



# Manpower Update Report

## Electronics and Telecommunications Industries

# 2024



# **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 the manpower demand of the industries, 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

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conducted every four years, and this is supplemented by two manpower updates. The ECTB completed its latest manpower survey in 2020. One manpower update was conducted in 2023 while another one will be conducted in 2024.

The 2024 manpower information update comprises:

(a) two focus group meetings to get 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 advertisements including job market trends and skills required in the Electronics and Telecommunications (EC) industries.

## Objectives

The objectives of the manpower update are:

- (i) to examine the latest trends and developments in 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 industries through focus group meetings, supplemented by referring 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 1. Manufacturing, 2. Telecommunications Services, 3. IT Services for EC Industries, 4. Engineering Services for EC Industries, 5. Electronics Trading or Wholesale or Retail, 6. Startup in Electronic Product Design, 7. Emerging Technology Companies about Robotics / AI / IoT / Big Data, 8. Relevant Department in University, and 9. the Electrical and Mechanical Services Department.

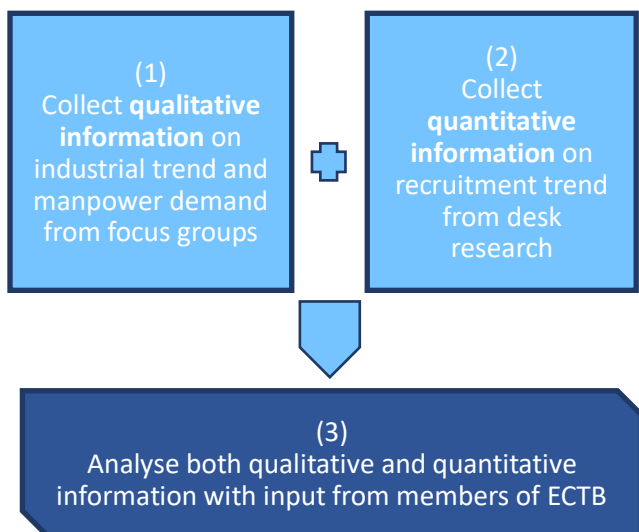
Two focus group meetings were conducted on 14 and 18 December 2023 with discussion on topics selected by the Working Party on Manpower Survey of the ECTB. The discussions were recorded and transcribed to facilitate analysis.

## Desk Research

Manpower information covering the period between January and December 2023 was collected through desk research. An information system was developed to capture relevant recruitment data from major online recruitment portals. Collected information was mapped against the list of companies related to the EC 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 around 11,000 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 and the report focuses mainly on the manpower trends. The information on job advertisements was collected from major recruitment websites and the Labour Department. Other channels, such as headhunting 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.



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# Findings

## Factors Affecting the Development of the Industries

### *Resumption of Normal Travel between Hong Kong and Mainland*

In early 2023, the normal travel between Hong Kong and the Mainland was fully resumed after the implementation of travel restrictions during the COVID pandemic. The convenient transportation and the newly introduced “Northbound Travel for Hong Kong Vehicles” scheme fostered the northbound travel and consumption of Hong Kong residents, particularly during weekends. The focus group observed a reduction in people visiting shopping malls and shopping on the street in Hong Kong subsequent to the increased northbound travel and the significant drop in the sales of electronics products which hit the retail and wholesale sectors of the local EC industries. The focus group highlighted that some retail stores laid off front-line sales persons to reduce expenses.

### *Launching of Telecommunications E-service Platforms*

Online shopping and digital payment have been growing behaviour, and the trend was accelerated by the pandemic lockdowns in recent years. Some telecommunications services companies launched e-service platforms which enable online services as well as the

purchase and renewal of mobile service plans to cater for the growing demand for convenience. The focus group observed that the telecommunications services sector has migrated towards digitalisation.

### *Immense Potential of Artificial Intelligence (AI) and Big Data*

AI and big data analytics technologies have driven the digital transformation of businesses as well as creating new business opportunities, and services and improving the business operational efficiency and effectiveness. The focus group emphasised that AI was a tool with immense potential and its applications were not to substitute existing processes but to explore new business opportunities and create new job positions. Big data would contribute to business operations enhancement, especially for e-commerce, through data-driven analysis and forecasting. Its applications could extend to provide data analytics services and solutions to other sectors and industries.

With the growing adoption of data-driven technologies, the Government has developed the “Ethical AI Framework” for general reference by organisations when planning, designing and implementing AI and big data analytics in their projects and services.

