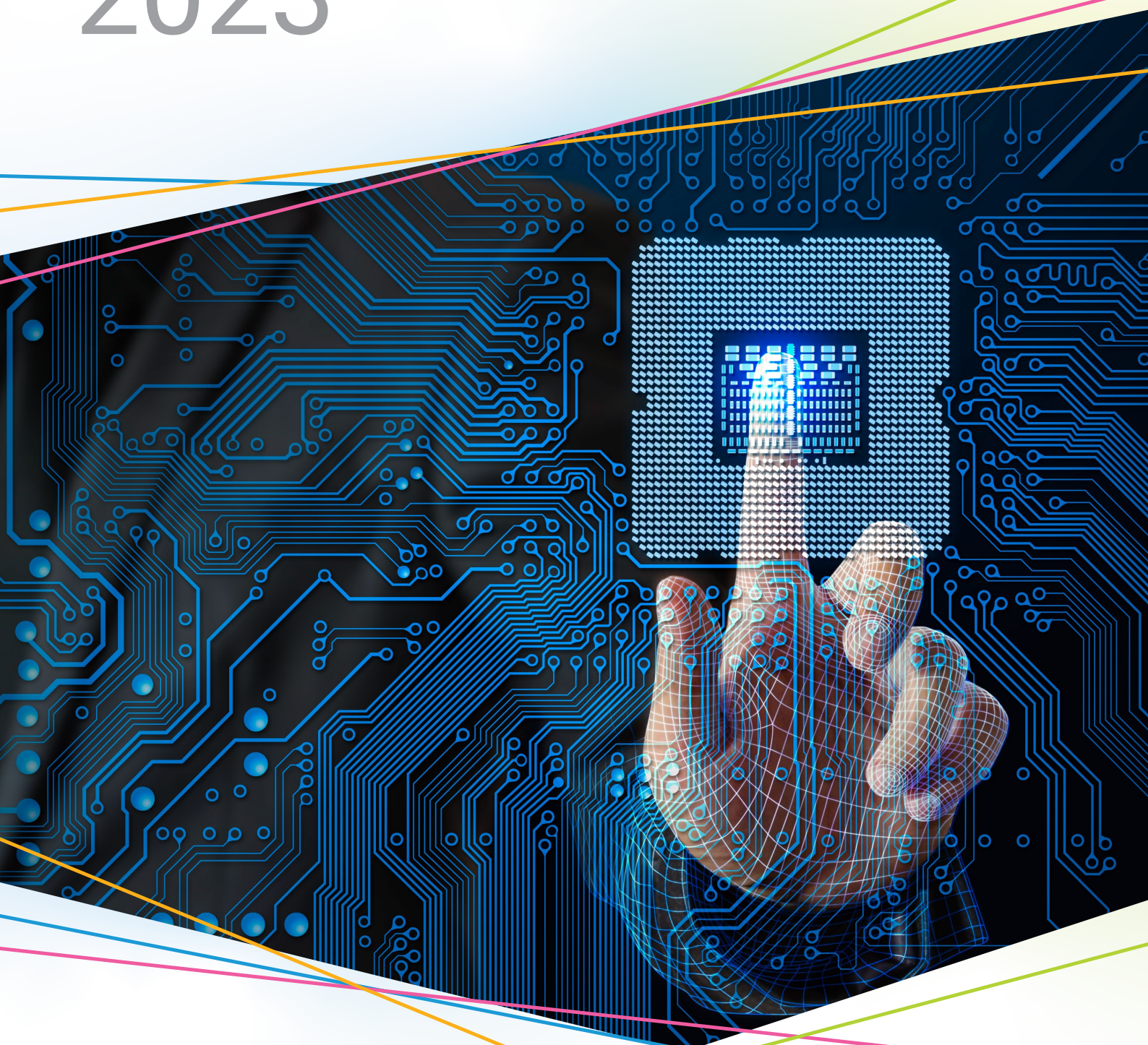
Electronics and Telecommunications Training Board

Manpower Update Report

Electronics and Telecommunications Industries

2023



ACKNOWLEDGEMENT

The Electronics and Telecommunications Training Board (ECTB) would like to express its gratitude to the members of the focus groups for their valuable time and insights on the manpower situation in the Electronics and Telecommunications Industries. Special thanks go to the CPJobs and CTgoodjobs which shared with us their database of job vacancies. The views of focus group members and information from major recruitment websites formed an integral part of this report.

