

2020 MANPOWER SURVEY REPORT

**ELECTRONICS AND
TELECOMMUNICATIONS INDUSTRIES**

**ELECTRONICS AND
TELECOMMUNICATIONS
TRAINING BOARD**

VOCATIONAL TRAINING COUNCIL

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Acknowledgement

Electronics and Telecommunications Training Board wishes to thank all the respondents of the sampled companies for providing manpower information in the 2020 Manpower Survey of the Electronics and Telecommunications industries.

The Training Board also highly appreciates the contributions of the Members of the Working Party on Manpower Survey and the external industry experts who have provided invaluable insights into the industry development and recommendations, which help the Electronics and Telecommunications industries address changes in their business landscape.

1. Executive Summary

Background

1.1 The Electronics and Telecommunications Training Board (Training Board) conducted a manpower survey of the electronics and telecommunications industries from June to August 2020, with the reference date on 1 June 2020. This report presents the survey findings of the latest manpower situation of the industries and proposes recommendations in response to the manpower demand and training needs to the different stakeholders of the industries, including the Hong Kong Special Administrative Region Government (The HKSAR Government), related trade associations, employers, employees and training providers, by making reference to the business outlook.

Survey Coverage

1.2 The survey covered the electronics and telecommunications industries. A total of 711 establishments were selected from 7 276 establishments of the industries recorded on the central registrar of the Census and Statistics Department (C&SD) for this survey and 48 supplementary samples were also included. The selected establishments were required to provide manpower information based on the list of the principal jobs, which were defined and considered significant by the Training Board. According to the level of responsibilities, complexity of jobs and the skills, knowledge and training required, the principal jobs were classified in four levels, i.e. (a) technologist, (b) technician, (c) craftsman, and (d) operative.

Methodology

Survey Methodology

1.3 A stratified random sampling method was adopted to draw 711 sampled establishments from the Hong Kong Standard Industrial Classification list of the C&SD of the HKSAR Government, and 48 establishments were also included as supplementary samples, making a total of 759 samples. The selected sample establishments completed a questionnaire which comprised two parts: (i) quantitative manpower information by job levels and by principal jobs and (ii) supplementary information related to manpower situation. The data collection and enumeration processes were closely monitored and data was verified to ensure data quality. The effective response rate was 92.7% after enumeration.

Manpower Projection Methodology

1.4 The Training Board adopts a forecasting method which rests on the weighted averages of historical data for projecting manpower demand of the electronics and telecommunications industries. Taking consideration of the historical manpower data with heavier weighting given to the recent data, market trends in a longer term, technological developments of the industry and other social-economic determinants, the Training Board made the decision on the manpower projection of all job levels for the period from 2021 to 2024. The details of the projection methodology are provided in *Appendix 8*.

Findings

Number of Employees, Vacancies and Trainees

1.5 Among 67 084 persons being employed in the electronics and telecommunications industries as of 1 June 2020, 59.0% of the employees worked in the trading and services sector, and 58.9% were employed at the technician level as presented in Table 1.1.

Table 1.1 Number of Employees by Sector and Job Level (as of 1 June 2020)

Sector	No. of employees					Percentage of total no. of employees
	Technologist	Technician	Craftsman	Operative	Total	
Manufacturing	542	1 716	638	717	3 613	5.4%
Trading and Services	9 846	24 847	4 393	518	39 604	59.0%
Telecommunications Services	3 622	5 312	3 711	7	12 652	18.9%
Wholesale	325	3 596	250	2	4 173	6.2%
Design Houses, Universities & Government	1 858	2 274	816	25	4 973	7.4%
Retail	4	1 775	290	0	2 069	3.1%
Total	16 197	39 520	10 098	1 269	67 084	100.0%
Percentage of total no. of employees	24.1%	58.9%	15.1%	1.9%	100.0%	

1.6 At the time of survey, there was a total 1 084 vacancies, representing a vacancy rate of 1.6% of the total number of employees and vacancies of the industries. Most of the vacancies were found in trading and services sector (612), and design houses, universities and related government bureau/departments sector (337), and were concentrated on the technician level (554) as shown in Table 1.2.

Table 1.2 Number of Vacancies by Sector and Job level (as of 1 June 2020)

Sector	No. of vacancies (vacancy rate %)*				
	Technologist	Technician	Craftsman	Operative	Total
Manufacturing	0 (0%)	2 (0.1%)	22 (3.3%)	4 (0.6%)	28 (0.8%)
Trading and Services	205 (2.0%)	353 (1.4%)	49 (1.1%)	5 (1.0%)	612 (1.5%)
Telecommunications Services	10 (0.3%)	42 (0.8%)	23 (0.6%)	0 (0%)	75 (0.6%)
Wholesale	0 (0%)	13 (0.4%)	16 (6.0%)	0 (0%)	29 (0.7%)
Design Houses, Universities & Government	70 (3.6%)	141 (5.8%)	110 (11.9%)	16 (39.0%)	337 (6.3%)
Retail	0 (0%)	3 (0.2%)	0 (0%)	0 (-)	3 (0.1%)
Total	285 (1.7%)	554 (1.4%)	220 (2.1%)	25 (1.9%)	1 084 (1.6%)

Note: * Vacancy rate = No. of vacancies / No. of post

Number of Trainees

1.7 Among 1 083 trainees being employed in the electronics and telecommunications industries as of 1 June 2020, most of them were concentrated on the technician level (505) and craftsman level (472) as shown in Table 1.3.

Table 1.3 Number of Trainees by Sector and Job Level (as of 1 June 2020)

	Technologist	Technician	Craftsman	Operative	Total
No. of trainees	106	505	472	0	1 083
Percentage of total no. of trainees	9.8%	46.6%	43.6%	0%	100.0%

Prominent Principal Jobs

1.8 The prominent principal jobs with the most employees are shown in Table 1.4 below.

Table 1.4 Prominent Principal Jobs

Prominent principal jobs		No. of employees	% of total number of employees
Technologist	◆ Electronics / Computer Engineer ; Telecommunications Engineer	9 486	14.1%
Technician	◆ Sales Technician	14 024	20.9%
	◆ Electronics Technician ; Telecommunications Technician	13 198	19.7%
	◆ Programmer ; Software Technician	5 368	8.0%
Craftsman	◆ Electronics Craftsman	7 451	11.1%

Employers' Forecasted Manpower Demand

1.9 The employers being surveyed forecasted that there would be 68 140 employees in June 2021, a mere decrease (-0.04%) over 68 168 existing posts in June 2020.

Table 1.5 Employers' Forecasted Manpower Demand for 2021

No. of Employees (a)	No. of Vacancies (b)	Total No. of Posts (c = a + b)	Forecasted No. of Employees for 2021 (d)	Forecasted No. of Increase/Decrease in Manpower in 2021 (e = d - c)	Percentage Change
67 084	1 084	68 168	68 140	-28	-0.04%

Preferred Education Level

1.10 The preferred education level increased with job level. A first degree was preferred for employees at the technologist level while sub-degree and diploma/certificate for employees at the technician level, and secondary 4 to 7 for employees at the craftsman level as shown in Table 1.6.

Table 1.6 Preferred Level of Education for Full-time Employees

Job Level	Education Level	%
Technologist	First Degree	81.0%
Technician	Sub-degree	40.6%
	Diploma/Certificate	41.6%
Craftsman	Secondary 4 – 7	66.1%

Turnover

1.11 A total of 3 978 employees left or a turnover rate of 5.8% was recorded in the past 12 months. Among the four job levels, the technician level recorded the highest number of employees left (2 323) whereas the operative level registered the highest turnover rate (8.3%) as presented in Table 1.7.

Table 1.7 Employees Left in the Past 12 Months by Job Level

Job Level	No. of employees left	Turnover Rate*
Technologist	1 011	6.1%
Technician	2 323	5.8%
Craftsman	537	5.2%
Operative	107	8.3%
Total	3 978	5.8%

*Note: * Turnover rate = no. of employees left in the past 12 months / (no. of employees + no. of vacancies)*

Major Areas of Skills for Enhancement

1.12 Employees at technologist level required strategic planning and management skills as well as technical skills whereas employees at technician level and craftsman level concentrated on enhancing technical skills. The major areas of skills should be enhanced by job level are shown in Table 1.8.

Table 1.8 Major Areas of Skills for Enhancement

Technologist	Technician	Craftsman
• Quality management (30.1%)	• Maintenance (24.4%)	• Maintenance (66.1%)
• Business continuity management (28.7%)	• Information Security (20.0%)	• Information Security (12.4%)
• Network Technology Management (22.0%)	• Network Technology Management (18.6%)	• System Integration (9.8%)
• Risk Management (21.2%)	• Quality management (13.1%)	• Network Technology Management (6.1%)
• Business Network Building (19.7%)	• Business Network Building (12.2%)	• People Management (5.8%)
	• Manufacturing and Operations (12.0%)	

Manpower Analysis

Manpower Changes between 2016 and 2020

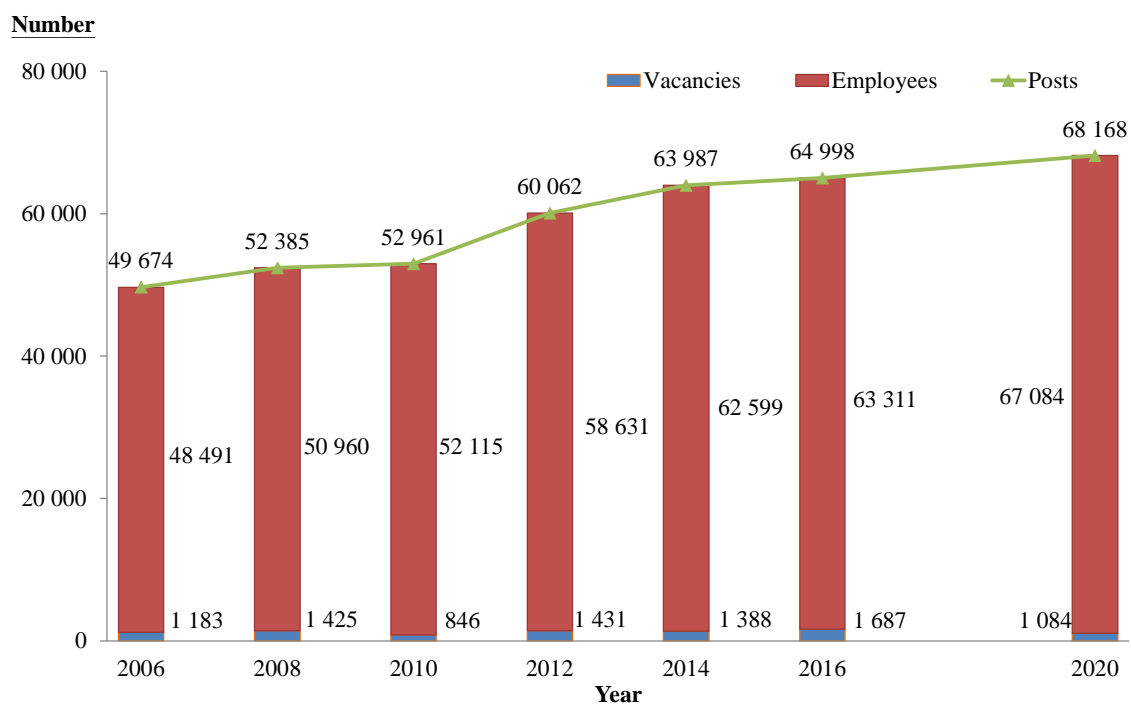
1.13 The overall manpower of the electronics and telecommunications industries exhibited an increase from 63 311 in 2016 to 67 084 in 2020 (+6.0% vs. 2016) as shown in Figure 1.1. Key trends of the changes between 2016 and 2020 include:

- (a) The increase in the overall manpower was mainly contributed by the increase in the telecommunications sector (+4 597, +57.1% vs. 2016). On the other hand, a manpower reduction was recorded in the manufacturing sector (-767, -17.5% vs. 2016) and the retail sector (-886, -30.0% vs. 2016).
- (b) A notable increase over 2016 was observed in “electronics craftsman” (+2 372, +46.7% vs. 2016), “electronics technician, telecommunications technician” (+1 455, +12.4% vs. 2016), “electronics/computer engineer, telecommunications engineer” (+784, +9.0% vs. 2016), “system analyst, software engineer, AI engineer, machine learning specialist, UX designer” (+665, +25.9% vs. 2016) and “sales technician” (+599, +4.5% vs. 2016).
- (c) On the other hand, a decline over 2016 was recorded in “supervisor, foreman, leader” (-1 633, -40.3% vs. 2016), “operator, quality assurance/control operator, general worker” (-759, -37.4% vs. 2016) and “electrical engineer” (-506, -27.9% vs. 2016). The decrease in employees was mainly concentrated on the manufacturing sector.

1.14 The manpower changes in the industry reflected:

- (a) The shrinking of the manufacturing sector;
- (b) An upcoming trend of telecommunications sector;
- (c) A growing trend of using e-commerce for selling electronic products in the retail sector; and
- (d) More companies in wholesale and retail sectors are in the process of digital transformation under the pandemic period, they have reduced the operation of their physical shops but recruited more technicians and craftsmen to handle the backend digital operations.

Figure 1.1 Change in Number of Posts from 2006 to 2020



Business Outlook

1.15 Accounting for 71.8% of Hong Kong's total export in 2020, the Hong Kong electronics and telecommunications industries maintain the largest local merchandise export earner of the territory. The Training Board is of the view that the following factors will affect the industries:

- (i) The Mainland China is moving towards a lower but more sustainable growth path under the National 14th Five-Year Plan for 2021-2025 with focus on the following areas :
 - Replacing high-speed growth with high-quality growth;
 - Rebalancing its economy with supply-side structural reform;
 - Expanding domestic demand, while continuing to support international export markets;
 - Driving modernisation through innovation and technological advancements; and
 - Promoting high-end, intelligent, and green production.

- (ii) To develop strategic technologies prioritised in its plans, Mainland China is prioritising efforts to obtain foreign technology through global pathways that are not yet restricted, such as partnerships in open technology and basic research, the establishment of research and development (R&D) centers overseas, and talent programs for foreign experts to work in Mainland China.
- (iii) The economic policy of “Dual circulation” was launched which aims to boost both domestic supply and demand in response to uncertain global environment. The approach seeks to transfer and localise foreign capabilities in Mainland China and maintain access to global markets wherever possible, including for key inputs, technology, and exports, to develop Mainland China’s capabilities.
- (iv) By year end of 2020, Mainland China has signed the Regional Comprehensive Economic Partnership (RCEP) with other 14 countries/economies which shall give bigger opportunities for businessmen at the Great Bay Area to intensify and synergise their multinational business. RCEP offers a free trade agreement to optimise the business environment, open up markets and reducing trade barriers. Looking forward that Hong Kong will become a RCEP member soon which will enliven the overall business.
- (v) Strong support of the government and active participation of enterprises have proven to be the key to success for most of the innovative cities in the world. Hong Kong should make use of Mainland China’s favorable policies, advantages of an international financial center and regional cooperation toward its development of innovation and technology. The Government needs to make innovation and technology a priority from resources for research and development, technology talent, investment funding, research infrastructure, legislation and regulations and science education.
- (vi) The electronics and telecommunications industries should experience robust growth in 2021 following the global recovery from the impact of COVID-19 pandemic.

1.16 All the above situations will impose certain effects on the electronics and telecommunications industries in the coming years. However, the reform and continuous development in Mainland China will bring more business opportunities to the world as well as the electronics and telecommunications industries in Hong Kong.

Manpower Projection and Annual Training Requirement

1.17 The Annual Additional Manpower Requirement has taken into account the (i) projected manpower trend and (ii) wastage rate of the industries (i.e. percentage of employees leaving the industry permanently on annual basis). The estimated Annual Additional Manpower Requirement from 2021 to 2024 is shown in Table 1.9 below.

Table 1.9 Estimated Annual Additional Manpower Requirement from 2021 to 2024

Job Level	Estimated Annual Additional Manpower Requirement
Technologist	612
Technician	1,393
Craftsman	852

Note: Retail sector was excluded in the figures.

Recommendations

1.18 In view of the above, the Training Board has a cautious but optimistic view that the electronics and telecommunications industries will continue to grow steadily. Coping with present situation and challenges ahead, the Training Board recommends the following measures for industry stakeholders:

Government

(i) Enhanced support to development of innovation and technology

Strong support of the government and active participation of enterprises have proven to be the key to success for most of the innovative cities in the world. Hong Kong should make use of Mainland China's favorable policies, advantages of an international financial center and regional cooperation toward its development of innovation and technology. The Hong Kong government needs to make innovation and technology a priority from resources for R&D, technology talent, investment funding, research infrastructure, legislation and regulations, and science education as well as providing more support to the industry through the Re-industrialisation Funding Scheme for promoting smart manufacturing and the Research Talent Hub to encourage the R&D activities in Hong Kong.

(ii) Providing assistances to develop Hong Kong into a technology and innovation hub

Strengthening Hong Kong's role as an international finance centre and offshore Chinese Yuan centre with position as the centre of investment, financing and venture capital activities. These advantages can also take Hong Kong to the frontline of developing into a technology and innovation hub by providing the necessary assistances to create the ecosystem that is essential for fostering innovation, entrepreneurship, international patent management and international business collaboration.

(iii) Image of a prospective career

The government should promote the image of the industries by outlining a more promising perspective for local students to have aspirations to be recruited in the electronics and telecommunications related careers.

(iv) Support for start-ups

In collaboration with the industries, more measures should be provided to help the entrepreneurs in the Hong Kong Science and Technology Parks Corporation and Hong Kong Cyberport, so that they could operate their businesses with necessary guidance and training. These entrepreneurs might train up a pool of talents to meet the manpower demand in the future.

Industries

(i) Enhanced promotion of Hong Kong to be a major information and telecommunications hub

The industries should collaborate with the Government to enhance promotion of Hong Kong as an international trade network, open markets, relatively low tax rates, a fair environment, well established international standard for intellectual property protection and judicial system, to attract overseas and Mainland China top research institutions to help develop Hong Kong into a major information and telecommunications hub in the region for healthcare, child care, elderly care and smart city.

(ii) Clarity of Career Paths

It is important to provide clear career paths for various levels of technical professionals. To arouse young people's interest in joining the industries, information such as structured progression pathways and career prospects could be made available to help them have a better understanding of the future opportunities of the industries.

(iii) Upgrading courses for in-service practitioners

The trade associations should collaborate with the education institutions to organise upgrading courses and webinars to in-service practitioners to upgrade their technical knowledge and skills in latest development of new technologies (e.g. Artificial Intelligence (AI), Internet of Things and Big Data) and legal regulations related to the sector.

Education Institutions

(i) Update course curriculum with advanced/ emerging skills needed

The education institutions should update the related curriculum of the modules with reference to the advanced / emerging skills that are in demand in the industries,

(ii) Develop curriculum related to Industry 4.0

In order to keep pace with the development of Industry 4.0, they should organise relevant training programmes related to Industry 4.0 such as applications of AI in both industrial and non-industrial sectors.

(iii) Closer collaboration with leading companies

Education institutions could work with leading companies in the industries, to provide updated training to teaching staff and cooperate in research project in order to fill up the lagging gap between the curriculum and the industry expectation.

Employers

(i) Providing Mentorship

To enrich the new recruits with the development and culture of their companies, the employers should provide mentorship to train up newly recruited employees.

(ii) Offer More Training Places

Employers should consider to offer more opportunities of training places leading to recognition of professional associations such as the Hong Kong Institution of Engineers.

Employees

(i) Proactive to learn

Employees should have the capability to self-learn through on-line training courses and classroom training. They should keep abreast of the development with new technologies, and be creative to develop new products/ services using the new technologies.

(ii) Make use of Government's subsidies

Employees are encouraged to make use of the subsidies provided by the Government such as the Continuing Education Fund and the Re-industrialisation and Technology Training Programme to upgrade their knowledge and skills.

1.19 On top of the individual company's training needs, the Training Board suggests that the "Skills Employees Need to Enhance" at *Appendix 9I* will be a good reference on potential areas of training for employers. In order to keep pace with the technological trend, employers are recommended to step up their training efforts in order to ensure supply of well-equipped manpower to meet the challenges and business opportunities ahead. The Training Board also recommends the Vocational Training Council and other education institutions to keep track of the training needs of the electronics and telecommunications industries and to meet such needs in time by providing suitable and timely training courses.

1.20 The Training Board will conduct another manpower survey of the electronics and telecommunications industries in 2024 to review and update the manpower requirements of the two industries.

