile is summarised in Appendix C, Table C.1.

a. Fresh graduates

Out of 396 respondents, 56.3% were males and 43.7% were females. The median age of the sample was 25 years. A majority of the respondents graduated in 2020 (56.1%, 222 respondents), followed by graduation year 2019 (39.6%, 157 respondents) and graduation year 2021 (4.3%, 17 respondents). Nearly 60% of the respondents were from Penang, followed by those from Perak (10.6%, 42 respondents) and Kedah (9.1%, 36 respondents). Meanwhile, 71.7% resided in Penang during the survey, and others resided in Kedah (7.3%, 29 respondents), Selangor (5.6%, 22 respondents), Perak (4.5%, 18 respondents) and Kuala Lumpur (3.5%, 14 respondents).

In terms of educational attainment, 77% of them graduated with a Bachelor's degree while about 20% completed a Master's degree and beyond. Respondents from the STEM made up 50.3% of the entire fresh graduate sample while non-STEM graduates constituted 49.7%. About a quarter of the respondents were from engineering, followed by accounting & finance (A&F hereinafter, 17.7%), business & administration (B&A

⁹ A total of 22 fresh graduates then pursuing further studies were excluded from this sample; this was due to the objective of this study to examine the employment characteristics of fresh graduates.

hereinafter, 13.1%) and computer science (CS hereinafter, 9.1%). Over half of the respondents were from public universities or colleges compared to 40.9% were from private IHLs. Furthermore, 49% of them attained a second class upper in academic performance followed by first class honours (28.5%, 113 respondents) and second class lower (16.2%, 64 respondents).

b. Retrenched graduates

Out of 24 respondents, 58.3% of the retrenched graduates were between 25-34 years old while nearly 30% of them were 40 years old and above. Males and females made up 58.3% and 41.7% respectively. Single and married respondents were responsible for 45.8% each (11 respondents). Meanwhile, more than one-third of the entire sample had the highest educational level of Certificate and Diploma, while 62.5% of retrenched graduates had Bachelor's degrees and above. In terms of FOS, retrenched graduates who responded to the survey made up 25% of B&A graduates, followed by 16.7% of engineering and CS, and 12.5% respectively for food & hospitality and arts graduates.

Chapter 3

Characteristics of Graduate Employment

This chapter discusses Penang's labour market situation amid the Covid-19 pandemic. It also explores the level of employability among fresh graduates through their employment status, duration taken to find a job and monthly salary for various fields of study and industries. This chapter also provides an overall picture of the profile of fresh graduates who were unemployed during the survey period. A case study is presented in the end on the profile of retrenched workers.

3.1 The labour market situation amid Covid-19

The ability to secure a job after graduation primarily relies on two key aspects: (1) the employment opportunities available in the economy; and (2) the characteristics of the fresh graduates in the job search. Amid the pandemic, the job search becomes more challenging and job competition heightens as more students complete their studies at a time of economic restraint.

According to Malaysia's Graduate Tracer Study 2020, the share of graduates who gained employment six months after graduation was 59.5%, declined by 3.6% compared to the share in 2019. Meanwhile the share of unemployed graduates was 20%, increased marginally by 1.2% (Table 3.1). In contrast, a higher percentage of graduates pursued further studies and took upskilling programmes in 2020 compared to the years before. This may be because of the unfavourable economic conditions during the pandemic.

Table 3.1 Percentages of Malaysian graduates by employment status in Malaysia according to the Ministry of Higher Education (MOHE)□, 2019 and 2020

Employment status (%)	2018	2019	2020
Employed	58.5	63.1	59.5
Further study	15.5	16.7	18.1
Upgrading skills	1.3	1.4	2.3
Unemployed ⁱⁱ	24.7	18.8	20.0

Notes:

- ⁱ *The IHLs under MOHE include public universities, private IHLs, polytechnics, community colleges and vocational colleges.*
- ⁱⁱ *This includes graduates who are waiting for job placements.*

Source: Graduate Tracer Study 2018, 2019 and 2020, MOHE.

In Penang, the unemployment rate reached a historical peak in 2020, soaring to 3.5% from 2% in 2019. Its youth unemployment rate (15-24 years) climbed to 10.3% in 2020 from 6.6% in 2019. This was partly attributed to graduates being currently unemployed and seeking jobs. According to the DOSM's Graduate Statistics, Penang's graduate unemployment rate, marked at 2.4% in 2020, rose slightly by 0.5% compared to the rate in 2019. Meanwhile, non-graduates remained the most affected workforce amid the Covid-19 pandemic.

Based on data provided by SOCSO, youth who registered a loss of employment made up 17.6% (or 1,844 workers) of Penang's loss of employment in 2020. Of these, about 72% were non-graduates.

The state's economic activities also shifted amid the pandemic. Due to the challenging and uncertain business environment in light of the closure of much of the economy, recreation, tourism-related and construction activities have experienced severe losses in business revenue. This has led to downsizing and layoffs.

As shared by an IHL in Penang, the demand for tourism and hospitality programmes was hit the hardest by the pandemic. The situation has also aggravated by the fact that a handful of graduates from these programmes made career switches upon graduation in response to the closure of most travel and hospitality operators. While A&F and B&A remain the most in-

demand programmes, information technology (IT) programmes saw an increase in student admission.

The health pandemic has also affected students' internship training. It was highlighted that students from tourism and hospitality, and early childhood education, took a long time searching for internship placements or completing an internship due to the lockdown measures. Unlike students from IT and A&F where work- from-home orientation has been possible, these students are expected to take longer to complete their degrees.

According to the DOSM's Labour Force Survey, the size of employment in art, entertainment and recreation; electricity, gas, steam and air-conditioning supply; construction; accommodation and food service activities; and professional, scientific and technical activities, saw a double-digit decline, respectively plunging by 22.9%, 20.8%, 15.1%, 13.3% and 10% in 2020 compared to 2019. Meanwhile, employment in information and communication technology (ICT); human health and social work; administrative and support services; real estate activities increased by 36.3%, 30.3%, 29.4% and 23.7%.

In terms of professions, low- and mid-skilled occupations were more affected by the pandemic than high-skilled occupations. The number of employed people in mid-skilled and low-skilled occupations respectively declined by 4.6% and 2.8% in 2020, while those holding high-skilled occupations rose instead, by a considerable 7.9%.

Table 3.2 Employment and loss of employment by occupational groups in Penang, 2020

	Employed people		Loss of employment	
	No. ('000)	% change	No.	% share
Managers	57.8	12.7	924	8.8
Professionals	133.1	5.6	2,192	20.9
Technicians and associate professionals	110.2	8.3	1,935	18.5
Clerical support workers	93.1	13.4	864	8.3
Service and sales workers	161.9	0.2	515	4.9
Skilled agriculture, forestry, livestock and fishery workers	11.4	0.0	-	-
Craft and related trade workers	54.8	-22.6	322	3.1
Plant and machine operators and assemblers	149.9	-10.9	2,852	27.3
Elementary occupations	60.8	-2.8	593	5.7
Total	832.9	-0.3	10,465	100.0

Note: The loss of employment does not sum to 10,465 because a total of 268 workers who reported a loss of employment cannot be defined in occupational groups.

Source: Labour Force Survey by DOSM and MYFutureJobs by SOCSO.

Although more employment loss was registered for high-skilled occupations, some retrenched workers have been able to be reemployed after the reopening of economic activities. For example, of the 10,465 retrenched workers reported by SOCSO, 48.3% moved on to high-skilled positions; over half of them were graduates. A note shared by an industry player highlighted that rehiring of employees who had been retrenched was imminent once construction projects are restarted or when the company receives more projects.

Despite the challenging labour market conditions, the demand for workers remains strong. The employer survey showed that 82.6% out of 23 companies were still open for recruitment.

The most in-demand jobs for fresh graduates include software developer, system support engineer, research and development (R&D) engineer, technical support engineer, IT engineer, E&E engineer, mechanical design engineer, quality engineer, process engineer, business analyst, failure analysis engineer, automation engineer, etc.

According to MYFutureJobs by SOCSO, as of October 2021, the number of job vacancies advertised had increased two-fold from 73,191 vacancies in 2020 to 157,434 vacancies in 2021. The hiring incentive 1.0-3.0 by SOCSO have also helped more than 12,000 paid workers who had lost their jobs to gain a job through incentive programmes for those aged 40 and below, 40-60 years old, apprentice, vulnerable and Malaysianisation.¹⁰

However, recruitment has also been difficult in the industries. Lack of qualified candidates who meet the job requirements and have relevant work experiences were the most-cited challenges claimed by the employers. Specifically, an employer commented that the engineering skillsets available are largely manufacturing-oriented. In contrast, skills in design and development are increasingly crucial for Industry 4.0.

3.2 Penang's graduate employability survey: the employment status

This section analyses Penang's fresh graduates' employability using data collected from the graduate employability survey.¹¹ Out of the 396 fresh graduates surveyed, about three-quarters were employed during the survey¹² while 24.7% were not. In terms of the broad FOS, both STEM and non-STEM graduates posed a rather similar employment pattern, as depicted in Table 3.3. In comparison, non-STEM graduates had a relatively higher percentage of graduates unemployed compared to the STEM cohorts.

10 Malaysian employees are being paid a RM500 pay raise in various sectors as part of the hiring incentives.

11 Graduated from IHLs in Penang, working or residing in Penang (see Figure 2.2).

12 This includes graduates between 2019 and March 2021.

Table 3.3 Distribution of fresh graduates by employment status and broad FOS

	STEM	Non-STEM	Total
Employed	152 (77.2%)	146 (73.4%)	298 (75.3%)
Unemployed	45 (22.8%)	53 (26.6%)	98 (24.7%)
Total	197 (100.0%)	199 (100.0%)	396 (100.0%)

3.2.1 The profile of employed graduates

Essentially, STEM and non-STEM graduates show different magnitudes of employability. This can be measured by job type, time taken to obtain a job, further learning, and employable skills (Harvey, 2001). These measures are also considered for the sake of comparing employability differences within the STEM courses.

Fields of study and duration taken to find a job

Figure 3.1 illustrates that graduates from FOS at the top-right quadrant possess relatively higher employability, while those from FOS at the bottom-left quadrant have lower employability. By taking the size of graduates who gained employment for each FOS into consideration, the weighted employment share stood at 75.4%, indicating that about three-quarters of the surveyed graduates were able to find a job upon graduation. More importantly, about 87% of them who are currently employed took less than six months to get a job.

The survey results found that STEM graduates are generally more employable than graduates with non-STEM degrees. As can be seen in Figure 3.1, engineering and CS graduates showed a relatively higher share of graduates being employed compared to other disciplines. At least 80% of these graduates gained employment within six months after graduation. From the industry perspective, a majority of them reported working in the E&E sector, followed by machinery and equipment (M&E), both representing 69.1% of engineering graduates and 61.8% of CS graduates with over 90% of them finding a job within six months of graduation (Figure 3.2).

The manufacturing sector being the backbone of Penang's economy, STEM-related jobs in E&E, precision engineering and medical technology are in high demand. According to Penang Institute, two-third of the total vacancies advertised on JobStreet.com in March 2021 were related to the engineering, manufacturing and ICT sectors despite the challenging economic conditions brought by the pandemic (Ng & Yap, 2021).

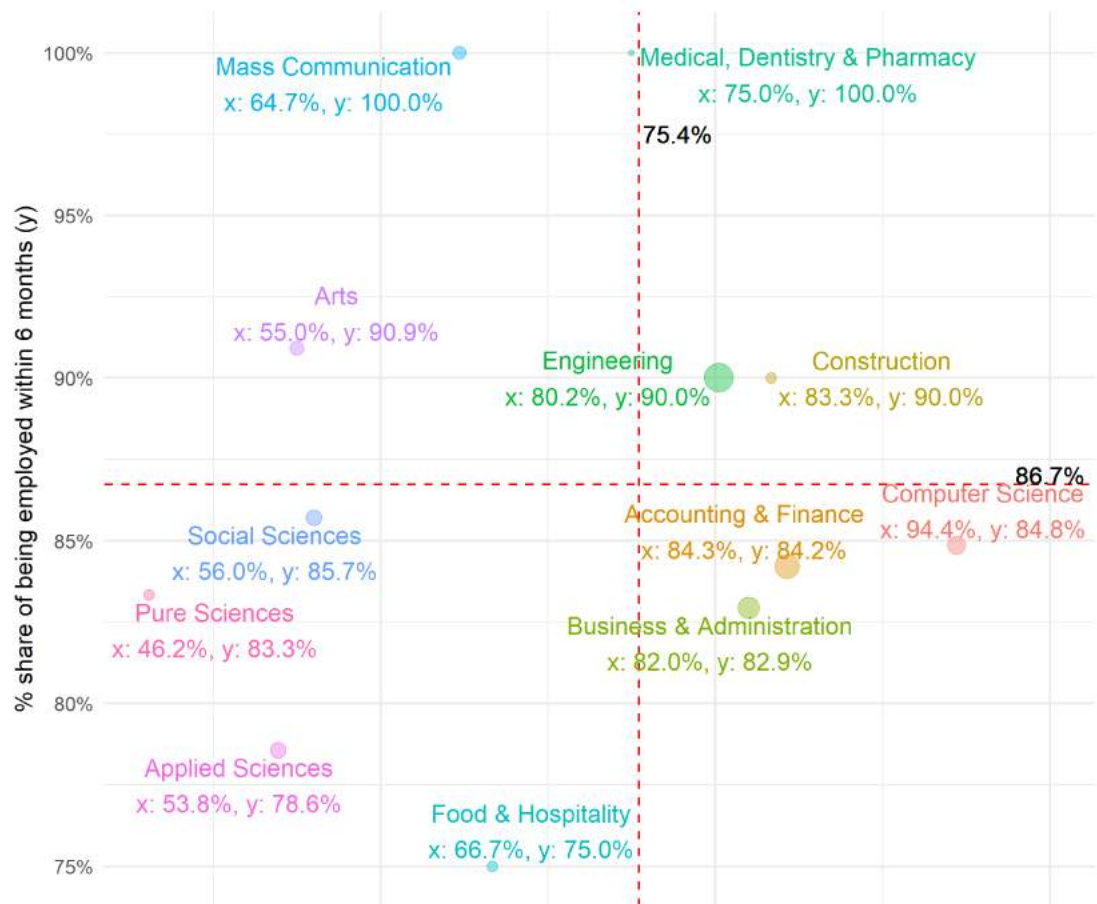
It should be noted that not all STEM graduates experience equal employment opportunities. Graduates from applied and pure sciences show lower levels of employability compared to engineering and CS graduates. Less than half from the pure sciences¹³ were employed, with 83.3% of them being employed within six months; while about 54% of the applied sciences¹⁴ were employed. This may be due to the lack of adequate employment opportunities in the life sciences and pharmaceuticals industries¹⁵ in the state, and the country in general. In such a situation, labour underutilisation may increase if graduates are unable to obtain jobs that are connected to the skills and knowledge learnt from university courses. This may lead to skill-related underemployment.

¹³ In general, pure sciences include zoology, physics, mathematics, chemistry, biology, etc.

¹⁴ Applied sciences include mathematics and statistics, actuarial science, environmental biology, pharmaceutical chemistry, food technology, biotechnology, forensic science, etc.

¹⁵ JobStreet.com showed that on 14 September 2021, only 0.7% of the total job vacancies advertised for science graduates.

Figure 3.1 The percentage share of fresh graduates who reported being employed within six months, by selected fields of study



Notes:

1. The x-axis refers to the share of employed graduates.
2. The y-axis refers to the ratio of the number of graduates employed within six months and the employed graduates.
3. Only FOS with at least five employed graduates are shown.

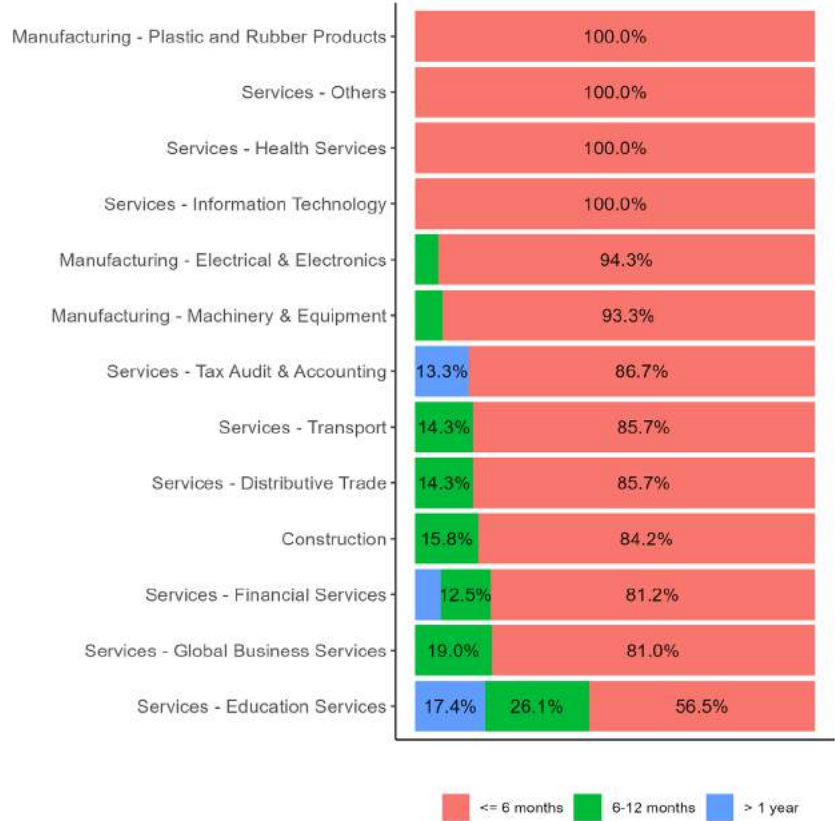
4. *The size of the bubble indicates the number of graduates surveyed in a specific FOS.*
5. *The dotted lines are the weighted averages of both shares.*

Within the non-STEM degrees, graduates from A&F and B&A have greater employability compared to graduates from arts, social sciences, and food & hospitality. While the latter may be affected by the pandemic, A&F and B&A are highly sought-after degrees in Penang, underpinned by the state's development target to enhance global business services (GBS) hub in the region through diversified value-added functions. From our survey, out of 21 graduates who are currently employed in GBS, 81% of them were employed within six months upon graduation and the remaining 19% were able to find a job within 12 months (Figure 3.2).

Meanwhile, among the non-STEM disciplines, arts and social sciences generally have the lowest level of employability, with only about 56% of the surveyed graduates securing a job (Figure 3.1). Intriguingly, while graduates with these degrees work in various industries,¹⁶ there are a fairly large number of them joining education services, which is 20% of the total respondents from arts and social sciences. Additionally, the difficulty to search for a job can also be explained by 43.5% of them who had spent more than six months to find a job in this industry, as depicted in Figure 3.2.

¹⁶ These graduates work in construction, GBS, health services, educational services, agriculture, fisheries and forestry, government services, telecommunications, food manufacturing, etc.

Figure 3.2 Duration taken by respondents to secure a job upon graduation, by industry



Note: Only industries with at least five employed graduates in the survey are shown.

Monthly salary for fresh graduates

In a constrained labour market, shortage of skilled labour leads to higher labour compensation, signifying the demand for skilled labour, *ceteris paribus*. As revealed by Korn Ferry (2018), higher wages were necessitated by highly skilled labour attraction and retention in major global economies by 2030, resulting from the expected global talent shortage. The estimated wage bills are expected to increase in proportion to labour shortages.

This wage performance is in tandem with the labour situation in Penang. With the growing capital investment in the state, anecdotal evidence suggests that the shortage of talent in engineering fields required by the E&E industry does increase the wage rate. While the rise in the wage rate may be slow, the higher wage rate offered by new companies has increased pressure on existing local and foreign companies to retain employees who had been trained for years.

Based on the graduate employability survey, STEM graduates earned an average monthly salary of RM3,022.¹⁷ This marked considerably higher compared with the non-STEM cohorts at RM2,501. The average monthly salary for engineering graduates is estimated at about RM3,096.10, followed by the CS (RM2,985.30) and construction (RM2,701.50) (Figure 3.3). This shows that CS and engineering graduates make relatively higher salaries than other graduates in Penang because they are highly sought after and always represent a shortage in Penang's industrialisation landscape.

Specifically, while there was a small proportion of engineering and CS graduates making RM 5,000 and above per month, about 60% of them reported salaries between RM3,001-RM4,000 (Figure 3.4). This is higher compared with graduates from other FOS. Compared to non-STEM graduates, about 58% of accounting and finance graduates are remunerated between RM2,001-RM3,000 per month while less than a third of these graduates earn between RM3,001-RM4,000. This group is making lower salaries than the former cohort because of the fact that the vacancies that require such disciplines are not difficult to fill from the graduate market.

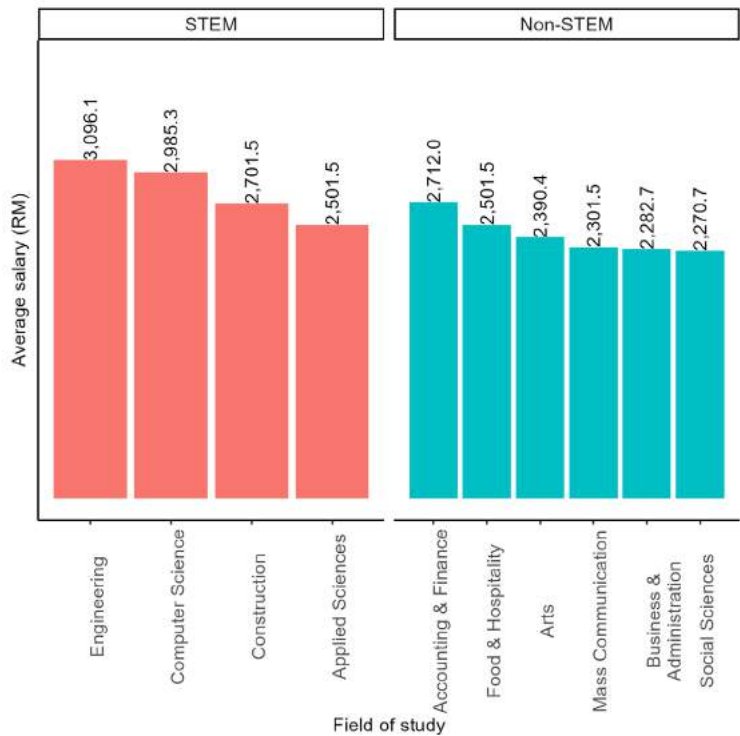
Linking this finding to JobStreet's 2019 Salary Report, employers in the Northern region, which can be used as a proxy for Penang's salary benchmark,¹⁸ offered a relatively more competitive monthly salary in engineering and A&F compared to that on offer for the same job functions in the Central region. As can be seen in Table 3.4, under engineering job functions, some employers in industries such as construction, engineering services, ICT, E&E and semiconductor in the Northern region gave about RM100-RM400 more than employers in the Central region. For A&F, the salary offered by call centre/BPO and E&E in the Northern region significantly surpassed that of the other regions.

¹⁷ This is the estimated average of the mid-salary value of each salary range for each broad FOS. Thus, respondents who reported the same salary group are treated as earning the same salary amount.

¹⁸ This is due to a relatively large employment compared to other states in the Northern region.

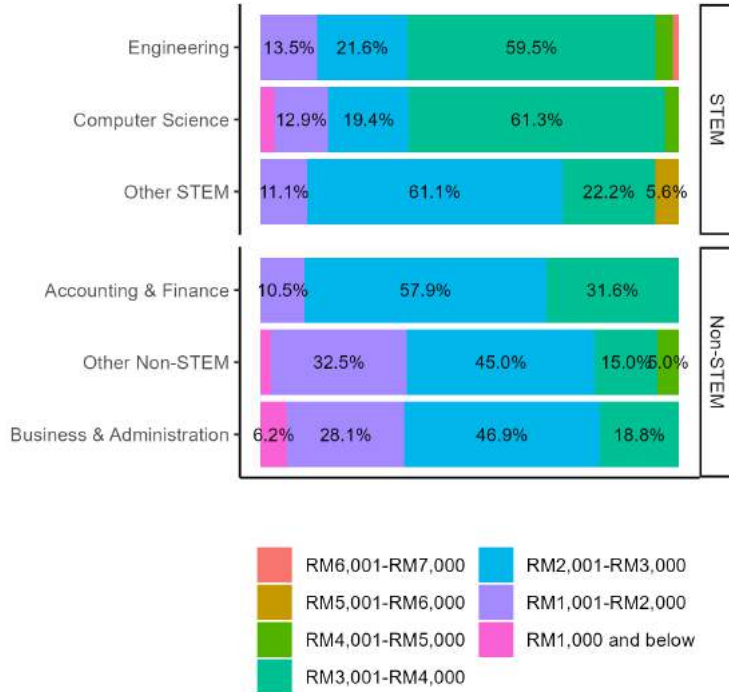
In contrast, the Central region showed continued strength in job functions for computer/IT, with employers offering the most competitive salaries in Malaysia. Specifically, call centre/BPO, consulting, ICT and E&E appear to offer higher salaries than in other regions in Malaysia.

Figure 3.3 Estimated average monthly salary among fresh graduates, by fields of study



Notes:

1. Only respondents with education levels of Certificate, Diploma and Bachelor's degrees are included in the analysis.
2. Only FOS with at least five respondents are included in the analysis.

Figure 3.4 Percentage share of respondent by monthly salaries and major fields of study

Note: Only respondents with education levels of Certificate, Diploma and Bachelor's degrees are considered in this analysis.

Table 3.4 Average minimum and maximum salaries (RM) of fresh-level positions by selected job function, industry and region in Malaysia, 2019

	Northern region	Central region	Southern region
Accounting & finance			
• Accounting	1,912-2,861	1,924-2,603	1,796-2,457
• Banking/financial services	2,423-3,548	2,446-3,612	2,542-3,989
• Call center/BPO	2,500-3,500	2,341-2,932	-
• Consulting	1,763-2,515	2,187-3,193	1,942-2,921
• Manufacturing – E&E	2,240-2,856	1,865-2,559	1,885-2,713
Computer/information technology			
• Call center/BPO	2,731-3,914	2,896-3,958	2,656-3,791
• Consulting	2,324-3,112	2,447-3,510	2,080-2,720
• Engineering/industrial services	2,500-3,500	2,238-3,210	2,500-3,500
• ICT	2,314-3,240	2,591-3,838	2,162-3,284
• Manufacturing – E&E	2,150-2,960	2,488-3,205	1,525-2,149
Engineering			
• Construction	2,158-3,248	2,043-2,976	2,284-3,389
• Consulting	1,874-2,820	2,118-2,923	2,087-3,208
• Engineering/industrial services	2,100-2,972	2,061-2,820	2,170-3,262
• ICT	2,600-3,326	2,048-3,015	2,019-2,808
• Manufacturing – E&E	1,970-2,708	1,922-2,682	1,699-2,439
• Manufacturing – Semiconductor	2,508-3,545	2,884-3,188	2,065-2,969

Note: Northern region – Perlis, Kedah, Penang, Perak; Central region – Selangor, Kuala Lumpur, Putrajaya; Southern region – Melaka, Johor, Negeri Sembilan.

Source: Compiled from JobStreet's 2019 Salary Report.

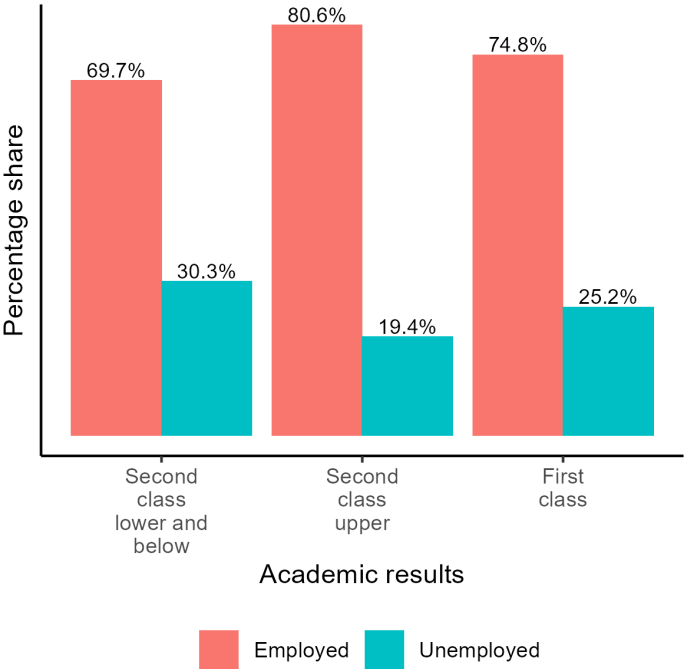
3.2.2 The profile of unemployed graduates

The graduate employability survey also captured the characteristics of graduates who were unemployed at the time of the survey. These include the length of time taken looking for a job, perceived reasons for not being able to find a job, and expected salary. These characteristics are analysed from the perspectives of the FOS and academic results.