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### *Increasing Concerns of Cybersecurity*

The focus group highlighted that the application of technologies has been widened to relieve the pressure of front-line staff recruitment. For example, the security services companies which encountered difficulties in recruiting security guards have started adopting IoT CCTV cameras and video analytics for real-time security monitoring to reduce the manpower required for patrolling. However, the applications have brought up concerns about the potential cybersecurity threat. The recent incidents of hacker intrusions into the network and computer systems of public organisations have revealed the growing cybersecurity threats. The focus group iterated that special attention should be given to cybersecurity using enhancing the security of networks, protecting data, and preventing potential cyber-attacks under the broad adoption of technologies.

### *Challenging Global Conditions*

Along with the continued geopolitical tensions and China-US trade disputes, the focus group pointed out that some manufacturers were requested by their foreign clients to relocate their production sites and processes to southeast Asia. The manufacturers have hence opened up new factories in other regions / countries, such as Vietnam and Malaysia, for the production of exported products, while the factories in the Mainland continue the production of goods supplying the local markets. It was

known as the “China-for-China” approach. Vice versa, some manufacturers were trying to use components from other countries/regions that would not be affected by the US export restrictions.

In addition, the tensions have led to restricted access to certain advanced technologies in Hong Kong, such as AI tools and quantum computing which hindered the development of industries.

### *Disruption of Global Supply Chain*

The disruption of the global supply chain remained a critical issue. The focus group highlighted that the supply of some critical components, such as semi-conductors and chipsets, is still not stable and has hindered the manufacturing and delivery of electronics products. The delivery of products usually suffers from prolonged lead time.

### *Outsourcing Business Operations*

The focus group reflected that an increasing number of local companies have outsourced parts of their business operations due to the challenges of local recruitment, such as research and development (R&D), quality control and testing, software development and early-stage hardware design, to Mainland and other regions / countries, such as Taiwan and Malaysia. However, operational outsourcing was not practicable for those customer-oriented services.



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### *Enhanced Talents Admission Schemes*

To attract more non-local talents to come and meet Hong Kong's development needs, the Talent List applicable for various talent admission schemes, such as the Top Talent Pass Scheme (TTPS), has expanded its coverage, in which AI specialists, data scientists and cybersecurity specialists were included under the "innovation and technology" segment. The Technology Talent Admission Scheme (TechTAS) enabled the admission of non-local technology talents to undertake R&D works in areas such as microelectronics, robotics, data analytics, AI and IoT in Hong Kong. In addition, the Immigration Arrangements for Non-local Graduates (IANG) and the newly introduced Vocational Professionals Admission Scheme (VPAS) aimed to attract university graduates and vocational and technical talents to stay and work in Hong Kong.

### *Boosted Development of New Industrialisation*

As announced in "The Chief Executive's 2023 Policy Address", the New Industrialisation Development Office would be established to promote new industrialisation in Hong Kong and assist the manufacturing sector in upgrading and transformation by making use of innovation and technology (I&T) and support the growth of start-ups. A \$10 billion New Industrialisation Acceleration Scheme would be set up to provide funding assistance for enterprises in

fields such as AI and data science, advanced manufacturing, life and health technologies and new energy technologies. The initiatives would provide resources and support to the I&T development and the development of EC industries.

### *Thriving Start-up Ecosystem in Hong Kong*

Start-ups in Hong Kong continued to flourish. The number of start-ups has reached a record high in 2023. The Government launched various schemes under the Innovation and Technology Fund to support technology start-ups in transforming and commercialising R&D outcomes, such as the Research, Academic and Industry Sectors One-plus Scheme (RAISe+ Scheme) and the third InnoHK cluster. A variety of start-up incubation programmes and I&T competitions, such as the HKSTP Ideation Programme, the City I&T Grand Challenge, the Hong Kong Techathon, Cyberport Creative Micro Fund, the IET Young Professionals Exhibition & Competition, and Hong Kong ICT Awards, launched in recent years to encourage innovations and entrepreneurial culture among young generations and foster the growth of start-up ecosystem in Hong Kong.

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### *Persisting Manpower Demand for Maintaining Conventional Systems*

Digital transformation has been remarkably speeded up across industries, while the manpower demand for maintaining conventional systems persisted. The focus group iterated that the comprehensive understanding of both fundamental electronics engineering and emerging technologies was equally essential for carrying out maintenance or enhancement of conventional electronic devices and systems, such as radio network systems.

### *Enhanced Employee Retention Strategies*

The focus group highlighted the enhanced employee retention strategies implemented in their companies, such as salary increments, the introduction of “birthday leave” and “well-being leave”, as well as the implementation of flexible working hours and work-from-home arrangements to promote stronger employee engagement.