2. Introduction

Background

2.1 The Electronics and Telecommunications Training Board (Training Board) of the Vocational Training Council (VTC) is appointed by the HKSAR Government to analyse the manpower situation and training needs of the electronics and telecommunications industries. The Training Board comprises members nominated by major trade associations, trade unions, professional bodies, educational and training institutions, and government departments. The Working Party on Manpower Survey is formed by the Convenor and selected members of the Training Board. The membership and terms of reference are listed in *Appendices 1, 2 and 3*.

2.2 The electronics and telecommunications manpower survey is conducted every four years, starting from 2020, followed by two periodic manpower updates through focus group and desk research to better reflect the changing trends of the technical manpower situation. Technical manpower refers to the personnel who are employed in the principal jobs of the electronics and telecommunications industries to apply the industrial knowledge and technical skills required to complete the work assigned.

2.3 Data of this manpower survey was collected from June to August 2020, with the reference date on 1 June 2020. This report presents the survey findings and analysis of the latest manpower situation of the electronics and telecommunications industries and proposes recommendations on the manpower development to the different stakeholders of the industries, including the HKSAR Government, related trade associations, employers, employees and training providers, by making reference to the business outlook.

Objectives

2.4 The objectives of the manpower survey conducted for the electronics and telecommunications industries are:

- (a) To collect up-to-date manpower information by the principal jobs by level by sector in the industries.
- (b) To assess the industries' technical manpower situation.
- (c) To forecast training requirements in the near future.
- (d) To recommend to the VTC and relevant stakeholders the development of training strategies to meet the needs.

Survey Coverage

2.5 The survey adopts the stratified random sampling method to carry out the fieldwork. A total of 711 establishments were selected from the 7 276 establishments of the electronics and telecommunications industries recorded on the central registrar of the Census and Statistics Department (C&SD) for this survey. An additional 48 supplementary samples were included. The sectors and branches of the electronics and telecommunications industries covered in the survey are shown as follows:

- (a) Manufacturing
- (b) Trading and Services
 - (i) Engineering Services
 - (ii) Information Technology Services
 - (iii) Import and Export Trading
 - (iv) Sizeable companies related to Electronics and Telecommunications Industries
- (c) Telecommunications Services
- (d) Wholesale
- (e) Design Houses, Universities and Related Government Bureau/Departments
- (f) Retail

3. Methodology

Sample Design

3.1 Based on the Hong Kong Standard Industrial Classification list from the Census and Statistics Department (C&SD) of the HKSAR Government, there were 7 276 establishments in the electronics and telecommunications industries. By adopting the stratified random sampling method and the inclusion of 48 supplementary samples recommended by the Training Board, there were 759 sampled establishments selected for the survey. The detailed sampling plan is at *Appendix 10*. The sectors and branches of the industry covered in the survey are shown as follow (with details at *Appendix 11*):

- a. Manufacturing
- b. Trading and Services
 - (i) Engineering Services
 - (ii) Information Technology Services
 - (iii) Import and Export Trading
 - (iv) Sizeable companies related to Electronics and Telecommunications Industry#
- c. Telecommunications Services
- d. Wholesale
- e. Design Houses, Universities and Related Government Bureau/ Departments#
- f. Retail

Note: # Supplementary Samples

Questionnaire Design

3.2 The questionnaire designed for the survey comprised two parts. Part I collected quantitative manpower information by job levels and by principal jobs, and Part II collected supplementary information related to manpower situation. The list of principal jobs was defined by the Training Board with detailed job descriptions given for each job, and was classified in four job levels as follows:

- (a) Technologist level
- (b) Technician level
- (c) Craftsman level
- (d) Operative level

3.3 While job titles adopted in the establishments might vary with the descriptions of the principal jobs, respondents were required to provide manpower information corresponding to the job descriptions and the skill levels of the principal jobs. The definition of terms and the survey documents including a sample questionnaire, explanatory notes and job descriptions for the principal jobs are given in *Appendices 4 and 5*.

Data Collection

3.4 Data collection was carried out between June and August 2020. A pack of survey documents was given to each sampled establishment. The respondents of the establishments were asked to provide manpower information of their establishment at the time of the survey with the reference date on 1 June 2020. During the fieldwork period, enumerators assisted the respondents to complete the questionnaire through phone calls or on-site visits.

3.5 Various measures were taken to assure the quality of the data collection process. These included prior fieldwork preparation, thorough training of fieldwork staff, monitoring of the fieldwork execution, measures to increase the response rate, checking of the completed questionnaires, double data entry and validation of the collected data. The list of quality control measures is shown in *Appendix 6*.

Data Analysis

3.6 Among the 574 valid sampled establishments, 532 were successfully enumerated, giving an effective response rate of 92.7%.¹ Taking into account (a) the satisfactory response rate of individual branches, (b) the satisfactory response rate from a majority of prominent and sizeable establishments, and (c) the grossing-up of sample results based on the statistically-grounded method, it could be concluded that the survey findings presented in this report contributed to a significant level of representativeness of the sector. The response rate achieved for individual sector was also adequate to produce meaningful breakdown by sector. The response profile is shown in *Appendix 7*.

Manpower Projection Methodology

3.7 The Training Board adopts a forecasting method which rests on the weighted averages of historical data for projecting manpower demand of the electronics and telecommunications industries. Taking consideration of the historical manpower data with heavier weighting given to the recent data, market trends in a longer term, technological developments of the industry and other social-economic determinants, the Training Board made the decision on the manpower projection of all job levels for the period from 2021 to 2024. The details of the projection methodology are provided in *Appendix 8*.

¹ Sampled establishments with suspended operation, change of industry, nil reply to the survey were considered as invalid.

Limitations

3.8 During the survey period, the manpower impacts of some new government initiatives were not included. For example, the increase in the number of startups in Hong Kong Science Parks (HKSTP) /Cyberport (Cyberport has over 2,000 offsite startups), increase in the number of companies in HKSTP, increase in re-industrialisation projects by Hong Kong Productivity Council as well as increase in projects due to new funding scheme by Enterprise Support Scheme under the Innovation and Technology Fund, etc.

3.9 The surveyed companies may not have included all the companies in HKSTP undergoing recruitment.

3.10 During the economic downturn, large corporations tend to have a more pessimistic view on hiring while startups may still proceed to recruit new employees due to operational need.

3.11 The following suggestions are also proposed to be included in future manpower surveys:

- (a) A wider survey coverage may be considered to include the start-up companies in HKSTP and Cyberport.
- (b) Secondary data from trade associations as well as the global and regional government policies should be taken into account for assessing the manpower demand.

4. Survey Findings

Number of Employees

4.1 As of 1 June 2020, there was a total of 67 084 persons employed in the electronics and telecommunications industries, with most of them (59.0%) working in the trading and services sector and 18.9% working in the telecommunications sector. 58.9% were employed at the technician level and 24.1% at the technologist level as shown in Figures 4.1a and 4.1b.

Figure 4.1a Employees by Sector

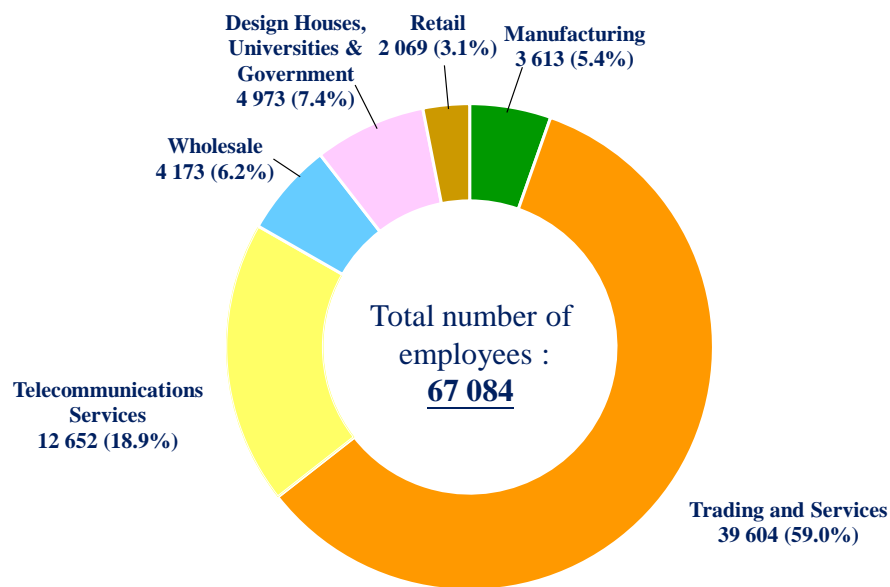
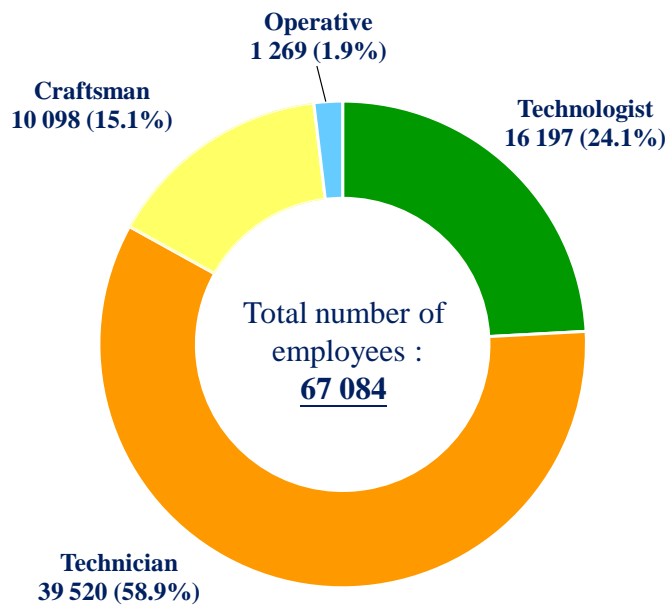


Figure 4.1b Employees by Job Level



Prominent Principal Jobs

4.2 The prominent principal jobs, which accounted for 73.8% of the total number of employees, are shown in Table 4.1 below.

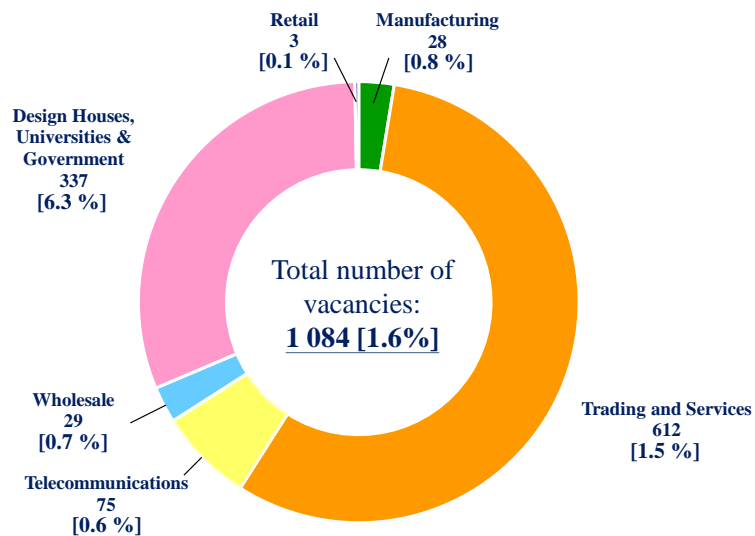
Table 4.1 Prominent Principal Jobs

Prominent principal jobs		No. of employees	% of total number of employees
Technologist	◆ Electronics / Computer Engineer ; Telecommunications Engineer	9 486	14.1%
Technician	◆ Sales Technician	14 024	20.9%
	◆ Electronics Technician ; Telecommunications Technician	13 198	19.7%
	◆ Programmer ; Software Technician	5 368	8.0%
Craftsman	◆ Electronics Craftsman	7 451	11.1%

Number of Vacancies

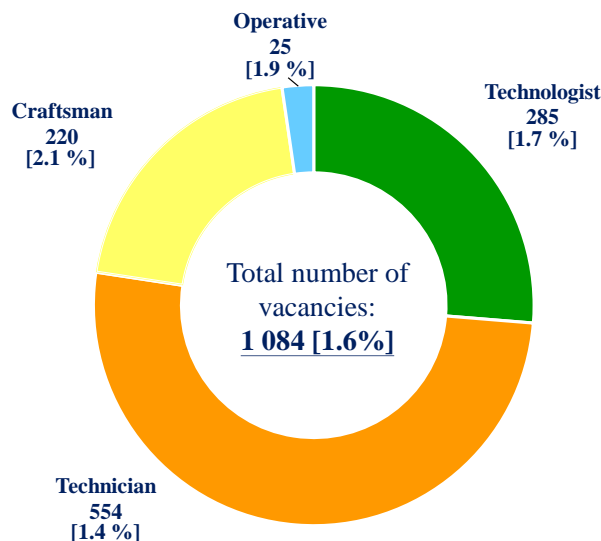
4.3 At the time of survey, there was a total 1 084 vacancies, representing a vacancy rate of 1.6% of the total number of employees and vacancies of the industry. Most of the vacancies were found in trading and services sector (612), and design houses, universities and related government bureau/departments sector (337), and were concentrated on the technician level (554) as shown in Figures 4.2a and 4.2b.

Figure 4.2a Vacancies by Sector



Note:
 Figures in [] brackets indicate the **Vacancy rate** (for particular sector) = $\frac{\text{No. of full-time vacancies}}{\text{No. of full-time employees} + \text{No. of full-time vacancies}}$

Figure 4.2b Vacancies by Job Level



Note:
 Figures in [] brackets indicate the **Vacancy rate** (for particular job level) = $\frac{\text{No. of full-time vacancies}}{\text{No. of full-time employees} + \text{No. of full-time vacancies}}$

Prominent Vacancies

4.4 The prominent vacancies, which accounted for 61.8% of the total number of vacancies, are shown in Table 4.2 below.

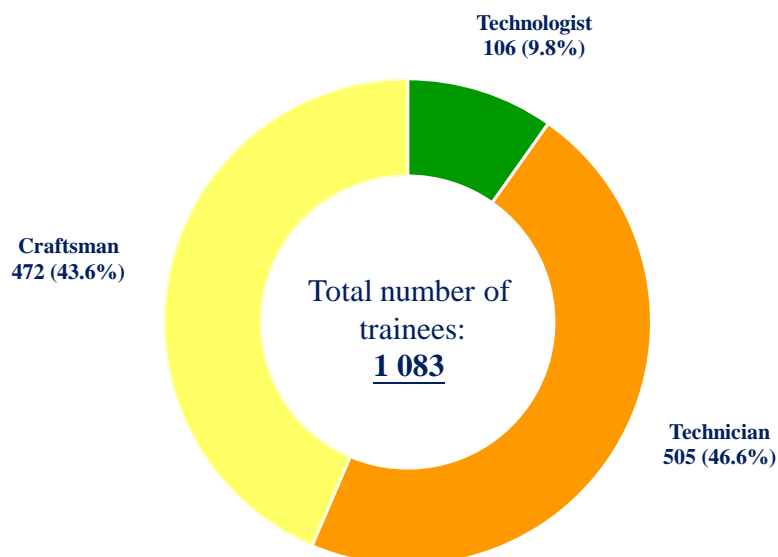
Table 4.2 Prominent Vacancies

Prominent vacancies		No. of vacancies	% of total number of vacancies
Technologist	◆ Electronics / Computer Engineer ; Telecommunications Engineer	119	11.0%
Technician	◆ Electronics Technician ; Telecommunications Technician	276	25.5%
	◆ Sales Technician	98	9.0%
	◆ Supervisor ; Foreman ; Leader	72	6.6%
Craftsman	◆ Electronics Craftsman	105	9.7%

Number of Trainees

4.5 Among 1 083 trainees being employed in the electronics and telecommunications industries as of 1 June 2020, most of them were concentrated on the technician level (505) and craftsman level (472) as shown in Figures 4.3.

Figure 4.3 Trainees by Job Level



Employers' Forecasted Manpower Demand

4.6 The employers' forecasted manpower demand reflected a marginal decrease (-0.04%) for 2021 from 68 168 existing posts in June 2020 to 68 140 employees in June 2021.

Table 4.3 Employers' Forecasted Manpower Demand for 2021

No. of Employees (a)	No. of Vacancies (b)	Total No. of Posts (c = a + b)	Forecasted No. of Posts for 2021 (d)	Forecasted No. of Increase/Decrease in Manpower in 2021 (e = d - c)	Percentage Change
67 084	1 084	68 168	68 140	-28	-0.04%

Monthly Income

4.7 The monthly income in the electronics and telecommunications industries increased with job level. The average monthly income of the majority of employees centralised to the range of \$10,001-\$20,000 for the operative level, increased to \$15,001-\$25,000 for the craftsman level, \$20,001-\$30,000 for the technician level, and \$25,001-\$50,000 for the technologist level. The distribution is shown in Table 4.4.

Table 4.4 Average Monthly Income of Full-time Employees by Job Level

Job Level	Average Monthly Income						
	\$10,000 or below	\$10,001 - \$15,000	\$15,001 - \$20,000	\$20,001 - \$25,000	\$25,001 - \$30,000	\$30,001 - \$50,000	\$50,001 or above
Technologist	0%	0%	0%	10.8%	21.3%	57.5%	10.5%
Technician	0%	0%	20.1%	44.0%	23.7%	8.6%	3.6%
Craftsman	0.3%	3.9%	67.3%	25.9%	2.6%	0%	0%
Operative	3.8%	66.5%	29.1%	0.5%	0%	0%	0%
Total	0.1%	1.9%	21.3%	32.4%	19.9%	19.7%	4.8%

Preferred Education Level

4.8 The preferred education level also increased with job level. A first degree or above was preferred for employees at the technologist level while sub-degree and Diploma/Certificate for employees at the technician level, and Secondary 4 to 7 for employees at the craftsman level. The distribution is shown in Table 4.5.

Table 4.5 Preferred Level of Education for Full-time Employees by Job Level

Job Level	Preferred Education Level					
	Postgraduate Degree	First Degree	Sub-degree (e.g. Higher Diploma)	Diploma/Certificate	Secondary 4 to 7	Secondary 3 or below
Technologist	7.4%	81.0%	11.1%	*	0%	0%
Technician	*	17.3%	40.6%	41.6%	*	0%
Craftsman	0%	*	1.0%	31.9%	66.1%	1.0%

Note: * Less than 0.05%

Preferred Mode of Training and Period of Training

Mode of Training

4.9 On-the-job training was generally preferred for employees across technologists, technician, and craftsman level. The distribution is shown in Table 4.6.

Table 4.6 Preferred Mode of Training for Full-time Employees by Job Level

Job Level	Preferred Mode of Training		
	On-the-job training	Graduate traineeship	Apprenticeship
Technologist	86.2%	13.8%	0%
Technician	99.4%	0.6%	0%
Craftsman	79.9%	0%	20.1%

Period of Training

4.10 The preferred period of training was mainly 3 years or above for employees at technologist level, 1 to less than 3 years for employees at technician level, and 1 to less than 2 years for employees at craftsman level. The distribution is shown in Table 4.7.

Table 4.7 Preferred Period of Training for Full-time Employees by Job Level

Job Level	Preferred Period of Training				
	4 years or above	3 years to less than 4 years	2 years to less than 3 years	1 year to less than 2 years	Below 1 year
Technologist	30.8%	37.6%	30.7%	*	0.7%
Technician	10.5%	15.4%	38.6%	35.1%	*
Craftsman	1.5%	*	39.8%	52.3%	6.3%

Note: * Less than 0.05%

Employees Left and Recruited in the Past 12 Months

Employees left

4.11 Among the four job levels, the technician level recorded the highest number of employees left (2 323) in the past 12 months whereas the operative level registered the highest turnover rate (8.3%) in 2020. As shown in Table 4.8, the entire industry recorded an overall turnover rate of 5.8%.

Table 4.8 Employees Left in the Past 12 Months and Turnover Rate by Job Level

Job Level	Number of Employees Left	Turnover Rate*
Technologist	1 011	6.1% [6.4%]
Technician	2 323	5.8% [7.4%]
Craftsman	537	5.2% [10.7%]
Operative	107	8.3% [21.3%]
Total	3 978	5.8% [8.0%]

Note: * Turnover rate = no. of employees left in the past 12 months / (no. of employees + no. of vacancies)

[] Turnover rate in 2016

Staff Recruited

4.12 Of the 3 608 new employees recruited in the past 12 months, most of the new recruits were found in technician level (2 056). Table 4.9 showed that most job levels (except craftsman level) preferred new recruited staff with industry experience.