Fields of study and academic performance

As mentioned in Section 3.2.1, out of 396 respondents, nearly a quarter, or 98 respondents, were unemployed at the time of the survey. Graduates' academic performance suggests some differences in employability. As can be seen in Figure 3.5, fresh graduates attaining second class lower and third class in academic performance were proportionately more likely to be unemployed as compared to other academic results. Therefore, excellent academic results have a positive correlation to employability.

Figure 3.5 Distribution of fresh graduates, by academic results and employment status



With reference to FOS, pure sciences, applied sciences, arts, social sciences, mass communication and food & hospitality respondents, more than one-third of them reported being unemployed (Table 3.5). While the unemployment for food & hospitality graduates is largely cyclical amid the Covid-19 pandemic, the unemployment of other FOS is assumed to be associated with structural mismatches.

Table 3.5 Selected FOS with the higher unemployment rate among graduates

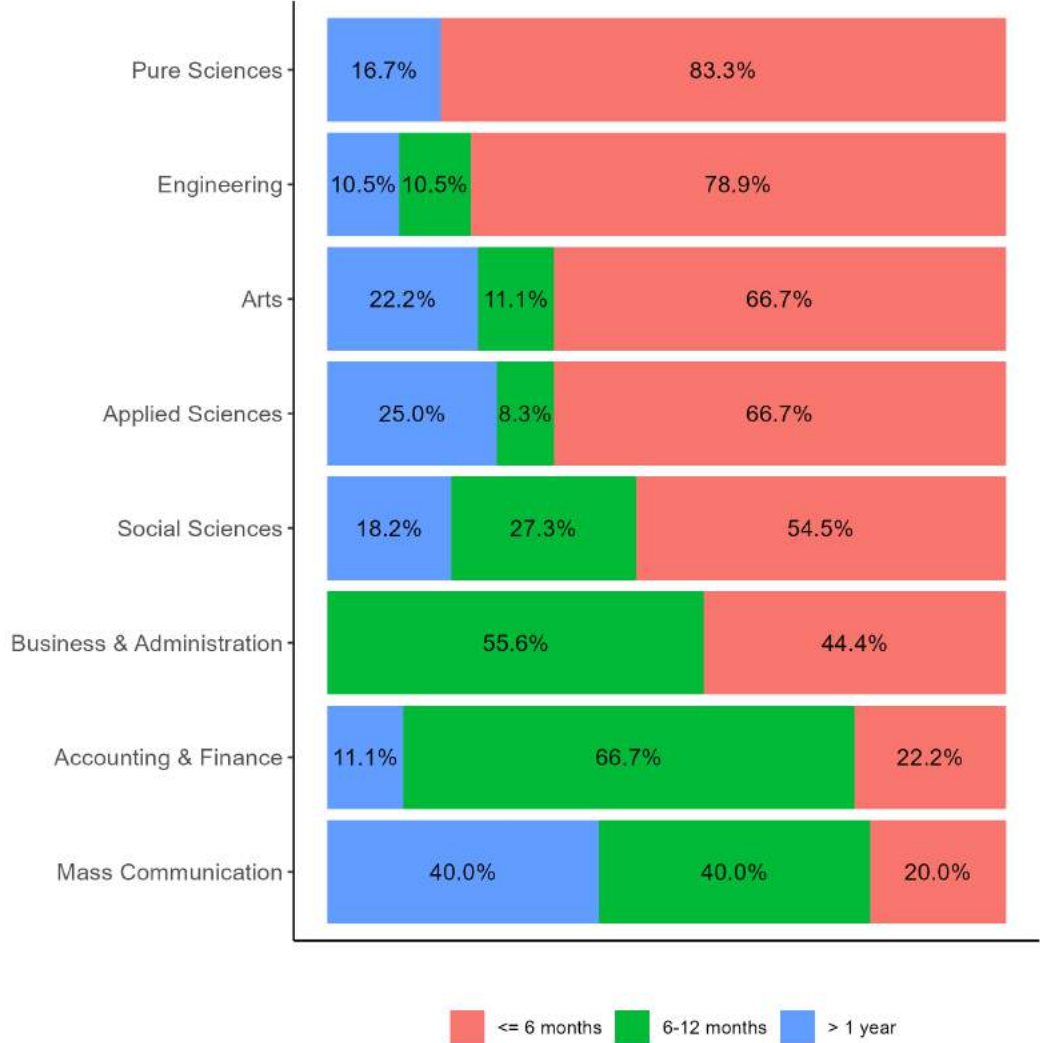
FOS	Unemployment rate (%)
Pure Sciences	53.8
Applied Sciences	46.2
Arts	45.0
Social Sciences	44.0
Mass Communication	35.3
Food & Hospitality	33.3

While graduates may possess strong technical skills, good command of the English language, problem-solving, analytical thinking and communication skills are strong attributes to job mismatch; this is regardless of good academic grades (Mohammad, et al., 2018). Poor soft skills were also cited by the employers (see Chapter 4), who find that some graduates are not able to present their technical knowledge appropriately and to apply what they know in practice.

Length of time being unemployed

As many as 43% of the unemployed graduates had been looking for a job for more than six months upon graduation. Specifically, about a quarter of applied sciences and arts graduates remained unemployed for more than a year (Figure 3.6). Other graduates unemployed for more than a year include those from pure sciences (16.7%), social sciences (18.2%), A&F (11.1%) and engineering (10.5%).

Figure 3.6 Time taken to look for a job by major FOS



Note: Only FOS with at least five graduates are shown.

Barriers to employment

The top five reasons cited by the respondents as barriers to employment can be grouped into three broad categories. These are (1) inability in finding a relevant job; (2) lack of suitable employment opportunities in Penang; and (3) underqualified/overqualified for the jobs. Figure 3.7 shows the top reasons perceived by respondents who were unable to secure employment during the survey. The detailed result is presented in Table C.2 of Appendix C.

From our survey, we found that some graduates assumed difficulties in job search partly because of the limited employment opportunities available that matched their academic backgrounds. About 46.2% of graduates who cited this reason were primarily from social sciences, applied sciences, arts, pure sciences and mass communication. The next biggest barrier to employment was the wait for job interviews outside Penang, sought by some of them. Most of these were from B&A and A&F, who preferred to work outside Penang even if there were job opportunities in Penang in industries such as consulting, GBS and manufacturing.

Figure 3.7 Top reasons for unemployment cited by fresh graduates

Top reasons of unemployment	Percentage share	Most cited by graduates from
Unable to find relevant jobs	46.2%	Social Sciences, Applied Sciences, Arts, Pure Sciences, Mass Communication
Awaiting job interviews outside Penang	28.0%	Business & Administration, Accounting & Finance
Don't have skills required	21.5%	Engineering
Underqualified	18.3%	Engineering
No suitable jobs in Penang, have to go to Singapore/KL	16.1%	Social Sciences, Applied Sciences, Pure Sciences
Overqualified	16.1%	Business & Administration, Arts, Applied Sciences, Pure Sciences

Note: Only FOS with at least five respondents are considered in this analysis.

It is worrying to note that 16.1% of graduates mainly from social sciences, applied sciences and pure sciences cited that the lack of suitable jobs in Penang had caused them to search for jobs in Kuala Lumpur and Singapore. This may be due to the nature of Penang's industrial landscape, where certain skills and qualifications are not in demand, specifically within the fields of psychology and zoology. A small number of engineering and A&F graduates with excellent academic grades are awaiting international travel restrictions to be lifted, and plan to explore job opportunities in Singapore.

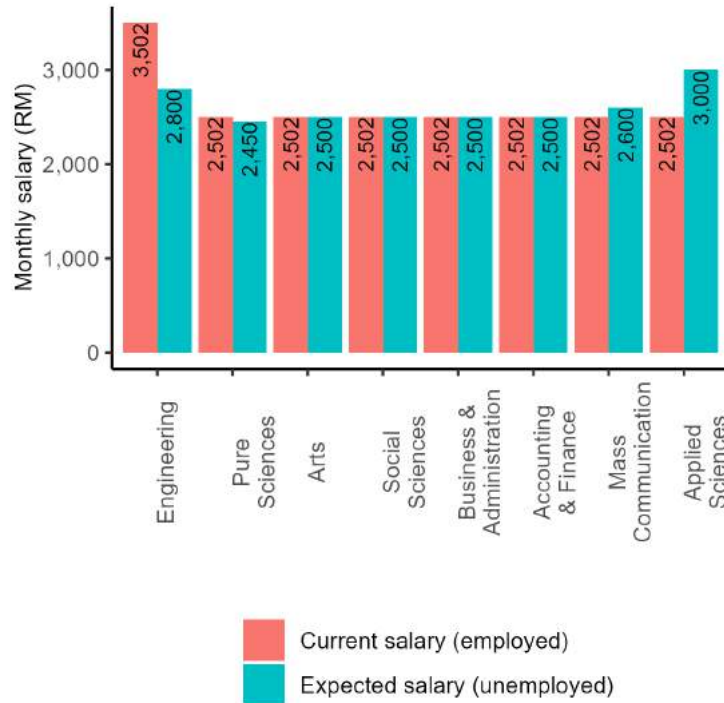
Among those who cited lack of skills needed by the market and being underqualified for the jobs, most were engineering graduates. There are multifaceted causes for this concern. The significant one includes rapid technological advancement. Slow catch-up changes taken by the IHLs have led to skills and employment misalignments. Some graduates seem to be aware of the rapid change in technology which may impede employment due to skills mismatch.

Expected monthly salary among unemployed graduates

Graduates expecting high salaries for their first job have been widely debated as a factor contributing to graduate unemployment. Our survey shows that while the STEM graduates expected a higher salary compared to their non-STEM peers, this demand was not extraordinary and was in fact relatively reasonable within the average salary range published by the 2019 JobStreet Salary Report (Table 3.4).

As an example, all graduates who were unemployed had almost similar median salaries obtained by graduates employed with the same academic backgrounds, except applied sciences. Engineering graduates looking for a job at the time of the survey turned out to have lower expectations than their peers who are already employed (Figure 3.8). Applied sciences graduates, on the other hand, demanded a slightly higher salary compared to those currently employed.

Figure 3.8 Median salary for employed fresh graduates versus median expected salary for unemployed fresh graduates



Notes:

1. Only FOS with more than five unemployed graduates are shown.
2. FOS are arranged in ascending order of difference between the median salary of unemployed and the median expected salaries of employed.

3.2.3 Factors affecting graduate employability

This section explores the factors affecting graduate employability. Particularly, the relationship between graduate employment and the graduate's attributes are examined. The graduate's attributes include age, gender, marital status, academic qualification, academic results, work experience and FOS (see Table 2.2).

A number of logistic regression models have been tested to achieve a model that is best for

estimating the determinants of graduate employability (see Appendix C: Table C.3). The final model is presented in Table C.4 with a lower AIC value¹⁹ and better pseudo R² value.²⁰

The results show that academic qualification, academic results, FOS and age have statistically significant relationships to graduate employability.

It is important to iterate that academic qualification is negatively associated with employment. The odds of graduates with postgraduate qualification being employed is 73.6% ((0.264-1)*100%) less than that of the non-postgraduates, indicating that postgraduates are about 74% less likely to get a job as compared to non-postgraduates. This indicates the phenomenon of over-education, which will be discussed in Section 4.2.

A higher grade in academic performance is positively related to graduate employment. Having a second class upper or first class nearly doubles the odds of being employed as compared to those with second class lower and below. However, the odds of getting employed have no significant difference between those in postgraduate research and the second class lower.

Work experience does not have a significant relationship with graduate employment. Nevertheless, its negative coefficient which contradicts the usual notion of experience-enhanced employability is worth investigating. The interaction effect between FOS and work experience was examined, and the results are shown in Figure 3.9a (for work experience regardless of duration) and Figure 3.9b (for work experience of at least one year).

The higher employment rates for experienced graduates from other STEM, engineering and CS after considering work experience of at least one year implies that work duration matters to some extent. Having experience of at least a year increased employability. This leads to the selection of the regression model that includes the experience of at least one year (see Appendix C, Table C.4).

¹⁹ AIC value refers to the Akaike Information Criterion. The lower the AIC, the better the model.

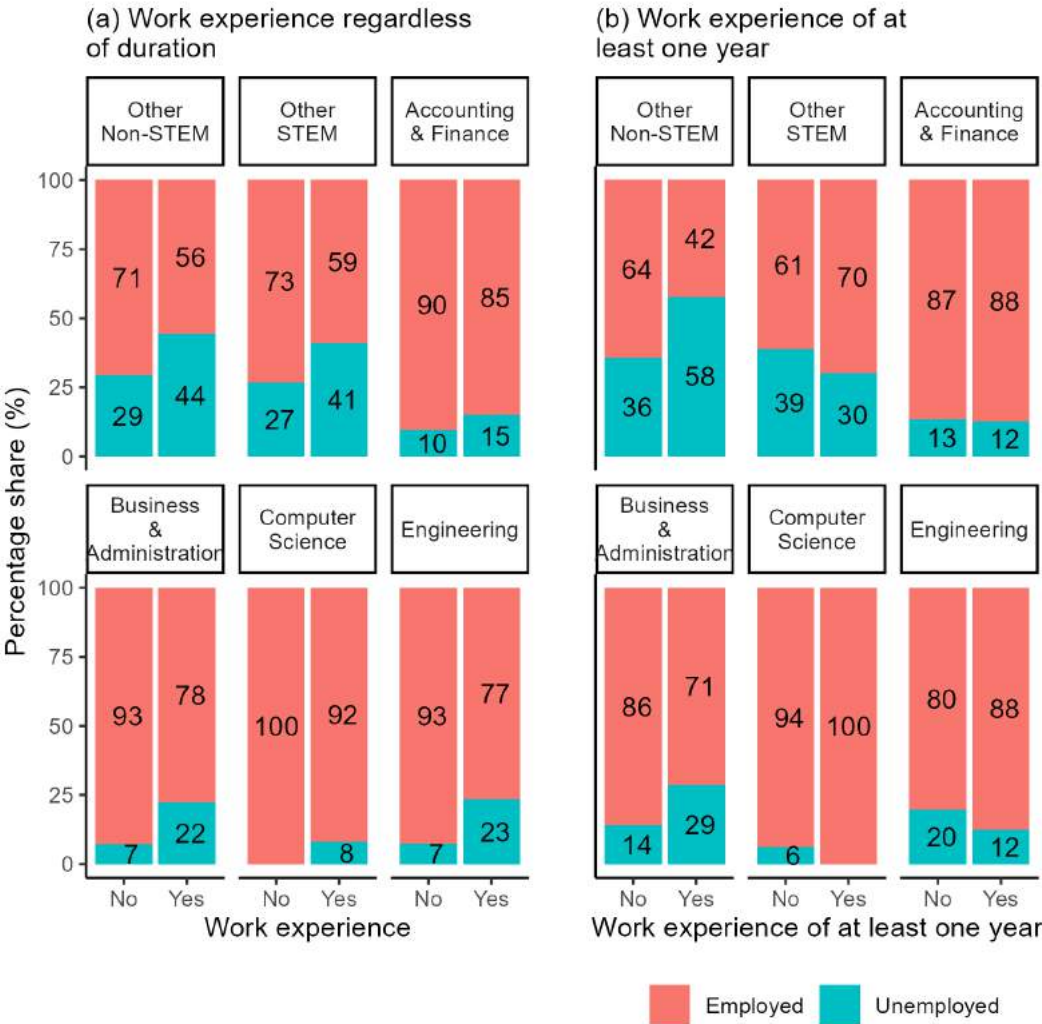
²⁰ Two measures of pseudo R² were used, namely Adjusted McFadden and CoxSnell. The higher the value, the better the model.

On the other hand, lower employment rates for those with experience occur in cohorts of other non-STEM and B&A. The other non-STEM graduates are mostly postgraduates and were looking for jobs in the education sector. While there are several reasons for unemployment among experienced B&A graduates, most of them were in fact waiting for job interviews.

Besides that, FOS also plays a significant role in graduate employment. Engineering, CS, B&A and A&F are found to be positively associated with graduate employment, with CS marking the highest odds of being employed at 14.6 times, compared to other non-STEM cohorts. This is then followed by A&F graduates (4.6x), Engineering (3.5x) and B&A (3.5x). This result further confirmed that these FOS are highly required in Penang's labour market.

With reference to demographics, age is also significantly correlated to graduate employability. A graduate who gets older by one year is associated with a nearly 20% increase in odds of getting employed. Meanwhile, gender is barely significant, with female graduates being relatively more employable than the males, other variables being constant.

Figure 3.9 Fresh graduates’ employment rates by work experience and FOS



3.3 Case study: An analysis of the retrenched graduates in Penang

Only 24 graduates who were redundant after March 2020 responded to the survey despite it being administered through SOCSO and NCIA. Of this, 79% or 19 of the affected graduates remained unemployed during the survey; most of them were in their 30s (Table 3.6). Nearly half of them were unemployed for six to twelve months, and a large proportion of them who were still unemployed at the time of the survey were previously from the airline and E&E industries. This is not surprising since these industries are among those most affected by the pandemic and lockdown.

Table 3.6 Profile of retrenched graduates who were not employed at the time of the survey

Age		Length of time being unemployed		Major industries in the last employment	
20s	3 (15.8%)	6 months and below	7 (36.8%)	Airline	4 (21.0%)
30s	10 (52.6%)	6-12 months	9 (47.3%)	E&E	3 (15.8%)
40s	5 (26.3%)	More than 1 year	3 (15.8%)	Health services	2 (10.5%)
50s	1 (5.3%)			Education	2 (10.5%)

Reasons for graduates who were involved in displacement were also sought in the survey. Normal retrenchment topped the list (37.5%) followed by the closure of the company due to Covid-19 (16.7%) and the expiry of a fixed-term contract (16.7%) (Table 3.7).

Table 3.7 Reasons for leaving the last employment

Reasons	No.	% share
Normal retrenchment and redundancy	9	37.5
Bankruptcy or closure of the company due to Covid-19 and MCO	4	16.7
The expiry of a fixed-term contract	4	16.7
Constructive dismissal (e.g. an employee is forced to leave or quit his/her job because of the employer's conduct)	3	12.5
Closure of the company due to natural disaster	2	8.3
Imminent shutdown and relocation of the company	1	4.2
Relocation and consolidation of business	1	4.2
Total	24	100.0

There were a number of reasons cited by the retrenched graduates for not being able to look for a job. Interestingly, a majority of them indicated that their failure to find jobs that match their studies was the top reason for being unemployed. These included those aged 30 years old and above, with some prior work experience. Their academic backgrounds were in food & hospitality, construction, B&A and pharmacy.

The next biggest reason provided by respondents was the high expected salary, followed by them not being able to find a suitable job in Penang, leading to them planning to search for jobs in Singapore or Kuala Lumpur.

Five respondents found employment with another company during the survey; four within six months. This included retrenched workers who received new offers immediately after being laid off. All technical STEM workers reemployed in a similar occupation, with academic backgrounds in CS and engineering. They secured a job that was either paid better, or was equivalent compared to their last employment.

Table 3.8 summarises individuals' characteristics of employment redundancy, based on the uniqueness of each individual.

Graduating amid a pandemic poses various challenges to the search for work. First, the duration of the job search may be longer than before the pandemic. The labour market appears to be facing a lack of workers rather than a lack of jobs. Although a large proportion of engineering graduates were able to gain employment within a short period, there still exists abundant job vacancies for experienced graduates. Be that as it may, graduate unemployment will have long-term implications on job prospects if the impacts of Covid-19 on graduate employment are not resolved.

Table 3.8 Characteristics of selected graduates who were retrenched amid the pandemic

Characteristics	Individual A	Individual B	Individual C	Individual D	Individual E	Individual F
1. Age	41	29	27	42	34	26
2. Gender	Male	Male	Female	Female	Female	Male
3. Employment status during the survey	Employed	Employed	Employed	Unemployed	Unemployed	Unemployed
4. Field of study	Engineering (Electronics)	Computer Science (IT)	Arts (Economics)	Engineering (E&E)	Applied Science (Applied Chemistry)	Food & Hospitality
5. Current industry	E&E	GBS	Other services	-	-	-
6. Last industry	E&E	E&E	Hotel & tourism	E&E	Transport equipment	Airline

Chapter 3: Characteristics of Graduate Employment

7. Current job title	Senior Manager	IT Software Engineer	Admin	-	-	-
8. Previous job title	Senior Manager	Technical Specialist	Finance Rewards	Document Control	Chemist	Operation Executive
9. Current salary	RM14,001- RM15,000	RM6,001- RM7,000	RM1,001- RM2,000	-	-	-
10. Last drawn salary	RM13,001- RM14,000	RM6,001- RM7,000	RM1,001- RM2,000	RM1,001- RM2,000	RM3,001- RM4,000	RM1,001- RM2,000
11. Reason for retrenchment	Department shut down (offered VSS)	Imminent shutdown and relocation of the company (offered VSS)	Closure of the company due to natural disaster	Normal retrenchment	Bankruptcy or closure of company due to Covid-19 and MCO	Normal retrenchment and redundancy
12. Reasons for not being able to find a job	-	-	-	My expected salary is higher than what was offered by the potential employer.	My expected salary is higher than what was offered by the potential employer.	I can't find jobs that are relevant to my field of study.
13. Length of time taken looking for a job	Three months and below	Three months and below	More than one year	9-12 months	More than one year	9-12 months

14. Occupation of interest	-	-	-	Document control	Chemist/ laboratory assistant in a chemical laboratory	Any available jobs
15. Expected salary	-	-	-	RM2,300	RM2,800	RM2,200
16. Level of mismatches	My current job is a good fit for my skills/ qualifications, due to my previous work experiences.	I expect my new job to require skills and qualification that are associated with my old job, which I was a good fit for.	Under-qualified	-	-	-

Chapter 4

Skill Issues and Challenges of Graduate Employment

This chapter discusses the issues of skills among graduates, which include the mismatch of these skills with the industry's expectations, and the challenges faced by graduates at work. We specifically look into issues of over-education in relation to unemployment and underemployment among the postgraduates in this study. Next, this chapter analyses information provided by employers on their hiring preferences with regards to fresh graduates and/or retrenched workers. In discussing the issues of skills, this chapter discusses the desired skills training among jobseekers and current employees which could be beneficial in strategizing for and planning an effective upskilling/reskilling framework.

4.1 Skills mismatch and underemployment

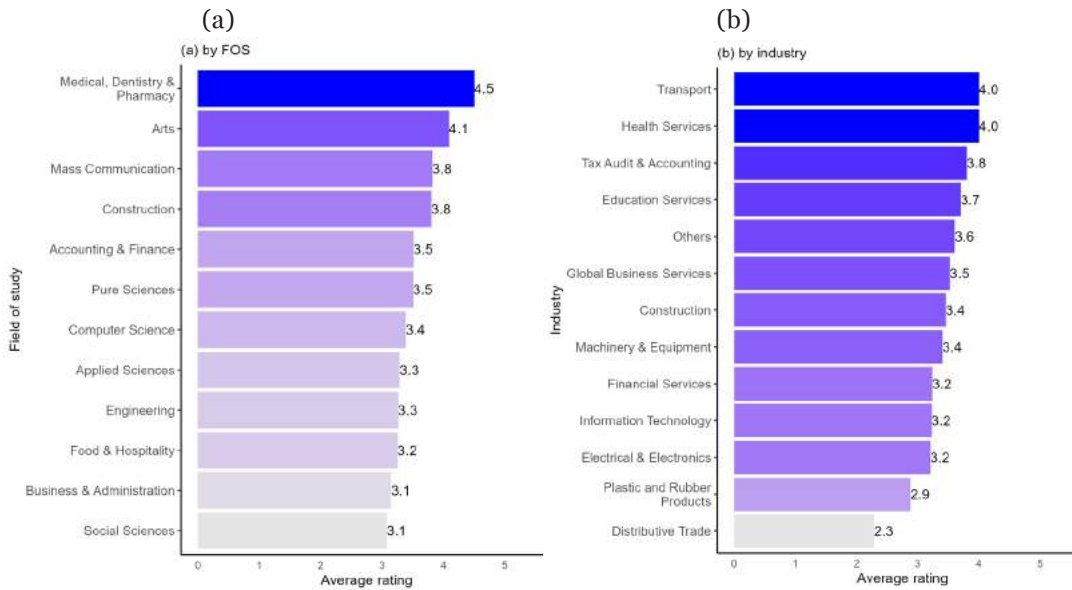
4.1.1 Graduates' perspective: the relevance of skills and skill-related underemployment

Job-skill relevancy

The state's workforce requires suitable skillsets to be competitive and employable. Based on FOS, those in compulsory service in the medical and medical-related fields (medical, dentistry and pharmacy) on average rated a high 4.5 for job-skill relevancy, followed by arts (4.1), mass communication (3.8), construction (3.8), A&F (3.5) and pure sciences (3.5) (Figure 4.1a).

Engineering and CS graduates, who are important technical skilled talent integral to the state's economic structure, on average, rated skills learnt in university to be somewhat relevant to current jobs, at 3.3 and 3.4, respectively. In contrast, three groups that rated job-skill relevancy the lowest by FOS are food & hospitality (3.2), B&A (3.1) and social sciences (3.1).

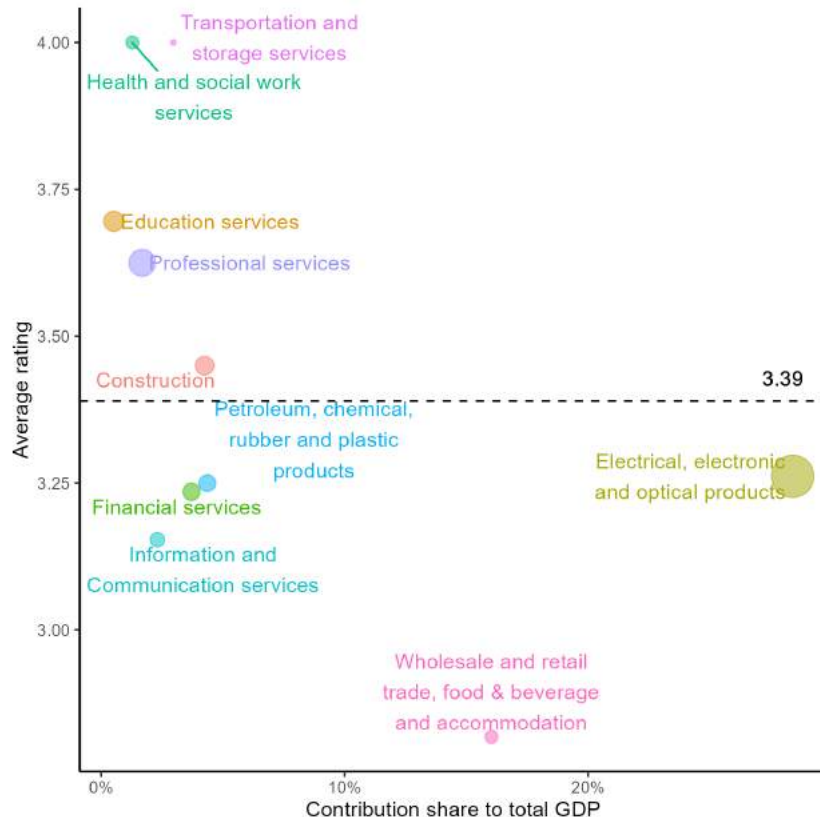
Figure 4.1 Average rating for job-skill relevancy by (a) FOS and (b) industry



Notes:

1. Only FOS/industries with at least five employed graduates are presented.
2. 1-Highly irrelevant, 2-Irrelevant, 3-Somewhat relevant, 4-Relevant, 5-Highly relevant

Figure 4.2 The relationship between fresh graduates' average rating for job-skill relevancy and its share of contribution to total Gross Domestic Product (GDP) in Penang, by industry



Notes:

1. The industries are re-categorised based on the economic activities used in the GDP calculation by the Department of Statistics Malaysia.
2. Only industries with at least five graduates are shown.
3. The dotted line represents the weighted average rating for job-skill relevancy by the number of graduates employed in the respective industry.
4. The size of the bubble indicates the number of graduates in that industry.
5. The GDP in 2017 (base year: 2015) is used for calculation due to data availability.