Furthermore, on account of the significant emigration of experienced and skilled technical professionals and middle management, some international companies put on an internal transfer strategy by engaging emigrated staff in overseas branches to reduce talent loss.

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# Manpower Demand

## Focus Group

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Considering the trends and development of the industries, views of the focus group on the anticipated changes in manpower demand were collected.

Relevant job titles highlighted by the focus group were as follows:

- Electronics Engineer
- Data Analyst / Scientist
- Information Security Specialist
- Programmer
- Product Designer
- Sales Technicians
- Telecommunications Technicians
- Testing and Certification Engineer

In addition, the focus group highlighted the severe demands for middle management who have possessed 5 to 10 years of work experience and supervisory skills for leading and training junior staff.

## Desk Research

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

|    |  |       |
|----|--|-------|
| 1  | System Analyst / Engineer                        | 23.9% |
| 2  | Software Engineer / Developer                    | 12.0% |
| 3  | Electronics Sales / Support / Service Engineer   | 10.0% |
| 4  | Programmer; Software Technician                  | 8.6%  |
| 5  | Electronics Engineer; Computer Engineer          | 7.2%  |
| 6  | Telecommunications Engineer                      | 5.8%  |
| 7  | Data Engineer; Data Analyst; Data Scientist      | 3.4%  |
| 8  | Electronics Technician                           | 3.4%  |
| 9  | Web Developer / Designer; Computer Game Designer | 2.9%  |
| 10 | Product Designer; Packaging / Graphic Designer   | 2.8%  |

# Training Needs

## Focus Group

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

### Technical skills

- Electronics Fundamentals
- Artificial Intelligent
- Data Science / Analytic
- Cybersecurity
- Environmental, Social and Governance (ESG)
- Aerospace Engineering

### Soft skills

- Design Thinking
- Business Mindset
- Creative Thinking
- Problem-solving Skills
- Supervisory Skills
- Global perspective
- Ethical Awareness of Technology

## 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   |
|---------------------|--|---|
| Cybersecurity       | <ul style="list-style-type: none"> <li>• Network Engineer</li> <li>• System &amp; Infrastructure Manager</li> </ul>                                | Cyber & Information Security Management / Control               |
| Cloud Computing     | <ul style="list-style-type: none"> <li>• Cloud Engineer</li> <li>• Cloud Solution Architect</li> </ul>   | Cloud Technologies  |
| Robotic             | <ul style="list-style-type: none"> <li>• Software Engineer (Robotic)</li> <li>• Robotic Engineer</li> <li>• Service Engineer (Robotics)</li> </ul> | Robotic Programming / Solutions<br>Robotic Hardware and Control |
| AI                  | <ul style="list-style-type: none"> <li>• AI Engineer</li> <li>• AI Software Developer</li> <li>• Machine Learning Engineer</li> </ul>              | Machine Learning Algorithms<br>AI Frameworks<br>Deep Learning   |
| IoT                 | <ul style="list-style-type: none"> <li>• IoT Solution Architect</li> </ul>   | IoT Embedded System / Firmware                                  |
| Big Data            | <ul style="list-style-type: none"> <li>• Data Scientist / Engineer</li> <li>• Data Analyst Programmer</li> <li>• Solution Architect</li> </ul>     | Data Modelling and Analytic                                     |

# Recruitment Challenges

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

## Reduced Workforce of Local Manpower Market

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The persistently low birth rate and an ageing population have reduced the overall workforce of the local manpower market. The focus group highlighted the phenomenon that companies competed for talents with electronics backgrounds among various sectors, and even across other industries.

limited junior staff with appropriate competency and sufficient experience to fill the vacancies at middle to senior levels resulting in succession gaps of talents in the industries. In tandem with the increasing number of practitioners reaching retirement age, the succession gap was further widened particularly for the middle management level.

## Reduced Sub-degree Graduates

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The focus group pointed out the prominent trend of Hong Kong students pursuing further studies at degree or above levels, instead of seeking employment, after the completion of sub-degree studies. A manpower gap was found in the positions at the technician level, desiring sub-degree graduates.

## Salary and Remuneration Package

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The young generation showed higher intention to work in Government Departments which offered more competitive salaries and remuneration packages. The small and medium enterprises (SMEs) and consultancy companies which could not afford the cost encountered challenges in hiring, especially for chartered engineer and technician positions.