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Introduction

Background

The Electronics and Telecommunications Training Board (ECTB) of the Vocational Training Council (VTC) is appointed by the Government of the HKSAR. According to its Terms of Reference, the ECTB is responsible for determining manpower demand of the industry, assessing whether the manpower supply matches manpower demand, and recommending to the VTC the development of vocational and professional education and training (VPET) facilities to meet the assessed training needs.

A new approach for collecting manpower information is adopted to better reflect the dynamics of the manpower situation in the various industries. Under the new approach, one full manpower survey is conducted every four years, and this is supplemented by two

manpower updates. The ECTB completed its latest manpower survey in 2020. Two manpower updates was and will be conducted in 2023 and 2024 respectively.

The 2023 manpower information update comprises:

(a) two focus group meetings getting the views of industries experts on the latest developments in the industries, manpower and training needs, recruitment difficulties, and measures to tackle the challenges the industries face; and

(b) desk research analysing job advisements in the Electronics and Telecommunications (EC) industries.

Objectives

The objectives of the manpower update are:

(i) to examine the latest trends and developments of the industries;

(ii) to explore the job market situation and training needs;

(iii) to identify the recruitment challenges; and

(iv) to recommend measures to meet the training needs and to ease the problem of manpower shortage.

Methodology

Overview

This update report aims to provide qualitative descriptions of the recent development of the industry through focus group meeting, supplemented by making reference to some quantitative data of recruitment advertisements from desk research.

Focus Group Meeting

The focus group members are representatives from the sectors of the electronics and telecommunications industries, including Manufacturing, Trading and Services, Telecommunications Services, Wholesale, Design Houses and Relevant Departments in Universities and Government, and Retail for Electronics Products.

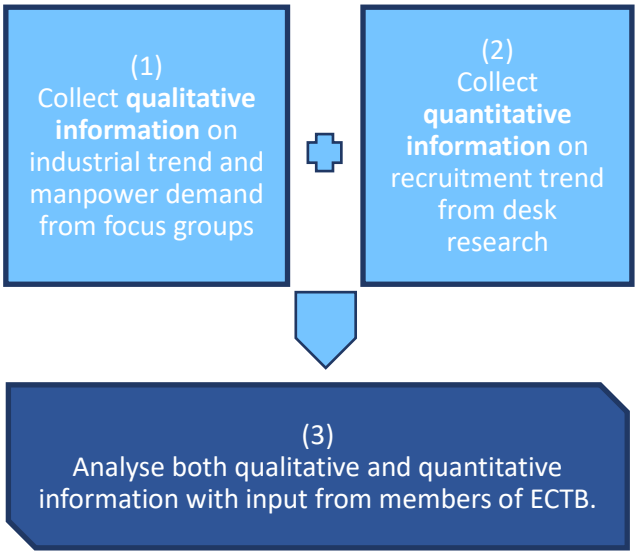
Two focus group meetings were conducted on 12 and 13 December 2022. The discussions were recorded and transcribed to facilitate analysis.

Desk Research

An information system was developed to capture relevant recruitment data from major online recruitment portals, covering the period between Quarter 4 of 2021 and Quarter 3 of 2022. Collected information was mapped against the list of companies related to the electronics and telecommunications industries under the Hong Kong Standard Industrial Classification devised by the Census and Statistics Department. After mapping and removal of duplicated records, a total of 14,165 recruitment records were collected during the research period and served as indicative information of the job market trend.