When analysed based on job industries (Figure 4.1b), the ratings for job-skill relevancy show a

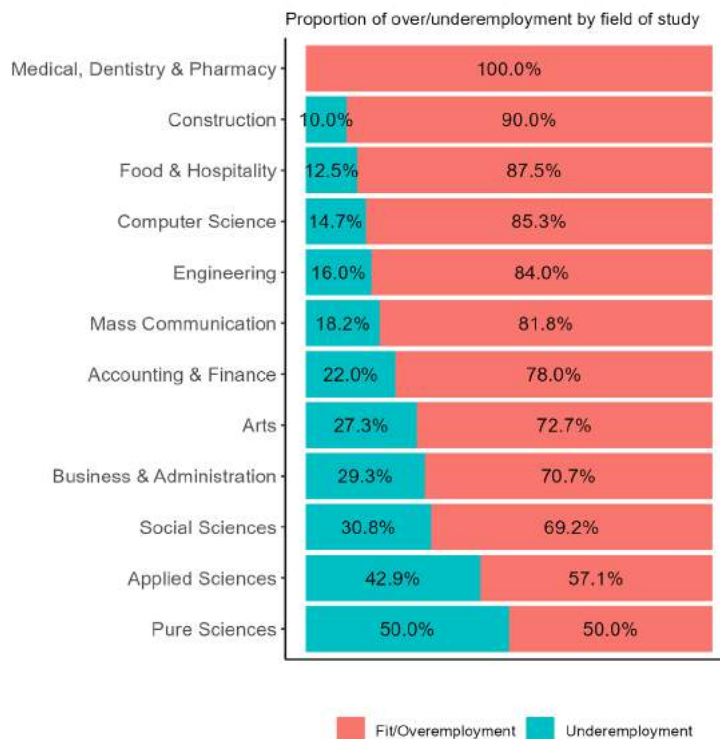
stark difference. Those in transport and health services rated job-skill relevancy at 4.0. Those in tax, audit and accounting, education services, and GBS rated job-skill relevancy between 3.5 and 3.8 while those in construction, M&E, financial services, IT and E&E rated job-skill relevancy between 3.2 and 3.4. Finally, two sectors that had low ratings for job-skill relevancy are plastic and rubber products (2.9) and distributive trade (2.3).

Furthermore, the relationship between rating for job-skill relevancy and its share of contribution to the state's Gross Domestic Product (GDP) (Figure 4.2) highlights the need for greater attention. The E&E industry, especially, which is a major contributor to the state's GDP but which shows relatively low rating for job-skill relevancy by graduates (below-average rating of 3.39) points to real-world gaps in the state's key economic industry. Other segment of wholesale and retail trade, food and beverage and accommodation (mostly linked to tourism and related services) also show such a gap, with even lower rating for job-skill relevancy despite the industry's importance to Penang's economy. While financial services and ICT services individually may not show all too high importance to Penang's GDP, when combined they still form an important part of the economy and the job-skill relevancy again points to a knowledge and industry requirement gap.

Given the large number of people employed in key sectors such as E&E, M&E, GBS, and tourism-related services, the perception on job-skill relevancy in this study suggests that there is a need to bridge the gap between conventional courses and training and industry work demands.

Skill-related underemployment

The employability of graduates is also examined from the angle of skill-related underemployment. A graduate is considered to be in the situation of skill-related underemployment if employed in a job which has a lower requirement (semi-skilled/low-skilled occupations) than his/her education level. According to DOSM (2021), underemployment in Malaysia's labour market is a structural and long-standing problem, and was faced by employed graduates even before Covid-19.

Figure 4.3 Percentage share of fresh graduates' skill-related underemployment by FOS

Note: Only FOS with at least five employed graduates are shown.

While the majority of the fresh graduates are employed in a job that matches their education level, the survey found that 22.5%²¹ of them are in a situation of skill-based underemployment. Specifically, graduates from pure and applied sciences had underemployment rates of about 50% (Figure 4.3), on top of their already low employment rates. This may be attributed to the double-whammy effects of the relatively low supply of suitable jobs and the correspondingly high number of graduates in these fields. The extent of underemployment for these groups is

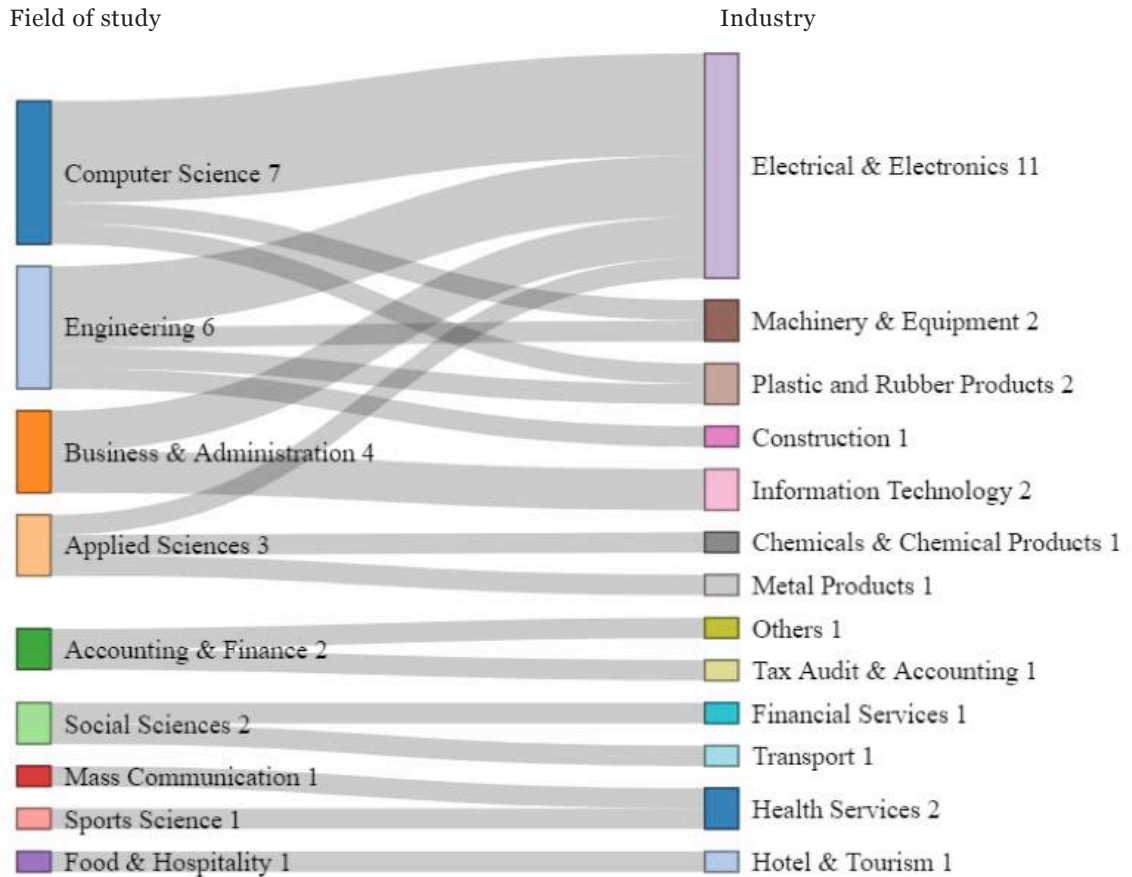
²¹ 68 out of 302 employed fresh graduates (one missing value)

relatively serious and mitigation efforts for this mismatch should be enhanced (see Section 6.1, Issues 1-3).

On the other hand, while most of the graduates from CS were employed in a job with requirements that matched their education level, nearly a quarter of them felt that they were underqualified for the job and needed to put in extra effort to their assigned tasks (Appendix D, Figure D.1). This might imply that their curriculum in the IHLs did not keep up with the pace in the industries. Ma'dan et al. (2020) had argued that in curriculum programme development, industry participation in curriculum design would go a long way towards helping to close the gaps between industry's requirements and university.

Breakdown by industry further shows that almost 15% of graduates working in the E&E and M&E sectors at equivalent levels perceived themselves as underqualified (Appendix D, Figure D.2). The reasons given are that (1) most are either not related to FOS, or (2) the skills were not learnt and acquired in IHLs. This finding shows that the perception of their ability at work is related to the skill relevance, referring to the applicability of relevant skills to their current job. Graduates who perceive themselves as underqualified for their job, in general, work in fields/industries that are less relevant as compared to their FOS. The same is observed across FOS and industries (Appendix D, Figure D.3 and D.4). For example, graduates in B&A, social sciences and mass communications who are unable to find opportunities related to their FOS were employed in other industries (Figure 4.4), and they perceived themselves as underqualified. In some cases, the requirements of their jobs were also lower than suggested by their qualification (such as a degree graduate hired for a diploma level position), albeit they were working in an alternative industry.

Figure 4.4 Perceived as underqualified for current job in correspondence between FOS and industry



Note: The numbers after the FOS/industry refer to the number of graduates.

Challenges faced at work

In terms of challenges at work, 63% of the fresh graduates felt their current jobs were challenging, regardless of whether or not there was a mismatch between their qualifications and job requirements. When broken down, (1) underemployed and (2) fit/overemployed, 56.1% of the underemployed faced challenges at work, but slightly less than among those fit/overemployed (65.4%) (Figure 4.5).

Figure 4.5 Percentage share of fresh graduates facing match/mismatch between education and job qualification and challenges at work

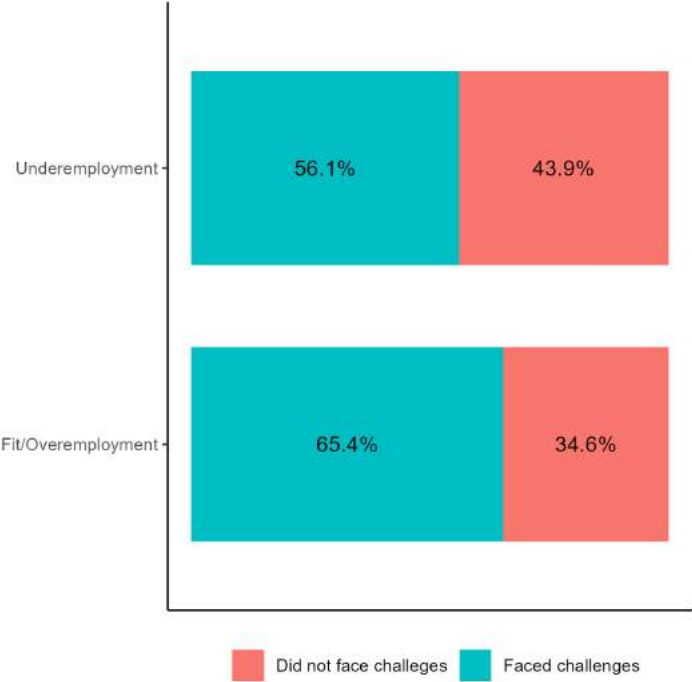


Table 4.1 Challenges faced by fresh graduates at work: high-frequency keywords related to work challenges and their neighbouring words

Keyword	Neighbouring words (n >= 2)
knowledge	lack, product
lack	knowledge, experience, communication, guidance
learn	adapt, time
time	management, learn, zone
skill	communication
management	time, poor
customer	meet
experience	lack, guidance

Four main issues emerge based on this analysis (Table 4.1):

a. Lack of knowledge to perform their work

This problem was mainly due to landing a job that is cross-field. Some situations observed were a CS graduate taking a job as an engineer, an engineering graduate in a job as a software engineer, and an accounting graduate in a financial analyst/business consultant job, and the like. Even in the same field, CS graduates who work as software engineers are also required to be equipped with knowledge within the hardware domain, which they admit to lack. In addition, there is a need to keep abreast of the latest software tools, even for non-IT related jobs.

b. Lack of experience and guidance²²

Some graduates stated that they had no experience and had no guidance at work, especially during the pandemic where most were working from home. Thus, they had to rely on self-learning and this is a challenging situation for them. More importantly, some graduates

²² Keywords such as “experience”, “guidance” and “learn” are related.

highlighted that they had to learn new knowledge, skills and subject matter, despite working in the relevant fields, as the knowledge gained in the IHLs were not in depth to be applied in real world situations.

c. Communication and soft skills remain important to be polished

Some graduates found that communicating and dealing with customers were challenging. During the pandemic, graduates found that negotiations were tougher as they were required to work with customers in different time zones. Besides that, graduates highlighted that they faced challenges in problem solving and writing-related tasks.

d. Multitasking and time management

Some graduates related that balancing multiple tasks with management of time at work was challenging. They also found the need to manage projects and adhere to different timelines at work. Such skills may be developed through participation in assignments and activities (academic or out-of-classroom activities), which strengthens the case that IHLs are not only for teaching and learning, and for research, but also a platform for self-development.

4.1.2 Employers' perspectives: graduates' mismatches and hiring challenges

Mismatch of graduates' competence and job requirements

Many respondents, nearly 80% of the employers opined that there was a mismatch (with varying degrees) between graduates' competence and job requirements (Figure 4.6). Lack of soft skills was the most cited skills gap. Some of the most prevalent soft skills cited were lack of communication skills, followed by lack of problem solving, lack of critical thinking, bad presentation skills and bad command of English.

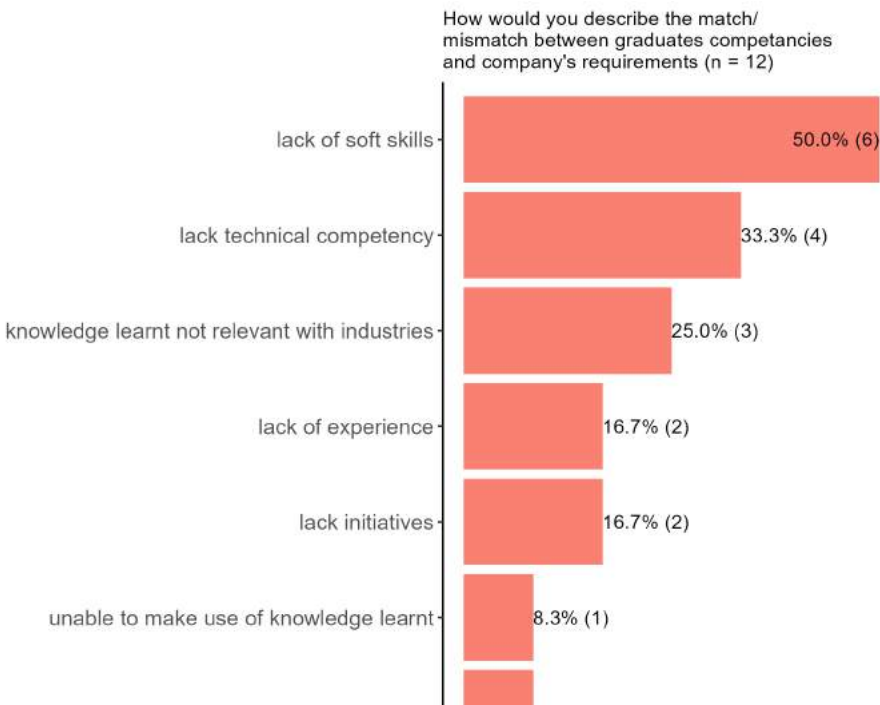
Figure 4.6 Match/Mismatch between graduates' competencies and company's requirements, from employers' perspective (n=19)



Note: Four respondents did not respond to this question.

Based on interviews with employers, the second top issue mentioned was lack of technical competency, including a gap between knowledge learnt and industrial requirement. Unsurprisingly, some employers highlighted the mismatch between university syllabus and industry requirements. Other employers highlighted the need for employees to improve technical skills related to their work through exposure to more work tasks or through experience accumulation (Figure 4.7). Noticeable technical skills that employers highlighted were related to software, digital, online marketing and e-commerce knowledge. Several employers also underlined the need for employees to be equipped with AI- and ML-related skills. This suggests the need to equip current and future employees with skills that employers are particularly focused upon for the future of their businesses and operations. In terms of transversal skills, adaptability, critical thinking, analytical and communication skills are the most cited skills for employees to be equipped with.

Figure 4.7 Employers’ responses on match/mismatch between graduate competencies and company’s requirements (n=12)



Note: Only employers who said there was a mismatch between graduates’ competencies and company’s requirements are included in this chart.

Depending on industry and company requirements, the skills gap between technical and vocational education and training (TVET) and university graduates differs accordingly. The employers' responses to the skills gap in immediate or short term are summarised in Table 4.2. During the pandemic and border closure, some companies were forced to hire graduates whose skills did not fit their requirements. Some companies may then decide to hire a talent which had had training in TVET for a job usually performed by someone with other skills.

Some employers opined that TVET graduates have different competencies and skills that are not available in university graduates and vice-versa. For example, TVET graduates are fast to pick up the skills required in machinery use due to their practical and hands-on training. Meanwhile, university graduates are strong in engineering theories and concepts, which are the fundamental knowledge required, especially in the engineering sphere. This knowledge is vital for high value-added job functions in research, design and development, inculcated with critical and analytical skills that complement practical skills.

Table 4.2 Employers' responses on skills differences between TVET and university graduates

Immediate or short-term expectations	Employers' perspective		
	TVET graduates	University graduates	Remarks
Familiarity with machines on manufacturing floor	TVET graduates exhibit a shorter learning curve to be familiar with machines on the manufacturing floor as they have practical and hands-on training.	University graduates require a longer time to be familiar with machines related to manufacturing (if related to their work) as their university training may not have a large component of hands-on experiences with manufacturing machines.	Employers, however, highlighted that hands-on experience alone is insufficient. In the long run, workers are required to acquire the skill to eliminate a problem through a deep analysis and not merely to contain a problem. This is not well addressed in TVET institutes' curriculum.
Critical thinking and analytical skills	The TVET training usually does not allocate enough modules for critical thinking/analytical skills. TVET graduates employed for other job functions may find it challenging and exhibit a steeper learning curve.	University graduates are better equipped with critical thinking/analytical skills.	University/college education and curriculum are geared towards the transfer of knowledge rather than skills, compared to TVET education.

4.2 Overeducation in the graduate labour market

This section assesses if there is a situation of over-education among the postgraduates in this study based on the following key aspects:

- a. employment rate;
- b. salary level;
- c. underemployment; and
- d. perceived ability at work.

Of the total sample (396 respondents) in the graduate employability survey, nearly 20% had at least a Master's degree while 80% were non-postgraduates. The distribution of the postgraduates shows that graduates in applied sciences, B&A and pure sciences have a higher tendency to further their studies after their Bachelor's degree (Figure 4.8).

Figure 4.8 Percentage share of postgraduates (n=79) and non-postgraduates (n=317) by FOS



The key observation based on responses in this study is that postgraduates recorded significantly lower employment rates than non-postgraduates (Table 4.3). Past studies such as Lee (2020) and Jamaludin et al. (2021) highlighted that there may be a lack of quality jobs for graduates in Malaysia, and this situation seems more prevalent among postgraduates.

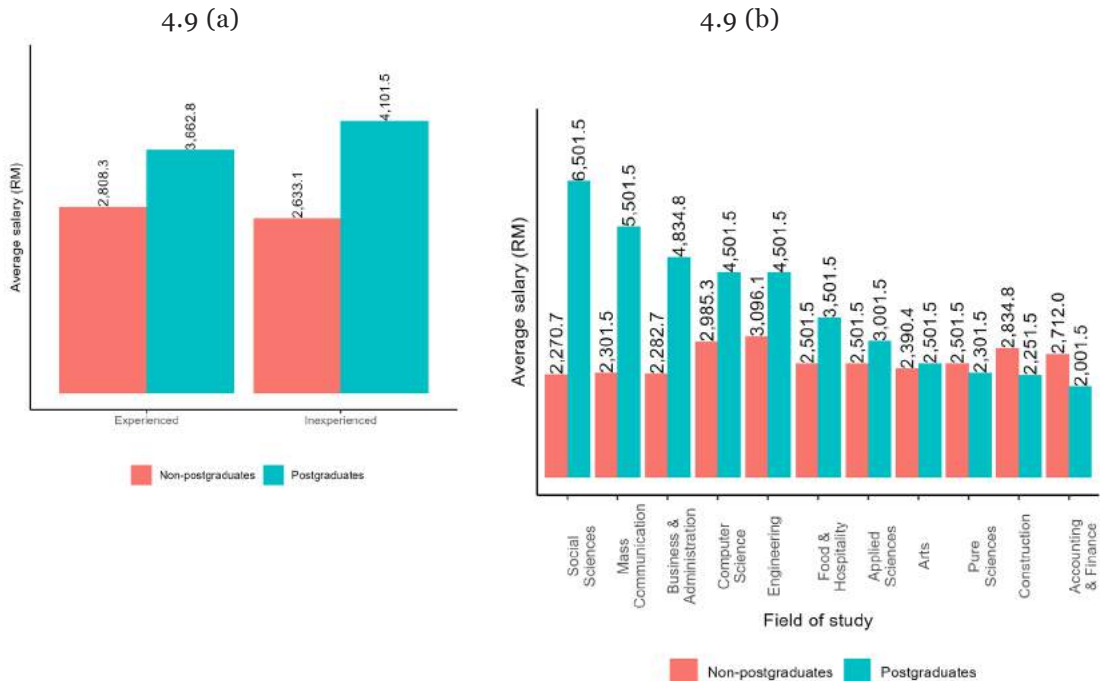
Table 4.3 Employment status among postgraduates and non-postgraduates

	Fresh graduates		Retrenched graduates		Non-post-graduates	Post-graduates
	Non-post-graduates	Post-graduates	Non-post-graduates	Post-graduates		
Employed	252 (79.5%)	46 (58.2%)	3 (16.7%)	2 (33.3%)	255 (76.1%)	48 (56.5%)
Unemployed	65 (20.5%)	33 (41.8%)	15 (83.3%)	4 (66.7%)	80 (23.9%)	37 (43.5%)
Total	317 (100.0%)	79 (100.0%)	18 (100.0%)	6 (100.0%)	335 (100.0%)	85 (100.0%)

In terms of salary, among the fresh graduates, postgraduates had a slightly higher average monthly salary²³ of RM3,806 as compared with RM2,755 for non-postgraduates. The same is observed among experienced and inexperienced fresh graduates (Figure 4.9a), although the salary differences between postgraduates and non-postgraduates were significantly larger among inexperienced fresh graduates. The average difference in salary between postgraduates and undergraduates is in line with the observation made in Tumin (2021) suggesting that the higher salary offered to employees with postgraduate qualifications may not be substantial, and this raises questions about return on investments for a postgraduate.

²³ Average of average of the monthly salary

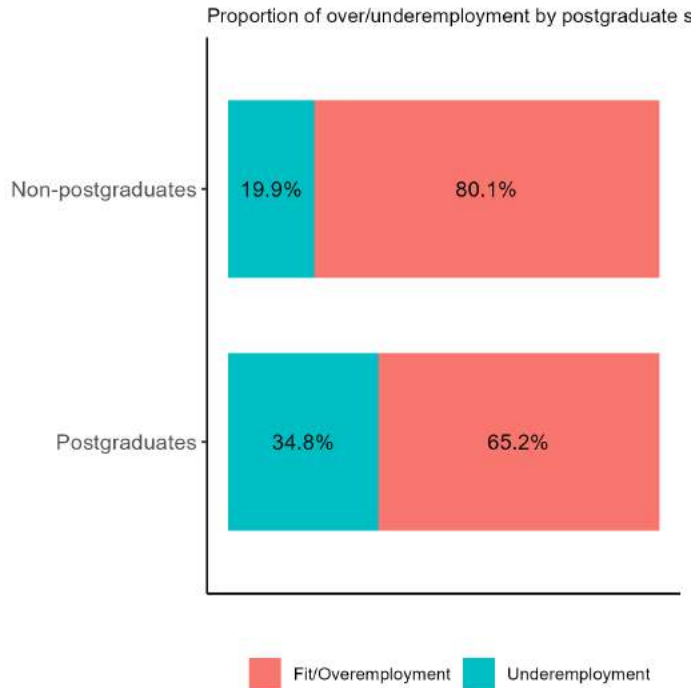
Figure 4.9 Average salary between postgraduates and non-postgraduates, by (a) experience and by (b) FOS, among fresh graduates



Breaking down by FOS shows that most postgraduates receive higher average salaries than non-postgraduates (Figure 4.9b). From this aspect, postgraduates in the survey did not experience underemployment. To recap, there is a lower employment rate among postgraduates compared to undergraduates, especially among fresh graduates, but within the employed postgraduates, there is no situation of being underemployed in terms of salary, in general.

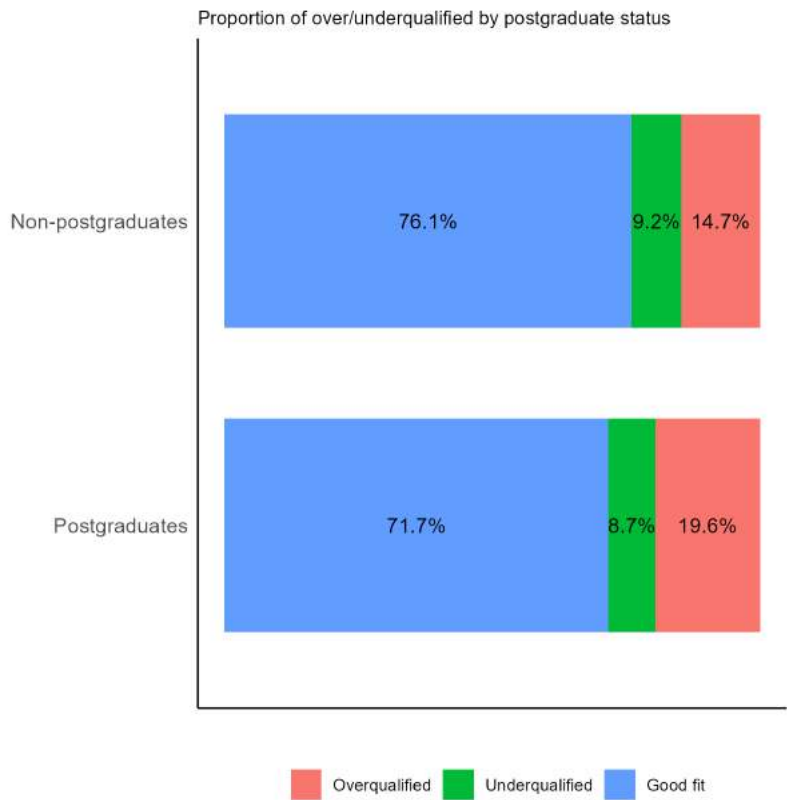
In terms of skill-related underemployment, postgraduates were more likely to be employed in jobs which had lower requirements than surmised by their education qualifications. This is in line with our earlier expectations. About 35% of postgraduates were underemployed, as compared to 19.9% of non-postgraduates (Figure 4.10).

Figure 4.10 Percentage share of fresh graduates' skill-related underemployment by postgraduate status



As mentioned above, a relatively higher share of postgraduates was underemployed. However, these did not possess an obvious advantage at work over non-postgraduates. A higher proportion – 76.1% – of postgraduates stated that their jobs were a good fit as compared to 71.7% for non-postgraduates. On the other hand, the percentage shares of self-perceived over-qualification and under-qualification between postgraduates and non-postgraduates were also at comparable levels, at 19.6% vs. 14.7% and 8.7% vs. 9.2%, respectively (Figure 4.11).

Figure 4.11 Fresh graduates’ perceived ability at work by postgraduate status



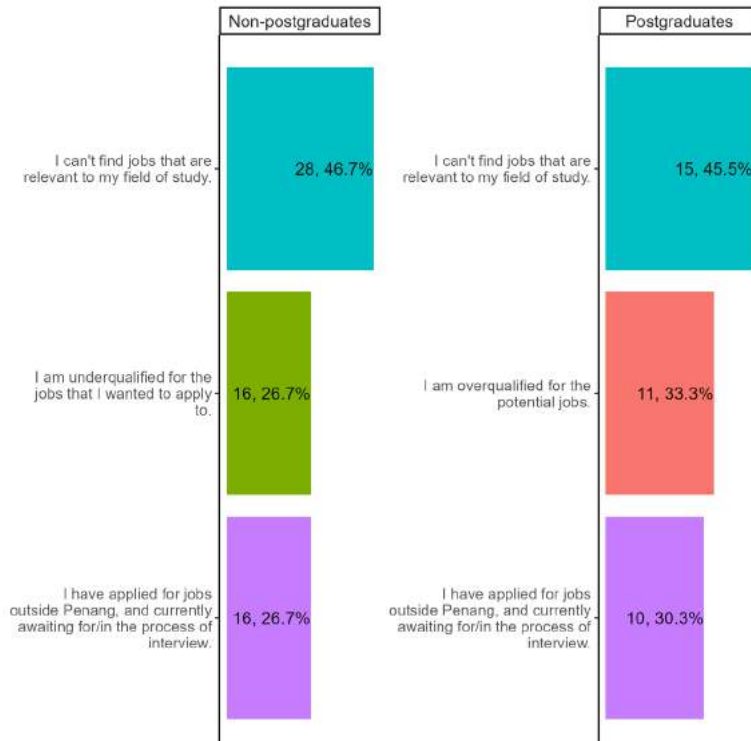
Insights from the unemployed postgraduates group

Among unemployed fresh graduates, two of the top three reasons cited for being unemployed by the non-postgraduates and postgraduates were the same (Figure 4.12). Interestingly, the postgraduates self-perceived themselves as overqualified while the non-postgraduates tended to attribute the reason of their unemployment to their being underqualified. As observed

repeatedly in this study, problems of unemployment among postgraduates revolved around two issues, reflecting problems of demand and supply:

- Relevance of course studied to available jobs (demand side, and mismatch); and
- Intention to get a job outside of Penang (supply side).