Table 4.9 Staff Recruited in the Past 12 Months by Job Level

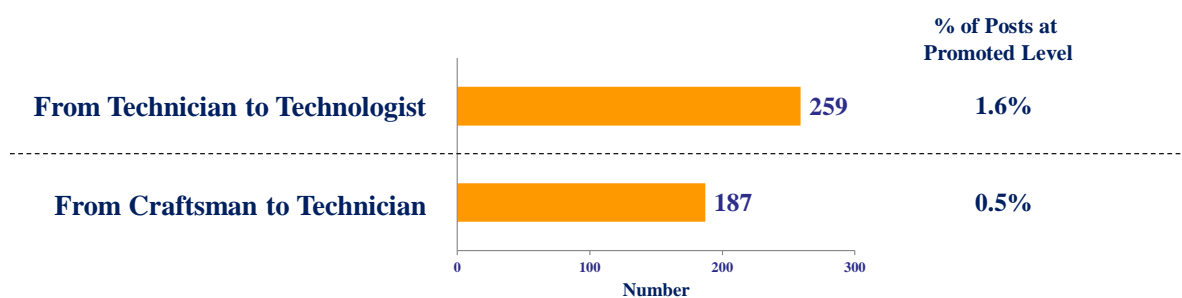
Job Level	New Recruits with Relevant Industry Experience	Total Number of New Recruits
Technologist	686 (75.6%)	908
Technician	1 647 (80.1%)	2 056
Craftsman	243 (44.5%)	546
Operative	94 (95.9%)	98
Total	2 670 (74.0%)	3 608

Note: () As a percentage of total number of new recruits for particular job level

Internal Promotion

4.13 In the past 12 months, 259 employees (1.6% of the posts at technologist level) were promoted from technician level to technologist level and 187 employees (0.5% of the posts at technician level) were promoted from craftsman level to technician level.

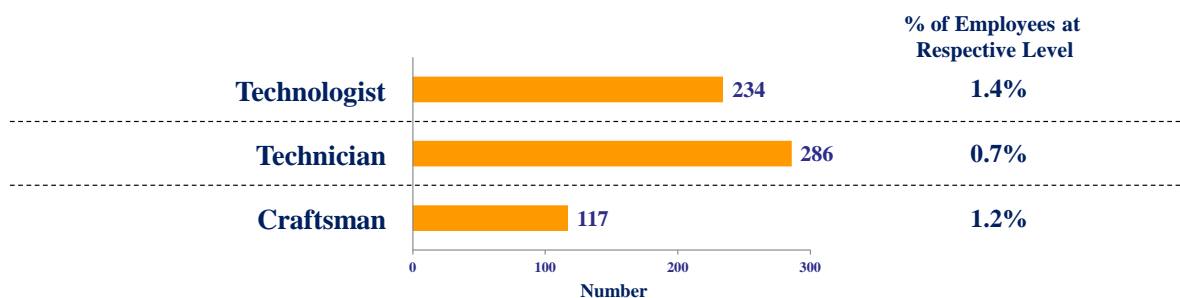
Figure 4.4 Internal Promotion of Employees in the Past 12 Months



Employees to be Retiring in the Coming 12 Months

4.14 Both the number and percentage of employees to be retiring in the coming 12 months were not high, with 234 employees at technologist level (1.4%), 286 employees at technician level (0.7%) and 117 employees at craftsman level (1.2%) as given in Figure 4.5.

Figure 4.5 Employees to be Retiring in the Coming 12 Months



Major Areas of Skills for Enhancement

4.15 Employees at technologist level required strategic planning and management skills as well as technical skills whereas employees at technician level and craftsman level concentrated on enhancing technical skills. The major areas of skills should be enhanced by job level are shown in Table 4.10.

Table 4.10 Major Areas of Skills for Enhancement

Technologist	Technician	Craftsman
• Quality management (30.1%)	• Maintenance (24.4%)	• Maintenance (66.1%)
• Business continuity management (28.7%)	• Information Security (20.0%)	• Information Security (12.4%)
• Network Technology Management (22.0%)	• Network Technology Management (18.6%)	• System Integration (9.8%)
• Risk Management (21.2%)	• Quality management (13.1%)	• Network Technology Management (6.1%)
• Business Network Building (19.7%)	• Business Network Building (12.2%)	• People Management (5.8%)
	• Manufacturing and Operations (12.0%)	

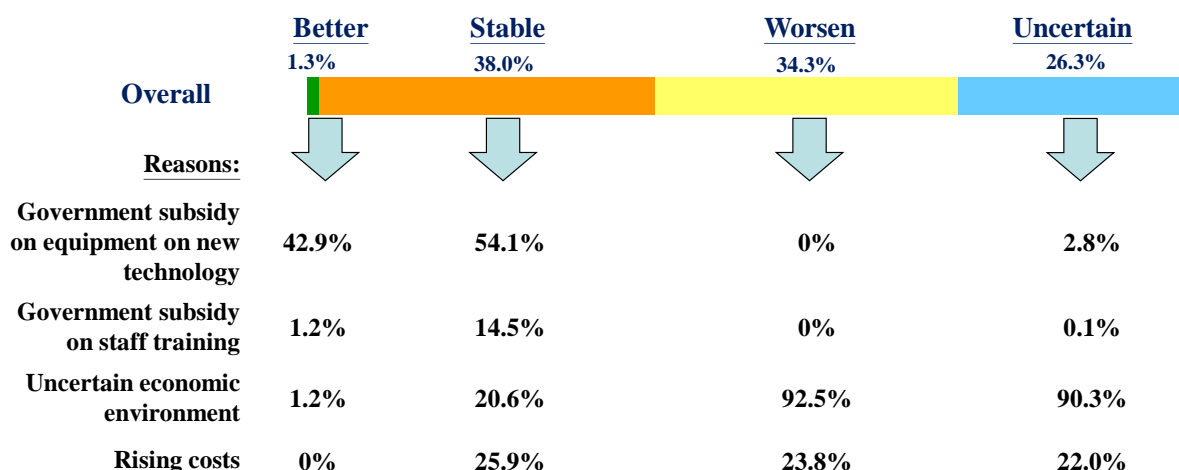
Employers’ Views on Business Situation

4.16 About one-third (38.0%) expected that the business situation would be stable in the coming 12 months while another one-third (34.3%) expected the business situation would be worsen and 26.3% expected the business situation would be uncertain.

4.17 For companies which expected stable business situation, 54.1% considered that Government subsidy on equipment on new technology could lead to stable business situation.

4.18 For companies which expected worsen and uncertain business situation, over 90% considered “uncertain economic environment” could lead to worsen and uncertain business situation. Details are shown in Figure 4.6.

Figure 4.6 Expected Change in Business Situation in the Coming 12 Months



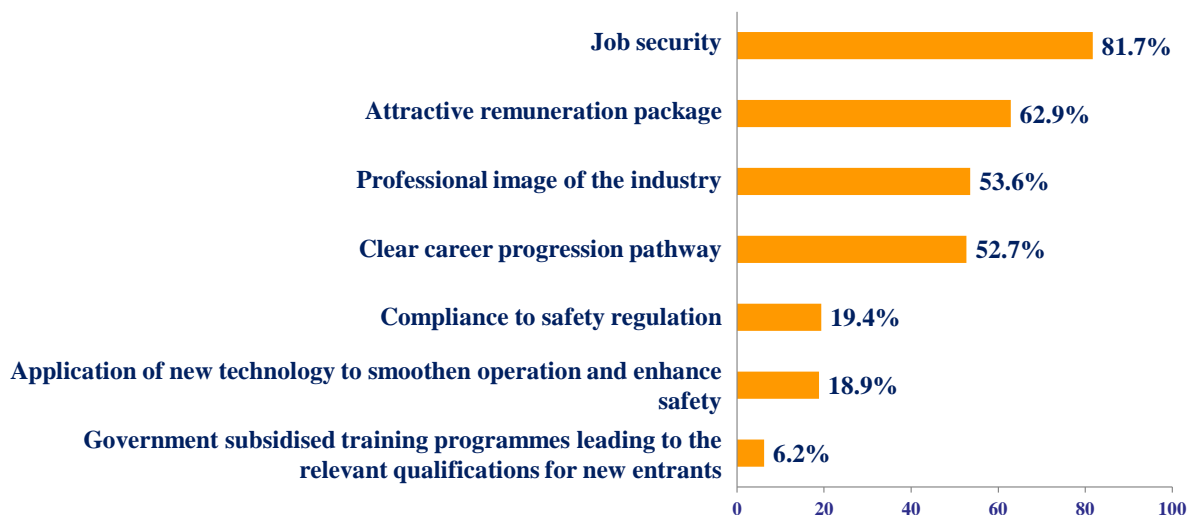
Note:

- Percentages of views on the expected change are calculated on the basis of total number of companies
- Percentages of reasons are calculated on the basis of total number of companies which answer the respective views on the expected change

Factors Considered Useful to Attract New Entrants to the Industry

4.19 As shown in Figure 4.7, “job security”, “attractive remuneration package”, “professional image of the industry” and “clear career progression pathway” are the key factors that were considered useful to attract new entrants to the industry.

Figure 4.7 Factors Considered Useful to Attract New Entrants to the Industry



Note:

- Percentages are calculated on the basis of total number of companies
- Companies are invited to give three factors that were considered to be useful to attract new entrants to the industry

Statistical Tables

4.20 The detailed manpower statistics of the electronics and telecommunications industries are tabulated in *Appendix 9*.

5. Manpower Analysis

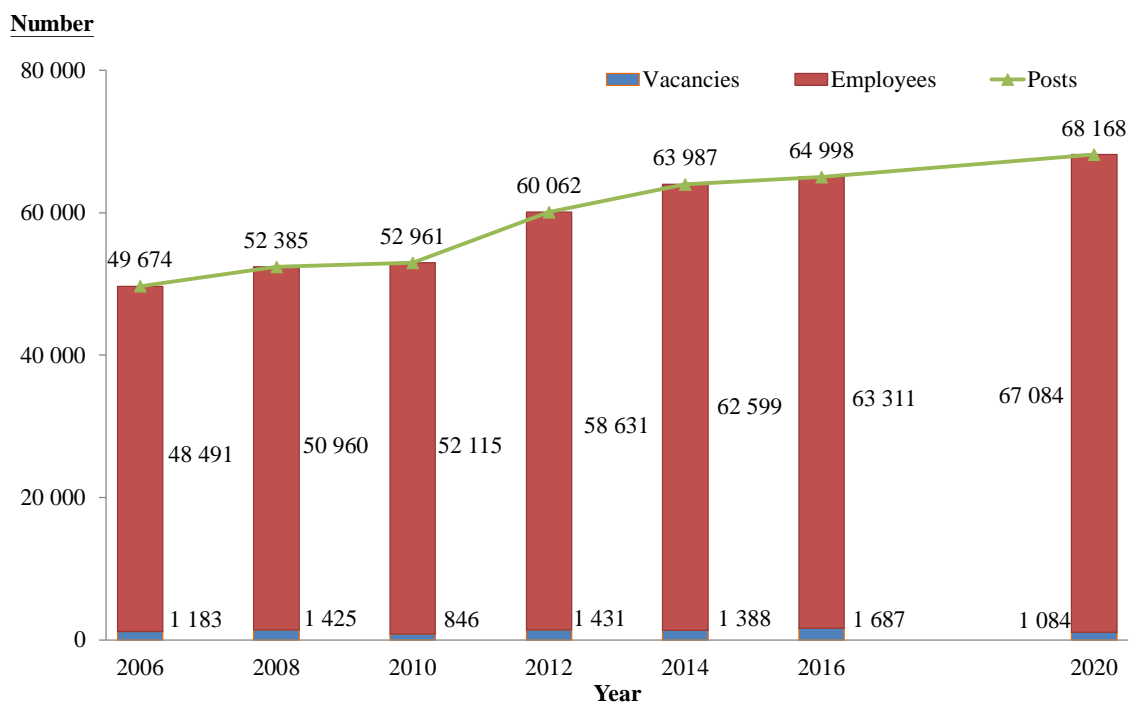
Manpower Changes between 2016 and 2020

5.1 Based on the survey findings of 2016 and 2020, the manpower changes were analysed. However, taking into account the development of the industries over the past years, for the survey of 2020, some new branches have been introduced to various sectors (e.g. trading and services sector, wholesale sector) while at the same time, some obsolete branches have also been removed (The details of the survey coverage are provided in *Appendix II*). Readers are alerted to take into account the above changes in survey scope when interpreting the manpower changes between 2016 and 2020.

Changes in Number of Posts

5.2 The overall number of employees of the electronics and telecommunications industries exhibited an increase (+3 773, +6.0%) from 2016 to 2020 as shown in Figure 5.1.

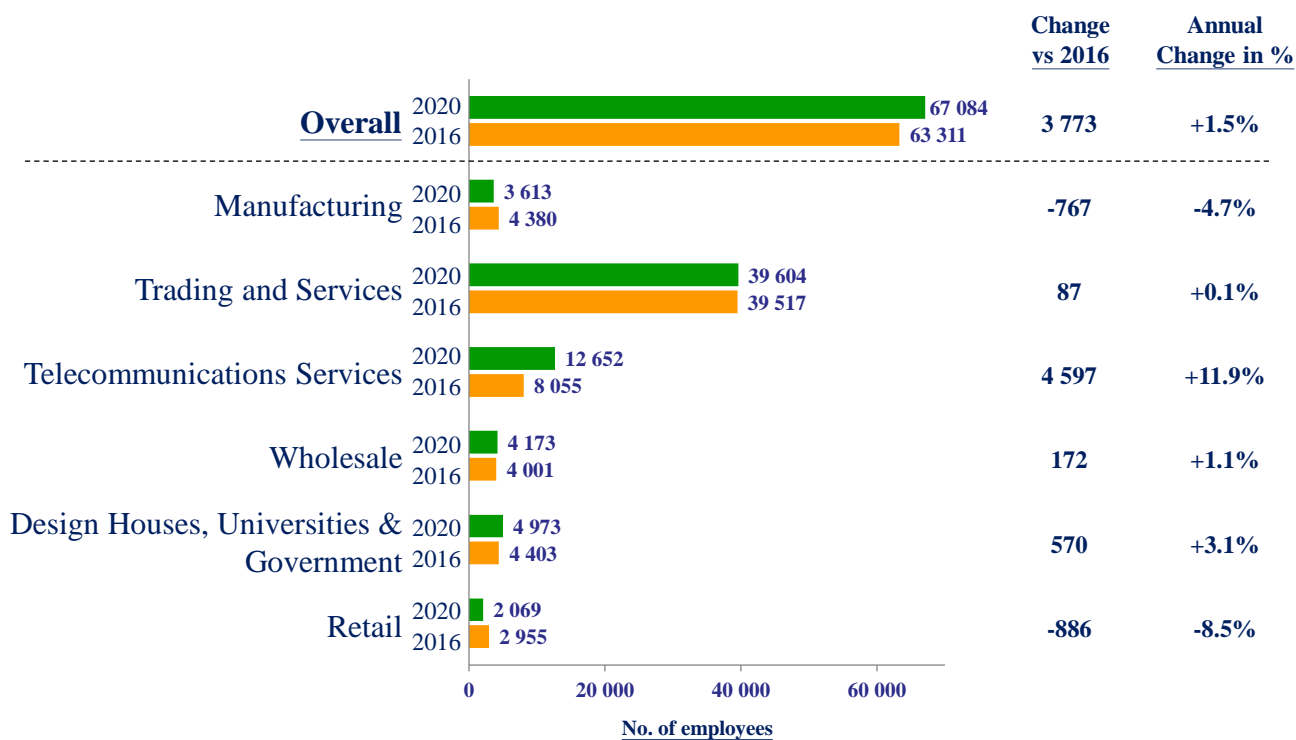
Figure 5.1 Change in Number of Posts from 2006 to 2020



5.3 The overall manpower has significantly increased in the telecommunications sector (+4 597, +57.1% vs. 2016), contributed by the significant increase in manpower in all job levels to cater and support for the 5G services, e-commerce and other telecommunications services.

5.4 On the other hand, a manpower reduction was recorded in the manufacturing sector (-767, -17.5% vs. 2016), attributed to the relocation of manufacturing plants or engineering office to South East Asia or Mainland China and automation using robotics and computer vision being deployed for assembly, testing and inspection to reduce cost, and the retail sector (-886, -30.0% vs. 2016), attributed to the impacts of COVID-19, social issue and possible development of e-commerce in retail business.

Figure 5.2 Changes in Employees over 2016 by Sector

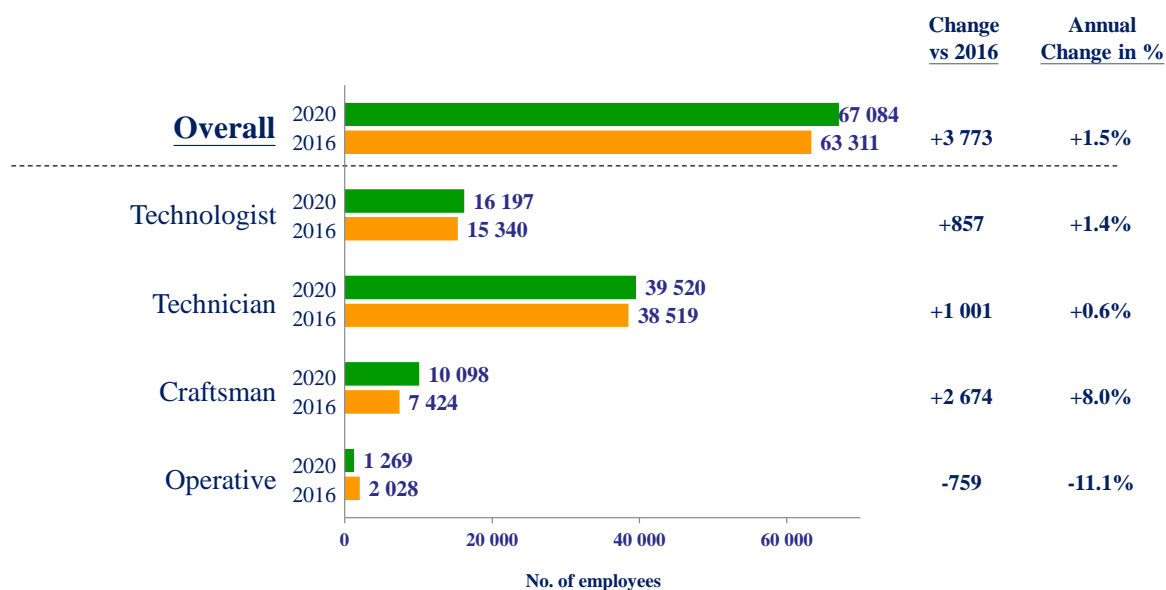


Note: Readers are alerted to interpret the compared figures presented with caution due to different survey coverage between 2020 and 2016.

5.5 As shown in Figure 5.3, an increase in the manpower was recorded in the technologist level (+857, +5.6% vs. 2016), technician level (+1 001, +2.6% vs. 2016) and craftsman level (+2 674, +36.0% vs. 2016). The increase in the manpower in the craftsman level was contributed by the increased demand for the craftsman level workers to support the 5G services, e-commerce and other telecommunications services.

5.6 On the other hand, a decrease in the manpower was noted in the operative level (-759, -11.1%), which was attributed to the automation using robotics and computer vision being deployed for assembly, testing and inspection to reduce cost.