Data Analysis

The analysis consists of the following three steps:



Limitations

As this is not a full manpower survey, the findings and recommendations of the focus group meetings are more qualitative in nature and the report focuses mainly on the manpower trends. The information of job advertisements was collected from major recruitment websites and the Labour Department. Other channels, such as head hunting for managerial positions, were not covered. Since the data collected is a snapshot of a particular period without reference to any historical data, this can serve as reference information supplementary to the findings of focus group meetings.

Findings

Factors Affecting the Development of the Industry

Acceleration of Digital Transformation

Accelerating the application of new technologies

Over the past few years, the Government has been actively promoting the development of smart city and digital economy in Hong Kong. Digital transformation in businesses has been remarkably speeded up across industries. Many companies have strengthened their efforts in leveraging new digital tools and accelerated the application of digital technologies, such as 5G, big data, artificial intelligence, cloud computing and blockchain, in their operations, products and services.

The focus group stated that accelerating digital transformation in businesses was rather important for the post-epidemic recovery of electronics and telecommunications industries. This would be one of the key factors allowing companies to enhance competitiveness and explore new business opportunities under the challenging global business environment.

Digitalising the daily operations of business

Companies have speeded up the digitalisation of their day-to-day operations and services to improve the efficiency and accuracy of internal work processes. Adopting IoT solutions and process automation to certain business operations would partially relief the pressure of manpower shortage. Real-time data could also be captured and analysed for better monitoring and rapid reaction on relevant processes and services.

New business opportunities with digital transformation

Digital transformation was also reflected on the new development of smart services and products for the clients. In the light of the increasing clients' requests on data analytics services, tailor-designed AI and IoT solutions, etc., some telecommunications companies have expanded their core business "from telcos to techcos" (i.e. from a telecoms operator to a technology company). The new business model would facilitate the digital transformation of other industries as well as create new business opportunities and values of the services of the electronics and telecommunications industries.

Digital platforms launched by the Government

The Government also built up various digital platforms to facilitate the implementation of smart city development. The focus group highlighted an example of the E&M InnoPortal launched by the Electrical and Mechanical Services Department which facilitated collaboration between various Government departments, public organisations and the Innovative & Technology (I&T) sector through applying innovative technologies to tackle the electrical and mechanical engineering challenges.

Demand for multi-skilled technical staff

Given the new development of smart products and systems involving a combination of several fast-evolving innovative technologies such as Smart Robots, AI, 5G and Big Data, the focus group highlighted the need of multi-skilled technical staff who possess with broad knowledge and skills in various emerging and traditional technologies. Taking Telecommunication Engineers as an example, they were expected to concurrently manage devices and systems using well-established 3G and 4G networks as well as support the development of new applications with the 5G / 6G technologies.

Emerging technologies

The focus group highlighted that some emerging technologies, such as AI, Blockchain, Metaverse, Cyber Security, Microelectronics, Quantum Computing and Aerospace Engineering, possessed extensive opportunities for development and would require further efforts on nurturing talents to support their development in Hong Kong. The extensive application of BIM technology, i.e. Building Information Modelling, in the construction industry has also raised demand for talents with electronics background to support its application development, such as BIM for asset management.

Changes in Business Environment

Challenging Global Conditions

By the reasons of geopolitical tensions, China-US trade disputes, sharp interest rate hikes, etc., the global business environment was still challenging and stayed weak in the fourth quarter of 2022 and the first quarter of 2023. Despite the economy improvement of Mainland along with the fading of pandemic, the focus group reflected that the market sentiment for electronics industry remained conservative and cautious.

The focus group also believed that the China-US trade disputes would continue to impose uncertainties to the recovery of the electronics industry. The disruption of global supply chain remained a critical issue, while the industry needed to remain vigilant in supply chain management. Building completed and secured supply chains would be rather important for manufacturers who had factory plants located in Mainland or Southeast Asia to minimise the potential geopolitical risks in the future.

Impact of vast Mainland Market

Owing to the vast Mainland market which was highly competitive, the focus group highlighted that online sales and social media marketing have gained importance in Mainland market in recent years. Businesses such as retailers and brand owners were steadily adopting the mode of O2O, i.e. Online to Offline, which both online shops / social media and physical retail shop were managed at the same time for the all-round customer services, sales and marketing. The movement has brought remarkable raise of turnover but resulted in increasing pressures in business operations and staffing.