Figure 4.12 Top three reasons of unemployment cited by postgraduates (n=33) and non-postgraduates (n=60), among fresh graduates



Note: Five unemployed graduates who did not answer this question were excluded.

4.3 Employers' responses towards hiring of fresh graduates and retrenched workers

From the employers' responses, most employers' hiring preferences of fresh graduates or experienced employees are dependent on the work situation at large. About 26% of them stated that they prefer to hire experienced employees compared to fresh graduates, while another 17% prefer hiring fresh graduates, mainly due to the ease in inculcating corporate values and objectives, and setting personal and company growth targets. Meanwhile, a larger segment of employers stated that their hiring preferences, if given a choice between fresh graduates and experienced hires, are based on:

- a. Attitude and academic performance;
- b. Potential to grow with the company;
- c. Composition of the team who may train the new hire; and
- d. Match of skillsets required, and urgency to fill the position.

Interestingly, these preferences are not dependent on company size or the company's status—as a multinational company (MNC), local large company (LLC) or small and medium enterprise (SME).

Based on the above setting, we also enquired on employers' hiring preferences of fresh graduates and experienced retrenched workers. 36% of employers surveyed have higher preferences to hire experienced retrenched employees as they believe that members of the retrenched group have work experience that would reduce the time and investment needed to train them. The readily-possessed skillsets by relevant retrenched workers are seen as the most relevant factor for securing new employment.

The large segment of employers who stated that their preferences are dependent on various factors or an outright lower preference for hiring of retrenched workers set a challenging backdrop for retrenched workers in securing new employment. This is especially for retrenched workers with less relevant skillsets or those in a contracting/low-growth sector. All too clearly, similar trends of employers' hiring preference are reflected in the employees' and retrenched workers' survey that was conducted within this study.

4.4 Requirements for skills training programmes

This section discusses skill training programmes, an important element from both the graduates' and employers' perspectives, for upskilling and/or reskilling in the labour market.

4.4.1 Graduates' perspectives: Demand for upskilling/reskilling and training provided by the employers

Skills training in the pursuit of upgrading/reskilling are increasingly necessary as existing skillsets may not be sufficient to meet market demands. As Ng (2018) pointed out, the skills required in the labour market are no longer confined to knowledge about hardware or only about software, but have grown more complex. This also indicates that graduates must be multi-skilled – acquiring skills not only from IHLs but also through channels outside the classroom.

Employees and jobseekers are generally aware of the importance of acquiring necessary skills, and they are willing to do so. 67% out of 418 respondents expressed the need to upskill/reskill themselves in order to enhance their employability. Meanwhile, another 87.9% of graduates surveyed are willing to learn relevant new skills.

Table 4.4 shows graduates' responses to whether or not they think they need to upskill/reskill, by graduate status, FOS and employment status. There are no significant differences in the assumed need to upskill/reskill between fresh and retrenched graduates ($2(1) = 1.17, p = 0.279$), and STEM and non-STEM graduates ($2(1) = 0.01, p = 0.916$), but where employment status is concerned, the difference is significant ($2(1) = 13.46, < 0.001$). Noticeably, about 81.0% of the unemployed graduates responded about their need to upskill/reskill, compared to only 61.6% of employed graduates.

Table 4.4 Number and percentage share of respondents by assumed need to upskill/ reskill

	Graduate status		Broad field of study		Employment status		Total
	Fresh graduates	Retrenched graduates	STEM	Non-STEM	Employed	Unemployed	
Need	261 (66.2%)	19 (79.2%)	140 (68.0%)	140 (66.0%)	186 (61.6%)	94 (81.0%)	280 (67.0%)
Do not need	133 (33.8%)	5 (20.8%)	66 (32.0%)	72 (34.0%)	116 (38.4%)	22 (19.0%)	138 (33.0%)
Total	394 (100%)	24 (100%)	206 (100%)	212 (100%)	302 (100%)	116 (100%)	418 (100%)

Note: Two STEM fresh graduates did not answer the question.

All respondents (whether they indicated a need to upskill/reskill or otherwise) were required to respond on courses that are beneficial for their careers. 318 mentioned at least one type of course, while the remaining 102 did not give any suggestions. The courses suggested by the respondents have been broadly categorised into technical and transversal skills; technical-skills-only courses were mentioned by 69.8% of the 318 respondents, followed by 24.5% for transversal-skills-only courses and 5.7% for both technical and transversal skills.

Figure 4.13 Percentage share by broad FOS and type of upskilling/reskilling courses

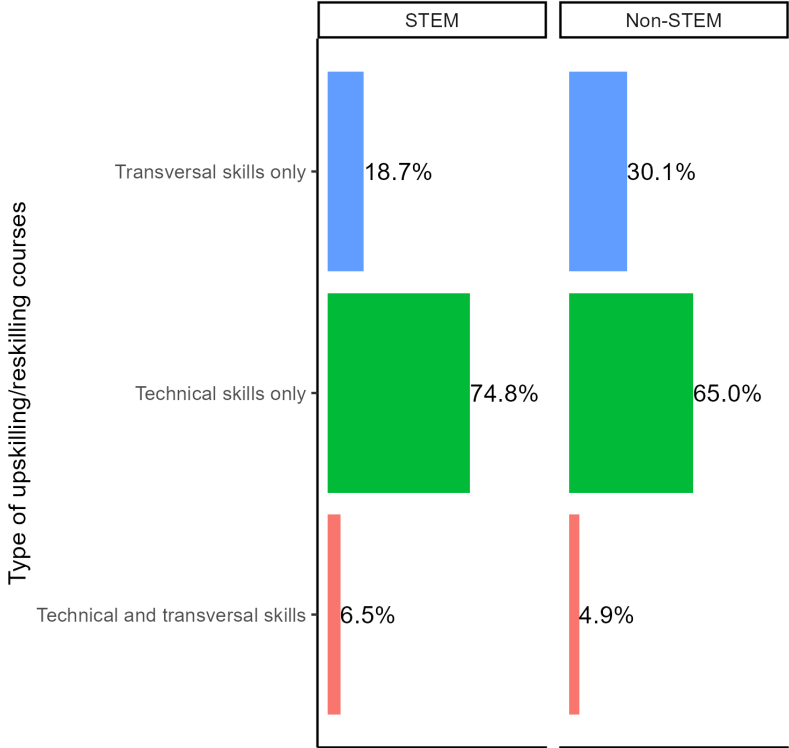


Figure 4.14 Specific upskilling/reskilling courses stated by the respondents (n = 318)

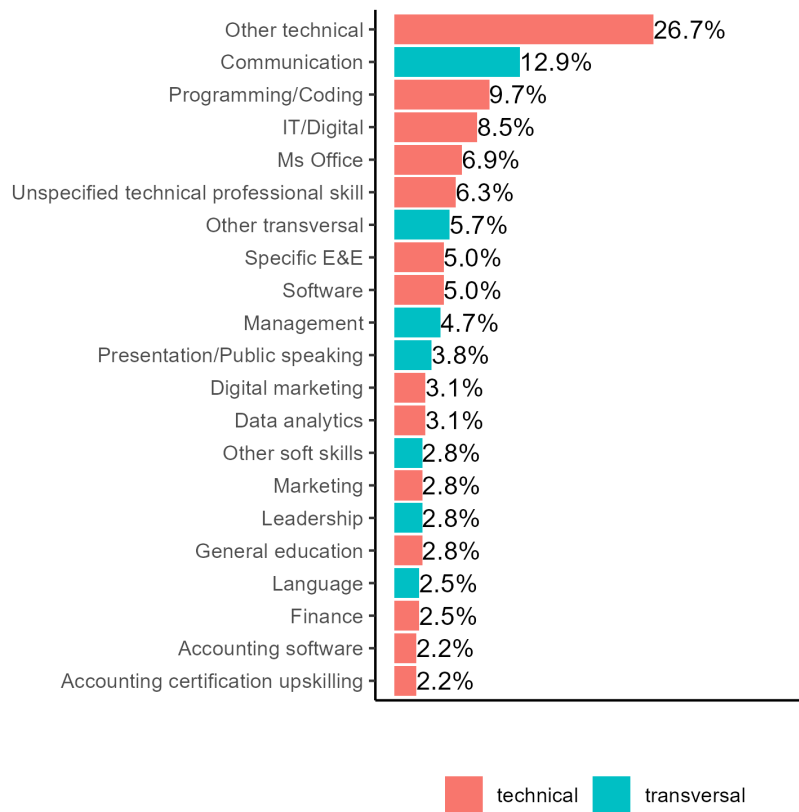
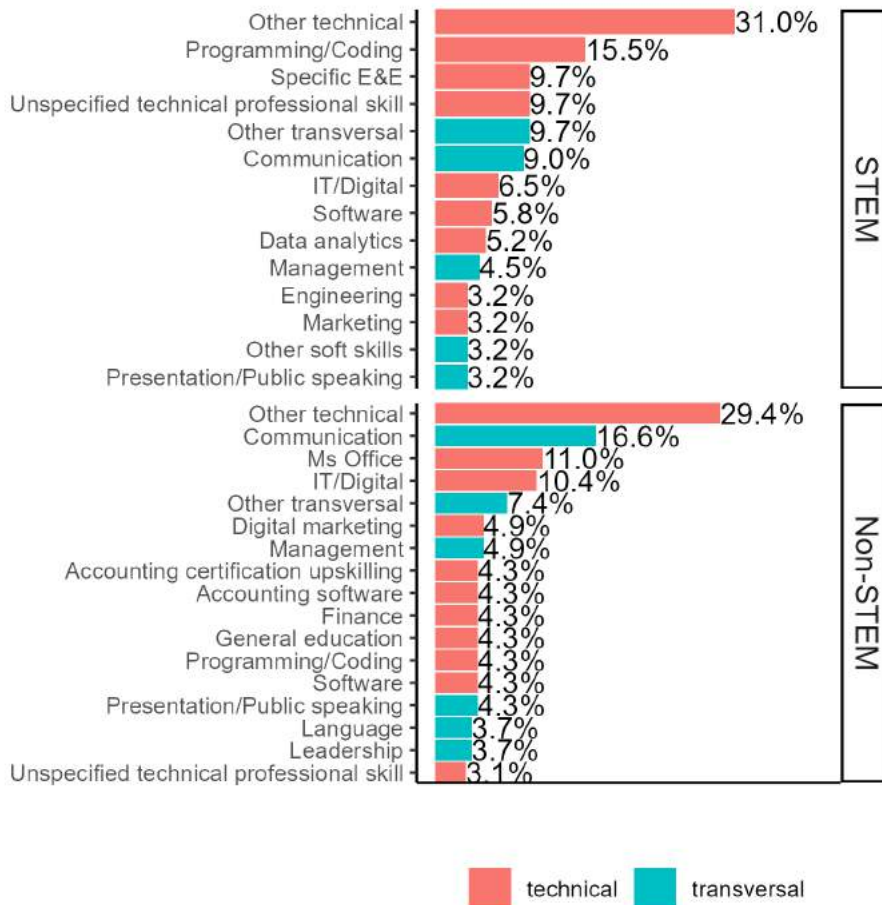


Figure 4.15 Specific upskilling/reskilling courses stated by broad FOS**Notes:**

1. “Other technical” and “Other transversal” group all the courses with percentage share less than 2%.
2. Some examples of “Other technical” are project management, business strategy and analysis, graphic design, e-commerce, etc.
3. Some examples of “Other transversal” are logical thinking, problem solving, decision making, time management, etc.

Besides that, the findings show that the skillsets needed converge across occupations. In particular, digital literacy is important not only for STEM graduates, but for non-STEM graduates as well. Around 18% of respondents surveyed (STEM and non-STEM fields combined, refer Figure 4.14) felt that programming and IT-related skills were important to acquire or upgrade for their careers. Most non-STEM graduates stated MS Office and IT/digital as courses beneficial to them, while STEM graduates wanted programming-related courses. In general, communication skill (transversal) (12.9% of respondents) was the top highlighted skill, followed by the technical skills of programming/coding (9.7%) and IT/digital (8.5%).

4.4.2 Graduates' perception/participation on HRD Corp e-LATiH programme

The government, through Human Resources Development Fund (HRDF), is cognisant of the labour market's need for upskilling/reskilling, and thus launched the e-LATiH programme. Despite the high demand for upskilling/reskilling, however, the participation of respondents was not very encouraging.²⁴ It had been hoped that the modules provided on an online platform would be attractive to the target group when given ease of access and courses being free of charge.

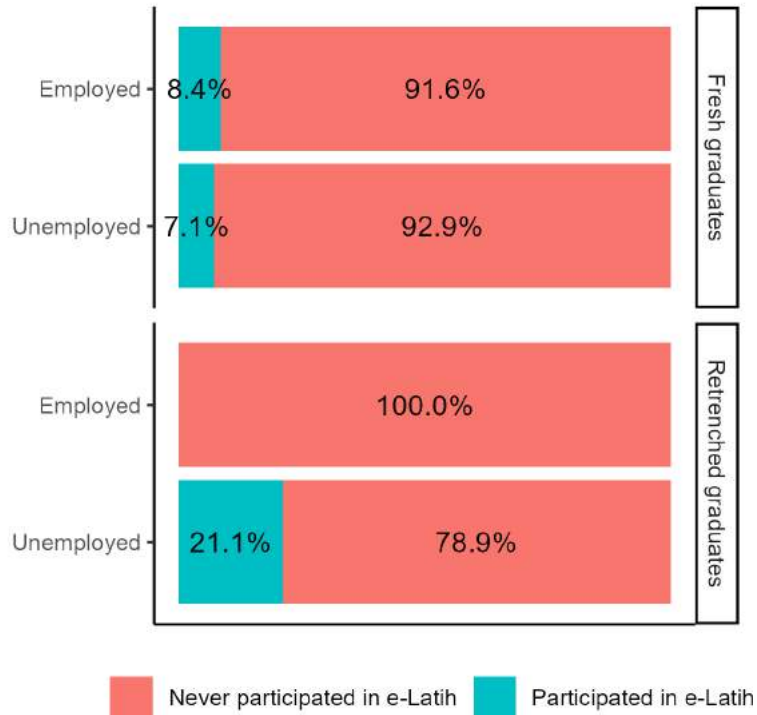
Only 8.6% (36 out of 418²⁵) of the respondents participated in at least one course under the programme (fresh graduates: 8.1%, retrenched graduates: 16.7%). The remaining of 91.4% never joined the programme (fresh graduates: 91.9%, retrenched graduates: 83.3%). The participation rates were similar between the employed and unemployed (Figure 4.16).

In February 2021, the Ministry of Human Resources aimed for a target of two million users on the platform by end 2021 (The Sun Daily, 7 February 2021); but half way through the period, in July 2021, HRDF announced that the total users had only surpassed 100,000 users (Kanagaraj, 13 July 2021). It is suggested that more promotion and outreach programmes be undertaken to increase awareness of the portal.

²⁴ The reasons behind are worth investigating.

²⁵ Two respondents did not answer this question.

Figure 4.16 Percentage share of respondents participating in HRDF's e-LATiH programme, by graduate status and employment status



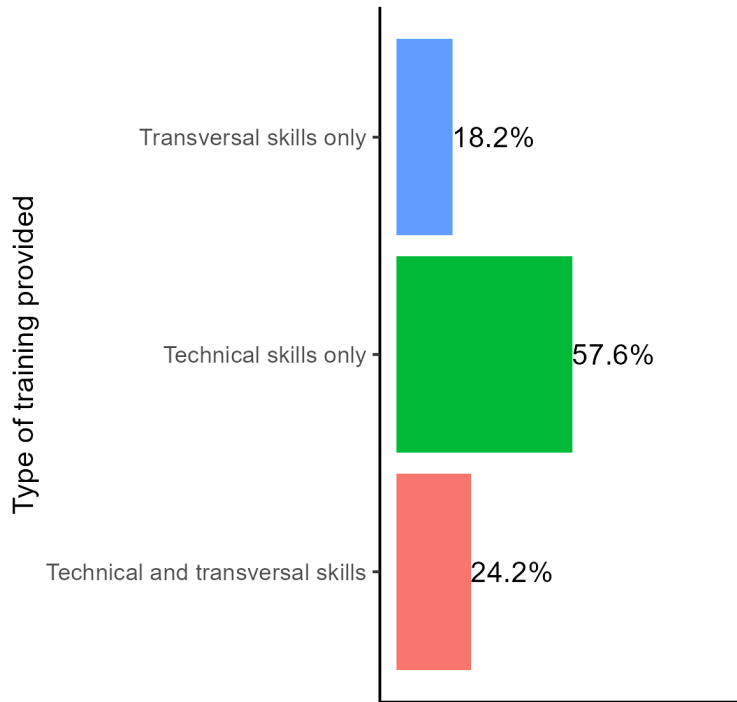
4.4.3 Graduates' perception on skills training provided by the employers

This section discusses training that had been provided by employers for respondents in our survey. Out of 302 employed graduates,²⁶ 78.5% (or 237) indicated that their employers had provided training for them, including technical, transversal skills and general learning platforms.

Over 80% of the employees received training on technical skills, while about 42% had training on various transversal skills. As about one-third were employed in the E&E sector, training related to specific E&E skills and software was the most cited type of training received (6.5%), followed by programming/coding (5.7%), accounting certification/upskilling (5.2%), IT/digital (4.8%) and MS Office (4.3%).

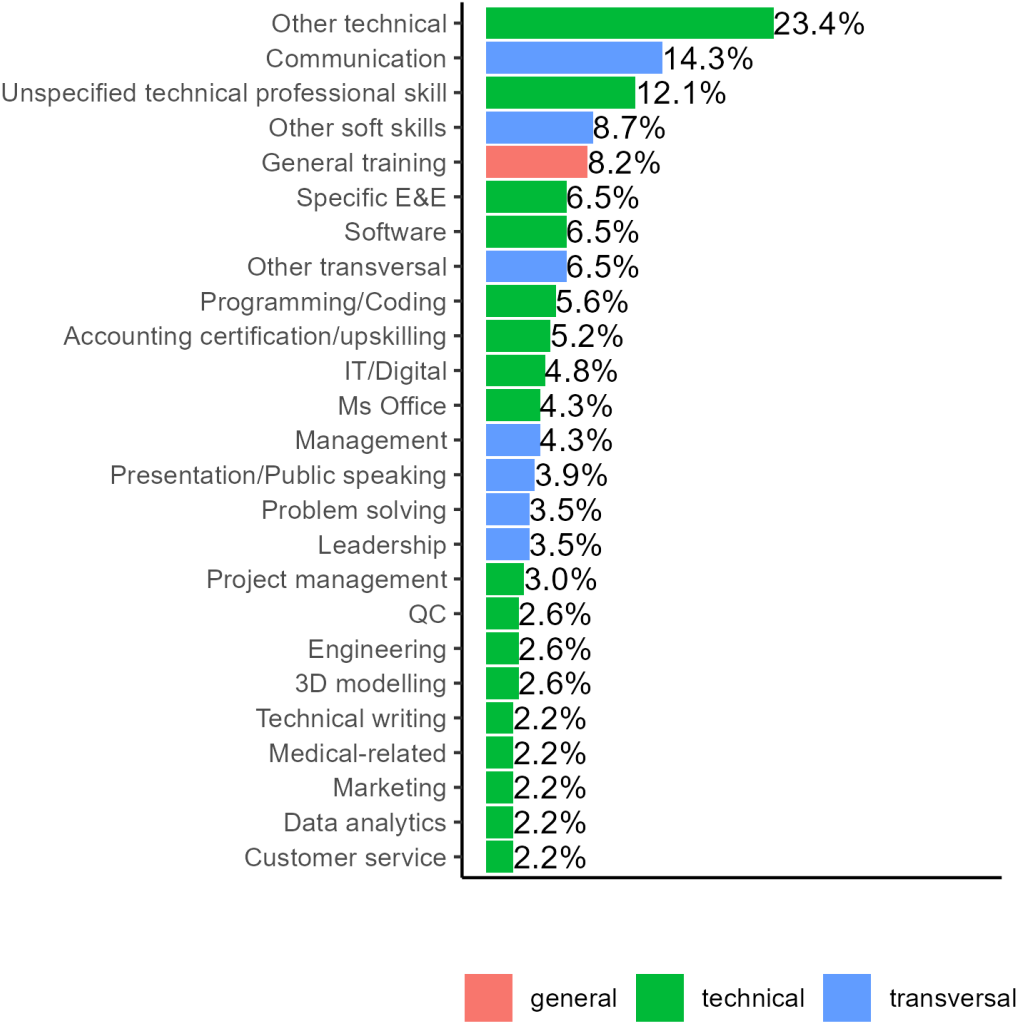
²⁶ One did not answer the question.

Figure 4.17 Percentage of employed graduates by type of training provided by their employers (n=231)



Note: Six respondents did not state the training courses provided by their employers.

Figure 4.18 Specific training provided by the employers (n=231)



Note: General training refers to the general answers such as “a lot”, “many” and e-learning platforms.

Chapter 5

Penang's Future Graduate Workforce

This chapter discusses the extent to which Penang can retain and attract graduates by looking into graduates' responses to their current work and future intentions. Next, the career and industry outlook from both employees' and employers' perspectives is discussed, followed by graduates' involvement in the government LMI. The chapter ends with a discussion on the role of government and IHLs to improve graduates' employment opportunities.

5.1 Developing, retaining and attracting talent in Penang

As the most urbanised state in Malaysia, Penang has established its labour market foundation mainly in high-tech manufacturing activities where highly skilled talent are often in high demand. The industries have raised concerns over the challenges in recruitment and an insufficient talent pool in Penang. The willingness of graduates to contribute to the labour market gives insights into the extent to which Penang can retain and attract talent. In this section, we analyse the graduates' movements from their birthplace to the locations of IHLs and workplaces. This analysis expects to show how inclined graduates are to be employed in Penang after completion of the study, reflecting the state's ability to retain graduates who completed their studies in Penang on top of attracting talent from other states.

5.1.1 Talent retention and attraction

The effort to retain and attract a highly-skilled workforce is interrelated with the availability of education within the industrialisation ecosystem. The proximity of higher education institutions to job opportunities is a pull factor, and students who graduate from the region would be more inclined to look for a job in the same state. In other words, students who are born in other states would consider migration if employment opportunities are available

within the same region as their school. The patterns of graduates' movements are illustrated in Figure E.1 and Figure E.2 (Appendix E).

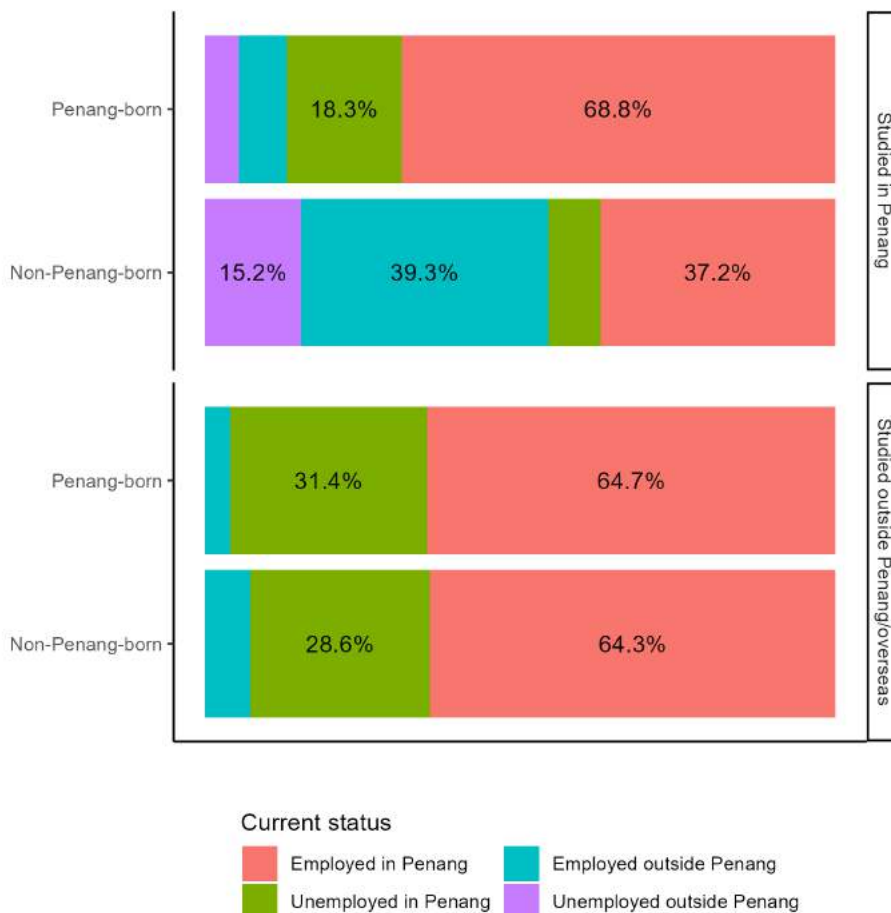
Our survey shows that a majority of Penang-born respondents enrolled in IHLs in Penang are more likely to stay on and work in Penang. In fact, 68.8% of them were born and studied in Penang's IHLs as compared to 37.2% who were born outside Penang (Figure 5.1). Out of 396 graduates who responded to the graduate survey, 83.6% or 331 respondents graduated from IHLs in Penang. Of this, 41.1% were from other states; 56.2% were from Penang. Of those who obtained employment, about 72% found that in Penang while 28% obtained employment outside Penang. This seems to show that most graduates from Penang remain in Penang.

For graduates who migrated to work in Penang, out of 63 respondents, two-third of them were from the northern region, largely from Kedah and Perak. Of this, a large proportion of them studied engineering (41.3%) mainly working as E&E engineers, industrial and production engineers and mechanical engineers. As estimated by Ng and Yap (2021), there was an average net inflow of 1,330 graduates annually migrating to Penang in 2014-2018 from the northern states.²⁷

There is a slightly higher percentage of non-Penang-born graduates who studied in Penang who then migrated to other states for employment (39.3%), as compared to 37.2% who obtained employment in Penang. Out of the 57 respondents who left Penang, most had non-STEM backgrounds (66.7%) such as A&F, social sciences and B&A, and their job functions centred around accounting and auditing, advertising and marketing, and financial, investment and credit (Appendix E, Table E.1). Undeniably, the job demand with such functions is more diverse and prevalent in Klang Valley.

²⁷ The net inflows refer to the number of internal migrants from other northern states (Perak, Kedah and Perlis) to Penang minus the number of internal migrants from Penang to other northern states (inflows minus outflows). The numbers of graduate net inflows are then estimated by assuming that the internal migrants for all states have the same distribution for age and educational attainment as Malaysia's. The average refers to the average in years 2014 -15, 2016 and 2018.

Figure 5.1 Distribution of employment status and state of employment for fresh graduates by the state of study and state of birth



For graduates who did not study in Penang, out of 64, about 65% worked in Penang regardless of their birth states; and about 31% of them were residing in Penang (Figure 5.1). For those who were looking for a job, not being able to find a relevant job remained the main reason cited for unemployment, mainly in social sciences and applied sciences (Appendix E, Table E.2). It is imperative for the state's machinery to tap on the talents of this segment.