Figure 5.3 Changes in Employees over 2016 by Job Level

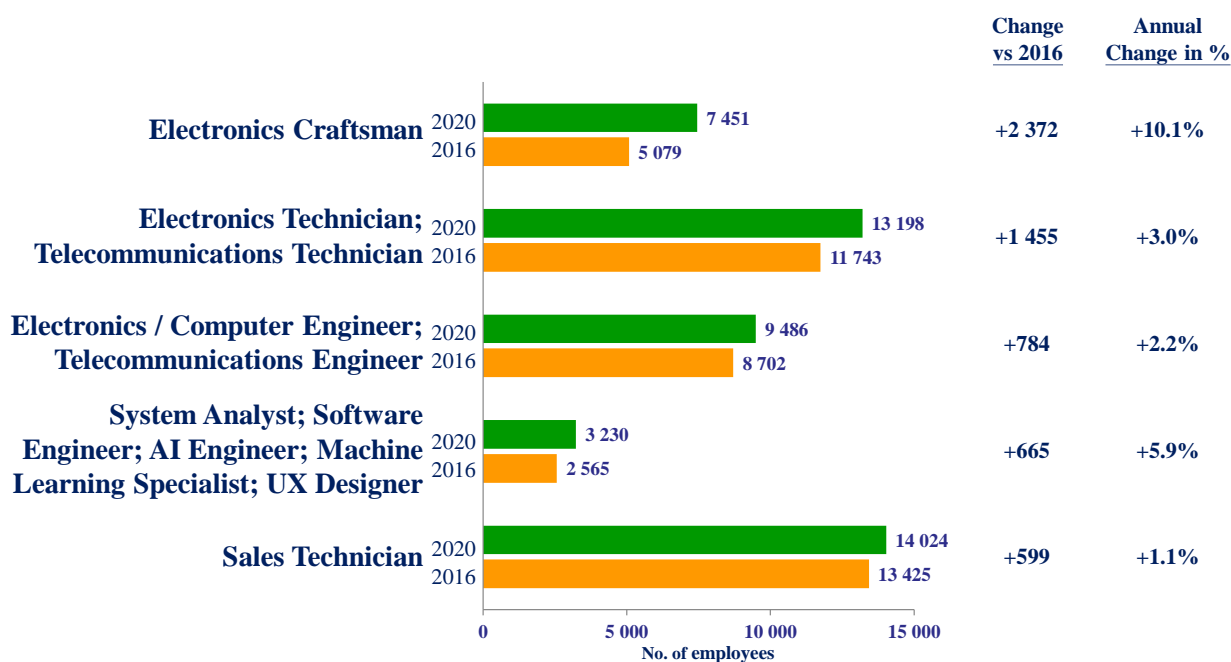


Note: Readers are alerted to interpret the compared figures presented with caution due to different survey coverage between 2020 and 2016.

Principal Jobs with Significant Increase / Decrease

5.7 With respect to the principal jobs, a notable increase over 2016 was observed in “electronics craftsman” (+2 372, +46.7% vs. 2016), “electronics technician, telecommunications technician” (+1 455, +12.4% vs. 2016), “electronics/computer engineer, telecommunications engineer” (+784, +9.0% vs. 2016), “system analyst, software engineer, AI engineer, machine learning specialist, UX designer” (+665, +25.9% vs. 2016) and “sales technician” (+599, +4.5% vs. 2016) as presented in Figure 5.4a.

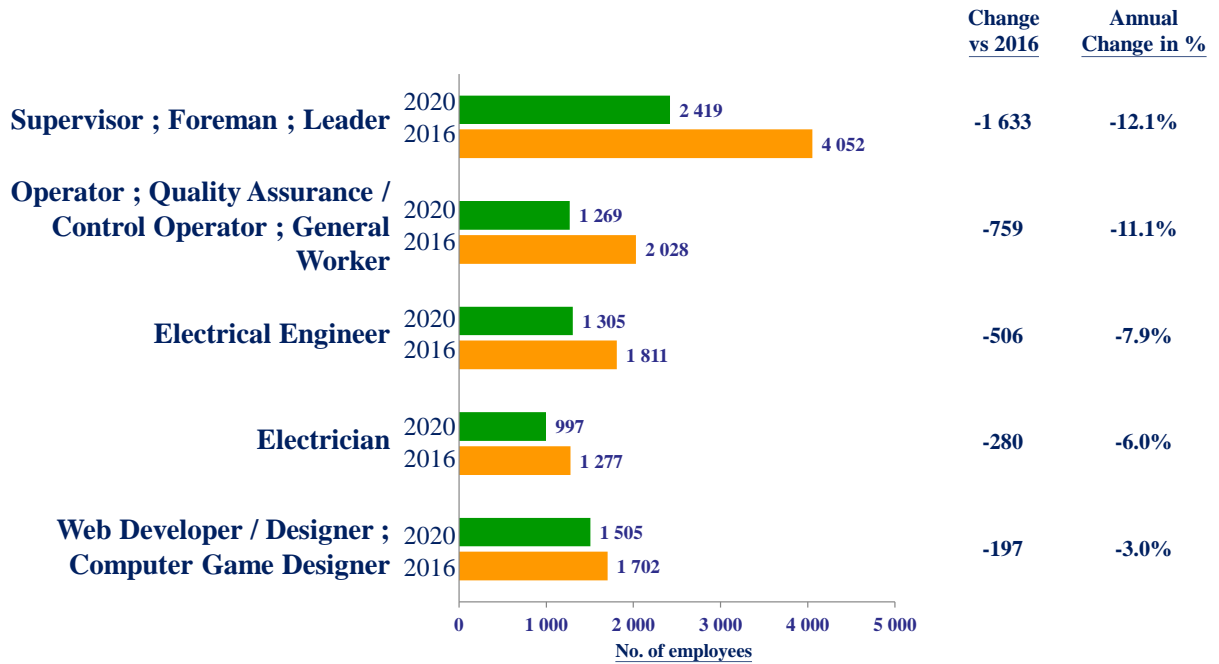
Figure 5.4a Principal Jobs with Significant Increase over 2016



Note: Readers are alerted to interpret the compared figures presented with caution due to different survey coverage between 2020 and 2016.

5.8 On the other hand, a drop over 2016 was recorded in “supervisor, foreman, leader” (-1 633, -40.3% vs. 2016), “operator, quality assurance/control operator, general worker” (-759, -37.4% vs. 2016) and “electrical engineer” (-506, -27.9% vs. 2016). The decrease in employees was mainly concentrated on the manufacturing sector. Details are shown in Figure 5.4b.

Figure 5.4b Principal Jobs with Significant Decrease over 2016

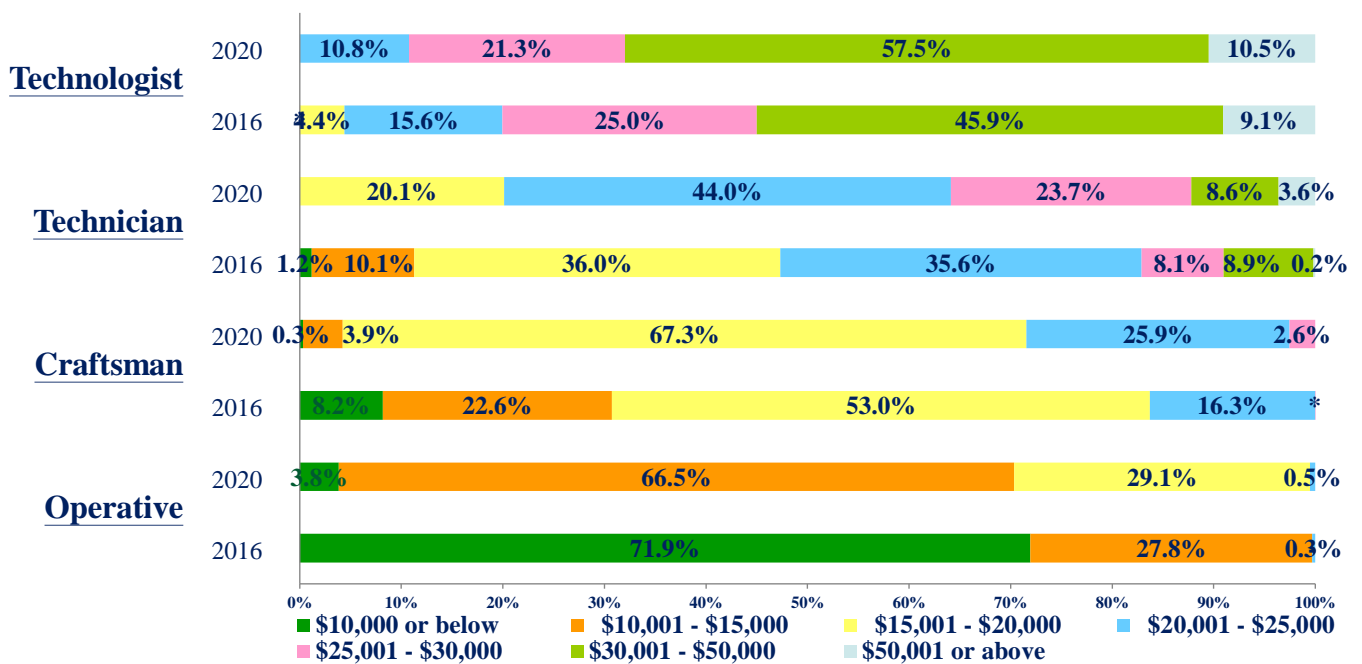


Note: Readers are alerted to interpret the compared figures presented with caution due to different survey coverage between 2020 and 2016.

Changes in Monthly Income

5.9 Compared to that of 2016, the monthly income of employees generally shifted to higher income ranges for all job levels in 2020. An average monthly income of >\$30,000 was increased from 55.0% to 68.0% (2020 vs 2016) at technologist level while >\$20,000 was increased from 52.7% to 79.9% (2020 vs 2016) at technician level. An increase in average monthly income of > \$15,000 from 2016 to 2020 at craftsman and operative level was observed (from 69.3% to 95.8% and from 0.3% to 29.6% respectively).

Figure 5.5 Average Monthly Income of Full-time Employees by Job Level



Note: * Less than 0.05%

Business Outlook

Global Economic Outlook

5.10 Although recent vaccine approvals have raised hopes of a turnaround in the pandemic in 2021, renewed waves and new variants of the virus pose concerns for the outlook. Amid exceptional uncertainty, the global economy is projected to grow 5.5 % in 2021 and 4.2 % in 2022 by taking into account of the expectations of a vaccine-powered strengthening of activity later in the year and additional policy support in a few large economies.

5.11 The strength of the recovery is projected to vary significantly across countries, with the US and Japan projected to regain late 2019 activity levels in the second half of 2021, while in the Euro area and the United Kingdom activities are expected to remain below late 2019 levels into 2022. The wide divergence reflects to an important extent differences across countries in behavioral and public health responses to infections, flexibility and adaptability of economic activity to low mobility, pre-existing trends, and structural rigidities entering the crisis.

5.12 Considerable differentiation is expected between Mainland China and other economies, where effective containment measures, a forceful public investment response, and central bank liquidity support have facilitated a strong recovery².

5.13 Expectations over Mainland China's economic outlook have turned bullish recently, with the world's second-largest economy leading the global recovery from the impact of the coronavirus with its robust export growth, strong government spending and a low infection rate. Mainland China is now expected to be the only Group of 20 nations to show a positive economic growth rate in 2020, predicted to be 1.9% by the International Monetary Fund (IMF) and 2.0% by the World Bank.

5.14 Its growth rate is expected to increase sharply in 2021 due to both the continued strong recovery and the low 2020 base for comparison. The IMF then expects Mainland China's GDP growth to be 8.2% in 2021, analysts are divided on whether Mainland China's consumer demand will return to pre-pandemic levels even with Beijing promoting its dual circulation strategy which places more emphasis on domestic consumption and home-grown innovation.

² World Economic Outlook Update - International Monetary Fund, January 2021

5.15 The continuous appreciation of Chinese Yuan, rise in wage, taxes and duties, and the up and down of oil price, interest rate and currencies making fluctuation costs of energy and materials cause a great challenge to the industry. The Mainland China is moving towards a lower but more sustainable growth path under the National 14th Five-Year Plan for 2021-2025 with focus on the following areas³:

- Replacing high-speed growth with high-quality growth;
- Rebalancing its economy with supply-side structural reform;
- Expanding domestic demand, while continuing to support international export markets;
- Driving modernisation through innovation and technological advancements; and
- Promoting high-end, intelligent, and green production.

5.16 Chinese leaders plan to expand the state's role in the economy and advance national economic security interests; use market restrictions and its One Belt, One Road global networks to foster Chinese-focused supply chains; and sharpen the use of antitrust, intellectual property (IP), to advance industrial policies. To develop strategic technologies prioritised in its plans, Mainland China is prioritising efforts to obtain foreign technology through global pathways that are not yet restricted, such as partnerships in open technology and basic research, the establishment of research and development centers overseas, and talent programs for foreign experts to work in China.

5.17 The economic policy of “Dual circulation” was launched which refers to leveraging the dual forces of domestic and global demand by developing domestic capacity while pursuing openings in global markets. The policy aims to boost both domestic supply and demand in response to uncertain global environment. The approach seeks to transfer and localise foreign capabilities in Mainland China and maintain access to global markets wherever possible, including for key inputs, technology, and exports, to develop Mainland China's capabilities. Dual circulation appears to have intensified Mainland China's non-reciprocal approach to trade whereby its market has become increasingly restrictive while Chinese firms expand overseas⁴.

5.18 By year end of 2020, Mainland China has signed the Regional Comprehensive Economic Partnership (RCEP) with other 14 countries/economies which shall give bigger opportunities for businessmen at the Great Bay Area (GBA) to intensify and synergise their multinational business. RCEP offers a free trade agreement to optimise the business environment, open up markets and reducing trade barriers. Looking forward that Hong Kong will become a RCEP member soon which will enliven our overall business.

³ “Planning Your 2021 Investment Budget: Opportunities in China”, China Briefing, 29 October, 2020

⁴ Congressional Research Service, 5 January, 2021

Local Industry Outlook

5.19 Hong Kong's electronics industry is the territory's largest merchandise export earner, accounting for 71.8 % of total exports in 2020. A substantial portion of these exports are regarded as high-tech products, especially those related to telecommunications equipment, semiconductors and computer items. Mainland China is both the major source of and the major destination for Hong Kong's electronic products trade.

5.20 According to the latest available statistics, Hong Kong was the world's largest exporter of electronic integrated circuits; the second largest exporter of computer parts/accessories, telephones/mobile phones and video cameras; and the world's third largest exporter of video recording apparatus in value terms in 2020. This is contributed by the huge re-export business handled through the territory, as Hong Kong is among the major global trading hubs.

5.21 Parts and components constitute about three quarters of Hong Kong's electronics exports, of which the majority are re-exported to Mainland China for outward processing production. Finished goods constitute about one quarter of the exports, of which the majority are consumer electronics for domestic use, including a wide range of audio-visual equipment, computer products and telecommunications equipment.⁵ Details of the export values of electronic products between 2008 and 2020 are shown in Table 5.1.

Table 5.1 Export Values of Electronic Products Between 2011 and 2020

Electronic Products Value (HK\$ Million) in Year	Domestic Exports	Re-Exports	Total Exports
2011	9 532	1 841 149	1 850 680
2012	7 393	1 973 389	1 980 782
2013	5 222	2 025 798	2 031 020
2014	3 664	2 139 817	2 143 481
2015	3 055	2 194 553	2 197 608
2016	2 968	2 261 293	2 264 261
2017	2 800	2 654 600	2 567 400
2018	2 100	2 839 800	2 841 900
2019	2 036	2 723 807	2 725 843
2020	2 551	2 817 251	2 819 801

Source: *Hong Kong External Merchandise Trade Statistics, Census and Statistics Department*

⁵ Electronics Industry in Hong Kong, TDC Research, 30 July 2020.

5.22 If the global economy continues to improve, the Hong Kong economy will likely resume positive growth in 2021, but the speed and strength of the recovery will be constrained by a number of factors. Externally, the Mainland economy is expected to grow strongly, rendering support to Hong Kong's exports. However, the COVID-19 epidemic is still spreading in many places around the world and the situation is volatile. Whether the epidemic can be alleviated and contained in the coming year would depend on when effective vaccines are rolled out and the speed at which they could be widely adopted. This in turn would affect the recovery pace of Hong Kong's retails industry.

5.23 The pandemic of COVID-19 in 2020 has largely changed the daily life of people in the world. Work-from-home are widely adopted in many companies in Hong Kong and other countries to avoid spreading and inflection of the virus. Many students have changed from face-to-face classes to online education or eLearning during the upsurge of inflection cases in 2020. Both arrangements have boosted up the internet traffic in Fixed and Mobile Broadband service and the usage of various video conferencing and collaboration applications, such as ZOOM, Microsoft Teams and Google Meeting. Besides, under the new normal due to the pandemic, more companies and their employees are switching from traditional on-premises application software to cloud-based application, such as Office 365 and Google Workspace, in order to achieve work from anywhere, on any device, without boundaries.

5.24 It is observed that e-Commerce becomes essential in our daily lives under the pandemic environment. A digital transformation is nearby that change the behavior of people in office, person and home, e.g. work from home, paperless money and consumption patterns. Our life is embraced by this "new normal" in which the industry should play a role to strengthen the technologies in this area as it becomes indispensable in our society and daily lives.

5.25 Regarding the development in telecommunications industry, the mobile broadband penetration rate of Hong Kong has reached 281% as of September 2020. Hong Kong is one of the pioneers for adoption and deployment of innovative technology and solutions in telecommunication arena. As the evolution of Mobile Communication in the industry, mobile operators in Hong Kong have launched 5G service to the public in April 2020. There are three key characteristics of 5G mobile network which lead to the evolutionary development of new business applications. The speed of 5G mobile network targets to achieve maximum download speed of 20Gbps (20 times of 4G) contributed by new frequency spectrum of 26/28GHz (mmWave) and advancement in 5G NR (New Radio) system with massive Multi-input Multi-output (MIMO). The advancement in 5G mobile network can support latency communication which greatly reduced from 30ms of 4G to 1ms in 5G. The high speed and low latency characteristics of 5G mobile network has great contribution to the emergence of various new business applications, including VR gaming, tele-consultation and even autonomous driving. The 5G network can also support massive numbers of Internet of Things devices, which can further expedite the development and deployment of Smart City Projects in Hong Kong.

5.26 On the fixed broadband front, the penetration rate of fiber-to-the-home (FTTH) and fiber-to-building (FTTB) has reached 78% as of September 2020. This is mainly contributed by the comprehensive coverage of fiber-based network in urban area in Hong Kong. To further extend the coverage of high speed broadband service in Hong Kong, telecommunication operators has accelerated the fiber cable laying in rural areas under the encouragement of subsidy scheme initiated by the Government. The subsidy scheme covers 235 villages across nine districts in the New Territories and even outlying islands, including Lamma Island. With the launch of 5G mobile service, telecommunication operators also leverage the benefits of 5G advanced technology to provide high speed broadband service to both residential and commercial customers, which is known as WTTx (Wireless-to-the-home or Wireless-to-the-business) service. The deployment of WTTx service can provide much better performance to existing customers who are still using copper solution for Internet access due to limitation of fiber coverage. Besides, it can serve as the backup solution to commercial customer for mission critical application and minimize the service impact in case unexpected fiber cable damage.

5.27 On the other hand, Mainland China is increasingly opening up to foreign investment and globalisation and this situation provide Hong Kong with a significant opportunity to maximise the role and benefits as an integrated part of the GBA Initiative to create a globally competitive business region. The Mainland's high-tech industry develops very rapidly and the local government, the public and businesses are well aware of the relatively slow growth of technology in Hong Kong. Even though the local activities of innovation and technology continued to grow but there is a long way to improve Hong Kong's global ranking in innovation and technology. Results of surveys on Hong Kong's innovation and technology reveal that Singapore, Seoul, Shenzhen, and Taipei outperform Hong Kong in the development of innovation and technology.

5.28 With reference to other countries, Hong Kong SAR Government may consider to provide innovative enterprises with tax, licenses, loan and office rental concessions in order to build an ecosystem for collaboration between different sizes of enterprises, government departments and educational institutions. Strong support of the government and active participation of enterprises have proven to be the key to success for most of the innovative cities in the world. Hong Kong should make use of Mainland China's favorable policies, advantages of an international financial center and regional cooperation toward its development of innovation and technology. The Government needs to make innovation and technology a priority from resources for R&D, technology talent, investment funding, research infrastructure, legislation and regulations, and science education. Big data and artificial intelligence are believed to be the key areas of development in the near future. The application of cloud computing and artificial intelligence in the mobile infrastructure, internet network and the daily live in Hong Kong will attract national-level R&D institutions and experts to come to Hong Kong for development.

5.29 According to latest semiconductor market forecast in November 2020 by The World Semiconductor Trade Statistics (WSTS), a non-profit organisation of semiconductor product companies and the industry's only source for monthly industry shipment statistics, WSTS expects the world semiconductor market to be up by 5.1% to US\$ 433 billion in 2020. For 2021, the global semiconductor market is projected to grow by 8.4%, driven by double-digit growth of Memory and Optoelectronics. All other product categories are also expected to show positive growth rates. All regions are expected to grow in 2021.