Populations and Labour Force

Outflow of talents

The emigration waves in recent years have resulted in a reduction of experienced and skilled technical professionals, as well as middle management. In this connection, the Government has formulated different admission schemes to engage Mainland and overseas talents from various backgrounds and professional to come and settle in Hong Kong.

Demand for new entrants to the Industry

The number of local graduates from the electronics and computer related studies could not fulfill the huge manpower demand of the electronics and telecommunications industries. Some companies introduced training schemes and referral programmes to encourage graduates from non-engineering or IT backgrounds to join the industries.

Remote working model

More companies embraced remote working model to allow flexibility, attract more talents, uplift the productivity, as well as reduce the operating expenses of their businesses. Overseas talents and emigrated staff could be engaged to serve the company by remote working from overseas under this work model. Some companies highlighted the offer of remote working arrangement in the recruitment advertisements to attract more potential applicants. The focus group echoed that the practice was found more popular and practicable to certain project-based work, such as Mobile App Development, Programming, UI / UX Design, which required less involvement of on-site equipment / machinery, hardware testing and support of office setting. However, the practice might be an obstacle to team bonding and might require additional effort on work coordination and project management.

Policy

Promotion of STEAM education in primary and secondary levels

The Government has stepped up the promotion of innovation and technologies, as well as STEAM education in primary and secondary schools levels, which build a positive perception of the electronics and telecommunication industries and the relevant technologies among the community. The focus group emphasised that the Government's promotion initiatives would be one of the key factors in attracting more potential students to pursue studies in the related fields.

Regulations on new technology

The Government published the second edition of Smart City Blueprint for Hong Kong (Blueprint 2.0) in 2020 to enhance and expand existing city management measures and services with different digital infrastructure projects and major initiatives under six smart areas.

The focus group pointed out that it was essential for the Government to gradually lay down regulatory framework and guidelines to broaden and publicise the applications of new technologies. The stepped-up preparatory work for a new licensing regime for virtual asset service providers, as well as the development of Web 3.0 would serve as examples.

Manpower Demand

Focus Group

With reference to the trends and development of the industry, views of the focus group on the anticipated changes in manpower demand were collected. Job positions in high demand related to compliance, new technologies and new areas of applications were identified as follows:

- Network / Telecommunication Engineers
- Mobile App Developers
- User Interface and Application Designers
- Backend Programmers
- AI Engineers
- Data Scientists / Modelling Analysts
- Blockchain / Smart Contract Engineers
- IoT Solution Architects
- Metaverse Managers
- Application Developers for BIM

Desk Research

Out of the relevant recruitment advertisements captured in desk research, the top five principal jobs with the highest number of recruitment advertisements were identified:

1	System Analyst / Software Engineer / AI Engineer / UX Designer	41.31%
2	Programmer / Software Technician	16.87%
3	Sales Technician	11.47%
4	Electronics / Computer / Telecommunications Engineer	7.96%
5	Web Developer / Computer Game Designer	7.86%

Details of the number of vacancy advertisements of popular recruitment media by job levels and principal job are at Appendix I.

Training Needs

Focus Group

The following are the corresponding training needs identified from the focus group members:

<u>Technical skills</u>

- Electronics Fundamentals
- Blockchain and smart contract engineering
- Data analytics / modelling

<u>Soft skills</u>

- Design thinking
- Problem-solving skills
- Project management
- Self-Learning Ability

Technical skills

- User experience / user interface design
- IoT integration / applications
- Digital signal processing
- Cyber security
- Programming

Soft skills

- Technical communication skills
- Interpersonal and communication skills
- Leadership / Supervisory Skills

Desk Research

In addition, the advanced / emerging skills and related job titles identified from the advertisements are summarised in the following table.