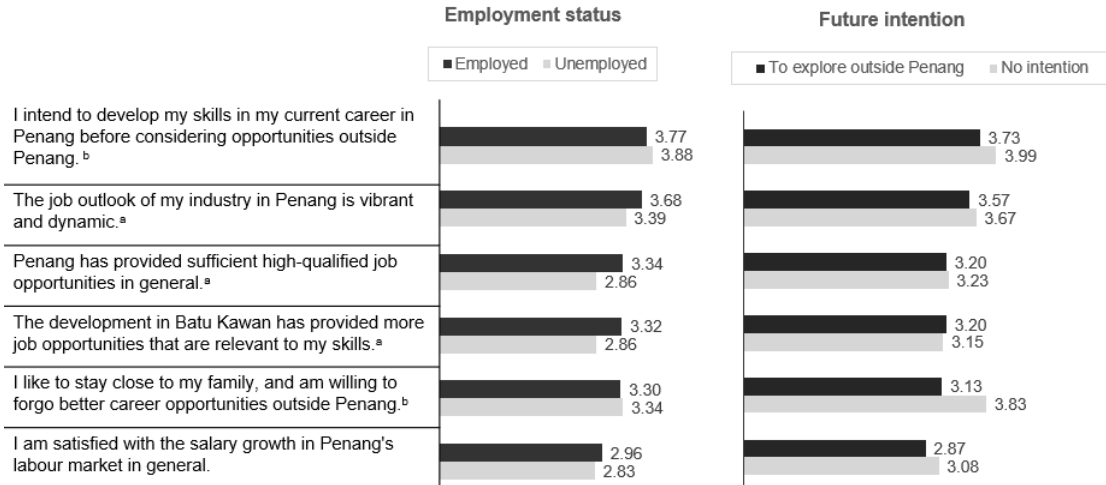
5.1.2 Graduates' perception of Penang's labour market and their future intentions

We asked respondents to rate their perception of Penang's job and industry outlook. We found that graduates who are employed viewed Penang's job prospects positively. As can be seen in Figure 5.2, on average, graduates who were employed rated the job outlook of my industry in Penang is vibrant and dynamic (mean=3.68, median=4) higher than unemployed graduates (mean=3.39, median=3).²⁸ They also rated Penang has provided sufficient high-qualified job opportunities in general (mean=3.34, median=3) higher than unemployed graduates (mean=2.86, median=3). It is noteworthy that a majority of graduates rating Penang positively are working in engineering-related jobs (especially for the vibrant job outlook) and accounting and audit, which further reinforce the job variability offered by the high-tech manufacturing companies in Penang.²⁹ In contrast, a majority of unemployed graduates who were less optimistic on these statements have the intention to explore work opportunities outside Penang.

28 On a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree)

29 Athukorala (2017) noted that the activities of electronics firms in Penang are also expanding into corporate and financial planning, R&D, product designing and tooling, sales and marketing, in addition to the standard manufacturing activities.

Figure 5.2 Mean score of graduates' perception of Penang's labour market by employment status and future intention



Notes:

1. Likert-type scale: 1=Strongly disagree; 2=Disagree; 3=Neutral; 4=Agree; 5=Strongly agree
2. ^{a,b} There is a statistically significant difference between two cohorts of (a) employment status and (b) future intention, by using the Wilcoxon Mann-Whitney U-test (Appendix E, Table E.3 and Table E.4).

Furthermore, we explore the future intentions of fresh graduates. Irrespective of their state of birth, state of study or current state of work/residence, a majority of them – 75% – intend to explore job opportunities outside Penang or Malaysia (see Appendix E: Figure E.3).

As expected, Kuala Lumpur, Singapore and Selangor are the most preferred locations for them to explore further job opportunities (Figure 5.3). Besides Singapore, Australia was the next preferred country to explore, followed by China, the USA and the UK.

It is important to note that about 25% of graduates had no intention to leave Penang for other job opportunities. They rated highly for the intention to develop skills in Penang before considering opportunities outside Penang. Showing a mean and median score of about 4 respectively, most of them held a degree in engineering, A&F and B&A. In fact, 57.7% had the intention to develop skills in Penang presently, with those employed in manufacturing showing the strongest intention (67.3%), followed by services (51.1%) and construction (50%) (Figure 5.4).

Figure 5.3 Top preferred destinations for considering job opportunities outside Penang (n=296)

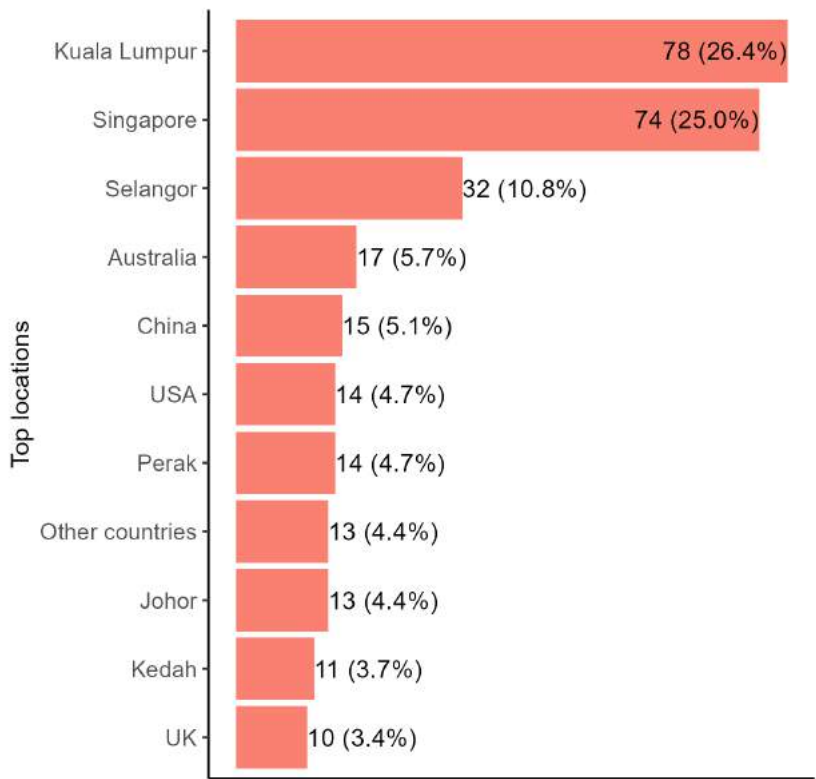


Figure 5.4 The percentage share of respondents (n=399) by agreement level to statements related to career and industry outlook, by three main broad sectors



Notes:

1. M - Manufacturing, S - Services, C - Construction

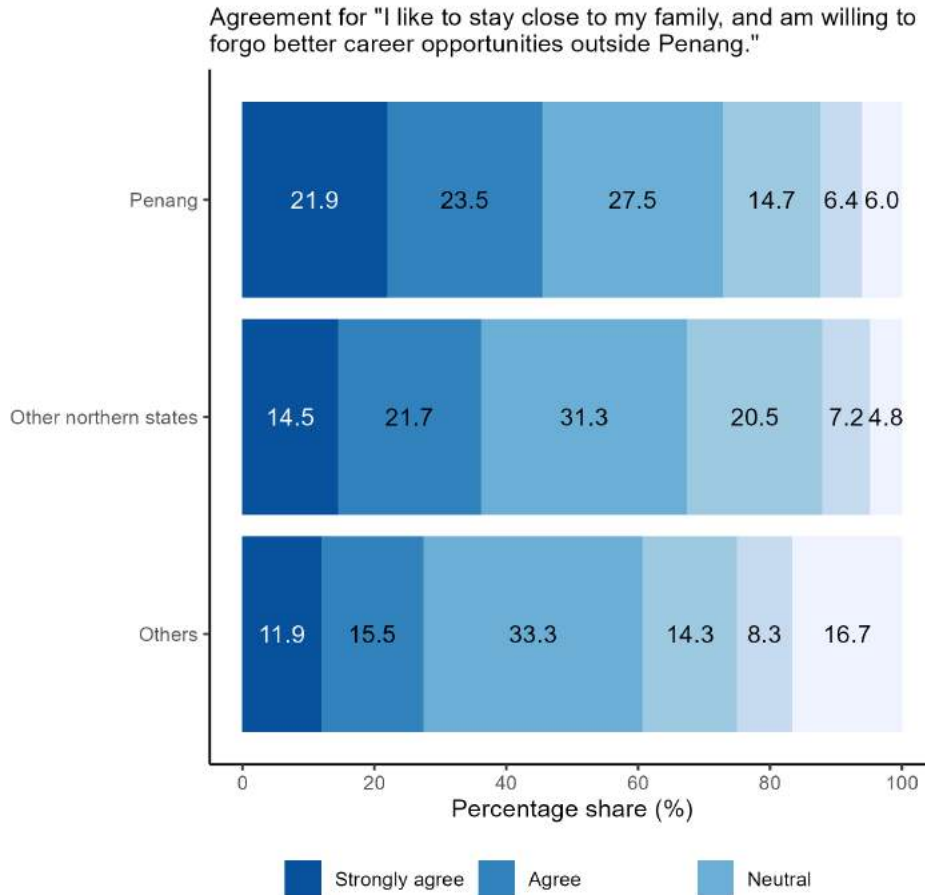
2. *Only respondents who were employed or were unemployed but with working experience were included.*

Salary growth is also a pull factor to retain and attract graduates. Out of 396 graduates, 31.1% were dissatisfied with the salary growth in Penang's labour market, compared to those who were satisfied (29.6%), with a mean score hovering at 2.93 only, with a lower rating for those who intended to explore opportunities outside Penang (Figure 5.2). Only those in the manufacturing sector had a marginally higher share for satisfaction (36.4% satisfied vs. 28.9% dissatisfied) (Figure 5.4), while both construction (26.9% satisfied vs. 38.5% dissatisfied) and services (17.9% satisfied vs. 31.2% dissatisfied) were more dissatisfied than those satisfied with the salary growth, where the gap was the largest for the services sector.

Reflecting the usual anecdotes that Penang remains desirable for talent who wish to stay close to their families, graduates who have no intention to explore opportunities outside Penang were more inclined to stay close to their family and were willing to forgo better opportunities outside Penang (mean=3.83, median=4), with about 40% of them being willing to forgo better opportunities outside Penang for that reason, at least in short term, as opposed to 22.7% who preferred to advance their career. This was again especially true for those in the manufacturing sector (43.8% agreed vs. 21.0% disagreed), which may imply that the outlook of the sector in Penang is more vibrant as compared with services (37.4% agreed vs. 24.6% disagreed) and construction (26.9% agreed vs. 26.9% disagreed) sectors.

When compared against the respondents' state of origin, it is unsurprising that the respondents who indicated agreement to stay in Penang, stay with their families, and forgo opportunities outside Penang are largely from Penang, followed by those from other northern states, and finally from other locations (Figure 5.5).

Figure 5.5 Percentage of respondents for perception of their willingness to stay in Penang and forgo opportunities outside Penang, by state of origin (n=418)



Finally, in responding to whether Batu Kawan has a vibrant job outlook and has provided sufficient high-skilled jobs, graduates in the manufacturing sector were more inclined to concur, as compared with their peers in two other sectors (Figure 5.4). This reflects the dominance of manufacturing in Batu Kawan's economic structure, and as Batu Kawan Industrial Park (BKIP) 2 and BKIP 3 are developed, the commercial areas and purpose-built offices in Batu Kawan should attract a more balanced mix of talent from different sectors and FOS.

According to the International Institute for Management Development (IMD) World Talent Ranking 2021, Malaysia ranked three spots lower at 25th in overall performance as compared to the year before, with investment and development recording the lowest rank in the indices, followed by appeal and readiness (IMD, 2021). Female labour force participation and total public expenditure on education per student were the top weaknesses. Remuneration packages in services professions and management, students' performance in Programme for International Student Assessment (PISA) and education management also require improvements.

Meanwhile, Singapore made it to the top 10 in talent development, retention and attraction. The country led in measures of readiness where it has a high percentage of science graduates, with high achievements in PISA and effective primary and secondary education.

Additionally, there are multifaceted steps to retain and attract talent in a country. The Organisation for Economic Co-operation and Development (OECD) has assessed the indicators of talent attractiveness that has significantly led to the convergence of policy frameworks in retaining and attracting new talent to the country (OECD, 2019). These indicators include the country's quality of opportunities, income and tax, prospects, family environment, skills environment, inclusiveness and quality of life. As a highly internationalised state in Malaysia with a strong presence of international companies, the success of mitigating skills shortage lies in the policies and practices of these aspects that should be closely developed and monitored for sustainable economic development.

5.2 Perception of graduates and employers on industry outlook

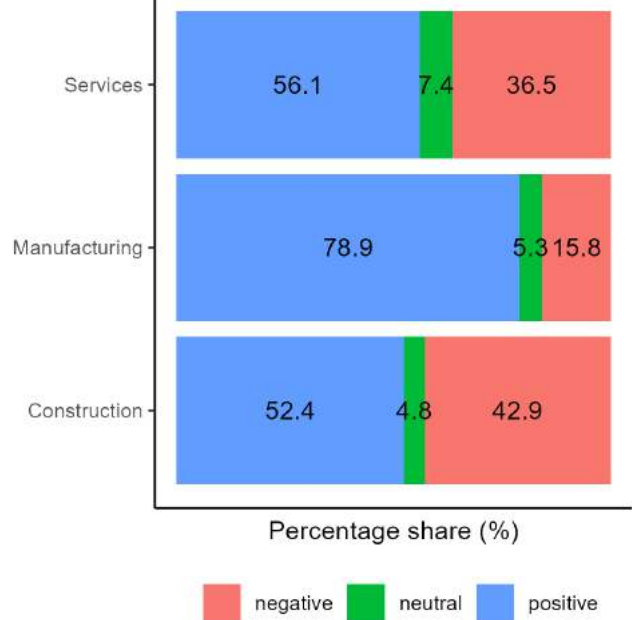
5.2.1 Graduates' perception on industry outlook

Overall, the survey respondents (n = 295³⁰) were rather optimistic about the outlook of their respective sectors—63.4% were positive, 30.2% were negative, and the remaining 6.4% were neutral. As expected, the sentiment varied across different sectors:

- a. Respondents in the manufacturing sectors were largely positive (78.9%).
- b. About 56.1% in the services sector commented positively while 36.5% were negative.
- c. In the construction sector, 52.4% were positive while 42.9% were pessimistic about the future.

³⁰ 125 of the respondents either did not give a valid answer or did not express their opinion on the outlook of the respective industry.

Figure 5.6 Graduates’ sentiment of industry outlook by main sectors (n=287)



Note: Only respondents who were employed or were unemployed but with working experience were included.

Respondents with positive perceptions on industry outlook were mainly those who were related to the key growth sectors in Penang. Specifically, the E&E manufacturing, financial, GBS, IT and education sectors have a relatively positive outlook, as stated by the respondents. While 42.9% in the construction sector felt less confident of the industry outlook, some were optimistic due to the advent of digitalisation.

Table 5.1 summarises the key responses with regard to the outlook of selected industries in Penang. The responses do show the relative catalysts and challenges within each industry. For example, E&E and M&E respondents saw software integration, renewable energy and the continued technology development as growth catalysts. Meanwhile, those in the GBS sector highlighted the digital economy and adoption of IT to buoy the industry’s momentum.

The negative sentiments in the selected industries mainly revolved around: (1) the future growth in the industry and individual career growth; (2) the future uncertainties in the individual industry; and (3) the future of jobs as automation and technology may displace certain jobs. As expected, the relatively low expectation on salary was also one of the key negative sentiments. It is also interesting to note that within the negative sentiments, several points may serve as key areas to pay greater attention (and may be allocated more resources) to:

- E&E and M&E industries highlighted the competitive nature of the industries, and the need for Penang to increase capabilities in design (and research) to increase comparative advantages.
- Respondents in the education sector were concerned about the challenges in ensuring the effectiveness of the learning and teaching process. This highlights an area where policymakers may facilitate to reduce the long-term impact of the problem.
- The construction industry's response highlighted that future key catalysts for the sector are needed after Batu Kawan construction has reached maturity.

Table 5.1 Selected responses of graduates' sentiments on industry outlook in selected industries

Industry	Positive sentiments	Negative sentiments
E&E	<ul style="list-style-type: none"> • “Dynamic and will continue to grow with integration of software” • “Many opportunities and still growing” • “It’s a growing industry but there is a lot of competition” • “Future technology step stone” • “High potential in renewable energy” 	<ul style="list-style-type: none"> • “Competitive with mediocre salary increment” • “More effort needed on design”...“Manufacturing is not the strong point for Malaysia as neighbouring countries can provide same services at much lower costs” • “not quite diverse. low average pay”
Machinery & equipment	<ul style="list-style-type: none"> • “Bright future ahead as technology will always grow.” 	<ul style="list-style-type: none"> • “Uncertain”
Education	<ul style="list-style-type: none"> • “Growing with opportunities even in times of Covid-19” • “More job opportunities” 	<ul style="list-style-type: none"> • “Face challenges in ensuring the effectiveness of the learning and teaching process. Health concerns as well when school reopens.” • “Not promising enough” • “Very little opportunity”
GBS	<ul style="list-style-type: none"> • “Strong outlook, because the new way forward is IR4.0 and digital economy” • “I would say fairly good since the field of information technology” 	-
Financial services	<ul style="list-style-type: none"> • “Have growing opportunities” 	<ul style="list-style-type: none"> • “Hard” • “Need more automation”
Tax, audit & accounting	<ul style="list-style-type: none"> • “Good progression” 	<ul style="list-style-type: none"> • “Bleak, soon to be automated”

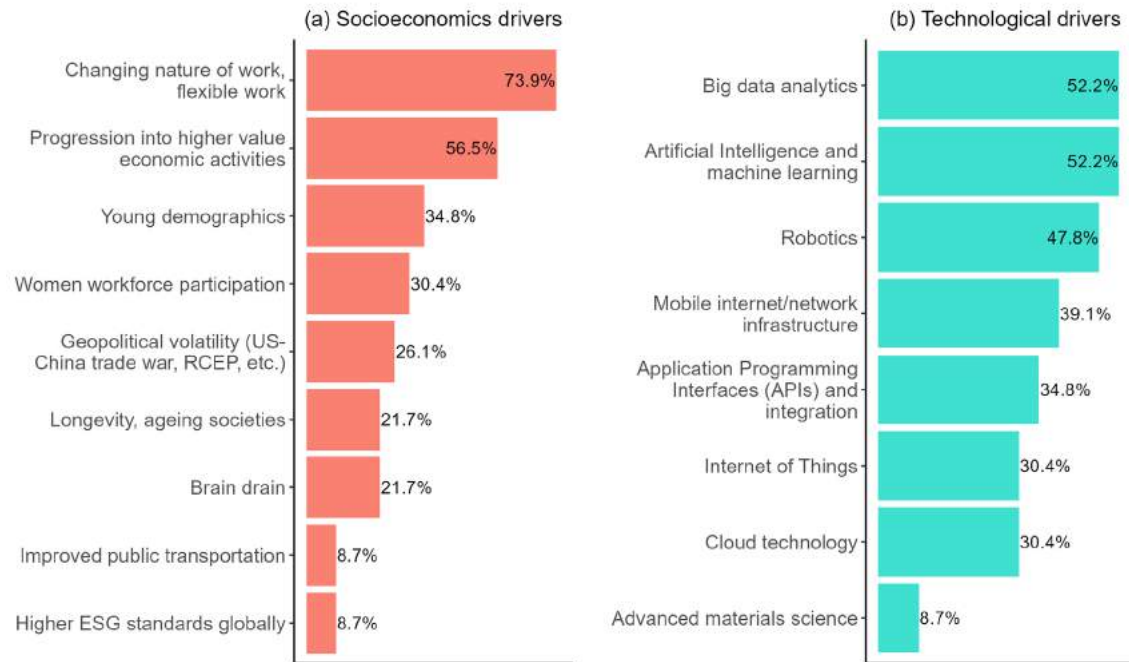
Construction	<ul style="list-style-type: none">• “Less competition, more opportunities”• “Digitalise future”	<ul style="list-style-type: none">• “Not so good, may face more competition in future”• “Low pay industry, after Batu Kawan area fully develop might cause slowing down in construction business”
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Note: Selected responses are summarised in this table, and the volume does not reflect the strength of positive/negative sentiments.

5.2.2 Main drivers for changes in future jobs

Based on interviews with employers in Penang, both the manufacturing and services sectors opined that changing work nature to flexible/remote mode, progression to higher value chain, and young demographics are the main socioeconomic drivers for changes in future jobs.

Figure 5.7 Percentage share of socio-economic and technological drivers for changes in future jobs (n=23)



In terms of technological changes and trends, big data analytics, artificial intelligence and machine learning (AI & ML) and robotics topped the list. However, services sectors had slightly different views from their manufacturing counterparts where they voted AI & ML, cloud technology and Internet of Things (IoTs) as the future drivers.

The drivers of growth selected by the employers in Penang are in line with the drivers reported in The Future of Jobs 2020 report (World Economic Forum, 2020) and at the same time are reflective of the dominance of the manufacturing and services sectors in Penang. The core of Penang industries entrenched in the manufacturing sector is reflected in the choices of factors related to value chain progression, AI, ML, robotics and IoT, although the factors being purely related to manufacturing or services are increasingly converging with the advent of multi-sectoral and multifunctional technologies. For example, the design and development of an

application to track sensors and gather such information would be categorised as services, but the application and usage may be in a manufacturing facility.

5.2.3 Job changes with the advent of technology and automation

In terms of job displacements, a large majority of employers agree that technology and automation will cause changes in the labour market. This affects especially routine, manual jobs that are repetitive. Employers opine that repetitive tasks can be automated and managed systematically to increase efficiency and productivity. Companies highlight that this is an ongoing trend driven by Industry 4.0. A key concern is that this trend is likely to impact unskilled workers first, as advanced automation lines and robotics eventually displace such jobs.

Another perspective from the employers is that automation and increase in the adoption of technology are increasingly needed due to shortage of talent and gaps in the labour market. Companies invest in technology and IT resources as the search for talent becomes increasingly challenging. The bottom line is still the balance of cost of investments and the return to the companies. However, companies also agree that jobs displaced do not necessarily mean loss of jobs, as the change in skills required for existing workers can be met with re-skilling existing workers to work on maintenance of robotics and advanced technology in the future. Unsurprisingly, jobs requiring higher skills, especially critical thinking, analytical skills and decision-making skills are unlikely to face displacement in the next five years, at least in the context of Penang's labour market.

5.3 Perceptions of graduates/retrenched workers on government programmes

5.3.1 Respondents hired under government initiatives

Since the onset of Covid-19 and the MCO, the government has provided support and incentives to keep the labour market afloat. This section discusses the awareness of respondents on government initiatives. Information about participants involved in hiring support measures undertaken by the government is also collected.

Few employees hired under hiring support measures undertaken by the government were

involved in this study. Only eight reported being hired under a programme supported by the government (Table 5.2). Four respondents reported that they are under the PenjanaKerjaya programme, followed by two each under MySTEP and NTEP. We are unable to reject the possibility that there were other respondents who were hired under government support programmes, but who were not aware that they were under such initiatives.

Table 5.2 Respondents that reported that they were hired under a programme supported by the government

Programmes/support	Number of respondents
PenjanaKerjaya	4
MySTEP	2
Northern Talent Enhancement Programme (NTEP)@NCER	2

5.3.2 Government programmes to improve employment opportunities

This section also examines obtained responses on what the government can do to improve employment opportunities for graduates in Penang and Malaysia. On top of the list is the call for the government to increase job opportunities in general, with a small number of responses requesting for an increase in employment opportunities by government agencies. More specific initiatives in increasing job opportunities were also requested, including creating policies and facilitation for better salary rates, providing incentives to support hiring, salary and employees’ benefits, and promoting incentives to hire Malaysians.

Respondents were generally aware that the initiatives to spur the labour market and increase labour demand require an increase in investments and a more conducive environment to spur research and development landscape in Malaysia. Almost 10% of respondents called for initiatives in these areas and proposed diversification in economic activities and technological development with some also proposing electronics, renewable energy, biotechnology, and information technology industries as foci areas of development.

Besides, another broad category of respondents' wish list to the government was on education and skills development. Respondents emphasised the importance of government initiatives and support for upskilling/reskilling opportunities. This highlights the fact that employees and jobseekers are aware of the importance of possessing and upgrading their skills in order to remain relevant. Fresh graduates, especially, also requested for more practical training in IHL courses relevant to industry requirements. This resonates with the anecdotal evidence by industry members that have often given feedback that fresh graduates are not well-equipped to meet industry requirements. Respondents also commented that Malaysia needs to improve the education system, curriculum content and skills training.

In terms of career support and progression, respondents proposed that the government increases support for fresh graduates' employment programmes. This includes support and initiatives for career fairs in IHLs and assistance in job search. Several respondents also promoted the idea of digital tracking and monitoring of graduates' employability. Such initiatives will be beneficial if the data is properly monitored and analysed, and may assist policymakers in facilitating labour mobility and career progress and industry trend changes. Besides that, respondents also requested for the government to support more relevant internship programmes that benefit graduates in job search. This is also linked to a proposal above for more relevant practical training and content in IHLs.

Table 5.3 Respondents' feedback on government initiatives to improve employment opportunities for graduates

What can the government do to improve employment opportunities for graduates?	Count
Labour market initiatives (LMI)	
Increase job opportunities	80
Initiative for better salary rates	28
Incentives to support hiring, salary and employee benefits	20
Incentives for hiring Malaysians	6
Education and skills (ES)	
Upskilling/reskilling programmes	53
More practical training in IHL courses relevant to industry requirements	16
Improve education, curriculum content and skills training	10
Career search and progression (CSP)	
Support for fresh graduates' employment and career fairs in IHLs/assist in job search	42
Graduate/apprentice training programmes	28
Support more relevant internship programs that will benefit graduates in job search	11
Macroeconomic initiatives (EI)	
Increase investments and facilitate R&D	26
Others	18

Note: Others (with less than five responses per category) include:

- a. Increase hiring in government agencies*
- b. Monitor employment status*
- c. Support management trainee programmes by companies*
- d. Increase government scholarships and incentives for private scholarships*
- e. Entrepreneurship trainings and development*
- f. Look into retirement age*
- g. Increase digitalisation*
- h. Increase corporate governance*

5.3.3 Progress of Malaysian government incentives for the labour market

The government has introduced various programmes to assist the labour market, especially with the objectives of retaining existing jobs and stimulating creation of new jobs. This section tracks the ongoing progress of some of the initiatives, at the national level and for Penang, specifically for (1) Wage Subsidy Programme, (2) Penjana Kerjaya's Hiring Incentives, (3) Penaja Kerjaya's Malaysianisation and (4) MOHE Career Advancing Programme (CAP).

Table 5.4 Number of beneficiaries of government programmes undertaken to assist the labour market during Covid-19

	Number of beneficiaries (Malaysia)	Number of beneficiaries (Penang)
Wage Subsidy 4.0 (Allocation: RM 3.8 billion)		
• Employers	177,300	13,208
• Employees	2,240,826	169,009
PenjanaKerjaya (Allocation: RM2 billion)		
Hiring Incentive (HI) Programmea		
• Employers	46,739	3,313b
• Employees	445,407	34,020
Malaysianisation (HI 3.0)		
• Employers	591	N/A
• Employees	3,000	282
MOHE Career Advancing Programme (RM100 million for 20,000 fresh/unemployed graduates)		

Notes: A total of HI 1.0, 2.0 and 3.0 (as of 17 December 2021), b Total of HI 1.0, 2.0 and 3.0 (as of October 2021).

Source: PERKESO, updated as of 17 December 2021.

The Wage Subsidy Programme is among the most prevalent programmes introduced by the government. It has benefitted 177,300 employers and more than two million employees in Malaysia (as of 17 December 2021). In Penang's case, 13,208 employers and 169,009 employees benefitted from the incentive.

Under PenjanaKerjaya, the government also introduced the Hiring Incentive Programme which offers financial incentives to employers to encourage them to expand hiring, and has the broad aim of decreasing unemployment. Incentive includes subsidies in the hiring of ordinary (40% of salary), graduate and vulnerable job seekers (60% of salary) being paid to employers who make hiring and locals their first priority (EIAS, 2021). This programme benefitted over 445,407 employees in Malaysia including 34,020 in Penang. Meanwhile, the Malaysianisation programme which incentivises local job seekers to take up jobs traditionally filled by the foreign workers or expatriates has benefitted 3,000 Malaysians, and 282 in Penang.

MOHE is also implementing a Career Advancing Programme (CAP) with a RM100 million allocation to reduce unemployment among graduates. Participants will be offered choices to be equipped with job competencies/self-employment in one of the three pillars of (1) Place and Train, (2) Entrepreneurship and (3) Gig Economy. Data on beneficiaries for this programme are not yet available.

5.4 The role of government and IHLs in job creation and upgrading employability support

The demand for talent is a derived demand from the expansion of industries and firms, and from diversification in economic sectors, along with the creation of new economic sectors. As such, the role of the government in facilitating macroeconomic conditions to stimulate the growth of private investments and enhance ease of doing business is vital, as are support for the creation of higher-value jobs and of decent and meaningful jobs (see Chapter 6).