## Succession Gap for Middle Management

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Acute manpower shortage was observed in middle management and supervisory roles, particularly the experienced engineers / senior engineers. There was

## Reduced Number of Fresh Graduates

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Given the reduced student population, the number of fresh graduates from electronics and telecommunications related programmes was not sufficient

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and those joining the industries have further decreased. The focus group supplemented that the demand for electronics engineers in the global market has been increasing due to the ever-advancing technology applications. It also heightened the intention of graduates to pursue careers in the Mainland, or other regions / countries.



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# RECOMMENDATIONS

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

## Government

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*Continue the Promotion of Professional Image of Vocational and Professional Education and Training (VPET) and its Diverse Articulation Pathways and Career Prospects in EC Industries*

The Government has endeavoured to promote a broad and diverse range of study choices and pathways in science, technology, engineering and mathematics (STEM) related disciplines for secondary school students. The Government should continue putting effort into the publicity to promote the professional image of VPET and its diverse career prospects and opportunities in the engineering and innovation & technology (I&T) fields, where the EC industries would be covered, to the secondary school students, their teachers and parents, as well as the public, to elevate receptiveness for VPET and attract more youngsters to pursue VPET education and join the EC industries as a preferred choice.

*Continue the Provision of Funding to Nurture Talents for EC Industries*

As announced in the 2024-25 Budget, funding has been set aside to support the VTC's initiatives including the extension of the Pilot Incentive Scheme to Employers (PISE) and the Pilot Subsidy Scheme for Students of Professional Part-time Programmes (Vplus) for five years.

The focus group emphasised that the EC industries were one of the leading industries to drive the I&T development in Hong Kong and support the I&T development of other sectors. To nurture I&T talents and boost development, the Government could continue to provide funding schemes like Vplus and the industry-oriented New Industrialisation and Technology Training Programme (NITTP) to support practitioners in pursuing qualifications in relevant fields.

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### *Promote STEM Learning in Government Departments and Public Sectors*

The focus group opined that equipping staff working in Government departments and public sectors with understanding and basic knowledge of STEM and the applications of other emerging technologies, such as AI, data science and cybersecurity, in their daily work and services was essential to enhance the effectiveness of implementation of the Government's e-services and other STEM-related schemes as well as the digitalised routine operations. The Government could provide regular training on STEM and the applications of other emerging technologies to update their staff on relevant knowledge.

### *Extend the Coverage of VPAS to EC Industries*

To attract vocational and technical talents to stay and work in Hong Kong and bridge the manpower gap for technicians, the Government should extend the coverage of VPAS to VTC's Higher Diploma programmes for the EC industries, which was not covered in its pilot launch, which would be essential for the development of the industries and boosting the I&T development of Hong Kong.

### **Education Institutions**

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#### *Enhance Education on Cybersecurity and Data Ethics*

With the growing adoption of data-driven technologies, education institutions should enhance the education of students and practitioners on cybersecurity and data ethics to instill knowledge and awareness of data privacy, as well as the ethical collection and dissemination of data. Information on relevant regulations and industry practices should also be included.

Besides, short courses or workshops on cybersecurity and data privacy could be launched and provided to the general public to enhance their awareness of information security.

#### *Offer Training Programmes in AI and Data Science*

To unleash the immense potential of AI and data science technologies, the education institutions were advised to offer comprehensive training programmes to nurture talents in AI and data science, cultivating their in-depth understanding of the technology development, and the potential applications and implementation in various industries for innovative products and services, and smart city development.

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### *Strengthen the Knowledge of Electronics Fundamentals*

The focus group highlighted the importance of nurturing “T-shape talents” with in-depth expertise in electronics and a broad set of related knowledge, such as programming, AI, data science, 5G and robotics, which enable them to collaborate across disciplines in a project team. It was essential to ensure that the fundamental knowledge of electronics remained robust in programme curricula despite incorporating the knowledge of emerging technologies. The education institutions could strengthen modules of electronics fundamentals within full-time programme curricula, and offer short courses / in-service training courses to supplement students / practitioners with relevant knowledge.

### *Nurture Students’ Design Thinking Abilities and Business Mindset*

Inspired by the application of gerontechnology like companion robots in elderly houses, the focus group emphasised the significance of facilitating the transfer of theoretical knowledge to solutions addressing real-life challenges. The education institutions were advised to strengthen the cultivation of students’ design thinking abilities and business mindset which would contribute to the development of innovative solutions and the popularisation to market.

### *Allocate Study Places to Nurture I&T Professionals*

With the promulgation of the “Hong Kong Innovation and Technology (I&T) Development Blueprint”, the education institutions should forecast the manpower demand and allocate corresponding study places in relevant study areas to nurture I&T professionals aligning with the future development.