5.30 For the telecommunications industry, after recording a 10.5% decline in 2020 due to the impact of the COVID-19 pandemic on the industry, smartphone sales are forecasted to rebound by 11.4% as predicted by Gartner Inc. in January 2021. The growing availability of 5G networks coupled with a higher variety of 5G smartphones starting at US\$200 will boost the demand of new smartphones and the investment in 5G applications and contents. In summary, the electronics and telecommunications industries should experience robust growth in 2021.

Product Trend

A) Artificial Intelligence of Things (AIoT)

5.31 Artificial intelligence (AI) plays a growing role in Internet of Things (IoT) applications and deployments. Both investments and acquisitions in startups that merge AI and IoT have climbed over the past two years. Major vendors of IoT platform software now offer integrated AI capabilities such as machine learning-based analytics.

5.32 The value of AI in this context is its ability to quickly wring insights from data. Machine learning, an AI technology, brings the ability to automatically identify patterns and detect anomalies in the data that smart sensors and devices generate—information such as temperature, pressure, humidity, air quality, vibration and sound. Compared to traditional business intelligence tools - which usually monitor for numeric thresholds to be crossed - machine learning approaches can make operational predictions up to 20 times earlier and with greater accuracy.

5.33 Other AI technologies such as speech recognition and computer vision can help extract insight from data that used to require human review. AI applications for IoT enable companies to avoid unplanned downtime, increase operating efficiency, spawn new products and services, and enhance risk management.

B) Cloud integrated services

5.34 Cloud integration is a system of tools and technologies that connects various applications, systems, repositories and IT environments for the real-time exchange of data and processes. Once combined, the data and integrated cloud services can then be accessed by multiple devices over a network or via the internet. Cloud integration was created to break down data silos, improve connectivity and visibility, and ultimately optimize business processes. It is a response to the need to share data among cloud-based applications and to unify information components. Cloud integration has grown in popularity as the use of Software as a Service (SaaS) solutions continues to increase. International Data Corporation predicts this growth will continue and that nearly one third of the worldwide enterprise application market will be SaaS-based by 2018.

5.35 Additionally, more businesses are operating with a hybrid mix of SaaS and on-premises applications, creating a greater need for progressive integration methods. Companies who use cloud integration have synchronised data and applications, improving their ability to operate effectively and nimbly. Integration in the cloud can involve creating cloud-to-cloud integration, cloud-to-on-premises integration, or a combination of both. Integrations can address different business components, including data and applications.

5.36 The purpose of data integration is the synchronisation of data between repositories. Data can be processed, transported and/or transformed during data integration. This is a strictly data-related connection.

5.37 Application integration which enables connection of various applications and arranges continued functionality and interoperability. This is more than data sharing and involves issuing requests and commands to trigger business events or processes.

5.38 Businesses have the option of building their own integration solutions or using a third-party provider to create cloud integrations. However, as the number of applications increases and cloud integrations grow more complex, it becomes far less scalable to build specialised in-house integrations that must be recreated for each project. Using a cloud integration platform empowers organisations to perform both application and data integration using an agile, scalable and reusable solution.

C) AI & Robotics

5.39 AI and robots are a powerful combination for automating tasks. In recent times, artificial intelligence has become a significantly common presence in robotic solutions, bringing in learning capabilities and flexibility in previously rigid applications. While still being nascent, both technologies work well when combined.

5.40 Virtual assistants and chatbots propel the world with astounding automation levels, driving costs down and productivity. Virtual assistants are a manifestation of AI and machine learning through the simulation of conversation with humans. Virtual assistants and chatbots are designed to obey automated rules using capabilities called Natural Language Processing. The recent advancements in technology have significantly improved their performance. From Siri to Google Assistant and Alexa, they are the glorified versions of virtual assistants.

5.41 As an illustration of their application, the retail sector is reaping the benefits of AI and machine learning for some time now. AI is helping retailers better understand their target market through data analysis. Since data is the new currency of this digital world, it can make or break a business. Keeping this in mind, retailers are using predictive analytics to help forecast customer behavior based on sales data. E-commerce sites are using recommendations based on the customer's regional search trends, location and search history. Moreover, shopping sites like Amazon offer its customers product recommendations based on past sales data.

5.42 AI also helps retailers enhance their online store by customizing messages they send to their prospective customers. Content generation is a tedious process, but with AI's Natural Language Generation, retailers can send targeted messages and offers to customers.

5.43 Robots have been introduced to manage the inventory and sales floor, giving ultimate precision and cutting high costs. And when it comes to fashion, AI is slowly taking over the supply chain and fashion store. From sorting of dresses to sewing, these mundane tasks are performed by AI-induced systems with better accuracy and faster speed. Robots can easily stitch fabrics with precision and can also detect flaws in the material, ensuring quality assurance.

D) Data and Smart City

5.44 With Hong Kong strive to become one of the first-movers in adopting 5G technology, people, devices, knowledge and data are all going to be more interconnected than they have ever been. The research and development of cutting-edge communications technologies and solutions for both pre-5G and 5G wireless systems promises to revolutionise the way people communicate with each other - and, after commercialising our products and letting them reach the market, could potentially unlock a whole new world of unlimited possibilities in the smart future.

5.45 Combining the information and communication technologies with sensors, intelligence, and next generation network and security technologies to improve the way the city operates, shares information and, ultimately, improves the quality of life for its residents. The industry develops various tools and platforms by which Smart City technologies can seamlessly communicate with one another. This will lead to increased functionality in AI-assisted technologies and, with that, the possibility of an improved quality of life for Hong Kong residents.

E) Healthcare and medical electronics

5.46 Electronic tools make it easy for those providing care to connect and communicate with patients. Electronic health records can give practitioners at a range of healthcare facilities access to shared patient files. Practitioners can also use electronics to connect and brainstorm solutions to patients' health complaints.

5.47 Electronic healthcare records have become a key part of the health industry as providers seek to improve patient outcomes. These electronic files are easily searchable, so they can be accessed quickly when practitioners need them. By providing a more comprehensive view of patient health, electronics can help practitioners offer more effective, targeted care and can even help lower the number of office visits. This is significant for patients without easy access to health care, including people living in remote communities and those without transport.

5.48 The demand for medical-grade wearables is driving the industry to develop products that could deliver medical data of the patients to the doctors through electronics means that drastically reduce the time for body checking and more importantly to discover the potential health problems before the critical health condition arises.

F) Smart manufacturing

5.49 Smart manufacturing is a broad category of manufacturing that employs computer-integrated manufacturing, high levels of adaptability and rapid design changes, digital information technology, and more flexible technical workforce training. Other goals sometimes include fast changes in production levels based on demand, optimisation of the supply chain, efficient production and recyclability. In this concept, as smart factory has interoperable systems, multi-scale dynamic modelling and simulation, intelligent automation, strong cyber security and networked sensors.

5.50 The broad definition of smart manufacturing covers many different technologies. Some of the key technologies in the smart manufacturing movement include big data processing capabilities, industrial connectivity devices and services and advanced robotics. One of the example is the “OWL” Intelligent Production Line located in Yuen Long - 12 robots installed, with a series of self-developed, customised, mechanical and automatic device, fully utilise technologies, such as Internet of Things (IoT), real-time monitoring, machine vision, computer-aided design, artificial intelligence, data analytics, etc. The overall production capacity increases by 1.5 times.

Manpower Projection and Annual Additional Training Requirement

Manpower Projection

5.51 The manpower information (i.e. employees and vacancies) collected for the current and past manpower surveys was used to project the manpower trend of the industry in the next four years. (Please refer to *Appendix 8* for more details). The respective manpower projections from 2021 to 2024 were included as follows.

Table 5.2 Manpower Trend for 2021-2024

Year	Technologist	Technician	Craftsman
2020 (Actual)	16,478	38,299	10,028
2021	16,619 (0.9%)	38,596 (0.8%)	10,575 (5.5%)
2022	16,738 (0.7%)	38,850 (0.7%)	11,106 (5.0%)
2023	16,838 (0.6%)	39,055 (0.5%)	11,617 (4.6%)
2024	16,921 (0.5%)	39,220 (0.4%)	12,107 (4.2%)

Notes: (1) Percentage in the bracket refer to the percentage of annual change of manpower over the preceding year.
(2) Retail sector was excluded in the figures.

Annual Additional Training Requirement

5.52 The Annual Additional Manpower Requirement has taken into account the (i) projected manpower trend and (ii) wastage rate of the industry (i.e. percentage of employees leaving the industry permanently on annual basis). After consultation with the industry, the Training Board considered that an annual rate of 3% in the industry would be appropriate. The estimated Annual Additional Manpower Requirement from 2021 to 2024 is shown in Table 5.3 below.

Table 5.3 Estimated Annual Additional Manpower Requirement from 2021 to 2024

Job Level	Wastage rate of the industry	Additional Annual Manpower Requirement		
		Manpower trend (a)	Industry leavers (b)	Total (a) + (b)
Technologist	3%	111	501	612
Technician	3%	230	1,163	1,393
Craftsman	3%	520	332	852

Note: Retail sector was excluded in the figures.

5.53 Table 5.3 shows that the technician level has the greatest manpower demand, while the technologist level has the least in the coming years. On the other hand, Table 5.4 shows the manpower supply from the local tertiary and vocational training institutes offering related training programmes and it is anticipated that not 100% of these graduates will enter into employment and work for the industry. In general, the graduates also take up electronics engineering and related jobs in other industries such as electrical and mechanical services, building services, information technology and manufacturing. It seems at first that the annual additional manpower requirement for the technologist level be met for coming years (about 50% of graduates will enter into employment from past record). However, in view of the new government initiatives and the increase in number of start-ups in HKSTP and Hong Kong Cyberport, it is anticipated that technologists are still in demand in coming years. Regarding the demand for technicians and craftsmen, it is noted that some of the technician and craftsman jobs may be filled by the training of secondary school leavers through apprenticeship and internal promotion of experienced craftsmen and operators respectively. According to the survey findings, there were 505 technician and 472 craftsman trainees in the industry at the time of the survey, and employees would be promoted to the technician and craftsman level jobs in the coming years. It is anticipated that there will be demand for technician and craftsman and the training institutions should strengthen their curriculum and increase the corresponding training places to attract more students.

Table 5.4 Estimated Annual Additional Manpower Requirement and Annual Supply of Graduates for 2021 to 2024

Job Level	Estimated annual additional manpower requirement	Estimated annual additional manpower requirement for related job title#	Estimated No of graduates per annual*
Technologists	551 – 673	462 – 563	930
Technician	1 254 – 1 532	1 108 – 1 354	786
Craftsman	767 – 937	621 – 759	286

Note:

Related job titles of the electronics and telecommunications industries for

Technologist level include:

- Electronics / Computer Engineer ; Telecommunications Engineer;
- Manufacturing Engineer ; Quality Assurance / Control Engineer; and
- System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer.

Technician Level include:

- Electronics Technician ; Telecommunications Technician;
- Draughtsman;
- Manufacturing Technician ; Quality Assurance / Control Technician
- Programmer ; Software Technician
- Web Developer / Designer ; Computer Game Designer; and
- Sales Technician.

Craftsman Level include:

- High Speed Data Network & Wireless Data System Integrator ; Cable Joiner; and
- Electronics Craftsman.

* Average estimated no of graduates of AY 2021/22 and 2022/23

6. Recommendations

6.1 In view of the above, the Training Board has a cautious optimistic view that the electronics and telecommunications industries will continue to grow steadily. Thus, the Training Board recommends the following measures for employers to consider coping with present situation and challenges ahead:

Government

Enhanced support to development of innovation and technology

6.2 Strong support of the government and active participation of enterprises have proven to be the key to success for most of the innovative cities in the world. Hong Kong should make use of Mainland China's favorable policies, advantages of an international financial center and regional cooperation toward its development of innovation and technology. The Hong Kong government needs to make innovation and technology a priority from resources for research and development, technology talent, investment funding, research infrastructure, legislation and regulations, and science education as well as providing more support to the industry through the Re-industrialisation Funding Scheme⁶ for promoting smart manufacturing and the Research Talent Hub⁷ to encourage the R&D activities in Hong Kong.

Providing assistances to develop Hong Kong into a technology and innovation hub

6.3 Strengthening Hong Kong's role as an international finance center and offshore Chinese Yuan center with position as the center of investment, financing and venture capital activities. These advantages can also take Hong Kong to the frontline of developing into a technology and innovation hub by providing the necessary assistances to create the ecosystem that is essential for fostering innovation, entrepreneurship, international patent management and international business collaboration.

⁶ <https://www.itf.gov.hk/en/funding-programmes/facilitating-technology/rfs/index.html>

⁷ <https://www.itf.gov.hk/en/funding-programmes/nurturing-talent/research-talent-hub/>

Image of a prospective career

6.4 The government should promote the image of the industry by outlining a more promising perspective for local students to have aspirations to be recruited in the electronics and telecommunications related careers.

Support for start-ups

6.5 In collaboration with the industry, more measures should be provided to help the entrepreneurs in the Hong Kong Science and Technology Parks Corporation and Hong Kong Cyberport, so that they could operate their business with necessary guidance and training. These entrepreneurs might train up a pool of talents to meet the manpower demand in the future.

Industries

Enhanced promotion of Hong Kong to be a major information and telecommunications hub

6.6 The industries should collaborate with the Government to enhance promotion of Hong Kong as an international trade network, open markets, relatively low tax rates, a fair environment, well established international standard for intellectual property protection and judicial system, to attract overseas and mainland top research institutions to help developing Hong Kong into a major information and telecommunications hub in the region for healthcare, child care, elderly care, and smart city.

Clarity of Career Paths

6.7 It is important to provide clear career paths for various levels of technical professionals. To arouse young people's interest in joining the industry, information such as structured progression pathways and career prospects could be made available to help them have a better understanding of the future opportunities of the industry.

Upgrading courses for in-service practitioners

6.8 The trade associations should collaborate with the education institutions to organise upgrading courses and webinars to in-service practitioners to upgrade their technical knowledge and skills in latest development of new technologies (e.g. Artificial Intelligence, IoT and Big Data, etc.) and legal regulations related to the sector.

Education Institutions

Update course curriculum with advanced/ emerging skills needed

6.9 The education institutions should update the related curriculum of the modules with reference to the advanced/ emerging skills that are in demand in the industry,

Develop curriculum related to Industry 4.0

6.10 In order to keep pace with the development of Industry 4.0, they should organise relevant training programmes related to Industry 4.0 such as applications of AI in both industrial and non-industrial sectors.

Closer collaboration with leading companies

6.11 Education institutions could work with leading companies in the industry, to provide updated training to teaching staff and cooperate in research project in order to fill up the lagging gap between the curriculum and the industry expectation.

Employers

Providing Mentorship

6.12 To enrich the new recruits with the development and culture of their companies, the employers should provide mentorship to train up newly recruited engineers.

Offer More Training Places

6.13 Employers should consider to offer more opportunities of training places leading to recognition of professional associations such as the Hong Kong Institution of Engineers.

Employees

Proactive to learn

6.14 Employees should have the capability to self-learn through on-line training courses and classroom training. They should keep abreast of the development with new technologies, and be creative to develop new products/ services using the new technologies.

Make use of Government's subsidies

6.15 Employees are encouraged to make use of the subsidies provided by the Government such as the Continuing Education Fund and the Re-industrialisation and Technology Training Programme to upgrade their knowledge and skills.

6.16 On top of the individual company's training needs, the Training Board suggests that the "Skills Employees Need to Enhance" at *Appendix 9I* will be a good reference on potential areas of training for employers. In order to keep pace with the technological trend, employers are recommended to step up their training efforts in order to ensure supply of well-equipped manpower to meet the challenges and business opportunities ahead. The Training Board also recommends the Vocational Training Council and other training organisations to keep track of the training needs of the electronics and telecommunications industries and to meet such needs in time by providing suitable and timely training courses.

6.17 The Training Board will conduct another manpower survey of the electronics and telecommunications industries in 2024 to review and update the manpower requirements of the two industries.

Annual Intake of Trainees

6.18 At the time of the survey, there were only 106, 505 and 472 trainees respectively at the technologist, technician and craftsman levels. Since it normally takes two to four years to train a technologist and three to four years a technician or a craftsman, it is evident that the present training efforts provided by employers are insufficient to satisfy the industries' needs.

6.19 The Training Board recommends that the electronics and telecommunications industries as a whole should embark on a training programme of a scale as set out in paragraph 5.52 for 2021 – 2024. A breakdown of the manpower requirements into various principal jobs is given at *Appendix 9J*. For manpower planning at company level, individual employers are requested to note that the volume of training when expressed in terms of existing manpower represents an average annual intake of trainees of about 3.8%, 3.5% and 8.4% respectively of the total number of technologists, technicians and craftsmen presently employed.

6.20 The recommended training routes for technologists, technicians and craftsmen are outlined in *Appendix 13*.

Educational and Training Institutions

6.21 The Hong Kong Institute of Vocational Education of the VTC and the Pro-Act Training and Development Centre (Electronics), as well as several other tertiary institutions, offer a wide range of pre-employment and in-service training courses for workers in the electronics and telecommunications industries. The Training Board encourages employers to recruit their graduates as apprentices/trainees and sponsor their in-service employees to attend relevant training courses.

Hong Kong Science and Technology Parks Corporation

6.22 Comprising Science Park, InnoCentre and Industrial Estates, Hong Kong Science & Technology Parks Corporation (HKSTP) is a statutory body dedicated to building a vibrant innovation and technology ecosystem to connect stakeholders, nurture technology talents, facilitate collaboration and catalyse innovations to deliver social and economic benefits to Hong Kong and the region.

6.23 Established in May 2001, HKSTP has been driving the development of Hong Kong into a regional hub for innovation and growth in several focused clusters including Electronics, Information & Communications Technology, Green Technology, Biomedical Technology, Materials and Precision Engineering. They enable science and technology companies to nurture ideas, innovate and grow, supported by their R&D facilities, infrastructure, and market-led laboratories and technical centres with professional support services. They also offer value added services and comprehensive incubation programmes for technology start-ups to accelerate their growth.

6.24 Technology businesses benefit from their specialised services and infrastructure at Science Park for applied research and product development; enterprises can find creative design support at InnoCentre; while skill-intensive businesses are served by their three industrial estates at Tai Po, Tseung Kwan O and Yuen Long.

Hong Kong Applied Science and Technology Research Institute

6.25 Hong Kong Applied Science and Technology Research Institute Company Limited (ASTRI) was set up by the HKSAR Government in 2000 with the mission of enhancing Hong Kong's competitiveness in technology-based industries through applied research. In 2019-20, ASTRI's Research and Development (R&D) organisation was restructured to work across five Technology Divisions (TDs): Artificial Intelligence and Big Data Analytics (AIBD); Communications (COM); Cybersecurity, Cryptography and Trusted Technologies (CCT); Integrated Circuits and Systems (ICS); and IoT and Sensors (IoTSEN). These five TDs are delivering market-relevant applications in five areas: Smart City, Financial Technology, Intelligent Manufacturing, Health Technologies, and Application Specific Integrated Circuits (this latter through our mandate as the Hong Kong branch of the Chinese National Engineering Research Centre (CNERC))

6.26 Since 2020, ASTRI has filed 1,220 patents (of which 866 have been granted and 23 sold), completed 544 research projects and had almost 750 of its in-house-developed technologies transferred to and used in various industries. In 2019-20 alone, we filed 66 patents and had 45 granted. The Training Board urges employers to seek assistance from ASTRI for R&D development and technology transfers.

STEM Education

6.27 The promotion of STEM education aligns with the worldwide education trend of equipping students to meet the changes and challenges in our society and around the world with rapid economic, scientific and technological developments. While technological development has become an integral part of the industry, STEM education for students is of paramount importance for the sustainable development of the industry. To align with the strategic direction of the HKSAR Government, VTC has set up STEM Education Centers recently to support students in the learning of STEM subjects and promote STEM education among students and teachers in secondary schools.

VTC Earn & Learn Scheme

6.28 In the 2014 Policy Address, the HKSAR Government announced the launching of the Pilot Training and Support Scheme, also known as VTC Earn and Learn Scheme (The Scheme), which aims to attract and retain talents for specific industries with a keen demand for labour, by integrating structured apprenticeship training programmes and clear career progression pathways. Under the Scheme, apprenticeship training for targeted industries will be provided to students alongside a guaranteed level of salary and incentive allowance.

6.29 The Scheme aims to cover industries meeting the following criteria –

- the industry is facing labour shortage and/or ageing problems, and it has difficulties in hiring and retaining young people;
- the relevant trades covered under the industry are very specialized and with a high level of technology contents; and
- the industry is committed to provide allowance or subsidy to trainees and to offer a certain salary level to trainees who have completed the apprenticeship training and are willing to join relevant industries.