5.4.1 Strengthening programmes' link-up to specific objectives

Focusing on some of Penang state's ongoing policies, this section discusses some suggestions for strengthening some programmes' link-up to specific objectives that the state intends to achieve:

Table 5.5 Proposed link-up in terms of existing programmes of Penang state government/agencies and intended outcomes

Main objectives	Link-up with existing programmes	Suggested enhancement to increase link-up between programmes and intended outcome
Creation of high-quality jobs	State industrial land capital investment policies	Non-financial incentives such as more flexible payment terms for assessment rates for companies that create/increase R&D related jobs/higher value jobs based on a specified capital investment per employment (CIPE) threshold.
	N/A	The government may also consider a study of living wage and productivity-linked compensation to increase information to assist decision-makers in the labour market.
Population growth — skilled workers and future talent	Penang Affordable Housing for Malaysians (other than existing schemes for Penangites)	<p>In addition to the existing programme that allows non-Penangite skilled workers to apply for Penang Affordable Housing, the state government may also introduce a rental scheme of state-owned and PDC-owned affordable housing units for rental to skilled workers, especially those who are married and are with children.</p> <p>This facilitates their relocation to Penang, and helps the family to decide on long-term stay in Penang.</p>

Social safety coverage for those in the informal sector and gig economy	Property assessment rates by local authorities	<p>To increase the number of people in the coverage of social safety (such as self-contribution for EPF, SOCSO), there may be one-off matching contributions in terms of rebate on property assessment rates.</p> <p>These groups would build a more resilient safety net for more workers in Penang.</p>
Lifelong learning and skills education	Penang Institute's Vocational Courses Portal	<p>Enhancement can be made to this integrated database by allowing more collaboration and interaction among education service providers and course-seekers with the following suggestions:</p> <ul style="list-style-type: none"> • Future functions to allow providers to provide information on new courses • Allow course-seekers to provide input on gaps in courses desired

5.4.2 Advancing the role of employment and career service centres in the university

While providing future-proofing knowledge and skillset for graduates, the university's career centre also plays a crucial role in determining their employability upon graduation. The university career centre is portrayed as a game-changer in bridging the labour market gap through providing the latest job market information and skill requirements to students.

In some institutions, internship programmes have been made compulsory for all students. Only students who perform and pass the internship training after at least three months will be conferred a degree or qualify for study completion. IHLs also collaborate with industry players to provide certification to students by assessing their proficiency level for a specific module. To enhance graduate employability, some IHLs collaborate with organisations that provide management trainee programmes for their graduates. This is also an initiative to promote the type of workforce available from the IHLs.

Active Memoranda of Understanding (MoUs) with industry players are also established by IHLs to strengthen the strategic partnerships with players from various industries. This collaboration is imperative not only to facilitate the internship placement of the IHLs, but also to institute a future-ready curriculum for industry experts to give feedback on the syllabus and update it following market requirements. Additionally, industry players are also invited to share their views on contemporary issues at career forums related to graduate employment.

In relation to this, documenting a list of employers recruited by the IHLs is also important to provide an informative guide to potential students and employers respectively, further boosting admission and job recruitment. The list of employers is made publicly available for students, career advisors and lecturers to access and obtain the most updated information on the job market. Besides this, some IHLs have maintained a job portal for students and alumni where available jobs are regularly shared so that they have a realistic understanding of the skills and knowledge required for the current job market.

Some IHLs try to prepare students with future-ready employability skills before graduation. For example, soft skills and digital skills are the main employability enhancement programmes available. These programmes also include training for professionalism in the workplace and embodies the abilities for effective communication (spoken and written), professional conduct and appearance, conflict resolution, critical thinking, business etiquette and teamwork. According to the Grand Canyon University in the US (2021), these characteristics should start being cultivated in the classroom, and people with such good qualities can be expected to act with competence and integrity in the workplace.

An IHL's alumni play an integral role in enhancing quality growth of inspiring students and achieving greater employability for them. These people are the role models and career mentors for students. In some cases, an alumni association is set up to foster the network with industries and most importantly, to provide continued career support. Other roles for alumni association can include mentoring students in a small group, providing leadership by serving in boards and association, and opportunities for networking among other alumni. Alumni ambassadors are also elected to help the university close the skills gap.

Alumni have the potential to transform the deliverables of IHLs through shared experiences and aspirations. Their involvement and contributions in decision making, network building and the development process from the organising of alumni events to faculty engagement

strengthen the alignments of teaching and learning programmes with the industry needs (Obeng-Ofori & Kwarteng, 2021; Tulankar & Grampurohit, 2020). This can also help the institution to increase its competitiveness globally. Maintaining constant relationships with alumni who have thrived internationally is a good strategy to implement. All of this must however be accompanied by world-class campus facilities and innovative human resources that are open and ready for transformation.

The university has also undertaken proactive initiatives to reduce graduate unemployment. While it has been identified that certain programmes provide lower employment than others such as engineering, A&F and CS, students in the former programmes should nevertheless be encouraged to attend entrepreneurial training. The students should be advised on labour demand and be encouraged to also study computer sciences and/or business management modules as elective subjects.

In sum, a university's career services centre should provide above-mentioned information on its webpage, on the latest programmes and recruitment initiatives. A searchable and interactive functional job portal and real-time career advice and relevant training programmes should be incorporated into the portal to make it accessible to employers, students and alumni. Qualified career advisors should be recruited to build a career-ready talent pipeline for students, beginning from the first university year. The websites of career services of selected universities should be assessed based on the services and support provided on the portal. These are presented in Appendix E (Table E.5).

Chapter 6

Recommendations and Conclusion

This chapter discusses measures to improve graduate employability and cultivate future-ready graduates. In particular, the proposed recommendations involve five areas: (1) Skills mismatch in the form of low job-skill relevancy and the gap of university-industry requirements; (2) Building a future-ready workforce; (3) Talent attraction and retention; (4) The functionality of career services in IHLs; and (5) Institutional reforms.

6.1 Measures to improve job-skill relevancy

The lack of relevance between skills learnt in universities and skills needed in employment lead to two consequences: 1) A high unemployment rate of graduates in some fields of study, and 2) Graduates not being well equipped to face work challenges. At the same time, graduates who are underemployed reported lower skills relevance.

Issues/observations	Recommendations
<p>1. Being unable to find a job in a relevant field is the main cited reason for unemployment.</p> <p>The survey shows that nearly half of the unemployed graduates are unable to find a job relevant to their fields of study. This is especially evident among graduates in arts and social sciences, and applied and pure sciences. These graduates show high unemployment rates ranging between 44% and 54%, and many took a relatively long time to find a job. Due to this specific reason, they also tend to look for work in Kuala Lumpur or Singapore, resulting in a talent loss for Penang.</p>	<ol style="list-style-type: none"> 1. Enhancing career counselling and handholding specifically for graduates who are unable to secure a job. 2. Providing information on career pathways to students early, preferably already at the lower secondary level so that they can make informed study decisions. 3. Establish a unified database to allow job seekers to identify suitable initiatives. This can also reduce duplication and ensure the efficiency of resources.
<p>2. Graduates are not equipped with the skills needed at work.</p> <p>Lack of technical competency is one of the mismatches mentioned by employers. Specifically, graduates lack knowledge on the job and are unable to apply their technical knowledge appropriately.</p> <p>Being part of the major workforce in Penang, engineering and CS graduates only perceive their jobs as being somewhat relevant to the knowledge they learnt in the universities. This reveals the issue of non-alignment of the university syllabus and the industry's requirements, which was highlighted by some employers.</p>	<ol style="list-style-type: none"> 1. Apprenticeship programmes targeting hard-to-fill critical positions can help fill the skills gap. 2. A skill monitoring committee and an implementing unit for skill and re-skilling initiatives should be established to address skill employability and career readiness of graduates. 3. Support should be given to industry players who provide vocational courses, in terms of the initial foundation, scaling up to serve target groups, and accreditation of relevant courses.

<p>3. Underemployment is associated with skills irrelevance, and poses a threat to talent retention.</p> <p>In general, the graduates who are underemployed tend to rate lower in skills relevance. Pure, applied and social sciences graduates report a higher rate of underemployment, on top of their already low employment rate. The reasons can be twofold: first, the low supply of jobs, and second, the correspondingly high number of graduates in these fields. This does not only cause a waste of resources but also encourages the talent to leave for a more relevant job.</p>	<ol style="list-style-type: none">1. A consultative committee can act as a central platform in understanding the needs and talent demand outlook for the life sciences industry in Penang.2. The creation of more high-skilled jobs in the services sector should be looked into, in order to retain talent as well as alleviate underemployment.
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6.2 Proposed measures to prepare for a future-ready workforce

Building a future-ready workforce involves equipping the current talent with the skills required by the job market. This requires the collaboration between employers, IHLs, government initiatives and graduates. Given the nature of Penang’s investment and economy, a future-ready workforce is necessary to increase the comparative advantage of human capital in the state.

Issues/observations	Recommendations
1. The rate of technological change is rising over time, especially in key industries such as E&E, M&E and IT. IHLs may not be able to keep up with the pace of new updates and equip future graduates with relevant knowledge and skills.	<ol style="list-style-type: none">1. Build an ecosystem for more holistic skills learning and development. Other than the formal curriculum in IHLs, there should be partnerships with the industry partners to fill technical knowledge and skills gaps. Industry associations and companies, while contributing in industry advisory panels (IAP), may also offer feedback on most-beneficial modules in IHLs.2. More open synergistic platforms and avenues for companies to access an IHL’s target pool of talent. Companies are always eager to tap into the pool of future talent, especially for hard-to-fill positions. In the short run, IHLs are encouraged to allow more partnerships, for example encouraging students to participate in innovation challenges and be close to the real-world problems faced in companies. In the medium to long term, IHLs can collaborate on shared labs and equipment with companies and work on industry-initiated research projects, especially for postgraduates.3. Feedback from industries should be properly considered and analysed for further action. At the Future Engineers Summit 2019, the panel agreed that feedback from IAP provides important inputs for addressing issues within policy-making pertaining to STEM education.

6.3 Proposed improvements in university employability

IHLs serve as an important platform for graduates to access information on the labour market. Some of the prevailing issues should be given greater attention, such as (1) enhancement of university career centres, (2) integration of job portals and career information as an important part of a university's career system, and (3) remedying the issue of insufficient information on skills development to enhance employability. Some recommendations to enhance graduate employability, especially through strengthening career services are presented below.

Issues/observations	Recommendations
<p>1. University's career services, being less visible, inaccessible and unattractive, have deterred students and graduates from using them.</p> <p>University's career services play a vital role in increasing graduate employability. It is a one-stop centre for employers and future graduates to obtain information related to the employment market. Some IHLs have established a variety of functions on their website. The website of the university's career services is the first point of contact for students, graduates and employers. Old-fashioned web designs hinder visitors from viewing and searching for information, demeaning the existence of such a facility.</p>	<ol style="list-style-type: none"> <li data-bbox="694 508 1232 748">1. The career services centre should be located in a highly-populated venue with ease of access for students, graduates, alumni and employers. Satellite offices should be set up in each faculty for students to have easy access to information for career preparation. <li data-bbox="694 778 1232 1019">2. The centre should also create a professional environment to attract students, graduates, alumni and employers. This set-up should come with modern design, smart devices and well-trained and experienced career personnel.

<p>2. Job portals and career information are not part of the university’s career services system.</p> <p>The lack of job portals with up-to-date information on job vacancies and employers have resulted in students being disconnected from the employment market. Insufficient comprehensiveness of job information has also left students unaware of industry requirements. This engagement should begin in year one and last until graduation year.</p>	<ol style="list-style-type: none">1. The career services centre should improve the functionality of its website. For example, a job portal with interactive information on employers and job vacancies helps to match the jobs for potential graduates.2. The job search function should be made available publicly or at least to students and alumni. It should be made more user-friendly too.3. Top employers from various industries that have successfully recruited the IHL’s students should be listed and made visible on the website.4. The university should also use this portal to promote their students for internship and apprentice placements. This should also be made visible to students and employers.
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<p>3. Insufficient public information available on the development of employability skills.</p> <p>A unified channel of information dissemination is not made available in the public domain. Such a channel, encompassing various graduate development programmes has a large impact on students' ability to secure a job upon graduation and helps students prepare for a future-ready workforce.</p>	<ol style="list-style-type: none"> 1. Graduate development programmes should be frequently conducted to enhance the employability of students and graduates. 2. This information should be made available interactively in the public domain and students should be encouraged to participate via self-registering on a unified platform integrated into the career services website. 3. The career services centre should also identify the skills gap by working closely with employers.
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6.4 Proposed measures to attract and retain talent in Penang

From the supply side, the labour market in Penang faces challenges in attracting and retaining talent especially as (1) skilled graduate employees have low satisfaction with salary growth in Penang, (2) a portion of current members of the workforce have an outlook that there are better prospects for jobs and career progression outside Penang, and (3) talent attraction and retention can be enhanced by attracting investments into higher-value areas relevant to future growth economies and to the aspirations of the local workforce.

Issues/observations	Recommendations
<p>1. Graduates have low satisfaction with the salary growth in Penang.</p> <p>Our survey shows that graduates are in general dissatisfied with salary growth in Penang. Furthermore, attractive salaries offered by employers in the Central region for computer/information technology is a pull factor for talent, and thus leads to talent loss in Penang. Better salary that is commensurate with living costs and expertise should be considered.</p>	<p>1. The government should look into a study on the living wage to assist in labour market decision making, specific for Penang. This can be similar to an earlier study conducted for Klang Valley. At the same time, the government should look into a regular study and report on worker productivity in Penang and provide persuasive data to contribute to the decision-making of employers.</p>

<p>2. A large number of respondents, especially young ones, have an outlook that there are better prospects for jobs and career progression outside Penang.</p> <p>Many respondents indicated their intention to look for opportunities outside Penang. However, there is a lack of data on the proportion within this group that have made firm plans on pursuing such opportunities. Notably, Penang has to compete in attracting and retaining talent with major hubs such as Kuala Lumpur and Singapore. In the long term, this affects the supply of high-quality talent (fresh graduates and experienced) for Penang and the country.</p>	<ol style="list-style-type: none"> 1. A consultative committee is proposed to understand the needs and talent demand for the life sciences industry in Penang. 2. There should be advancements and progression in the creation and expansion of more high-value jobs in Penang, leveraging on key growth sectors.
<p>3. There are areas for improvement in terms of investments in high-value services (such as IT services, consulting, research). Undeniably, Penang has achieved good progress in promoted sectors especially in E&E and its related industries. More concerted options need to be studied.</p>	<p>See Section 6.1, Recommendation 2, Issue 3.</p>

6.5 Measures to improve institutional roles

Given the importance of related government agencies in facilitating stakeholders in the labour market and graduate employability, it is suggested that there should be greater coordination and better communication between government agencies, and that an integrated and unified employment platform for government initiatives be formed.

Issues/observations	Recommendations
<p>1. The lack of coordination and communication between government agencies undermines skills enhancement and talent support.</p> <p>Government agencies are undertaking duplicated initiatives and programmes due to the lack of communication and collaboration between agencies, resulting in a waste of public resources and poor delivery of programmes.</p>	<ol style="list-style-type: none">1. Continued stakeholders' engagement with companies is crucial for providing constant infrastructure and talent support.2. Special establishment support should be offered to local industries which have centres of excellence, as part of the government's recognition of the educational role of local industry players. ViTrox through ViTrox Academy and PKT Logistics through Peninsula College have established educational arms to close the skills gap. This includes facilitation for premise space and handholding for necessary approvals; and distinctive accreditation in exchange for critical skills that are hard for the university to provide.3. Review and follow-up on ongoing initiatives should be conducted periodically, and project implementers should accept criticism and revisit programmes that require adjustment.

<p>2. The lack of an integrated and unified employment platform for government initiatives leads to confusion and reduces efficiency in talent recruitment.</p> <p>Skills upgrading and employment enhancement initiatives are widely available across different roles and responsibilities undertaken by government agencies. Duplicative tasks have however prevailed in employment assistance and job matching. Although some initiatives are targeted at youth, fresh graduates and the unskilled workforce, employers face challenges locating potential candidates and government initiatives are not able to serve their purpose due to them being not easily accessible.</p>	<p>A unified database that allows job seekers and employers to obtain suitable initiatives should be created to help job seekers and employers, and to increase information dissemination efficiency.</p>
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<p>3. The slow transformation in teaching and learning programmes, especially for building a future-ready workforce, affects negatively students’ abilities to be flexible and to adapt to the level of competency required in a rapidly changing world.</p> <p>Teacher-centred learning has been proven to be ineffective in students’ learning experiences. Students tend to memorise concepts and theories for examination purposes without rationally understanding the knowledge and the practicality of each concept. This has also led to an absence of critical thinking and problem-solving skills among graduates, which then leads to graduate unemployment. This also raises concerns with regards to the lack of knowledge and skills in lecturers’ delivery methods.</p> <p>Furthermore, changes in the administrative structure of some programmes and departments in the university may create disagreements between certain groups in the faculty (Ma’dan, et al., 2020). In the long term, more graduates will be unemployed especially those from less in-demand fields of study if mitigation measures are not undertaken immediately.</p> <p>The situation is worsened by the deficit of information on skills required, of courses to address targeted issues, and of fresh graduates entering the labour market with skills that are not fully relevant.</p>	<ol style="list-style-type: none">1. There is a need to increase university-industry collaboration in curriculum content design, teaching and learning processes and career advisory functions.<ol style="list-style-type: none">a. University should be more open and flexible, to allow Industry to give specific feedback on the curriculum of a degree programme.b. Teachers/lecturers should be proactive in increasing industry engagement for policy-related research. This increases the knowledge and exposure of lecturers.c. Career services centres in IHLs should play a mediator role to promote graduates. At the same time, students should be given the latest information on current job opportunities and market needs separately based on the field of study (Ma’dan, et al., 2020).2. Lecturers’ teaching methods should be periodically assessed by students, graduates, peers and industries. Lecturers who are lacking in delivering effective lectures or who do not meet the minimum criteria should attend professional and enhancement programmes periodically. These programmes should aim at enhancing communication skills, content delivery skills and the ability to speak confidently.
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	<ol style="list-style-type: none">3. Innovative teaching approaches that focus on student-centred learning are needed to deliver an efficient and effective learning and development process. Such methods prioritise the development of creative and critical thinking, problem solving, communication and team working.4. IHLs should provide more LMI to graduates and enhance the technical skills of graduates, especially those who, due to their degrees, take a relatively longer time to find a job.5. IHLs and government initiatives should focus on building relevant skills (technical and transversal) and resilient capabilities, and ensure that talent are able to leverage on machines and technologies to increase output and efficiency.
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6.6 Conclusion: Cultivating future-ready graduates for the future of work

This study discusses the broad issues of graduate employability, and employability among the retrenched amid Covid-19 (See Chapter 1 for the specific objectives). Beyond the short-term analysis of Covid-19 related issues, it is pertinent to be cognisant of the fact that many of the issues discussed are long-standing ones that require attention, and are not a direct result of Covid-19 per se.

This report further explores areas where decent, relevant and meaningful work is sought as an important channel for individuals to realise their potential, where industries upgrading and the nation's economic direction are seen as equally important aspects in relation to graduate employability. This also allures to the importance of cultivating the interests of school children in relation to the nation's long-term economic vision, with strong engagement and commitment to policy delivery.

There is a need to promote strategic multi-stakeholder co-operation, involving the government, industry and employees, public and private education institutions, and future graduates and parents. A collaborative effort at all levels is needed to support a level-playing field. For instance, industry players should be given opportunities in curriculum design in order to help develop skills aligned to the fourth industrial revolution.

To increase employability, it is recommended that a 4IR-oriented STEM curriculum be included in the traditional science subjects – biology, chemistry and physics, and makes computer science as a compulsory subject for all fields of study (Ong, et al., 2021). Online learning platforms should be made available for students or workers who wish to attend additional short-term courses. For example, the HRDF has introduced an e-LATiH platform providing online upskilling courses. University should enhance the accessibility of international online learning portals to students and to those who have just completed the courses.

In a fast-moving tech industry, greater efforts should be undertaken to encourage workers, including those from SMEs, to access e-learning platforms and participate in upskilling courses. Subsidies through tax incentives from the government are recommended. Some local high-tech manufacturing firms have taken necessary steps to reduce the skills gap in their industry. As an example, ViTrox, a local-grown automated machine vision inspection system

provider, expanded its campus in Batu Kawan, with an extension on ViTrox Academy – which focuses on industry-driven technical training programme and people competencies.

The industry's role in strengthening the capacities and capabilities of the workforce should also be supported. This is especially important since more and more industry members are keen to be involved in training the workforce either by establishing their own institutes of training, contributing to curriculum and workforce training modules or partnerships in training.

The authors of this study have observed one clear characteristic in the new institutions/training centres established/in the process of being established. They result from the efforts of Penang companies which grew in the 1980s/1990s, and of successful professionals or industry captains who are used to solving real-world problems daily.

In sum, all relevant stakeholders should be working closely to synergize available resources and avoid duplication of roles, all aiming to create a future-ready workforce relevant to Industry 4.0.

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Appendices

Appendix A. Graduate employability survey schedule

Survey Schedule

Employability for fresh graduates and retrenched workers in Penang March 2021

Penang Institute (a public policy think tank for the Penang state government) is carrying out a survey to examine the employability differences among fresh graduates and retrenched workers in Penang. This is part of the medium-term measures taken by the Penang state government to address graduate employability among the new graduates amid the Covid-19 pandemic. The competition for the job search may also have intensified due to increasing employee redundancy brought on by the pandemic.

This survey collects responses pertaining to education background, employment status, employment history, employment conditions and perceptions on skills, career and industry outlook.

The target respondents include fresh graduates for Jan 2019-Mar 2021 and retrenched workers (due to the pandemic). As a token of appreciation, a RM20 online shopping voucher will be given to the first 200 participants.

This survey will take not more than 15 minutes to complete. All information provided will be treated in the strictest confidence. Individual responses will not be disclosed to a third party.

Should you have any questions, please contact Ms Ng Kar Yong at karyong.ng@penanginstitute.org.

Preliminary questions	
1. Are you a fresh graduate who graduated in 2019-2021?	<input type="checkbox"/> Yes (Go to Q3) <input type="checkbox"/> No (Go to Q2)
2. Did you lose your job after Jan 2020 (exclude voluntarily resignation)?	<input type="checkbox"/> Yes (Go to Q3) <input type="checkbox"/> No (Thank you for your participation)
3. What is your highest level of education?	<input type="checkbox"/> No formal education <input type="checkbox"/> UPSR/UPSRA or equivalent <input type="checkbox"/> PT3/PMR/SRP/LCE/SRA or equivalent <input type="checkbox"/> SPM or equivalent <input type="checkbox"/> STPM or equivalent <input type="checkbox"/> Certificate <input type="checkbox"/> Diploma <input type="checkbox"/> Bachelor's degree <input type="checkbox"/> Master's degree <input type="checkbox"/> PhD and beyond
4. Do you plan to further study in 2021?	<input type="checkbox"/> Yes (Thank you for your participation) <input type="checkbox"/> No (Go to Section A)

Section A: Personal particulars

1. Age: _____
2. Gender: ☐ Male ☐ Female
3. Marital status: ☐ Single ☐ Married ☐ Divorced ☐ Widowed
4. House ownership in Penang: ☐ Own house ☐ No, stay with parents/relatives
☐ No, rented house/room
☐ No, quarter provided by employer
☐ Other (please specify): _____

5. State of birth: _____
6. Current state of residence: _____
7. Month and year of graduation (completed all courses, not graduation date):

8. University/Institution name: _____
9. Field of study:
- | | | | |
|---|--|---|--|
| <input type="checkbox"/> Accountancy | <input type="checkbox"/> Administration | <input type="checkbox"/> Applied sciences | <input type="checkbox"/> Arts |
| <input type="checkbox"/> Computer science | <input type="checkbox"/> Dentistry | <input type="checkbox"/> Economics | <input type="checkbox"/> Education |
| <input type="checkbox"/> Engineering | <input type="checkbox"/> Environment | <input type="checkbox"/> Finance | <input type="checkbox"/> Food/hospitality |
| <input type="checkbox"/> Islamic | <input type="checkbox"/> Journalism | <input type="checkbox"/> Law | <input type="checkbox"/> Management |
| <input type="checkbox"/> Marketing | <input type="checkbox"/> Medical | <input type="checkbox"/> Nurse | <input type="checkbox"/> Pharmacy |
| <input type="checkbox"/> Pure sciences | <input type="checkbox"/> Social sciences | <input type="checkbox"/> Sports science | <input type="checkbox"/> Transport/logistics |
| <input type="checkbox"/> Others | | | |
10. Please specify your major of study: _____
11. Academic results: First class/second class upper/second class lower/third class/
Other (please specify your CGPA): _____

Section B: Employment status

This section requires information related to your current employment.

1. Are you currently employed?
- ☐ Yes (go to Q2) ☐ No (go to Q16)

2. Type of employment:

☐ Full-time

☐ Part-time/temporary

3. Current company name: _____

4. Location of your current company: _____

5. Size of your current company:

☐ Less than 5 workers

☐ 5-30 workers

☐ 31-75 workers

☐ 76-200 workers

☐ More than 200 workers

6. Type of industry:

☐ Agriculture, Forestry & Fisheries

☐ Construction

☐ Manufacturing - Basic Metal Products

☐ Manufacturing - Chemicals and
Chemical Products

☐ Manufacturing - Electrical & Electronics

☐ Manufacturing - Fabricated Metal
Products

☐ Manufacturing - Food Manufacturing

☐ Manufacturing - Life Sciences/
Pharmaceutical

☐ Manufacturing - Machinery & Equipment

☐ Manufacturing - Medical Devices

☐ Manufacturing - Paper, Printing &
Publishing

☐ Manufacturing - Rubber Products

☐ Manufacturing - Plastic Products

☐ Manufacturing - Textiles & Textile
Products

☐ Manufacturing - Transport Equipment

☐ Manufacturing - Others

☐ Services - Airlines and Airport Services

☐ Services - Distributive Trade

☐ Services - Education Services

☐ Services - Financial Services

☐ Services - Global Business Services

☐ Services - Government Services

☐ Services - Health Services

☐ Services - Hotel & Tourism

☐ Services - Real Estate

☐ Services - Telecommunications

☐ Services – Transport☐ Services - Utilities☐ Services – Others☐ Other (please specify):

7. Type of your current company:

☐ Local☐ Multinational☐ Joint venture (local and foreign)

8. Your current job title:

9. Monthly salary range of your current employment:

☐ RM1,000 and below☐ RM1,001-RM2,000☐ RM2,001-RM3,000☐ RM3,001-RM4,000☐ RM4,001-RM5,000☐ RM5,001-RM6,000☐ RM6,001-RM7,000☐ RM7,001-RM8,000☐ RM8,001-RM9,000☐ RM9,001-RM10,000☐ RM10,001-RM11,000☐ RM11,001-RM12,000☐ RM12,001-RM13,000☐ RM13,001-RM14,000☐ RM14,001-RM15,000☐ RM15,001 and above

10. What are/were the changes at work (current workplace) that you have experienced due to Covid-19 and MCO? (Choose all that apply.)

☐ Requirement to work from home☐ No bonus/reduced bonus☐ Salary increases stopped/suspended☐ Reduction in salary☐ Salary freeze☐ Promotions stopped/suspended☐ Staff performance appraisals stopped/suspended☐ Requirement to take annual/vacation leave☐ Requirement to take unpaid leave☐ Reduction in number of paid hours worked

- ☐ No changes
☐ Other (please specify):

11. How many percent of your salary was deducted due to Covid-19?

- | | |
|----------------------------------|--|
| <input type="checkbox"/> 0% | <input type="checkbox"/> 1%-5% |
| <input type="checkbox"/> 6%-10% | <input type="checkbox"/> 11%-15% |
| <input type="checkbox"/> 16%-20% | <input type="checkbox"/> 21%-25% |
| <input type="checkbox"/> 26%-30% | <input type="checkbox"/> 31%-35% |
| <input type="checkbox"/> 36%-40% | <input type="checkbox"/> 41%-45% |
| <input type="checkbox"/> 46%-50% | <input type="checkbox"/> Other (please specify): |

12. Did you have to involuntarily accept your current job?

- ☐ Yes ☐ No

13. When did you start this job (e.g. Month/year: 12/2020, 01/2021)?

14. How long were you unemployed before getting your current job?

- | | | |
|---|--------------------------------------|---|
| <input type="checkbox"/> Less than or equal to 3 months | <input type="checkbox"/> 3-6 months | |
| <input type="checkbox"/> 6-9 months | <input type="checkbox"/> 9-12 months | <input type="checkbox"/> More than 1 year |

15. Are you hired under any of the following programmes by the government?

(Choose all that apply.)

- ☐ PenjanaKerjaya
☐ PROTEGE (previously known as SL1M)
☐ MySTEP
☐ Northern Talent Enhancement Programme (NTEP)@NCER
☐ JomKerja@NCER
☐ Other (please specify:)
☐ No, I am not hired under programmes by the government.

Go to Section C.

---- Those currently unemployed ----

16. Are you looking for a job?

- ☐ Yes (go to Q17) ☐ No (go to Q22)

17. How many months have you been looking for a job?

- ☐ Less than or equal to 3 months ☐ 3-6 months
☐ 6-9 months ☐ 9-12 months ☐ More than 1 year

18. Reasons for not being employed (Choose max of 2):

- ☐ I don't have skills required by the market.
☐ I can't find jobs that are relevant to my field of study.
☐ My expected salary is higher than what was offered by the potential employer.
☐ I am overqualified for the potential jobs.
☐ I am underqualified for the jobs that I wanted to apply to.
☐ The interview process was difficult to handle.
☐ I have applied for jobs outside Penang, and currently awaiting for/in the process of interview.
☐ I cannot find a suitable job in Penang, and have to go to Singapore or Kuala Lumpur.
☐ I plan to find jobs in Singapore because of the exchange rate, better salary and better prospects. But, I am awaiting for the travel restrictions to end.
☐ I want to be a homemaker.
☐ Other (please specify):

19. What is your expected salary (RM)?

20. What type of occupation are you looking for?

21. What channel(s) have you used to look for a job in the last six months?

(Choose all that apply.)