Advanced Technology	Related Job Titles	Emerging Skills
Cyber Security	Cyber Security Analyst	Information Security Management / Security Architect
Cloud Technologies	Cloud Engineer Cloud Solution Architect	Cloud Technologies and Platforms
DevOps	DevOps Engineer	DevOps Tools and Practices
Robotic	Electronics Engineer (Robotics) Automation / Robotics System Engineer	Robotic Programming / Robotic Hardware and Control
AI	AI Software Developer AI Algorithm Engineer	Machine Learning algorithms / AI frameworks
Quantum Computing	Quantum Control Software Developer	Quantum Error Correction / Quantum Control Tools
IoT	IoT Solution Architect	IoT Embedded System
XR	XR Application Developer	Multimedia Frameworks / Developing Environment & Tools
Big Data	Data Scientist / Engineer	Data Modelling & Analytic Tools

It is anticipated that those new emerging skills are required by the employers to develop new products/ services to meet the requirement of existing and potential customers. In this connection, the related professionals who possess those skills are in demand in the industry.

Recruitment Challenges

Due to the keen competition of the market, some employers have experienced difficulties in the recruitment process. The difficulties are summarised and related to some of the following factors:

Reduced Fresh Graduates

Given the reduced student population, the number of fresh graduates from electronics and telecommunications related programmes was not sufficient and those joining the industry has further decreased.

Ageing Workforce

Along with the ageing population, the overall workforce of the labour market was expected to decline, which compounded by the insufficient new entrants to fill the vacancies of ageing workers going into retirement.

Emigration

Middle management, professionals, experienced and skilled workers made up a significant proportion of emigrants in the recent emigration wave. There was a shortage of experienced professionals to fill the vacancies at middle to senior levels.

Talent Leakage

On account of the wide integration of I&T technologies in electronics and telecommunications industries, the job scope of practitioners has expanded. Incumbents were expected to equip and stay abreast of new technology skillsets and knowledge to meet the work requirements. The high expectations put pressure on incumbents and led to hesitation to retain in the industry.

Salary and Remuneration Packages

The young generation was more inclined to work in other sectors, such as financial sector, which offer more competitive salaries and remuneration packages, resulting in lack of interest in seeking career in the engineering services sector.

Preference for Remote Working

Amidst the pandemic, the young generation has got adopted to online learning. Some of them preferred to work for companies which offer remote or hybrid work arrangement.

RECOMMENDATIONS

To meet the future development of the industry, it is considered essential for the Government, education institutions and employers to provide suitable training opportunities and supports to the employees and students in the following areas:

Government

Improve subsidies schemes for continuing learning

The Government has launched various subsidies schemes to support the continuing learning of in-service practitioners, such as the Continuing Education Fund. The Government should review and increase subsidies amount to employees on continuing learning, as well as simplify the application procedures to give incentive to in-service practitioners for upskilling.

Introduce regulations on Smart City Blueprint for Hong Kong

Further to the launch of Smart City Blueprint for Hong Kong, the Government should introduce regulatory framework and standards on the implementation to foster the efficient adoption of new technologies.

Encourage mentorship programmes

With the purpose to arouse interest of young generation in the particular industries, the Government could introduce incentives to encourage industry-based mentorship programmes for students to receive the early exposure to the workplace environment and advices on career prospects of the industries.

Education Institutions

Enhance promotion of the profession

The education institutions should enhance the promotion of their education programmes to the secondary school students by highlighting the professional recognitions and the bright career prospects in different sectors of the electronics and telecommunications industries. The path for acquiring professional chartership status, as well as various skill-based professional certifications, could be explicitly illustrated.

Experts and young professionals of the industries could be invited to join the promotion campaigns to interact with students, as well as to

demonstrate their achievements and successful stories. It would heighten the interest of young generation in joining the industry and to raise the affinity among industry professionals.

Provide long-term workplace trainings

The education institutions could partner with the industry to develop education programmes integrated with structured workplace trainings, such as credit-bearing internship programme with longer duration, to enrich students' exposure and better prepare them to join the industry after graduation.