6.30 The Scheme has been well received by industries and trainees and regularised in AY 2019/20. The Scheme has successfully enrolled 5,712 students as at end of August 2020. The regularised Scheme has an annual quota of 1,200 trainees and an average monthly allowance of \$2,500 for a maximum of 3 years during the period apprenticeship. An upper limit of \$90,000 will be received by each student in three years.

6.31 The Government also offered a Pilot Incentive Scheme to Employers (PISE) to encourage Earn & Learn employers to join hand with VTC to implement Workplace Learning and Assessment (WLA). The aims of WLA was to engage employers in assessment of the competencies and performance of the trainees in the workplace, which makes learning more effective.

6.32 Implementation of WLA under Earn & Learn programmes starts from cohort AY 2019/20. For the first cohort of PISE implementation, 71 Earn & Learn employers have conducted WLA for some 305 trainees as at 31 August 2020. To encourage employers' participation, the Government would provide an amount of HK\$3,000 per month for each trainee, with a maximum of HK\$36,000 to those participated employers after the assessment tasks were completed.

Apprenticeship Training organised by Office of Director of Apprenticeship of Vocational Training Council

6.33 Office of Director of Apprenticeship offers free services to help employers organise the statutory apprenticeship training schemes through which technicians and craftsmen can be effectively trained to meet the needs of the electronics and telecommunications industries. The Training Board recommends employers to contact ODA for assistance in setting up training schemes and recruiting apprentices

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Appendix 1

Membership of the Electronics and Telecommunications Training Board (June 2020)

Chairman

Mr Christopher TSE Hung-keung (nominated by the Hong Kong Electronic Industries Association Limited)

Vice-Chairman

Ir Dr LAM Hiu-fung, M.H. (ad personam)

Member

Dr Stephen CHAN Wing-chi (nominated by an electronics services / manufacturing, telecommunications services company)

Ir Alan CHAN Ying-kwong (nominated by the Hong Kong Institution of Engineers)

Mr CHEUNG Chi-kin (nominated by a broadcasting company)

Mr Victor CHOI Kim-shing (nominated by the Hong Kong Electronics and Technologies Association)

Mr Sam HUI Kin-sang (nominated by an electronics services / manufacturing, telecommunications services company)

Mr Myron KWAN Man-lung (nominated by an electronics services / manufacturing, telecommunications services company)

Dr LAM Sai-keung (nominated by an electronics trading / engineering services company)

Mr Henry LAU (nominated by the Federation of Hong Kong Industries)

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Ms Evelyn LEE Yuk-kuen	(nominated by an electronics services / manufacturing, telecommunications services company)
Dr Lawrence POON Chi-kin	(nominated by the Hong Kong Productivity Council)
Mr SI Dik-kwong	(nominated by an electronics services / manufacturing, telecommunications services company)
Mr Andrew SOO On	(nominated by an electronics services / manufacturing, telecommunications services company)
Mr TAM Chi-chung	(nominated by the Hong Kong & Kowloon Electronics Industry Employees' General Union)
Dr WONG Chun	(nominated by the Chinese Manufacturers' Association of Hong Kong)
Prof Patrick YUE	(nominated by a Local University)
Ir Dr YIU Hing-leung	(nominated by the Hong Kong Science and Technology Parks Corporation)
Mr CHEW Tze-shing	(representing the Director - General of Communications)
Mr LEE Che-kit	(representing the Director of Electrical and Mechanical Services)
Miss MOK Pei-lee Priscilla	(representing the Director - General of Trade and Industry)
Dr LEUNG Hing-pong Joseph	(representing the Executive Director of the Vocational Training Council)
Dr LAU Hing-keung, George	
Mr LEUNG Wing-kwan Freddy	(Vocational Training Council)

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Appendix 2

Terms of Reference of the Electronics and Telecommunications Training Board

1. To determine the manpower demand of the industry, including the collection and analysis of relevant manpower and student/trainee statistics and information on socio-economic, technological and labour market developments.
2. To assess and review whether the manpower supply for the industry matches with the manpower demand.
3. To recommend to the Vocational Training Council (the Council) the development of vocational and professional education and training (VPET) facilities to meet the assessed manpower demand.
4. To advise the Council on the strategic development and quality assurance of its programmes in the relevant disciplines.
5. To prescribe job specifications for the principal jobs in the industry defining the skills and knowledge and advise on relevant training programme specifying the time a trainee needs to spend on each skill element.
6. To tender advice in respect of skill assessments, trade tests and certification for in-service workers, apprentices and trainees, for the purpose of ascertaining that the specified skill standards have been attained.
7. To advise on the conduct of skill competitions in key trades in the industry for the promotion of VPET as well as participation in international competitions.
8. To liaise with relevant bodies, including employers, employers' associations, trade unions, professional institutions, training and educational institutions and government departments, on matters pertaining to the development and promotion of VPET in the industry.
9. To organise seminars/conferences/symposia on VPET for the industry.
10. To advise on the publicity relating to the activities of the Training Board and relevant VPET programmes of the Council.
11. To submit to the Council an annual report on the Training Board's work and its recommendations on the strategies for programmes in the relevant disciplines.
12. To undertake any other functions delegated by the Council in accordance with Section 7 of the Vocational Training Council Ordinance.

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Appendix 3

Membership of the Working Party of the 2020 Manpower Survey

Convenor

Mr Myron KWAN Man-lung (An electronics services / manufacturing,
telecommunications services company)

Member

Ir Alan CHAN Ying-kwong (The Hong Kong Institution of Engineers)

Mr Victor CHOI Kim-shing (The Hong Kong Electronics and Technologies
Association)

Mr Sam HUI Kin-sang (An electronics services / manufacturing,
telecommunications services company)

Ir Dr LAM Hiu-fung, M.H. (ad personam)

Mr LEE Che-kit (representing the Director of Electrical and Mechanical
Services)

Ms Evelyn LEE Yuk-kuen (An electronics services / manufacturing,
telecommunications services company)

Mr SI Dik-kwong (An electronics services / manufacturing,
telecommunications services company)

Mr Andrew SOO On (An electronics services / manufacturing,
telecommunications services company)

Mr TAM Chi-chung (The Hong Kong & Kowloon Electronics Industry
Employees' General Union)

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Mr Christopher TSE Hung-keung (The Hong Kong Electronic Industries Association Limited)

Mr Basil WAI Siu-bong (The Hong Kong Electronic Industries Association)

Dr WONG Chun (The Chinese Manufacturers' Association of Hong Kong)

Ir Dr YIU Hing-leung (The Hong Kong Science and Technology Parks Corporation)

Dr LAU Hing-keung, George (representing the Director - General of Trade and Industry)

Dr LEUNG Hing-pong Joseph (representing the Executive Director of the Vocational Training Council)

Mr LEUNG Wing-kwan Freddy (Vocational Training Council)

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Appendix 4

Definition of Terms

Average monthly remuneration package	The monthly remuneration package, including the basic wage, regular overtime pay, cost of living allowance, meal allowance, commission and bonus. It is an average figure among employees engaging in the same principal job.
Employees	All personnel who are directly paid by the company and who are either at work or temporarily absent from work, viz sick leave, maternity leave, annual vacation, casual leave or on strike. They include all full-time/part-time personnel (excluding trainees) who are engaged in principal jobs related to various job levels.
Diploma/Certificate	Technical and vocational education programmes, including Diploma/Certificate courses, Diploma of Foundation Studies, Diploma of Vocational Education and programmes at the craft level or equivalent.
First degree	The first degree(s) offered by local or non-local education institutions, or equivalent.
Postgraduate degree	A higher degree(s) (e.g. master degree) offered by local or non-local education institutions, or equivalent.
Secondary 4 to 7	The education programmes under the Hong Kong Certificate of Education Examination (HKCEE), the Hong Kong Diploma of Secondary Education (HKDSE) Examination, Diploma Yi Jin, or equivalent.
Sub-degree	The Associate Degree, Higher Diploma, Professional Diploma, Higher Certificate, Endorsement Certificate, Associateship or equivalent programmes offered by local or non-local institutions.

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Technologist level	A technologist is a person who has the qualification and experience equivalent to that required for corporate membership of a professional institution. He/She should be competent in analysing and solving a wide range of technical problems. Furthermore, he/she should be able to assume personal responsibility for the development and application of engineering principles, to exercise original thought and judgment, to keep abreast of technology, to apply the latest techniques and to supervise/develop his/her subordinates.
Technician level	A technician is a person who occupies a position between the technologist and the craftsman. His/Her education, training and practical experience enable him/her to apply proven techniques and procedures to carry out technical tasks, normally under the guidance of a technologist.
Craftsman level	A craftsman is a skilled worker who is able to apply his/her skills to a wide range of jobs within his/her trade, with minimum direction and supervision. A craftsman possesses not only practical skills but also related theoretical knowledge which enables him/her to adapt himself/herself to new technologies.
Operative level	An operative is a person who performs tasks in the assembly of products in accordance with predetermined job instructions or operates machine(s) which have been set up by other persons.
Trainees	Trainees includes all employee receiving any form of training and apprentices under a contract of apprenticeship.
Vacancies	The unfilled, immediately available job openings for which the establishment is actively trying to recruit personnel at the time of survey.

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Appendix 5



VOCATIONAL TRAINING COUNCIL
職業訓練局

THE 2020 MANPOWER SURVEY OF THE ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES
電子及電訊業2020年人力調查

The 2020 Manpower Survey of the Electronics and Telecommunications Industries (EC) aims at collecting manpower information of the industries concerned for formulating recommendations on future manpower training. Please kindly provide the information of your establishment as at **1st June 2020** by answering the questionnaire. Thank you.

電子及電訊業2020年人力調查旨在蒐集業內人力情況的最新資料，並按此為未來人力訓練制訂適當建議。懇請貴機構根據**2020年6月1日**的人力情況填寫此問卷。多謝合作。

Establishment Information

機構資料

(For official use)

Industry Code _____

NATURE OF BUSINESS:

業務性質

- | | |
|---|---|
| <input type="checkbox"/> Manufacturing
製造 | <input type="checkbox"/> Engineering Services
工程服務 |
| <input type="checkbox"/> Information Technology Service
資訊科技服務 | <input type="checkbox"/> Import and Export Trading
出入口貿易 |
| <input type="checkbox"/> Telecommunications
電訊 | <input type="checkbox"/> Wholesales
批發 |
| <input type="checkbox"/> Retails
零售 | <input type="checkbox"/> Others, please specify
其他，請註明 |
- _____

TOTAL NO. OF PERSONS ENGAGED: _____

僱員總人數

Details of Contact Person*

聯絡人資料*

NAME OF PERSON TO CONTACT: _____

聯絡人姓名

POSITION: _____

職位

TEL. NO.: _____ - _____

電話

FAX NO.: _____

圖文傳真

E-MAIL: _____

電郵

* The information provided will be used for the purpose of this and subsequent manpower surveys.
所提供資料將用作是次及日後人力調查之用。

Part I – Manpower Information

第一部份 – 人力情況

Please complete columns ‘B’ to ‘F’ of the questionnaire according to the list of principal jobs by referring to Appendix B for job description of individual job.

請根據列表中的主要職務，並參考附錄B有關各種職務的工作說明來填寫表內各欄‘B’至‘F’。

Principal Jobs (Full-time employees) 主要職務 (全職僱員)

	(A) Principal Job 主要職務 (See Appendix B) (參閱附錄 B)	(B) No. of Employees as at Survey Reference Date (Excl. trainees [#]) 在統計日期的 僱員人數 (受訓者 [#] 除外)	(C) No. of Trainees [#] as at Survey Reference Date 在統計日期的 受訓者 [#] 人數	(D) No. of Vacancies as at Survey Reference Date 在統計日期的 空缺額	(E) Forecast Number of Employees as at June 2021 (Excl. trainees [#]) 預計在2021年6月的 僱員人數 (受訓者 [#] 除外)	(F) Average Monthly Remuneration Package of Employees (Excl. trainees [#]) 僱員之每月 平均薪酬 (受訓者 [#] 除外) Code 編號 1 \$10,000 or below 或以下 2 \$10,001 - \$15,000 3 \$15,001 - \$20,000 4 \$20,001 - \$25,000 5 \$25,001 - \$30,000 6 \$30,001 - \$50,000 7 \$50,001 or above 或以上
		Please enter a zero ‘0’ in the box if no employee/ trainees/ vacancy. 如沒有僱員/受訓者/空缺，請在方格內 填入‘0’。				
e.g. 例子	Job Title A (3 employees, 1 Trainee and 2 vacancies) 職位甲(3名僱員, 1名受訓者及2個空缺)	3	2	1	5	6
TECHNOLOGIST LEVEL 技師級						
A technologist is a person who has the qualification and experience equivalent to that required for corporate membership of a professional institution. He/She should be competent in analysing and solving a wide range of technical problems. Furthermore, he/she should be able to assume personal responsibility for the development and application of engineering principles, to exercise original thought and judgment, to keep abreast of technology, to apply the latest techniques and to supervise/develop his/her subordinates. 技師須具備相當於有關專業學會正式會員所需的資歷及經驗，並能分析及解決各類技術上的問題。此外，亦須負責發展及應用工程原理，具創見和判斷力；與科技發展並進，應用最新技術，以及督導和培訓下屬。						
101	Electronics / Computer Engineer ; Telecommunications Engineer 電子/電腦工程師；電訊工程師					
102	Electrical Engineer 電機工程師					
103	Mechanical Engineer 機械工程師					
104	Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證/控制工程師					
105	Chemical Engineer 化學工程師					
106	Product/Graphic Designer 產品/平面設計員					
107	System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer 系統分析員；軟件工程師；人工智能工程師； 機器學習專家；用戶體驗設計師					
TECHNICIAN LEVEL 技術員級						
A technician is a person who occupies a position between the technologist and the craftsman. His/Her education, training and practical experience enable him/her to apply proven techniques and procedures to carry out technical tasks, normally under the guidance of a technologist. 技術員的職級介乎技師/經理級人士與技工之間，須具備相當學歷、工作經驗及曾接受訓練，一般可在技師/經理級人士的督導下，運用已確立的技術和方法完成工作。						
201	Electronics Technician ; Telecommunications Technician 電子技術員；電訊技術員					
202	Mechanical Technician 機械技術員					
203	Draughtsman 繪圖員					

[#] “Trainees” refer to those employees undergoing any form of training, and includes trainees and apprentices under a contract of apprenticeship.
「受訓者」指正在接受各種形式訓練的僱員，包括受訓者及根據學徒合約受聘的學徒。

Job Code 職位編號	(A) Principal Job 主要職務 (See Appendix B) (參閱附錄 B)	(B) No. of Employees as at Survey Reference Date (Excl. trainees#) 在統計日期的 僱員人數 (受訓者# 除外)	(C) No. of Trainees# as at Survey Reference Date 在統計日期的 受訓者# 人數	(D) No. of Vacancies as at Survey Reference Date 在統計日期的 空缺額	(E) Forecast Number of Employees as at June 2021 (Excl. trainees#) 預計在2021年6月的 僱員人數 (受訓者# 除外)	(F) Average Monthly Remuneration Package of Employees (Excl. trainees#) 僱員之每月 平均薪酬 (受訓者# 除外)
	Please enter a zero '0' in the box if no employee/ trainees/ vacancy. 如沒有僱員/受訓者/空缺, 請在方格內 填入 '0'。					Code 編號 1 \$10,000 or below 或以下 2 \$10,001 - \$15,000 3 \$15,001 - \$20,000 4 \$20,001 - \$25,000 5 \$25,001 - \$30,000 6 \$30,001 - \$50,000 7 \$50,001 or above 或以上
e.g: 例子	Job Title A (3 employees, 1 Trainee and 2 vacancies) 職位甲(3名僱員, 1名受訓者及2個空缺)	3	2	1	5	6
TECHNICIAN LEVEL (con't) 技術員級 (續)						
204	Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員 ; 品質保證 / 控制技術員					
205	Supervisor ; Foreman ; Leader 監督 ; 管工 ; 組長					
206	Programmer ; Software Technician 程式編製員 ; 軟件技術員					
207	Web Developer / Designer ; Computer Game Designer 網站開發員 / 設計員 ; 電腦遊戲設計員					
208	Sales Technician 推銷技術員					
CRAFTSMAN LEVEL 技工級						
A craftsman is a skilled worker who is able to apply his/her skills to a wide range of jobs within his/her trade, with minimum direction and supervision. A craftsman possesses not only practical skills but also related theoretical knowledge which enables him/her to adapt himself/herself to new technologies. 技工是指熟練工人, 能在有限度的指示及督導下, 應用各種技能執行個別行業的職務。技工除須具備實際技能外, 亦需有相關的理論知識, 以便能適應日新月異的科技發展。						
301	High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工 ; 電纜連接技工					
302	Electronics Craftsman 電子技工					
303	Electrician 電氣技工					
304	Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工 (保養 / 裝配打磨工、機床工、工具 / 工模製造及修理工)					
OPERATIVE LEVEL 操作工級						
An operative is a person who performs tasks in the assembly of products in accordance with predetermined job instructions or operates machine(s) which have been set up by other persons. 操作工是指那些能按照既定的工作指示裝配配件使成製成品, 或操作已由他人校妥的一種或多種機床之工人。						
401	Operator ; Quality Assurance / Control Operator ; General Worker 操作工 ; 品質保證 / 控制工 ; 雜工					
OTHER RELATED STAFF 其他相關員工						
<i>For Official Use</i>						

"Trainees" refer to those employees undergoing any form of training, and includes trainees and apprentices under a contract of apprenticeship.
「受訓者」指正在接受各種形式訓練的僱員, 包括受訓者及根據學徒合約受聘的學徒。

Part II
第二部份

Internal Promotion

內部晉升

1. Number of internal promotion in the past 12 months:

過去十二個月內部晉升的僱員人數：

(a) From Technician to Technologist 由技術員晉升至技師	
(b) From Craftsman to Technician 由技工晉升至技術員	

New Recruitment

新聘僱員

2. Number of full-time employees **newly recruited** in the past 12 months.

過去十二個月內，貴機構**新招聘**的全職僱員人數。

	<u>Technologist Level</u> 技師級	<u>Technician Level</u> 技術員級	<u>Craftsman Level</u> 技工級	<u>Operative Level</u> 操作工級
(a) Total new recruits 新招聘總人數				
(b) Number of new recruits with the experience in electronics and telecommunications services 新招聘僱員中， 具 電子及電訊業的相關經驗				

Employees Leaving the Establishment

僱員離職

3. Number of full-time employees left in the past 12 months:

過去十二個月內離職的全職僱員人數：

(a) Technologist Level

技師級

(b) Technician Level

技術員級

(c) Craftsman Level

技工級

(d) Operative Level

操作工級

4. Expected number of employees who will be retiring in coming 12 months:

預計在未來十二個月內退休的僱員人數：

(a) Technologist Level

技師級

(b) Technician Level

技術員級

(c) Craftsman Level

技工級

Preferred Education level, training mode and training period

宜有的教育程度、訓練方式及訓練期

5. Please provide preferred education level, training mode and training period of full-time employees (should tick one “√” only for each job level).

請提供全職僱員宜有的教育程度、訓練方式及訓練期（每職級只可剔“√”選一個）。

	<u>Technologist Level</u> 技師級	<u>Technician Level</u> 技術員級	<u>Craftsman Level</u> 技工級
A. Education Level 教育程度			
(i) Postgraduate Degree 研究生學位	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(ii) First Degree 學士學位	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Sub-degree (e.g. Higher Diploma) 副學位（例如高級文憑）	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Diploma/Certificate 文憑／證書	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(v) Secondary 4 – 7 中四至中七	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(vi) Secondary 3 or below 中三或以下	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Training Mode 訓練方式			
(i) Graduate traineeship 工科畢業生訓練	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(ii) On-the-job training 在職訓練	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Apprenticeship 學徒訓練	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Others (please specify) 其他（請說明） _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Training Period 訓練期			
(i) 4 years or above 四年或以上	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(ii) 3 to less than 4 years 三年至四年以下	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iii) 2 to less than 3 years 二年至三年以下	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iv) 1 to less than 2 years 一年至二年以下	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(v) Below 1 year 一年以下	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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Training**培訓**

6. By making reference to Appendix C, please indicate the skills that should be enhanced for full-time employees.

(You may wish to tick “✓” more than 1 skill for each job level)

請參考附錄 C，請指出 貴機構的全職僱員需要加強培訓的技能。（每職級可剔“✓”選多個課程）

Skill 技能	Technologist Level 技師級	Technician Level 技術員級	Craftsman Level 技工級
A. Strategic Planning and Management Skill 策略規劃及管理技巧			
(i) Business continuity management 業務持續性管理	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Quality management 質量管理	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Risk management 風險管理	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Strategy Planning and Implementation 戰略規劃及推行	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Technical Skills 技術性技能			
(i) Automation Management 自動化管理	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Artificial Intelligence and Big Data Analytics 人工智能及大數據分析	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iii) Maintenance 保養	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iv) Manufacturing and Operations 製造與運營	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(v) Network Technology Management 網絡技術管理	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(vi) Production Management 生產管理	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(vii) Product Development and Testing 產品開發與測試	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(viii) Productivity and Innovation 生產力與創新	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(ix) System Integration 系統整合	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(x) Information Security 資訊保安	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Soft Skills 軟性技巧			
(i) Business Network Building 商業網絡建設	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(ii) Organisational Development 組織發展	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
(iii) People Management 人事管理	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>For Official Use</i>			
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Business Environment

行業概況

7. Please indicate your view on the expected change in business situation of your establishment in the next 12 months. (Please tick in the box as appropriate).