- ☐ PERKESO's MYFutureJobs
☐ Penang Career Assistance and Talent Centre (CAT Centre)
☐ Employment agencies/Job portals (e.g. JobStreet.com, EPS Consultants, Kelly Services, etc.)
☐ Company's website
☐ Family/friends/relatives
☐ University's career center
☐ Other (please specify):

Go to Section C.

22. Main reasons for not looking for a job:

- ☐ Family responsibilities
- ☐ Further studies
- ☐ Disabled
- ☐ Not interested to work
- ☐ Retired
- ☐ Lack of self-confidence
- ☐ Taking a break/travelling/vacation
- ☐ Health reason
- ☐ Lack of communication/soft skills
- ☐ Not allowed to work by family
- ☐ Other (please specify):

Section C: Employment history

This section requires responses regarding your immediate last employment.

1. Have you been employed in a permanent full-time/part-time job in your last employment (including internship)?
☐ Yes (go to Q2) ☐ No (go to Section D)
2. Your last company name: _____
3. Type of your last company:
☐ Local ☐ Multinational ☐ Joint venture (local and foreign)
4. Location of your last company: _____

5. Size of your last company:

☐ Less than 5 workers☐ 5-30 workers☐ 31-75 workers

6. Type of industry:

☐ 76-200 workers☐ More than 200 workers☐ Agriculture, Forestry & Fisheries☐ Construction☐ Manufacturing - Basic Metal Products☐ Manufacturing - Chemicals and Chemical Products☐ Manufacturing - Electrical & Electronics☐ Manufacturing - Fabricated Metal Products☐ Manufacturing - Food Manufacturing☐ Manufacturing - Life Sciences/ Pharmaceutical☐ Manufacturing - Machinery & Equipment☐ Manufacturing - Medical Devices☐ Manufacturing - Paper, Printing & Publishing☐ Manufacturing - Rubber Products☐ Manufacturing - Plastic Products☐ Manufacturing - Textiles & Textile Products☐ Manufacturing - Transport Equipment☐ Manufacturing – Others☐ Services – Airlines and Airport Services☐ Services - Distributive Trade☐ Services - Education Services☐ Services - Financial Services☐ Services - Global Business Services☐ Services - Government Services☐ Services - Health Services☐ Services - Hotel & Tourism☐ Services - Real Estate☐ Services - Telecommunications☐ Services – Transport☐ Services - Utilities☐ Services – Others☐ Other (please specify):

7. Your previous job title: _____

8. Monthly salary range of your last employment:

- | | |
|--|---|
| <input type="checkbox"/> RM1,000 and below | <input type="checkbox"/> RM1,001-RM2,000 |
| <input type="checkbox"/> RM2,001-RM3,000 | <input type="checkbox"/> RM3,001-RM4,000 |
| <input type="checkbox"/> RM4,001-RM5,000 | <input type="checkbox"/> RM5,001-RM6,000 |
| <input type="checkbox"/> RM6,001-RM7,000 | <input type="checkbox"/> RM7,001-RM8,000 |
| <input type="checkbox"/> RM8,001-RM9,000 | <input type="checkbox"/> RM9,001-RM10,000 |
| <input type="checkbox"/> RM10,001-RM11,000 | <input type="checkbox"/> RM11,001-RM12,000 |
| <input type="checkbox"/> RM12,001-RM13,000 | <input type="checkbox"/> RM13,001-RM14,000 |
| <input type="checkbox"/> RM14,001-RM15,000 | <input type="checkbox"/> RM15,001 and above |

9. How long did you work in your last employment
(e.g. 1 year, 5 years, 1 month, 3 months, 20 weeks)?

10. What was the reason you left/lost your last employment? (Choose one only)

- ☐ Normal retrenchment and redundancy
- ☐ Voluntary/Mutual Separation Scheme (VSS/MSS)
- ☐ Closure of the company due to natural disaster
- ☐ Bankruptcy or closure of the company due to Covid-19 and MCO
- ☐ Bankruptcy or closure of the company due to reasons other than Covid-19
- ☐ Constructive dismissal (e.g. employee is forced to leave or quit his/her job because of the employer's conduct)
- ☐ Dismissal due to misconduct by the employee
- ☐ Voluntary resignation
- ☐ Resignation due to sexual harassment or threat in the workplace
- ☐ Resignation after being ordered to perform dangerous duties that are not within the job scope
- ☐ Retirement
- ☐ The expiry of a fixed term contract
- ☐ Other (please specify):

11. Have you been offered a Voluntary Separation Scheme (VSS) or a Mutual Separation Scheme (MSS)?

☐ Yes ☐ No/Not applicable (go to Q14)

12. Did you accept a VSS/MSS offer?

☐ Yes ☐ No

13. What was the reason for accepting/not accepting the offer?

14. Did you successfully obtain an Employment Insurance Scheme (EIS) from PERKESO after loss of employment?

☐ Yes (go to Q16) ☐ No (go to Q15)

15. Why didn't you obtain EIS from PERKESO?

16. Does your current employment have a higher/lower/equivalent salary and/or position than your last employment? (Choose one only for each column.)

Current employment compared to last employment	Salary and/or benefit packages	Position
Higher		
Equivalent		
Lower		
Not applicable/currently unemployed		

Section D: Employment conditions (For those who are currently employed)

This section requires information related to your qualification and current employment.

1. Does your current job require a Diploma/Bachelor's degree?
☐ Yes ☐ No
2. Are you currently employed in a job which has a requirement that is lower than your education qualification?
☐ Yes ☐ No
3. Do you think you are overqualified/underqualified for this job function?
☐ Overqualified
☐ Underqualified (I need to put extra effort to perform the assigned tasks)
☐ My current job is a good fit for my skills/qualifications (I can handle the assigned tasks well, and have opportunities to learn new things)
4. In what way do you think you are a good fit/overqualified/underqualified?
5. How relevant are your skills learnt in university/institution to your current job? Please rate accordingly.
☐ 1-Highly irrelevant ☐ 2-Irrelevant
☐ 3-Somewhat relevant ☐ 4-Relevant ☐ 5-Highly relevant
6. Why do you think it is relevant/not relevant to your current job?
7. Would you like to look for other job opportunities?
☐ Yes ☐ No
8. Why do/don't you plan for new job opportunities?
9. Does your current employment provide you with training in certain skills?
☐ Yes (go to Q10) ☐ No (go to Q11)

10. What are the skills provided by the current employer?
11. Do you face any challenges in handling assigned tasks in your current job?
☐ Yes (go to Q12) ☐ No (go to Section E)
12. What are the main challenges in your current job?

Section E: Perception on skills, career and industry outlook

1. In your opinion, is there a need for you to participate in a re-skilling programme to enhance the relevancy of employment?
☐ Yes (go to Q2) ☐ No (go to Q3)
2. In your opinion, what are the key re-skilling or upskilling courses that are beneficial for your career?
3. Have you participated in any Human Resources Development Fund's (HRDF) e-Latih training programmes?
☐ Yes (go to Q4) ☐ No (go to Q5)
4. What is/are the programme(s) that you are currently taking/have completed?
5. What is your perception of the following statements? Please tick accordingly.

	1	2	3	4	5
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
I am willing to accept a job with salary lower than my current/ expected salary.					
I am willing to try new skills that are required in the industry.					

The job outlook of my industry in Penang is vibrant and dynamic.					
Covid-19 has hampered my career planning and prospects.					
For my industry, the government's assistance given is sufficient.					
Penang has provided sufficient highly-qualified job opportunities in general.					
The development in Batu Kawan has provided more job opportunities that are relevant to my skills.					
I am satisfied with the salary growth in Penang's labour market in general.					
I am willing to stay in the current employment even though there is a pay cut.					
I intend to develop my skills in my current career in Penang before considering other opportunities outside Penang.					
I like to stay close to my family, and am willing to forgo better career opportunities outside Penang.					

6. In times of Covid-19, what percentage of pay cut will make you consider leaving your employment?
 - ☐ I am currently unemployed
 - ☐ Less than 10%
 - ☐ 10%-20%
 - ☐ 21%-50%
 - ☐ Other (please specify):
 - ☐ No, I won't leave my current job
7. In times of Covid-19, how many months of savings do you have to cover all monthly expenses?
8. Do you intend to explore job opportunities outside of Penang/Malaysia?
 - ☐ Yes, would like to explore opportunities outside Penang, but within Malaysia.
 - ☐ Yes, would like to explore opportunities in overseas, but not other states in Malaysia.
 - ☐ Yes, would like to explore opportunities outside Penang or overseas.
 - ☐ No, no intention to explore opportunities outside Penang. (go to Q10)
9. Which location would you like to explore?
10. What is your perception of the outlook of your current industry?
11. What can the government do to improve employment opportunities for the graduates (new/experienced)?

--THANK YOU--

Appendix B. Employer survey schedule

Penang Institute, tasked by the Penang Socio-Economic Recovery Consultative Council (PSERCC) for the Labour Market Sector chaired by YB Deputy Chief Minister II, would like to gather feedback on graduate employability and talent attraction. This survey is to understand employers' perceptions of the characteristics of the graduate workforce and their hiring strategies.

All information provided will be treated with the strictest confidence. Individual responses will be made anonymous, and not be shared with a third party.

Company name: _____

Name of respondent: _____

Designation of respondent: _____

Email address: _____

A. Labour demand

This section requires information related to job recruitment for local and foreign workers.

1. What are the hiring differences before and after the Covid-19 pandemic?
2. During the pandemic (Mar 2020-Apr 2021), was your company opened for hiring?
☐ Yes (go to Q3) ☐ No (go to Q8)
3. During the Covid-19 pandemic (Mar 2020-Apr 2021), what were the most in-demand jobs that were opened for fresh graduates in your company? Please list down the job positions and job titles respectively.

4. During the Covid-19 pandemic (Mar 2020-Apr 2021), what were the most in-demand jobs that were opened for experienced graduates in your company? Please list down the job positions and job titles respectively.
5. During the Covid-19 pandemic (Mar 2020-Apr 2021), what were the most in-demand jobs that were opened for non-graduates in your company? Please list down the job positions and job titles respectively.
6. Were these recruitments for the expansion of company activities or replacement of employees who have left the company? (Choose all that apply.)
 - ☐ Expansion of company activities
 - ☐ Replacement of employees who left the company
 - ☐ Other (please specify):
7. What are the recruitment difficulties faced by the company?
8. What are the jobs in your company which require tertiary education that are most difficult to fill?
9. How many (in percentage) of your company workforce consists of local and foreign workers? (Please ensure the total percentage is 100%.)
 - i. Local skilled workers –
 - ii. Local unskilled workers –
 - iii. Foreign skilled workers –
 - iv. Foreign unskilled workers –
10. Is your company hiring foreign skilled workers to fill the skills gap that emerges in your company?
 - ☐ Yes (go to 10a) ☐ No (go to Q11)
 - a. What were the challenges your company encountered when hiring local skilled workers is not possible?
 - b. What are the reasons for hiring foreign skilled workers/expatriates?
11. Is your company hiring foreign unskilled workers? ☐ Yes (go to Q11a) ☐ No (go to Q12)

- a. What were the challenges your company encountered when hiring local unskilled workers is not possible?
 - b. What are the reasons for hiring foreign unskilled workers?
12. Can systematic digitalisation and automation adoption reduce foreign labour intake? Please elaborate.

B. Labour supply

This section seeks to understand your opinion pertaining to graduate employability.

1. How would you describe the labour supply situation for the categories of junior-level, mid-level and senior management positions in your company?
2. How would you describe the employability of graduates from STEM (Science, Technology, Engineering and Mathematics), accounting and finance, and other fields of study?
3. Would you consider hiring an experienced graduate or a fresh graduate for a position that requires a degree holder to fill? Please explain.
4. Do you think experienced retrenched graduates are more employable than fresh graduates? Please elaborate.
5. Will technological changes and automation have effects on the displacement of certain positions/jobs in the labour market in the next 5 years? Please explain.

C. Skills match/mismatch

This section requires your feedback with regards to the skills mismatch among fresh graduates.

1. How would you describe the match/mismatch between graduates' competencies and employers' requirements?
2. Is there a difference in skills mismatch between TVET (Technical and Vocational Education and Training) and normal academic university/college graduates? Please elaborate.

- 3. While employment losses possess important socio-economic implications, labour shortage is identified to be a more pressing issue in Penang. In your opinion, what types of labour are short in the labour market?
- 4. What specific technical and transversal skills are essential and highly desirable?

D. The future of work

This section gathers your view on the expected change for the future of work in your industry.

- 1. In your opinion, what would be the expected change for the future of jobs in your industry?
- 2. What do you think would be the top three drivers of changes for the future of work in your industry?

Demographic and socio-economic changes (please choose maximum three)	Technological changes (please choose maximum three)
<input type="checkbox"/> Changing nature of work, flexible work	<input type="checkbox"/> Mobile internet/network infrastructure
<input type="checkbox"/> Geopolitical volatility (US-China trade war, RCEP, etc.)	<input type="checkbox"/> Cloud technology
<input type="checkbox"/> Longevity, ageing societies	<input type="checkbox"/> Internet of Things
<input type="checkbox"/> Young demographics	<input type="checkbox"/> Artificial Intelligence and machine learning
<input type="checkbox"/> Women workforce participation	<input type="checkbox"/> Big data analytics
<input type="checkbox"/> Progression into higher value economic activities	<input type="checkbox"/> Application Programming Interfaces (APIs) and integration
<input type="checkbox"/> Improved public transportation	<input type="checkbox"/> Robotics
<input type="checkbox"/> Higher ESG standards globally	<input type="checkbox"/> Advanced materials science

<input type="checkbox"/> Brain drain	<input type="checkbox"/> Sharing economy/crowdsourcing
Other:	Other:

E. Government support

Government agencies have increased incentives for hiring and talent retention during the Covid-19 period. Some of these include partial subsidies for wage and coverage of certain statutory contributions for promoted positions and industries. Your opinion on the suggested strategies is crucial for the state government to ensure a sustainable talent pool is available in Penang’s labour market.

- 1. What are the strategies that the company/government should use to attract and retain talent in Penang?
- 2. What are some of the relevant incentives to upgrade the positioning of Penang’s labour market?
- 3. Please share your opinion on the following policy measures?
 - a. Raising minimum wage
 - b. Wage top-up for hard-to-fill vacancies
 - c. Akta 446
 - d. Support for statutory contributions (or EPF) for hard-to-fill positions such as IC Design, IT Architect, SAP Consultant, etc.
- 4. What is the industry’s wishlist to build a long-term road map for talent attraction and retention?

--THANK YOU--

Appendix C. Characteristics of graduate employment

Table C.1: Descriptive statistics of fresh and retrenched graduates

	Fresh graduates		Retrenched graduates		Total	
	No.	%	No.	%	No.	%
Total	396	94.3	24	5.7	420	100.0
Age						
Minimum	20	-	25	-	20	-
Mean	25.5	-	34.5	-	26	-
Median	25	-	33	-	25	-
Maximum	43	-	50	-	50	-
Age group						
20-24	166	41.9	0	0.0	166	39.5
25-29	198	50.0	6	25.0	204	48.6
30-34	21	5.3	8	33.3	29	6.9
35-39	8	2.0	3	12.5	11	2.6
40-44	3	0.8	5	20.8	8	1.9
45 years old and above	0	0.0	2	8.3	2	0.5
Sex						
Male	223	56.3	14	58.3	237	56.4
Female	173	43.7	10	41.7	183	43.6
Year of graduation						
2018 and earlier	0	0.0	23	95.8	23	5.5
2019	157	39.6	1	4.2	158	37.6
2020	222	56.1	0	0.0	222	52.9
2021	17	4.3	0	0.0	17	4.0

<i>Highest level of education</i>						
Certificate	2	0.5	2	8.3	4	1.0
Diploma	10	2.5	7	29.2	17	4.0
Bachelor's degree	305	77.0	9	37.5	314	74.8
Master's degree	63	15.9	5	20.8	68	16.2
PhD	16	4.0	1	4.2	17	4.0
<i>Marital status</i>						
Single	363	91.7	11	45.8	374	89.0
Married/Engaged	33	8.3	11	45.8	44	10.5
Divorced/Widowed	0	0.0	2	8.3	2	0.5
<i>House ownership in Penang</i>						
Own house	16	4.0	9	37.5	25	6.0
Stay with parents/relatives	267	67.4	11	45.8	278	66.2
Rented house/room	92	23.2	3	12.5	95	22.6
Quarter provided by employer	3	0.8	0	0.0	3	0.7
Others	1	0.3	1	4.2	2	0.5
Stay outside Penang	17	4.3	0	0.0	17	4.0
<i>State of birth</i>						
Penang	237	59.8	16	66.7	253	60.2
Perak	42	10.6	2	8.3	44	10.5
Kedah	36	9.1	1	4.2	37	8.8
Johor	15	3.8	0	0.0	15	3.6
Kuala Lumpur	11	2.8	0	0.0	11	2.6
Other states	46	11.6	4	16.7	50	11.9
Overseas	9	2.3	1	4.2	10	2.4
<i>State of residence</i>						
Penang	284	71.7	24	100.0	308	73.3
Kedah	29	7.3	0	0.0	29	6.9
Selangor	22	5.6	0	0.0	22	5.2
Perak	18	4.5	0	0.0	18	4.3
Kuala Lumpur	14	3.5	0	0.0	14	3.3
Other states	29	7.3	0	0.0	29	6.9

Academic results						
First class	107	27.0	5	20.8	112	26.7
Second class upper	191	48.2	12	50.0	203	48.3
Second class lower	64	16.2	3	12.5	67	16.0
Third class	12	3.0	1	4.2	13	3.1
Others	22	5.6	3	12.5	25	6.0
Institution type						
Public university/college	232	58.6	7	29.2	239	56.9
Private university/college	162	40.9	13	54.2	175	41.7
Overseas	1	0.3	3	12.5	4	1.0
Others	1	0.3	1	4.2	2	0.5
Field of study						
Engineering	101	25.5	4	16.7	105	25.0
Accounting & Finance	70	17.7	0	0.0	70	16.7
Business & Administration	50	12.6	6	25.0	56	13.3
Computer Science	36	9.1	4	16.7	40	9.5
Applied Sciences	26	6.6	1	4.2	27	6.4
Social Sciences	25	6.3	1	4.2	26	6.2
Arts	20	5.1	3	12.5	23	5.5
Mass Communication	17	4.3	0	0.0	17	4.0
Food & Hospitality	12	3.0	3	12.5	15	3.6
Construction	12	3.0	1	4.2	13	3.1
Pure Sciences	13	3.3	0	0.0	13	3.1
Medical, Dentistry & Pharmacy	8	2.0	1	4.2	9	2.1
Others	6	1.5	0	0.0	6	1.4

Table C.2: Percentage share of unemployed graduates by reasons of unemployment (%)

Reasons of unemployment	Fresh graduates	Retrenched graduates	Total
I can't find jobs that are relevant to my field of study.	46.2	42.1	45.5
I have applied for jobs outside Penang, and currently awaiting the process of an interview.	28.0	5.3	24.1
I don't have the skills required by the market.	21.5	15.8	20.5
I cannot find a suitable job in Penang and have to go to Singapore or Kuala Lumpur.	16.1	26.3	17.9
I am underqualified for the jobs that I wanted to apply to.	18.3	15.8	17.9
I am overqualified for the potential jobs.	16.1	15.8	16.1
My expected salary is higher than what was offered by the potential employer.	4.3	36.8	9.8
The interview process was difficult to handle.	6.5	5.3	6.3
I plan to find jobs in Singapore because of the exchange rate, better salary and better prospects. But, I am waiting for the travel restrictions to end.	6.5	0.0	5.4
I have applied for jobs in Penang, but still waiting for a reply.	4.3	0.0	3.6
Others	9.7	5.3	8.9
Total number of respondents (no.)	93	19	112

Notes:

1. Five graduates who did not answer this question were excluded.
2. The sum of percentages can be more than 100% as one respondent can select at most two reasons.

Table C.3: Regression coefficients of unrestricted and restricted models with graduate employment as dependent variable

	Model 1 (with or without experience)		Model 2 (with at least or less than one year experience)				Model 3 (with length of experience in months)
	Model 1.1	Model 1.2	Model 2.1	Model 2.2	Model 2.3	Model 2.4	
(Intercept)	-1.982	-4.549**	-4.149**	-3.797**	-4.028**	-4.781**	-4.296**
Qualification	-1.532**	-1.518**	-1.332**	-1.397**	-1.407**	-1.337**	-1.386**
Academic result (Second class upper)	0.903**	0.901**	0.878**	0.851**	0.859**	0.903**	0.861**
Academic result (First class)	0.808**	0.802**	0.648*	0.606	0.609	0.679*	0.645*
Academic result (Postgraduate's research)	-0.585	-0.529	-0.433	-0.392	-0.421	-0.565	-0.45
Experience	-1.085**	-1.133**	-0.397			-1.111*	-0.015
FOS (Other STEM)	0.528	0.546	0.494	0.574	0.555	0.152	0.539
FOS (Accounting & Finance)	1.486**	1.497**	1.531**	1.546**	1.568**	1.349**	1.541**
FOS (Business & Administration)	1.244**	1.235**	1.265**	1.26**	1.21**	1.395**	1.268**
FOS (Computer Science)	2.699**	2.690**	2.682**	2.717**	2.555**	2.423**	2.688**
FOS (Engineering)	1.284**	1.270**	1.243**	1.284**	1.105**	0.987**	1.244**
Age	0.147**	0.179**	0.175**	0.159**	0.161**	0.205**	0.182**
Gender	-0.602**	-0.614**	-0.529*	-0.53*		-0.492*	-0.529*
Marital	-0.716						
Experience * FOS (Other STEM)						1.493	

Experience * FOS (Accounting & Finance)						1.078	
Experience * FOS (Business & Administration)						-0.26	
Experience * FOS (Computer Science)						13.728	
Experience * FOS (Engineering)						1.815	
AIC	386.53	386.10	396.73	395.87	397.69	401.31	396.24
Pseudo R ² (Adjusted Mc Fadden)	0.099	0.100	0.075	0.077	0.073	0.065	0.076
Pseudo R ² (CoxSnell)	0.165	0.162	0.138	0.136	0.127	0.150	0.140

*Note: ** and * refer to the level of significance at 5% and 10%, respectively.*

Table C.4 Regression results of the final model (or Model 2.1 in Table C.3) with graduate employment as dependent variable

	Logistic regression			Wald test	
	Coefficient	Odd ratio (2.5%CI, 97.5% CI)	p-value	Chi-square	p-value
(Intercept)	-4.149	0.016 (0.001, 0.354)	0.013**		
Qualification	-1.332	0.264 (0.111, 0.622)	0.002**	9.235	0.002**
Academic result (Second class upper)	0.878	2.407 (1.222, 4.729)	0.011**	9.767	0.021**
Academic result (First class)	0.648	1.912 (0.893, 4.134)	0.096*		
Academic result (Postgraduate research)	-0.433	0.649 (0.159, 2.504)	0.536		
Experience (at least one year)	-0.397	0.672 (0.329, 1.406)	0.281	1.138	0.286
FOS (Other STEM)	0.494	1.638 (0.743, 3.705)	0.227	28.003	0.000**
FOS (Accounting & Finance)	1.531	4.625 (1.986, 11.655)	0.001**		
FOS (Business & Administration)	1.265	3.544 (1.491, 9.114)	0.006**		
FOS (Computer Science)	2.682	14.615 (3.853, 96.499)	0.001**		
FOS (Engineering)	1.243	3.465 (1.664, 7.421)	0.001**		
Age	0.175	1.191 (1.054, 1.364)	0.008**	8.144	0.004**
Gender	-0.529	0.589 (0.344, 1.003)	0.052*	3.801	0.051*
AIC	396.73				
Pseudo R ² (Adjusted McFadden)	0.075				
Pseudo R ² (CoxSnell)	0.138				

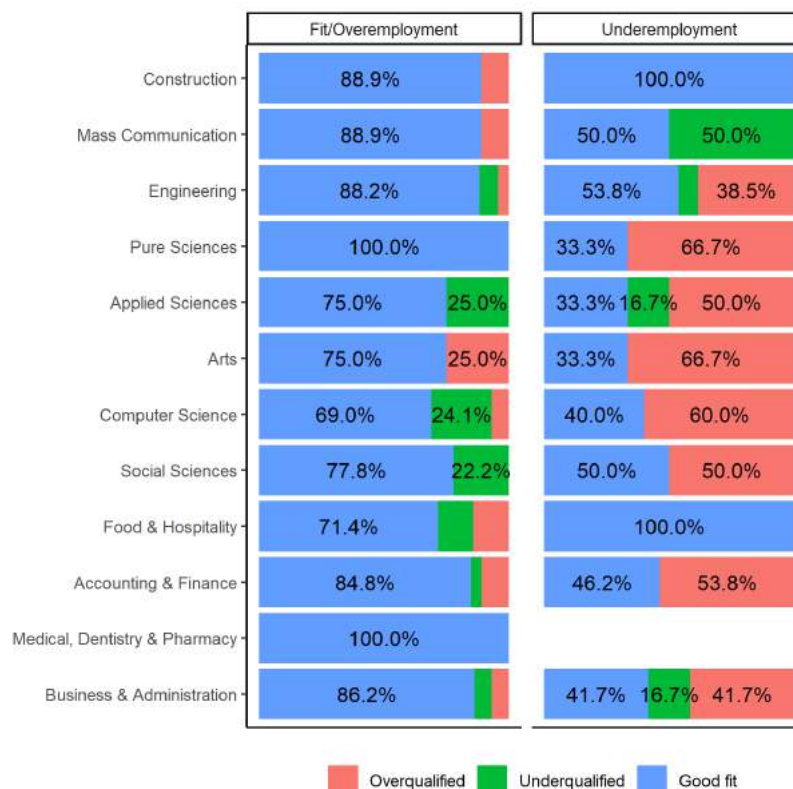
Notes:

1. ** and * refer to the level of significance at 5% and 10%, respectively.

2. *The Wald test is to test the overall significance of each variable.*
3. *Although Model 1.2 is the best model based on the AIC value, it is found that experience of at least one year (Model 2) explains the probability of graduate employment better compared to other models (either with the presence of work experience (Model 1) or the length of work experience (Model 3)). Furthermore, since experience is one of the main variables of interest, Model 2.1 was chosen as the final model.*

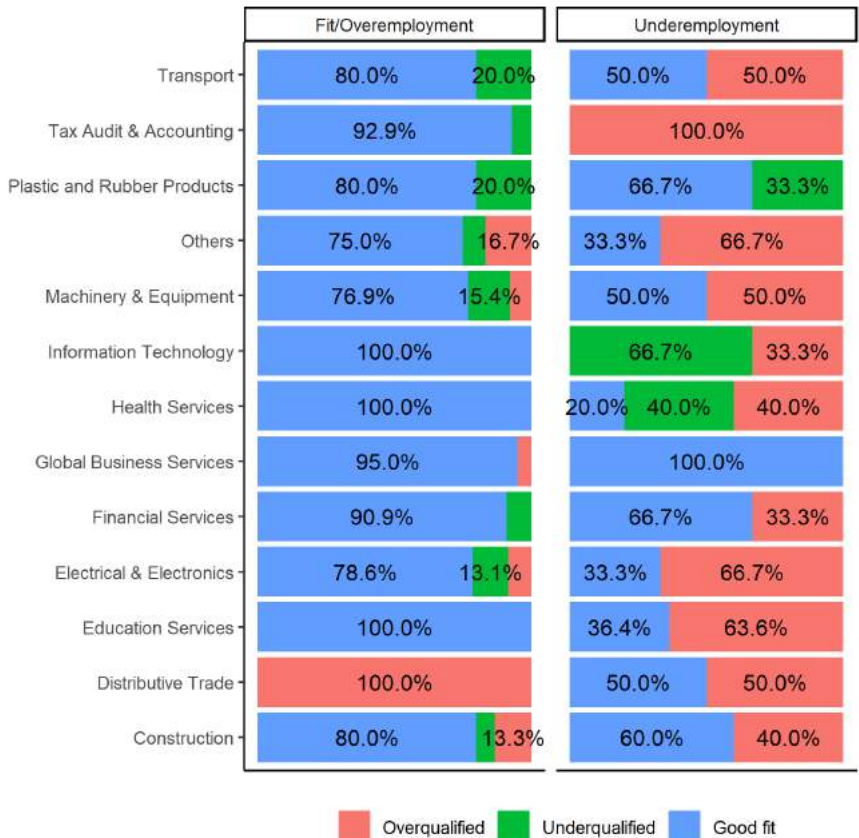
Appendix D. Skill issues and challenges of graduate employment

Figure D.1: Fresh graduates' match/mismatch between education qualification and job requirement versus perceived ability at work, by FOS



Note: Only FOS with at least five employed graduates are shown.