Provide in-service training courses for upskilling

To allow flexibility and provide speedy response to the training needs of the industries, the education institutions should offer more in-service training courses on latest technologies to allow the practitioners to upskill and acquire new skillsets, as well as quickly fill the gaps in their professional knowledge. Industry experts should be engaged to share the knowledge and skills of the latest technologies.

Develop structured in-demand training progrmames

In the long run, the education institutions should strengthen collaboration with the industry for the timely development of structured training programmes or update of existing curriculum for the emerging technologies, such as cyber security, data analytics and AI application, to cater for the manpower demand of the EC industries.

Offer training programmes in microelectronics

Considering the keen demand for talents in microelectronics, the education institutions were advised to offer a variety of training programmes to nurture relevant talents at different positions, including technical professionals, engineers and supporting staff, to support the rapid development of the industries in Hong Kong.

Provide life-long learning courses in cyber security

In view of the ageing population and the concerns on elderly suffering from internet fraud, the education institutions could offer life-long learning courses in cyber security to train up students who could educate elderly on online threats and raise their awareness on cyber security.

Nurture students' ability on design thinking and self-learning

Riding on the strengthening Government's promotion of STEAM education in primary and secondary schools, the education institutions were advised to further put a focus on nurturing students' design thinking and self-learning abilities to foster innovative solutions which apply ever-evolving technologies to tackle problems of various engineering and IT projects.

Employers

Provide clear career prospect

The employers should consider to figure out a clear career path and promotion ladder to new entrants. Structured progression pathways and career prospects would give a better understanding of the future opportunities of the industry and arouse interest of young generation to join.

Provide on-the-job trainings

The employers should encourage their staff to keep abreast of latest development of new technologies and provide adequate specialised on-the-job trainings for upskilling. For certain specialised training reaching the industry or professional standards, employers might consider to apply for recognition of their training and the staff trained from relevant professional bodies.

Encourage staff development

The employers could provide incentives to support staff development including the acquisition of various skill-based certifications of IT professionals, such as Certified Information Systems Security Professional (CISSP), as well as the possession of chartership from relevant professional institutions.

Engage potential new entrants

The employers are encouraged to collaborate with the education institutions to jointly promote the industry and engage potential new entrants from secondary schools and higher education institutions through visits, competitions, career talks and internship programmes. Winners of relevant competitions could be further engaged and nurtured through mentorship programmes offered by employers for their future development in the industries.

Offer structured internship programme

To enrich students' understanding about the industries and familiarity of their culture, the employers should offer structured internship programmes for undergraduate students with designated assignment, such as a project role.

Increase salary range

Salary is identified as one of the critical factors for attracting new entrants to join the industry. Owing to recruitment difficulties, the employers should consider to offer a higher salary to attract new entrants.

Employees

Proactive to learn

To stay competitiveness, employees should be proactive to keep abreast of the latest development and applications of new technologies.

Appendix I

Number of Advertisements from Popular Recruitment Media (Q4 2021 to Q3 2022) by Principal Jobs

Job Level	Principal Job	Total	%
Technologist	Electronics / Computer / Telecommunications Engineer	1,127	7.96%
	Electrical Engineer	148	1.04%
	Mechanical Engineer	203	1.43%
	Manufacturing / Quality Assurance Engineer	311	2.20%
	Chemical Engineer	8	0.06%
	Product / Graphic Designer	553	3.90%
	System Analyst / Software Engineer / AI Engineer / UX Designer	5,852	41.31%
Technician	Electronics / Telecommunications Technician	513	3.62%
	Mechanical Technician	17	0.12%
	Draughtsman	40	0.28%
	Manufacturing / Quality Assurance Technician	23	0.16%
	Supervisor / Foreman / Leader	13	0.09%
	Programmer / Software Technician	2,390	16.87%
	Web Developer / Computer Game Designer	1,113	7.86%
	Sales Technician	1,625	11.47%
Craftsman	High Speed Data Network & Wireless Data System Integrator / Cable Joiner	--	0.00%
	Electronics Craftsman	37	0.26%
	Electrician	85	0.60%
	Mechanic	72	0.51%
Operative	Operator / General Worker	35	0.25%
	Total	14,165	100.00%