請指出 貴機構在未來十二個月業務狀況的變化 (請在適當的格內填上“√”號)。

Better
較佳

Stable
穩定

Worsen
較差

Uncertain
不肯定

8. Please indicate your view on the reasons leading to the change of the business situation mentioned in Question 7. (Please tick in the box as appropriate, may choose more than one option)

就問題7提供的答案，請指出引起該業務狀況變化的原因。(請在適當的格內填上“√”號，並可選擇多於一項)

Government subsidy on equipment on new technology
政府對新技術設備的津貼

Government subsidy on staff training
政府對員工培訓的津貼

Uncertain economic environment
不明確的經濟環境

Rising costs
成本上漲

Others, please specify :
其他, 請列明 :

9. Please indicate the **top three factors** that your establishment consider useful to attract new entrants to the industry (please tick in the box as appropriate):

請指出 貴機構認為最能吸引新人入行的**首三個**因素 (請在適當的格內填上“√”號)

Clear career progression pathway
清晰事業晉升階梯

Professional image of the industry
行業專業形象

Attractive remuneration package
吸引的薪酬及條件

Government subsidised training programmes leading to the relevant qualifications for new entrants
有政府資助相關符合入行資格的培訓課程

Compliance to safety regulation
符合安全條例

Application of new technology to smoothen operation and enhance safety
應用新科技令運作暢順及加強安全

Job security
工作穩定

Others, please specify :
其他, 請列明

End of Questionnaire. Thank You for Your Co-operation.
問卷完，多謝合作。

The 2020 Manpower Survey of the Electronics and Telecommunications Industries
電子及電訊業 2020 年人力調查

Explanatory Notes

附註

Part I
第一部份

1. Principal Jobs - Column 'A'
 主要職務——‘A’欄

- (a) Please go through column 'A' and mark those principal jobs applicable to your establishment. For detailed job descriptions for principal jobs, please refer to Appendix B.
 請瀏覽‘A’欄，選取適用於貴機構的主要職務。有關詳細的工作說明，請參閱 附錄 B。
- (b) Please note that some of the job titles may not be the same as those used in your establishment. Please classify an employee according to his/her major duty and supply the required information if the jobs have similar or related functions.
 調查表內部分職稱可能有別於貴機構所採用。請根據僱員的主要職責分類。若員工職責與表內某職務的職責相近，可視作相同職務，請提供所需資料。
- (c) In the event where an employee's duties in your establishment are split between two or more job titles, please use the job title that best describes his/her principal responsibility.
 如貴機構有員工身兼多項職責，請選用最能反映其主要職責的職稱。
- (d) Please add in column 'A' titles of any principal jobs not mentioned in job descriptions (Appendix B); briefly describe them in respect of the appropriate job categories.
 如貴機構另有電子及電訊業的主要職務未載於工作說明（附錄 B），請一併填入‘A’欄內，並簡述其所屬的職務類別及等級。

2. Number of Employees as at Survey Reference Date (Excl. trainees) - Column 'B'
 在統計日期的僱員人數（受訓者除外）——‘B’欄

For each principal job, please fill in the total number of full-time employees (excluding trainees) as at survey reference date.

“Full Time Employees” refer to those working full-time (i.e. at least 4 weeks a month, and not less than 18 hours in each week) under the payroll of the establishment. These include proprietors and partners working full-time for the establishment. These definitions also apply to ‘full-time employee(s)’ appearing in other parts of the questionnaire. 請填寫貴機構於統計日期僱用的每個主要職務的全職僱員總數（受訓者除外）。

「全職僱員」指在貴機構內全職工作（即每月最少四週、每週不少於十八小時）的受薪人員，其中包括在機構內全職工作的東主及合夥人。調查表內所出現的「全職僱員」等詞，定義亦同。

3. Number of Trainees as at Survey Reference Date - Column 'C'
 在統計日期的受訓者人數——‘C’欄

Please fill in the total number of employees undergoing any form of training. This includes trainees and apprentices under a contract of apprenticeship.

請填寫正在接受各種形式訓練的僱員總數，包括受訓者及根據見習員合約受聘的見習員。

4. Number of Vacancies as at Survey Reference Date - Column 'D'

在統計日期的全職空缺額 ——‘D’欄

Please fill in the number of existing full time vacancies as at Survey Reference Date. ‘Existing Vacancies’ refer to those unfilled, immediately available job openings for which the establishment is actively trying to recruit personnel as at survey reference date.

請填上在統計日期每一主要職務的全職空缺額。「空缺額」是指該職位於統計參考日期仍懸空，須立刻填補，而現正積極招聘人員填補。

5. Forecast Number of Employees as at June 2021 (Excl. trainees) - Column 'E'

預計在 2021 年 6 月的全職僱員人數（受訓者除外） ——‘E’欄

The forecast number of full time employees means the number of full time employees you will be employing as at June 2021. The number given could be more / less than that in column ‘B’ if an expansion / a contraction is expected.

預計全職僱員人數指 貴機構在 2021 年 6 月的全職僱員人數。如估計業務屆時可能擴張／收縮，此欄所填的數字應多於／少於‘B’欄。

6. Average Monthly Income of Employees (Excl. trainees) - Column 'F'

僱員之每月平均薪酬（受訓者除外） ——‘F’欄

Please enter the code of average monthly remuneration package during the past 12 months for each principal job of full time employee(s). This should include basic salary, overtime pay, cost of living allowance, meal allowance, housing allowance, travel allowance, commission and bonus. If you have more than one employee doing the same job, please enter the average range.

請在‘F’欄填入每個主要職務的全職僱員過去 12 個月每月平均薪酬的編號。這包括底薪、逾時工作津貼、生活津貼、膳食津貼、房屋津貼、旅行津貼、佣金及花紅。如 貴機構有多於一名僱員擔任同一主要職務，則請取平均收入。

Part II

第二部份

7. Question 1 – Internal Promotion

問題 1 —— 內部晉升

An internal promotion is the promotion of a full-time employee to a higher level job by virtue of his performance or abilities. Please fill in the number of internal promotion from “Technician to Technologist”, from “Craftsman to Technician” in the past 12 months.

請填寫 貴機構內部晉升是指全職僱員因工作表現良好或具所需才能而獲提升至較高職位。請於所屬欄內填寫過去十二個月 貴機構內部由技術員晉升至技師、由技工晉升至技術員的人數。

8. Question 2 – New Recruitment

問題 2 —— 新聘僱員

(a) Please fill in the number of new recruits in the past 12 months.

請填入在過去十二個月 貴機構新招聘的僱員人數。

(b) Please fill in the number of new recruits with electronics and telecommunications services experience. “

請填入 貴機構的新招聘具電子業及電訊業相關經驗的人數。

9. Question 3, 4 – Employees Leaving the Establishment

問題 3, 4 —— 僱員離職

Question 3 Please fill in the number of different levels of full time employees left employment in the past 12 months.

問題 3 請填上過去十二個月內在 貴機構離職的各級全職僱員人數。

Question 4 Please fill in the expected number of different levels of full time employees who will be retiring in coming 12 months.

問題 4 請填上預計未來十二個月內在 貴機構退休的各級全職僱員人數。

10. Question 5 – Preferred Education Level, Training Mode and Training Period

問題 5 —— 宜有的教育程度、訓練方式及訓練期

Please tick the boxes the preferred education, mode of training and period of training which an full-time employee in each of the three job levels (i.e. technologist level, technician level and craftsman level) should have if he/she was to carry out his/her work competently. (Please tick 1 box for each job level).

請選擇技師級、技術員級及技工級的全職僱員宜具備何種教育程度、訓練方式及訓練期，才能勝任其工作。
(每職級請別選一項)

Definition of Preferred Level of Education:

宜有教育程度的定義：

- ◆ “Postgraduate Degree” refers to higher degrees (e.g. master degrees) offered by local or non-local education institutions, or equivalent.
「研究生學位」是指本地或非本地教育機構提供的高等學位（如碩士學位），或同等教育程度。
- ◆ “First Degree” refers to first degrees offered by local or non-local education institutions, or equivalent.
「學士學位」是指本地或非本地教育機構提供的學士學位，或同等教育程度。
- ◆ “Sub-degree” refers to Associate Degrees, Higher Diplomas, Professional Diplomas, Higher Certificates, Endorsement Certificates, Associateship or equivalent programmes offered by local or non-local education institutions.
「副學位」是指本地或非本地教育機構提供的副學士、高級文憑、專業文憑、高級證書、增修證書、院士銜或同等課程。
- ◆ “Diploma/Certificate” refers to technical and vocational education programmes including Diploma/Certificate courses, Diploma of Foundation Studies, Diploma of Vocational Education and programmes at the craft level, or equivalent.
「文憑／證書」是指技術及職業教育課程之文憑／證書、基礎課程文憑、職專文憑及技工程度的課程，或同等教育程度。
- ◆ “Secondary 4 to 7” refers to Secondary 4-7, covering the education programmes in relation to the Hong Kong Certificate of Education Examination (HKCEE), the Hong Kong Diploma of Secondary Education (HKDSE) Examination, Diploma Yi Jin, or equivalent.
「中四至中七」是指中四至中七（包括與香港中學會考、香港中學文憑考試、毅進文憑等相關的教育課程）或同等教育程度。
- ◆ “Secondary 3 or below” refers to Secondary 3 or below, or equivalent.
「中三或以下」是指中三或以下，或同等教育程度。

11. Question 6 – Training skills

問題 6 —— 培訓技能

Please indicate the skills that should be enhanced for full-time employees in three job levels (i.e. technologist level, technician level and craftsman level).

請指出 貴機構技師級、技術員級及技工級的全職僱員需要加強培訓的技能。

12. Question 7, 8, 9 – Business Environment

問題 7, 8 9 —— 行業概況

Please indicate

- (i) the expected change in business situation in the next 12 months;
- (ii) the reasons affecting the business situation in the next 12 months; and
- (iii) top three factors for attracting new entrants to the industry in your establishment.

請指出 貴機構認為

- (i) 未來十二個月業務狀況的變動；
- (ii) 未來十二個月業務狀況受影響的原因；及
- (iii) 最能吸引新人入行的首三個因素。

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2020 Manpower Survey of the Electronics and Telecommunications Industries
電子及電訊業 2020 年人力調查

Description for the Principal Jobs
The Electronics and Telecommunications Industries
電子及電訊業主要職務工作說明

Code 編號	Principal Job 主要職務	Job Description 工作說明
TECHNOLOGIST LEVEL 技師級		
101	Electronics / Computer Engineer ; Telecommunications Engineer 電子/電腦工程師； 電訊工程師 (Incl. Electronics Sales / Support Engineer) (包括：電子推銷 /支援工程師)	Carries out one or more of the following activities: research into electronic engineering / telecommunication engineering problems, design of, technical sales / support, and advice on electronic equipment and systems, components and products, and planning and supervision of their development, production, construction, installation, operation and maintenance. Usually specialises in one or more of the following: (i) computer systems; (ii) consumer electronic products; (iii) electronic instruments and equipment; (iv) semiconductor and electronic components; (v) telecommunication systems; (vi) multimedia electronics, audio-visual and entertainment systems; (vii) robotics engineering system and (viii) other electronic engineering fields. 擔任下列一項或多項工作：研究電子工程／研究電訊工程方面的問題；負責電子設備及系統、零件及產品的設計、技術推銷／支援及顧問工作；策劃及督導電子設備及系統、零件及產品的發展、生產、構造、安裝、操作及保養工作。通常與下列專門範疇有關： (i) 電腦系統； (ii) 電子消費產品； (iii) 電子儀器及設備； (iv) 半導體及電子零件； (v) 電訊系統； (vi) 多媒體電子、影音及娛樂系統； (vii) 機器人工程系統與 (viii) 電子工程其他方面的工作。
102	Electrical Engineer 電機工程師	Designs and advises on electrical equipment and systems, and plans, and supervises their development, construction, installation, operation, maintenance and repair. 設計電器及電機系統，並就該方面提供意見；策劃及監督電器及電機系統的發展、構造、安裝、操作、保養及維修。
103	Mechanical Engineer 機械工程師	Designs and advises on plant, mechanical parts, moulds and equipment, machinery and tools, and plans and supervises their development, construction, installation, operation, maintenance and repair. 設計廠房、機械配件、工模及設備、機器及工具，並就該方面提供意見；策劃與監督其中的發展、構造、安裝、操作、保養及維修。

Code 編號	Principal Job 主要職務	Job Description 工作說明
TECHNOLOGIST LEVEL (Continued) 技師級 (續)		
104	Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證／控制工程師 (Incl. Industrial Engineer) (包括：工業工程師)	Carries out one or more of the following activities: (i) Plans, directs and supervises all technical aspects of the manufacturing process to ensure the most efficient and economical means of operation and the maintenance of quality standards; (ii) Plans, directs and supervises the quality assurance / control at all phases of manufacturing, including testing and measurement, of incoming materials and parts, work-in-progress, and finished products to ensure compliance with standards, specifications, safety and environmental regulations. 擔任以下一項或多項工作： (i) 策劃、指導及監督製造程序的各種技術工作，確保採用最快捷經濟的生產方式，並且保持品質標準； (ii) 策劃、指導及監督各製造階段的品質保證／控制工作，包括測試及量度交來物料與配件、半製成品及製成品，確保產品符合標準、規格、安全與環保條例。
105	Chemical Engineer 化學工程師	Designs and advises on manufacturing processes in which chemical changes occur, and plans and supervises their development, construction, installation, operation and maintenance to ensure compliance with standards, specifications, and safety and environmental regulations. 設計能產生化學變化的製造程序，並就該方面提供意見；策劃及監督其發展、構造、安裝、操作及保養，確保符合標準、規格、安全與環保條例。
106	Product / Graphic Designer 產品／平面設計員	Originates and develops ideas to design, create, modify and arrange the form of manufactured products, layouts and containers for the products based on factors such as design function relationship, knowledge of design, art concepts, market and pricing characteristics, client specifications, method and cost of production to achieve aesthetically pleasing and functional effect for the products. 能根據設計與功能的關係、設計知識、美術概念、市場與價格特性、顧客規格、生產方法及成本等因素進行創作，並加以發揮，以便設計、創作、修改及安排製成品的形狀、結構及包裝，務求產品既美觀又實用。
107	System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ;UX Designer 系統分析員；軟件工程師；人工智能工程師；機器學習專家；用戶體驗設計師	Carries out one or more of the following activities: (i) Works closely with user personnel to identify problems, review methods and specify and evaluate information technology (IT) solutions; (ii) In accordance with product specifications, designs system firmware / software using high level and/or assembler languages for electronics, microprocessors, microcomputers and embedded systems; (iii) Uses artificial intelligence or machine learning technique or tools to enhance the effectiveness and efficiency of the operation processes; and (iv) Translates and documents the functional requirements based on user/customer requirements; performs system studies, analysis, design and implementation of computer systems to meet user/customer business and operational needs. 擔任以下一項或多項工作： (i) 與用戶部門緊密合作，確定問題、檢討方法、說明和評估資訊科技的解決辦法； (ii) 依據產品規格，使用高階語言及／或匯編語言，為電子、微處理器、微型電腦及嵌入式系統設計軟件及／或系統軟件； (iii) 使用人工智能或機器學習技術或工具來提高操作流程的有效性和效率，及 (iv) 根據用戶/客戶要求，制定及記錄功能規格；負責電腦系統的研究、分析、設計及推行，應付用戶/客戶的業務/運作需要。

Code 編號	Principal Job 主要職務	Job Description 工作說明
TECHNICAL LEVEL 技術員級		
201	Electronics Technician ; Telecommunications Technician 電子技術員；電訊技術員 (Incl. Maintenance Technician ; Service Technician ; Computer Technician ; Network Technician ; Audio-Visual Technician ; Electronic Support Technician) (包括：保養技術員；維修技術員；電腦技術員；網絡技術員；影音技術員；電子支援技術員)	Performs technical tasks, normally under the direction and supervision of an electronics / telecommunications engineer, contributory to design, development, manufacture, technical support, construction, installation, operation, maintenance and repair of: (i) Electronic and electrical products, equipment and systems, such as consumer electronics, home appliances, healthcare electronics, toys, and watch / clock; (ii) Telecommunication systems and equipment, such as telephone, digital broadcasting, high-definition electronic media, wireless / microwave / satellite communication, mobile communication and data communication systems; (iii) Computer and multimedia networks, systems and peripherals; (iv) Audio visual, entertainment and associated equipment and systems. 通常在電子／電訊工程師的督導下擔任技術工作，如參與設計、發展、製造、技術支援、構造、安裝、操作、保養、修理： (i) 電子及電機產品、器材及系統，例如消費電子產品、家居電器、保健電子產品、玩具及鐘錶； (ii) 電訊系統及器材，例如電話、數碼廣播、高清電子媒體、無線電／微波／衛星通訊、流動通訊及數據通訊系統； (iii) 電腦及多媒體網絡、系統及周邊設備； (iv) 影音、娛樂及附屬設備與系統。
202	Mechanical Technician 機械技術員	Performs technical tasks, normally under the direction and supervision of a mechanical engineer, contributory to design, development, construction, installation, operation, maintenance and repair of plant, mechanical parts and equipment, machinery and tools. 通常在機械工程師的督導下擔任技術工作，如參與設計、發展、構造、安裝、操作、保養、修理廠房、機械配件及設備、機器及工具。
203	Draughtsman 繪圖員	Prepares detail and assembly drawings and circuit diagrams according to design specifications. 按照設計規格繪製明細圖、裝配圖及線路圖。
204	Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員；品質保證／控制技術員	Performs technical tasks, normally under the direction and supervision of a manufacturing / industrial or a quality assurance / control engineer, contributory to: (i) The efficient and economical operation of the manufacturing process and the maintenance of quality standards; (ii) Quality assurance / control at all phases of manufacturing including testing and measurement of in-coming materials and parts, work-in-progress, and finished products to ensure compliance with standards and specifications, and safety and environmental regulations. 通常在製造／工業或品質保證／控制工程師的監督下擔任： (i) 製造程序中的技術工作，協助以最快捷經濟的方式運作，並且維持產品質素； (ii) 技術工作，協助各製造階段的品質保證／控制事項，包括測試及量度來料與配件、半製成品及製成品，確保產品符合標準、規格、安全與環保條例。