To address the pressing needs for Information Technology (IT) talent across industries, the VTC established the Hong Kong Institute of Information Technology in November 2023 to offer IT and relevant technology programmes for students, working adults and industry practitioners. “The Chief Executive’s 2023 Policy Address” announced that the Government would facilitate the establishment of universities of applied sciences (UASs) and provide additional subsidies to encourage institutions to offer more applied degree programmes related to technical professionals.

### *Support Students in Self-exploration and Career Planning at Secondary School Level*

The education institutions including secondary schools could strengthen the support to secondary school students in self-exploration and career planning through career exploration programmes, which would allow students to have a deeper understanding of their

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personalities, abilities and career interests at the early stage.

The VTC, as a VPET provider, had stepped up its promotional efforts in secondary schools by adopting a more targeted and coordinated approach to elevate receptiveness for VPET among secondary school stakeholders and offered students early exposure to VPET pathways. Industry-oriented life planning education was launched, comprising career exploration and experiential activities, competitions, exhibitions and seminars for secondary students designed and provided with the engagement of its Training Boards for different industries.

### Industries

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#### *Enhance Secondary School Students' Understanding of the Industries through Authentic Experiences*

Group interviews with secondary school students from F3 to F5 were carried out to understand their perception of the EC industries. The interviewees displayed a general understanding of both telecommunications and electronics sectors which they could identify some popular brands and companies, products and services, and front-line job positions, such as technical sales and customer services officers. The interviewees had no idea about the job natures, duties and roles of engineers in different professions and lacked

concepts of the back-end processes or supporting services, such as electronic products manufacturing and trading, as well as telecommunication infrastructure and network. After elaboration on the scope of the industries and the nature of different job positions, the interviewees expressed that the EC industries were professional and possessed promising prospects. They highlighted some examples including the development and applications of 5G / 6G networks, smart products with AI functions, unmanned electric vehicles and remote surgical robots.

It was observed that daily life observation was the major channel for secondary school students to gain a basic perception of the industries. The industries could consider offering more taster and exploration activities and trial workshops through authentic experiences and hands-on activities to provide secondary school students with more opportunities to understand the scope of the industries and the work environment.

#### *Promote Industry-wide Career Ladder and Prospects*

Apart from the personal interest and capabilities in science and mathematics, salary packages and promotional ladder would be the major considerations for secondary school students to choose their career and study. The industries were recommended to provide an industry-wide career path and

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progression pathway, including the requirement on acquisition of professional qualification, as well as highlight the demand for the related job positions in the manpower market to equip the young generation and prospective entrants with a deeper understanding of the future opportunities and prospects of the industries and arouse their interest to join the industries. The industries could also provide a general concept of the job nature, the scope of duties and responsibilities of different job positions of the EC industries, and their values and contributions to society, to the youngsters.

### Employers

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#### *Cultivate Employees' Sense of Ownership*

The sense of ownership was identified as an important factor to increase employees' job satisfaction. The focus group advised that employers should engage their employees by encouraging their participation in decision-making by taking their opinions and creative ideas into consideration. Furthermore, employers could recognise the outstanding achievements of employees by making internal announcements to appreciate their contribution and effort.

#### *Introduce Staff Retention Measures*

The focus group emphasised that employees were the most valuable asset of a company, the employers should impose effective measures to retain their employees. One of the measures was to allow internal job transfer, so the employees could opt for working and learning in a preferred department within the company. It could reduce employee turnover due to a change of profession. Furthermore, the employers should where feasible put more attention to the well-being of the employees and offer a desired work environment and culture. Shared by a focus group member, the provision of "birthday leave" in their company would be one of the simple but effective approaches.

#### *Foster Knowledge Transfer to New Entrants*

To bridge the knowledge gap between experienced technicians and new entrants, employers should foster the transfer of knowledge and skills to new entrants, fostering the familiarisation of their roles and ensuring the continuity of expertise within the organisation.

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### *Consider Further Employment of Staff Reaching Retirement Age*

Employers could consider further employment of their staff, who possess extensive experience in the industries, beyond the age of 60 or even 65 to extend their service in appropriate positions and relieve the pressure of manpower shortage. Relevant upskilling training could be provided to keep them updated on the latest developments in the industries, especially the application of emerging technologies.

### *Engage Potential Entrants at Early Stage*

The employers were encouraged to engage undergraduate students and fresh graduates with potential through active participation in job fairs, career talks and graduate engineering programmes. The focus group also shared their experience in identifying and employing outstanding employees through internship programmes.

## Employees

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### *Proactive to learn*

To stay competitive, employees should be proactive to keep abreast of the latest developments and applications of new technologies, in particular AI and data science.