Figure D.2: Fresh graduates' match/mismatch between education qualification and job requirement versus perceived ability at work, by industry



Note: Only industries with at least five employed graduates are shown.

Figure D.3: Average rating for job-skill relevancy among the fresh graduates by perceived ability at work and FOS

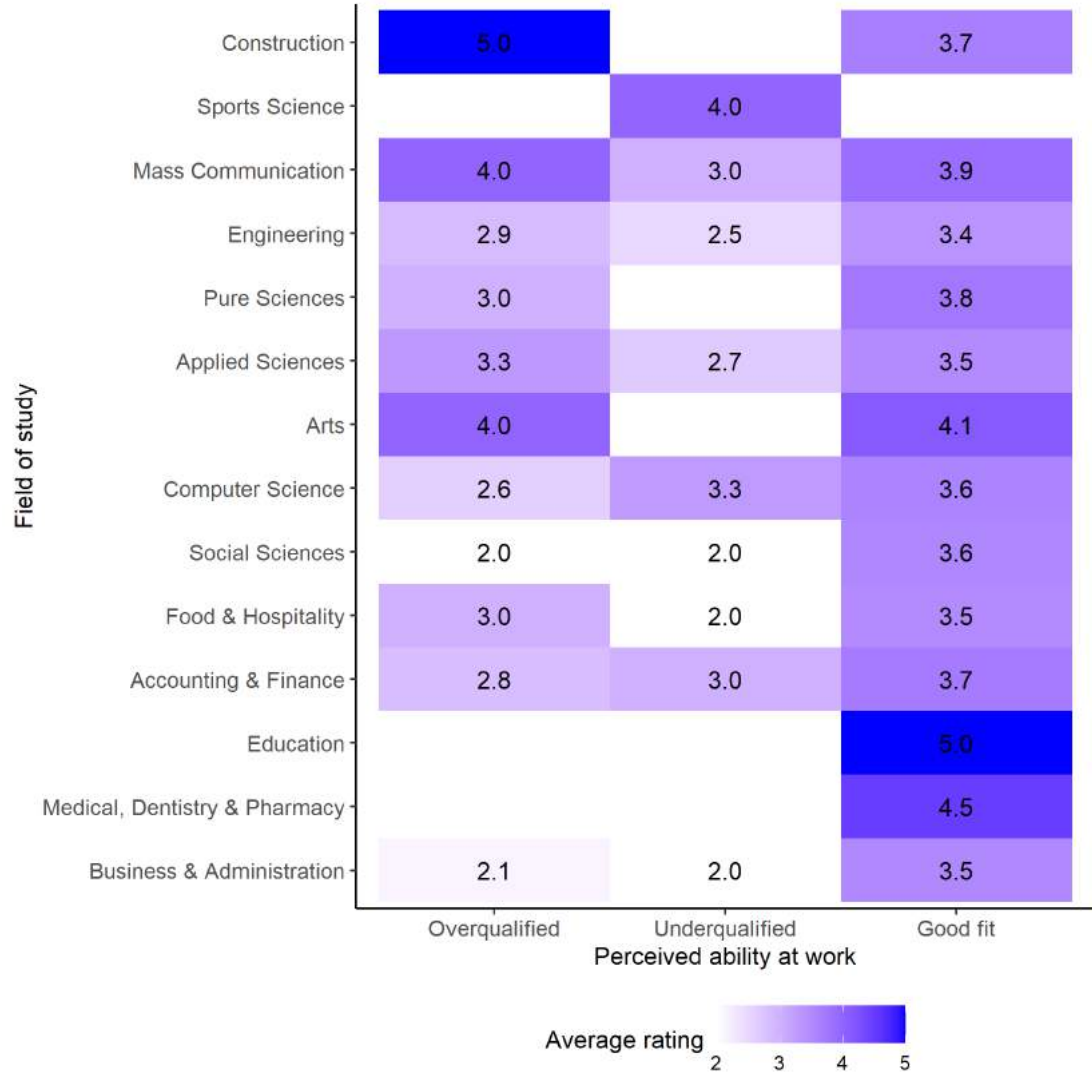
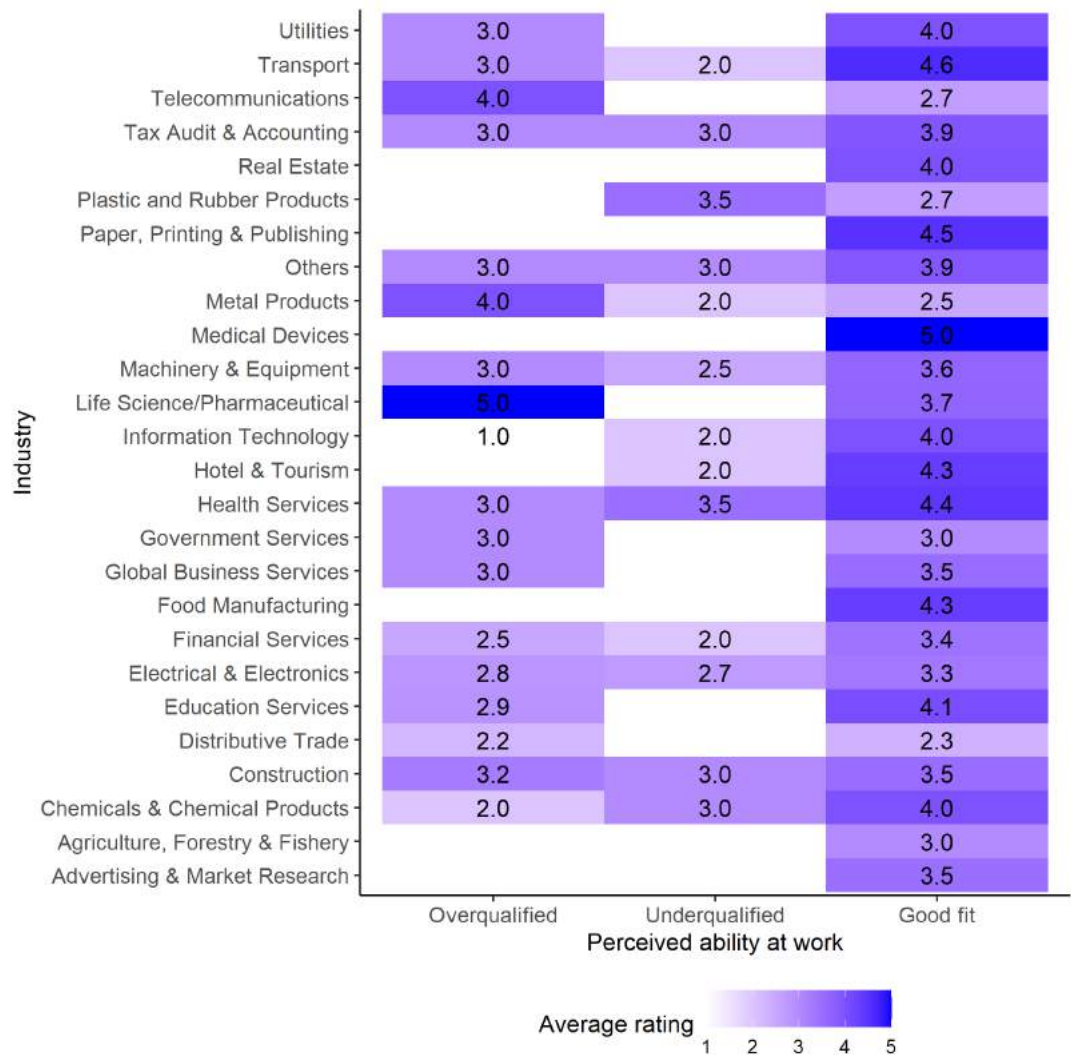


Figure D.4: Average rating for job-skill relevancy among the fresh graduates by perceived ability at work and industry



Appendix E. Penang’s future graduate workforce

Figure E.1: Movement of fresh graduates: state of birth-state of study-state of work/residence

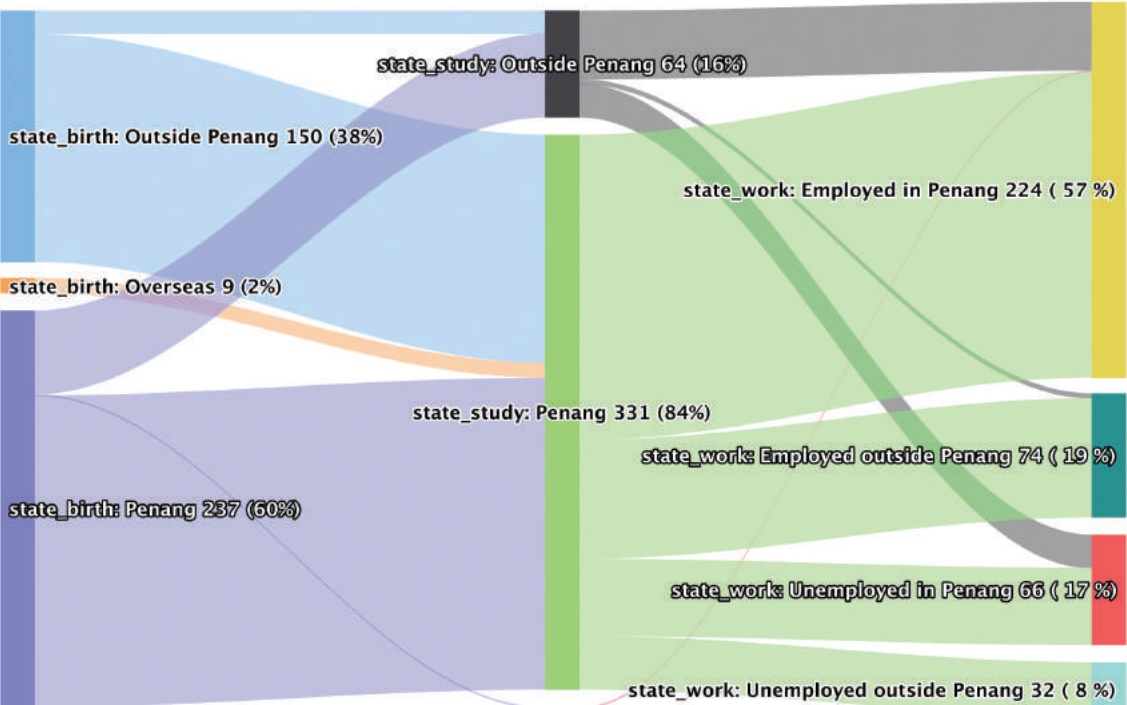


Figure E.2: Movement of fresh graduates: state of birth-state of work/residence-future intention

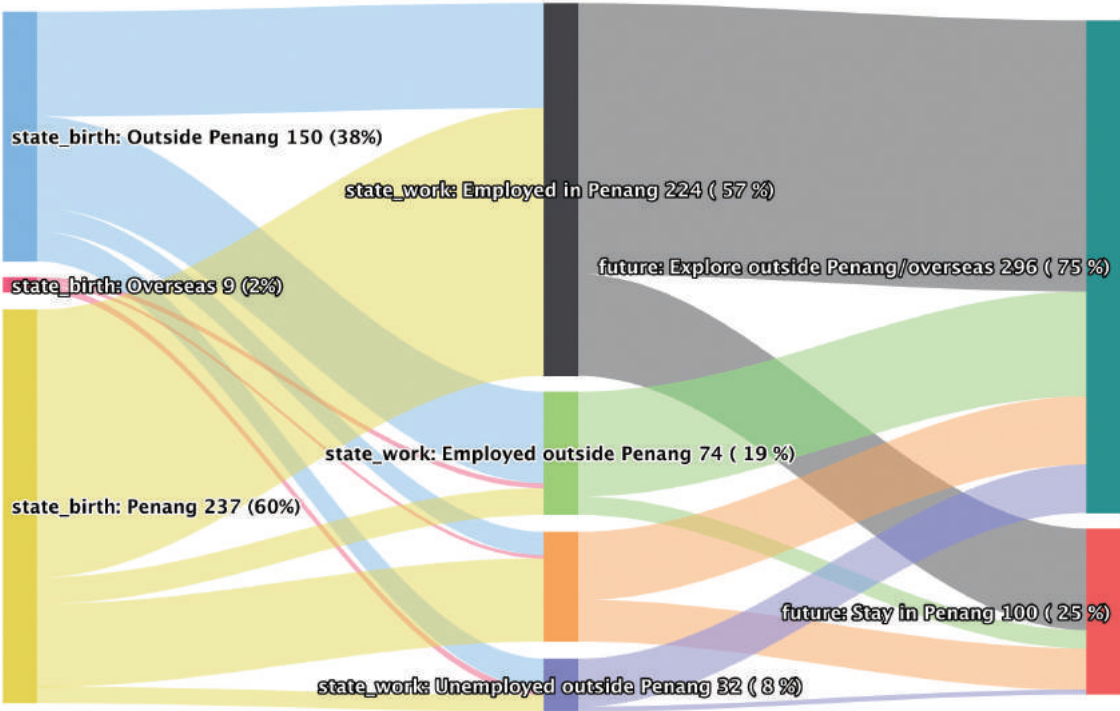


Figure E.3: Future job intention by the state of birth, by the state of study and by the state of work/residence

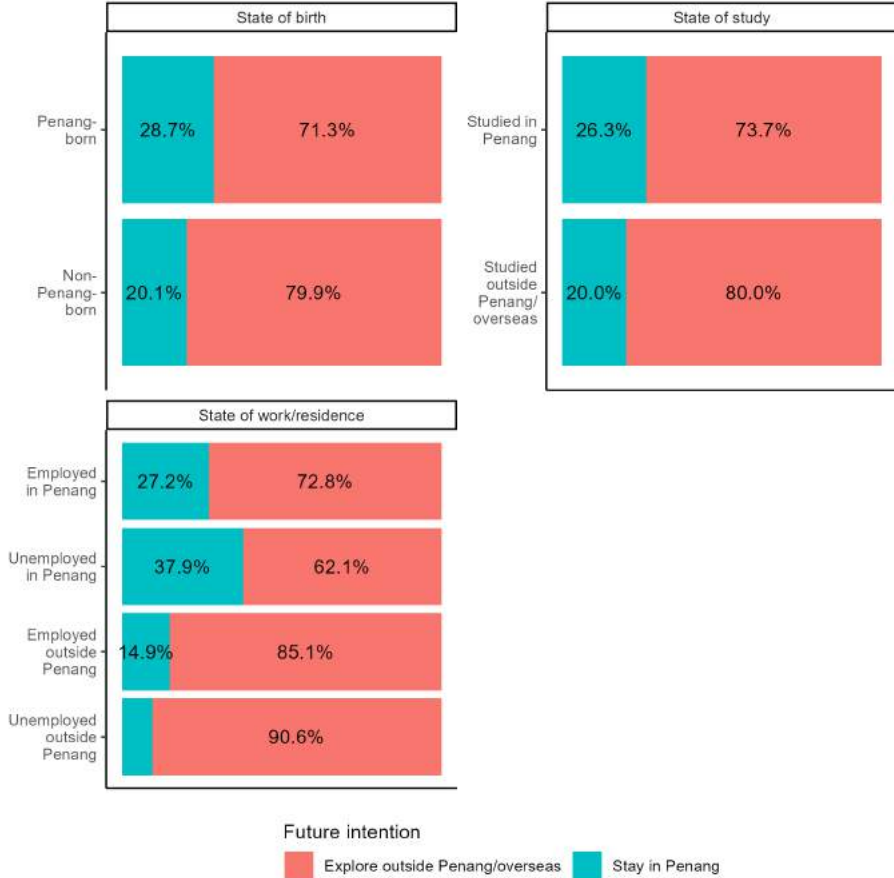


Table E.1: Characteristics of employed fresh graduates (selected cohorts) by birthplace, location of IHLs and workplace

Non-Penang-born, studied in Penang, employed in Penang (n=54)		Non-Penang-born, studied in Penang, employed outside Penang (n=57)	
Field of study (FOS)			
1. STEM	34 (63.0%)	1. Non-STEM	38 (66.7%)
2. Non-STEM	20 (37.0%)	2. STEM	19 (33.3%)
Top 5 FOS:			
1. Engineering	23 (42.6%)	1. Accounting & Finance	14 (24.6%)
2. Accounting & Finance	9 (16.7%)	2. Engineering	12 (21.1%)
3. Arts	4 (7.4%)	3. Social Sciences	7 (12.3%)
4. Business & Administration	3 (5.6%)	4. Business & Administration	5 (8.8%)
5. Social Sciences	3 (5.6%)	5. Mass Communication	5 (8.8%)
6. Computer Science	3 (5.6%)		
7. Applied Sciences	3 (5.6%)		
Education level			
1. Bachelor's degree	39 (72.2%)	1. Bachelor's degree	45 (78.9%)
2. Master's degree	10 (18.5%)	2. Master's degree	8 (14.0%)
3. PhD and beyond	4 (7.4%)	3. PhD and beyond	3 (5.3%)
4. Certificate/Diploma	1 (1.9%)	4. Certificate/Diploma	1 (1.8%)

Table E.2: Characteristics of unemployed graduates (selected cohorts) by birthplace, location of IHLs and workplace

Studied in Penang, unemployed in Penang (n=46)			Studied outside Penang, unemployed in Penang (n=20)		
Field of Study (FOS)					
1. STEM	23 (50.0%)		1. Non-STEM	11 (55.0%)	
2. Non-STEM	23 (50.0%)		2. STEM	9 (45.0%)	
Top 5 FOS:					
1. Engineering	11 (23.9%)		1. Engineering	4 (20.0%)	
2. Business & Administration	6 (13.0%)		2. Arts	3 (15.0%)	
3. Accounting & Finance	5 (10.9%)		3. Medical, Dentistry & Pharmacy	2 (10.0%)	
4. Social Sciences	5 (10.9%)		4. Accounting & Finance	2 (10.0%)	
5. Applied Sciences	5 (10.9%)		5. Social Sciences	2 (10.0%)	
6. Pure Sciences	5 (10.9%)		6. Applied Sciences	2 (10.0%)	
Education level					
1. Bachelor’s degree	32 (69.6%)		1. Bachelor’s degree	11 (55.0%)	
2. Master’s degree	12 (26.1%)		2. Certificate/Diploma	4 (20.0%)	
3. PhD and beyond	2 (4.3%)		3. PhD and beyond	3 (15.0%)	
			4. Master’s degree	2 (10.0%)	
Reasons for unemployment					
Top 5 reasons:		Cited mainly by:	Top 3 reasons:		Cited mainly by:
1. I can’t find jobs that are relevant to my field of study.	19 (44.2%)	Social Sciences, Applied Sciences	1. I can’t find jobs that are relevant to my field of study.	12 (60.0%)	Social Sciences, Applied Science

2. I don't have skills required by the market.	12 (27.9%)	Social Sciences, Engineering	2. I have applied for jobs outside Penang, and currently awaiting for/in the process of interview.	7 (35.0%)	Arts
3. I have applied for jobs outside Penang, and currently awaiting for/in the process of interview.	9 (20.9%)	Business & Administration	3. I am underqualified for the jobs that I wanted to apply to.	5 (25.0%)	Engineering
4. I am underqualified for the jobs that I wanted to apply to.	8 (18.6%)	Engineering			
5. I cannot find a suitable job in Penang, and have to go to Singapore or Kuala Lumpur.	7 (16.3%)	Applied Sciences			
Expected salary (RM)					
Weighted mean		2,728			2,880
Mean expected salary by main FOS:					
Engineering		2,730	Engineering		2,450
Business & Administration		2,667	Arts		4,333
Applied Sciences		3,300	Medical, Dentistry & Pharmacy		5,000
Pure Sciences		2,650	Social Sciences		2,400
Accounting & Finance		2,625	Applied Sciences		2,350
Social Sciences		2,520	Accounting & Finance		2,000

Table E.3: Results of Mann-Whitney U-test for differences in agreement rating between employment status

Statement	Employment status	Mean rating	Median rating	Std. dev.	Mann-Whitney
I intend to develop my skills in my current career in Penang before considering other opportunities outside Penang.	Employed	3.77	4	1.01	W=12596, p=0.295
	Unemployed	3.88	4	1.01	
The job outlook of my industry in Penang is vibrant and dynamic.	Employed	3.68	4	1.02	W=19016, p=0.006**
	Unemployed	3.39	3	1.01	
Penang has provided sufficient high-qualified job opportunities in general.	Employed	3.34	3	1.04	W=20343, p<0.001**
	Unemployed	2.86	3	1.09	
The development in Batu Kawan has provided more job opportunities that are relevant to my skills.	Employed	3.32	3	0.97	W=17802, p<0.001**
	Unemployed	2.86	3	1.04	
I like to stay close to my family, and am willing to forgo better career opportunities outside Penang.	Employed	3.30	3	1.19	W=14674, p=0.766
	Unemployed	3.34	3	1.19	
I am satisfied with the salary growth in Penang's labour market in general.	Employed	2.96	3	1.09	W=16711, p=0.335
	Unemployed	2.83	3	1.19	

Note: ** and * refer to the level of significance at 5% and 10%, respectively.

Table E.4: Results of Mann-Whitney U-test for differences in agreement rating between future intention

Statement	Employment status	Mean rating	Median rating	Std. dev.	Mann-Whitney
I intend to develop my skills in my current career in Penang before considering other opportunities outside Penang.	To explore outside Penang	3.73	4	1.02	W=11468, p=0.020**
	No intention	3.99	4	0.96	
The job outlook of my industry in Penang is vibrant and dynamic.	To explore outside Penang	3.57	4	1.01	W=15086, p=0.353
	No intention	3.67	4	1.07	
Penang has provided sufficient high-qualified job opportunities in general.	To explore outside Penang	3.20	3	1.07	W=15366, p=0.684
	No intention	3.23	3	1.09	
The development in Batu Kawan has provided more job opportunities that are relevant to my skills.	To explore outside Penang	3.20	3	1.01	W=13869, p=0.682
	No intention	3.15	3	0.99	
I like to stay close to my family, and am willing to forgo better career opportunities outside Penang.	To explore outside Penang	3.13	3	1.20	W=9544, p<0.001**
	No intention	3.83	4	1.01	
I am satisfied with the salary growth in Penang's labour market in general.	To explore outside Penang	2.87	3	1.11	W=13671, p=0.090*
	No intention	3.08	3	1.15	

Note: ** and * refer to the level of significance at 5% and 10%, respectively.

Figure E.4: Percentage share of respondents (n=418) by agreement level to statements related to career and industry outlook

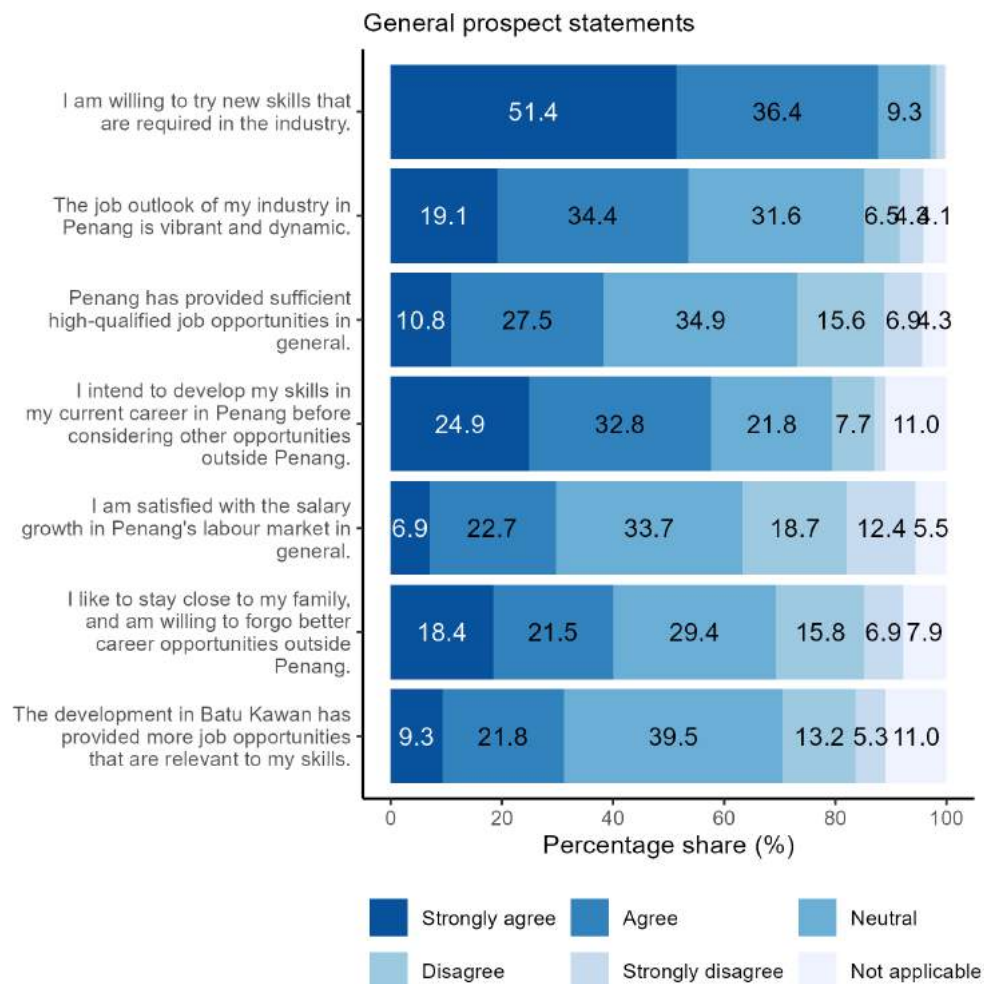


Table E.5: Available career services information on the website of selected universities

Type of information	Universiti Sains Malaysia (USM)	Multimedia University (MMU)	Taylor's university	National University of Singapore (NUS)
Services and support	<p>The USM HEBAT Development Centre (HDC) provides programmes comprising four agendas. These comprise: -</p> <ol style="list-style-type: none"> Student competency; Culture & volunteerism; Entrepreneurship; Career & graduate marketability. Past e- competency training programmes are available with instructors from various industries and faculty members. The blueprint for Career Development Model is shared on the website, and goals are targeted from the first year of learning in the university. 	<p>The MMU Career Connect provides job searchable functions, career planning, development and opportunities to all students. Top employers are also being featured on its webpage. A customised dashboard is available for candidates and employers. Employers who subscribed to it have access to candidate listing and are able to post new jobs. Likewise, candidates also have their own dashboard where they are able to find jobs, access career kits and employer listings.</p>	<p>Taylor's Career Services Centre provides information on preparatory steps to enhance employability for students from the first year to graduating year. Student Employability Enhancement & Development System (Seeds) is Taylor's One- Stop Career Portal, a fully automated and interactive system for real-time internship and employment management for students and employers. This includes: -</p> <ol style="list-style-type: none"> Employers' promotion for brand awareness, unlimited job ads and talent search; Career library, job and internship opportunities for students and resume template; Career services contact details for employer and industry collaboration and students on graduate employability and internship management; Personalised account access for students, employers and staff. 	<p>The NUS Centre for Future-ready Graduates (CFG) supports NUS students to be career-ready throughout their journey with the university. CFG programmes cover all aspects supporting students and alumni from building foundational career skills to career booster and career advancement with detailed programmes and direct registration through its webpage. Live chat function is available to assist students, alumni, employers and staff in any career and training related matters. Personalised career advisory services are also made available for booking online to meet with the certified CFG for career advice and coaching. A digital career resource library is available for career tips.</p>

Internship and employment	Job advertisements are available in poster format with details on various job types, positions and requirements.	A job searchable website is available for the latest job vacancies along with job titles, location and estimated salary range through an interactive webpage of Career Connect. This includes internship opportunities.	Local and overseas Internship opportunities are available on the webpage. The list of career partners from various industries is accessible. Other roles include: - a. Engaging with internship providers, graduate employers, expert speakers, field trip hosts, workshop facilitators; b. Encouraging collaboration/ partnership for signature events; and c. Promoting sponsorship for the career resource centre.	CFG has access to jobs and internships for students and alumni. They also facilitate effective recruitment strategies with employer partners through recruitment talks and networking sessions.
Website link	https://hdc.usm.my/	https://careerconnect.mmu.edu.my/	https://university.taylors.edu.my/en/campus-life/student-support/career-services-centre.html	https://nus.edu.sg/cfg/about