Code 編號	Principal Job 主要職務	Job Description 工作說明
TECHNICAL LEVEL (Continued) 技術員級(續)		
205	Supervisor ; Foreman ; Leader 監督；管工；組長 (Incl. Junior Supervisor) (包括：初級監督)	Performs supervisory duties contributory to the planning and allocation of tasks to workers, trainees and technical sales, and to the production, inspection, installation, operation, maintenance and repair of components, products, equipment and systems; including the training for technical sales. OR Organises and takes charge of a group or groups of operatives in a section, normally under the direction of a supervisor / foreman. 擔任監督工作，如參與策劃、向工人及受訓者分配工作，以及參與生產、檢查、安裝、操作、保養、修理零件、產品、器材與系統；及提供訓練與推銷技術員 或 通常在監督／管工指導下，安排及主管部門內一組或多組操作工的工作。
206	Programmer ; Software Technician 程式編製員；軟件技術員	Develops computer programmes and systems to implement embedded systems / software design, normally under the direction and supervision of a software engineer / system analyst. 通常在軟件工程師／系統分析員的督導下研究嵌入式系統／電腦程式，以便推行電腦系統及軟件設計。
207	Web Developer / Designer ; Computer Game Designer 網站開發員／設計員；電腦遊戲設計員	In the mixed technical and creative works, uses tool set to design and create web pages / sites, 2D / 3D graphics and animation and/or other multimedia contents and computer games for integration to IT applications according to business requirement, strategy and direction. 按照業務要求、策略及方向，結合科技與創作，使用工具套設計及製作網頁／網站、二維／三維圖像動畫或其他多媒體內容，以便配合電腦應用軟件使用。
208	Sales Technician 推銷技術員 (Incl. Electronic Sales Technician ; Electronic Merchandising Technician) (包括：電子推銷技術員；電子採購技術員)	Updates / studies / analyses electronic, technical and functional knowledge as well as contemporary trend and development of products, systems, equipment and components from the demands of electronics market, proposes and demonstrates suggestions / follows up orders according to the needs of clients and customers, and liaises with departments and suppliers to provide suitable alternatives in view of the market. Usually involves in one or more of the following: (i) consumer electronics, home appliance and healthcare electronics; (ii) telecommunication systems and equipment; (iii) computer and multimedia networks, systems and peripherals; (iv) audio-visual, entertainment and associated equipment and systems. 更新／學習／分析電子、技術及功能知識，以及市面上的潮流時興新穎的產品、系統、設備及零件；因應顧客需要而提供意見、示範產品及跟進訂單；與其他部門及供應商聯繫以提供適當意見。通常會與下列範疇有關： (i) 消費電子產品、家居電器及保健電子產品； (ii) 電訊系統及器材； (iii) 電腦及多媒體網絡、系統及周邊設備； (iv) 影音、娛樂及附屬設備與系統。

Code 編號	Principal Job 主要職務	Job Description 工作說明
CRAFTSMAN LEVEL 技工級		
301	High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工；電纜連接技工	Lays, joints, connects, terminates and maintains underground, submarine, surface and aerial telecommunication cables and wires. 敷設、接駁、端接及保養地底、海底、地面及架空電訊電纜。
302	Electronics Craftsman 電子技工 (Incl. Audio Visual Assistant ; Electronic Servicing Assistant ; Electronic System Installation Assistant ; Telecommunications and Surveillance Technical Assistant) (包括：影音助理；電子維修助理；電子系統安裝助理；電訊及監控技術助理)	Carries out one or more of the following activities: (i) Installs, services and maintains consumer electronics, audio-visual products, multimedia and entertainment electronic equipment and systems, In-building Coaxial Cable Distribution System, telecommunications and surveillance systems; (ii) Diagnoses, locates and repairs faults in the maintenance of electronic devices and products, systematically records these faults and recommends changes to minimize such occurrence; (iii) Installs, inspects, tests, repairs, calibrates and maintains electronic, electrical and mechanical instruments, meters, equipment and systems. 擔任以下一項或多項工作： (i) 安裝、保養及及維修消費電子產品、影音產品、多媒體和娛樂電子設備與系統、大廈內同軸電纜分配系統、電訊及監控系統； (ii) 在維修電子裝置及產品的過程中，查出及修理所出現的毛病，有系統地記錄下來，並且建議如何盡量減少毛病出現； (iii) 安裝、查驗、測試、修理、校準及保養電子、電機及機械儀器、儀錶、設備及系統
303	Electrician 電氣技工	Installs, maintains, tests and repairs electrical wiring, devices and equipment, and building services in buildings and other structures in accordance with regulations and specifications. 按照條例及規格安裝、保養、測試及修理屋宇電線、電器及其他設備。
304	Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工 (保養／裝配打磨工、機床工、工具／工模製造及修理工)	Carries out one or more of the following activities: (i) Fits, assembles, installs, repairs and maintains plant and machinery and makes replacement parts when required; (ii) Sets up and operates machine tools to produce components according to specifications; (iii) Makes, maintains and repairs press tools, dies, cutting tools, gauges, jigs and fixtures according to drawings and other specifications; (iv) Makes, maintains and repairs moulds and dies for plastics processing machines according to drawings and other specifications. 擔任以下一項或多項工作： (i) 打磨、裝配、安裝、修理、保養廠房及機器，並於需要時製作更換配件； (ii) 按照規格裝設及操作機床，以生產零件； (iii) 按照圖則及其他規格，製造及維修啤孔工具、工模、切削工具、量規及夾具； (iv) 按照圖則及其他規格，製造及修理塑膠機的工模。

Code 編號	Principal Job 主要職務	Job Description 工作說明
OPERATIVE LEVEL 操作工級		
401	<p>Operator ; Quality Assurance / Control Operator ; General Worker</p> <p>操作工；品質保證／控制工；雜工</p> <p>(Incl. Assembler, Soldering Worker, Aligner / Tester)</p> <p>(包括：裝配工、焊錫工、校整／測試工)</p>	<p>Carries out any one of the operative jobs in assembly line in the areas of:</p> <ul style="list-style-type: none"> (i) Assembles parts in the manufacture of electronics components (semiconductor, computer memory plane etc.) or assembles parts and components into printed circuit boards, modules and finished products, prepares materials by cutting, coats and paints protective or decorative materials onto parts or components; (ii) Performs proper soldering at all solder joints by hand or machine; (iii) Aligns, tests and inspects electronics products on production lines; (iv) Assists the quality assurance / control technician in the inspection of incoming parts and finished products before packaging according to a predetermined quality standard; (v) Operates various previously set-up processing machines, fixtures, continuous plating and etching baths, polishing machine and coil winding machines etc; (vi) Packs finished products into boxes, crates or other containers; (vii) Handles components, parts issued to and returned from assembly line. (viii) Sets, operates and controls data processing and/or data-switching systems, including all peripheral units according to operating instructions; operates data entry machines, which translate manually prepared data into computer readable format and store them into media, verifies / corrects entry data according to standard procedure; (ix) handles odd jobs and undertake other manual work. <p>擔任以下一項或多項工作：</p> <ul style="list-style-type: none"> (i) 裝配各種零件以製造電子元件（半導體、記憶板等等）或將零件及元件裝配在印刷線路板、模組及製成品上；切割材料；塗膠及鬆保護或裝飾塗料於零件或元件上； (ii) 用手或機器焊接所有焊點； (iii) 校整、測試及檢查生產線上的電子產品； (iv) 協助品質保證／控制技術員，依照預定的品質標準檢查交來配件，並在包裝前檢查製成品； (v) 操作各類已調校妥當的加工機械、夾具、連續運作電鍍及蝕刻設備、磨光機及繞線機等等； (vi) 以木箱、紙盒或其他容器包裝製成品； (vii) 負責搬運裝配工場的元件及零件； (viii) 根據工作指示，調校、操作及控制數據處理及／或數據交換系統，包括周邊設備；操作數據輸入機（可將人手編製的數據翻譯為可供電腦閱讀的資料，並將數據貯存在電腦卡、磁帶、紙帶或磁盤內）；根據標準程序核對／更正輸入的數據； (ix) 擔任雜務及其他勞力工作。

The 2020 Manpower Survey of the Electronics and Telecommunications Industries
電子及電訊業2020年人力調查

Description for Skills
培訓技能說明

Skills 技能	Description 說明
A.	Strategic Planning and Management Skill 策略規劃及管理技巧
(i) Business Continuity Management 業務持續性管理	<p>Business Continuity Management includes business continuity planning and crisis situations management, covering the techniques to execute business impact analysis, risk analysis, testing and exercising to ensure the currency of the organisation's business continuity plans and identify crisis response and recovery activities as well as implement the recovery and business continuity strategies to minimise the impact of disruptive events to the organisation.</p> <p>業務持續性管理包括業務持續性計劃和危機情況管理，涵蓋執行業務影響分析，風險分析，測試和演練的技術，以確保組織業務持續性計劃的通行性，確定危機響應和恢復活動以及實施恢復和業務持續性策略，以最大程度地減少破壞性事件對組織的影響。</p>
(ii) Quality Management 質量管理	<p>Quality Management includes audit management, failure analysis, material qualification, parametric testing, quality control and assurance, quality process control, quality system management and yield analysis, covering the techniques to assess organisational objectives, policies, procedures, structure, control and system for the verification of efficient management of the organisation's activities, examine the evidence to verify the causes of failure as well as identify the failure modes, manage quality of materials to ensure material specifications conform to product requirements, implement parametric tests and parametric data analysis to drive process and yield improvements, implement testing processes for the measurement and assurance of product quality and services to meet consumer expectations.</p> <p>質量管理包括審核管理、故障分析、材料鑑定、參數測試、質量控制和保證、質量過程控制、質量系統管理和產量分析，涵蓋了評估組織目標、政策、程序、結構、控制和系統的技術 驗證組織活動的有效管理，檢查證據以確認失敗原因並確定失敗模式，管理材料質量以確保材料規格符合產品要求，實施參數測試和參數數據分析以推動流程和提高產量，實施測試過程以測量和保證產品質量和服務，以滿足消費者的期望。</p>
(iii) Risk Management 風險管理	<p>Risk Management includes enterprise risk management and risk appetite and goals setting, covering the techniques to develop and implement risk management strategies to support business operations and manage productive practices to allow for effective and efficient management of work by making changes for continuous improvements in the organisation.</p> <p>風險管理包括企業風險管理、風險偏好和目標設定，涵蓋制定和實施風險管理策略的技術，以支持業務運營和管理生產實踐，通過進行更改以實現組織的持續改進，從而有效地進行工作管理。</p>
(iv) Strategy Planning and Implementation 戰略規劃及推行	<p>Strategy Planning and Implementation includes business planning, organisational analysis and organisational strategising, covering the techniques to develop business plans by reviewing existing resources to identify growth opportunities to achieve sustainable competitive advantage leading to a high exit valuation, evaluate factors that can affect the organization's performance as well as strategically assessing the organization's own resources and potential for improvement and provide an overall strategic direction to the organization to support achievement of strategic needs of the organisation.</p> <p>戰略計劃與實施包括業務計劃、組織分析和組織戰略制定，涵蓋通過審查現有資源來確定增長機會以實現可持續競爭優勢從而導致較高的退出估值的業務計劃制定技術，並評估可能影響組織績效的因素，以及從戰略上評估組織自身的資源和改進潛力，並為組織提供總體戰略指導，以支持實現組織的戰略需求。</p>

Skills 技能	Description 說明
B. Technical Skills 技術性技能	
(i) Automation Management 自動化管理	Automation Management includes automated operation monitoring, automated system design, automation process control and automation system maintenance, covering the techniques to ensure smooth automation operations by maintaining and monitoring the automated systems and manufacturing process flows, design and commission automated systems as well as evaluate the system design specification against functional requirements, apply automation process control to monitor performance metrics and quality of manufacturing outputs to determine the optimal settings as well as productivity improvement strategies and maintain automation systems to meet operation requirements as well as propose strategies for the automation systems performance improvement. 自動化管理包括自動化操作監視、自動化系統設計、自動化過程控制和自動化系統維護，涵蓋了通過維護和監視自動化系統和製造流程，確保自動化系統設計和調試以及評估系統來確保平穩自動化操作的技術。根據功能要求設計規範，應用自動化過程控制來監視性能指標和製造輸出的質量，以確定最佳設置以及生產率提高策略，並維護自動化系統以滿足操作要求，並提出提高自動化系統性能的策略。
(ii) Artificial Intelligence and Big Data Analytics 人工智能及大數據分析	Big Data Analytics includes data analytics system design and data synthesis, covering the techniques to integrate the use of data analytics in the production environment for the identification of bottlenecks and system improvements and analyse factory automation and manufacturing data to monitor the manufacturing processes for operations and product or process flow optimisation. 大數據分析包括數據分析系統設計和數據綜合，涵蓋了將數據分析在生產環境中的使用集成在一起的技術，以識別瓶頸和系統改進，並分析工廠自動化和製造數據以監控運營和產品的製造過程或流程優化。
(iii) Maintenance 保養	Maintenance includes equipment maintenance and facilities maintenance, covering the techniques to maintain tools and equipment to meet operation requirements, propose strategies for tools and equipment performance improvement and manage facility systems maintenance as well as propose strategies for performance enhancement. 保養包括設備維護和設施維護，涵蓋維護工具和設備以滿足操作要求的技術，提出改善工具和設備性能的策略，管理設施系統維護的策略以及提出提高性能的策略。
(iv) Manufacturing and Operations 製造與運營	Manufacturing and Operations includes defect density monitoring, electrostatic discharge control, factory system management, good manufacturing practices implementation, manufacturing process management, metrology management, operation management and production shut-down and re-start, covering the techniques to monitor the manufacturing process defect density metrics and manage deviations, analyse defect density issues and recommend corrective actions, implement precautionary measures required to avoid damage to sensitive electronic components as well as adopt proper components handling techniques and the use of appropriate personal grounding device, manage different factory system applications to ensure optimum manufacturing operations performance. 製造和運營包括缺陷密度監控、靜電放電控制、工廠系統管理、良好製造規範實施、製造過程管理、計量管理、運營管理以及生產停產和重新啟動，涵蓋了監視製造過程缺陷密度的技術度量和管理偏差，分析缺陷密度問題並建議糾正措施，採取必要的預防措施以避免損壞敏感的電子組件，並採用適當的組件處理技術和使用適當的個人接地設備，管理不同的工廠系統應用程序以確保最佳製造運營績效。
(v) Network Technology Management 網絡技術管理	Network Technology Management covering the techniques to interrelate computing devices, equipment and machines' data in a networked environment to provide specific solutions. 網絡技術管理涵蓋了在聯網環境中將計算設備，設備和機器的數據相互關聯以提供特定解決方案的技術。

Skills 技能	Description 說明
(vi) Production Management 生產管理	<p>Production Management includes production performance management, production planning and production resource management, covering the techniques to plan and manage resources to optimise production performance, manage production constraint and improve manufacturing efficiency, establish and execute the production plan to meet production targets and cycle time indices and plan and control capacity and quality issues to meet organisational needs as well as schedule resources to synchronise production processes.</p> <p>生產管理包括生產績效管理、生產計劃和生產資源管理，涵蓋計劃和管理資源以優化生產績效，管理生產約束和提高生產效率，建立和執行生產計劃以滿足生產目標和周期時間指標的技術，計劃和控制產能和質量問題，以滿足組織需求，並安排資源以同步生產過程。</p>
(vii) Product Development and Testing 產品開發與測試	<p>Product Development and Testing includes manufacturing process design, new product introduction, product testing and research and development, covering the techniques to analyse the design of the product to identify potential manufacturing risks and problems for the reduction of manufacturing costs, support new production by validating build plan to achieve cost-effective production and assembly, meet design specifications, formulate test programme structure based on product specifications as well as develop a systematic approach in resolving test issues and optimising manufacturing processes, material developments and development of new product line.</p> <p>產品開發與測試包括製造過程設計、新產品介紹、產品測試和研發，涵蓋分析產品設計的技術，以識別潛在的製造風險和問題以降低製造成本，並通過驗證製造來支持新產品計劃，實現具有成本效益的生產和組裝，符合設計規範，根據產品規範制定測試程序結構，並開發系統的方法來解決測試問題並優化製造流程，材料開發和新產品系列的開發。</p>
(viii) Productivity and Innovation 生產力與創新	<p>Productivity and Innovation includes continuous process improvement, innovation management and solutioning, covering the techniques to apply continuous improvement processes to improve products, services or processes seeking incremental improvement over time or breakthrough improvement all at once, respond to external or internal opportunities and apply creativity to introduce new ideas, processes or products and generate solutions by systematic analysis of the problem, proposing preventive and corrective measures as well as evaluating the effectiveness of the measures from different perspectives.</p> <p>生產力與創新包括持續的過程改進、創新管理和解決方案，涵蓋了應用持續改進過程來改進產品、服務或過程的技術，這些產品、服務或過程尋求隨著時間的推移逐步改進或突破性改進，應對外部或內部機會並將創造應用於通過對問題的系統分析，提出預防和糾正措施以及從不同角度評估措施的有效性，引入新的想法，過程或產品並生成解決方案。</p>
(ix) System Integration 系統整合	<p>System Integration includes embedded system integration and process integration, covering the techniques to implement control systems to perform pre-defined tasks and real-time monitoring for the real world and integrate process loops and architecture to optimise process interactions between and within process modules as well as formulate strategies for yield performance improvements.</p> <p>系統整合包括嵌入式系統整合和過程整合，涵蓋了實現控制系統以執行預定義任務和對現實世界進行實時監控的技術，並整合了過程循環和體系結構以優化過程模塊之間以及過程模塊之間以及內部的過程交互，制定提高產量性能的策略。</p>
(x) Information Security 資訊保安	<p>Information security refers to the processes and methodologies which are designed and implemented to protect print, electronic, or any other form of confidential, private and sensitive information or data from unauthorized access, use, misuse, disclosure, destruction, modification, or disruption which covers the techniques of mastering the technologies for Internet Commerce security (such as encryption standards, authentication, public key scheme, and digital signature), anti-virus protection for Windows systems, security for Wireless LAN and servers.</p> <p>資訊保安是指旨在保護印刷，電子或任何其他形式的機密，私人 and 敏感信息或數據免遭未經授權的訪問、使用、濫用、洩露、破壞、修改或破壞的過程和方法，包括掌握商業網絡安全技術（例如加密標準，身份驗證，公鑰方案和數字簽名），Windows 系統的防病毒保護，無線 LAN 和服務器的安全性的技術。</p>

Skills 技能	Description 說明
C. Soft Skills 軟性技巧	
(i) Business Network Building 商業網絡建立	Business Network Building covering the techniques to establish mutually beneficial relationship with other business stakeholders and potential clients and customers. 商業網絡建立涵蓋與其他業務利益相關者以及潛在客戶和客戶建立互惠關係的技術。
(ii) Organisational Development 組織發展	Organisational Development includes change management conflict management and learning and development, covering the techniques to implement organisational change smoothly as well as manage reactions to ensure seamless transition during change, perform conflict management within the organisation to assist staff members in resolving grievances and disputes and plan employees' learning and development activities to maximise employee contribution as well as building a skilled workforce. 組織發展包括變更管理衝突管理和學習與發展，涵蓋了平滑實施組織變更以及管理響應以確保變更期間無縫過渡的技術，在組織內執行沖突管理以協助員工解決申訴和糾紛併計劃員工開展學習和發展活動，以最大程度地提高員工的貢獻並培養熟練的員工隊伍。
(iii) People Management 人事管理	People Management includes effectiveness management, report writing and technical presentations, covering the techniques to set goals with team and evaluate team's effectiveness in achieving the defined goals and objectives, present specific information and evidence in a clear and structured format and deliver effective and engaging presentations to a variety of audiences. 人員管理包括有效性管理、報告撰寫和技術演示，涵蓋與團隊設定目標並評估團隊在實現既定目標和目標方面的有效性的技術，以清晰，結構化的格式呈現特定信息和證據，以及向團隊提供有效且引人入勝的演示各種各樣的觀眾。

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Quality Control Measures

Prior to fieldwork preparation

- Collect contact information of the sampled establishments
- Group sampled establishments to the same business organisation

Thorough training of fieldwork staff

- Industry briefing workshop by VTC
- Intensive briefing and training sessions by MOV in consultation with VTC

Monitoring of the fieldwork execution

- Well-trained enumerators who are experienced in conducting establishment surveys
- Closely monitor fieldwork progress and work of enumerators
- Debriefing sessions twice a week

Measures to increase the response rate

- Strategic directions given by VTC
- Assistance from the Training Boards and trade associations, etc.

Checking of the completed questionnaires

- Sample check of completed questionnaires by an independent team of QC checkers
- 100% vetting of the completed questionnaires by VTC

Double data entry and data validation

- Double data entry system
- Validation of collected data via computer programming and systems

Data analysis by VTC

- Comparison of survey findings with last round
- Benchmarking with relevant manpower information (if deemed appropriate)

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Appendix 7

Response Profile

Business Sector		(a) No. of Valid Cases*	(b) No. of Establishments Successfully Enumerated	(b)/(a) Effective Response Rate
Manufacturing		76	72	94.7%
Trading and Services	Engineering Services	102	102	100.0%
	Information Technology Services	85	80	94.1%
	Import and Export Trading	114	105	92.1%
	Electronics and Telecommunications Industry#	15	15	100.0%
Telecommunications Services		65	55	84.6%
Wholesale		84	80	95.2%
Design Houses, Universities and Related Government Bureau/ Departments#		18	17	94.4%
Retail		15	6	40.0%
Overall		574	532	92.7%

Note: # Supplementary samples

* Invalid cases were referred as those establishments which had been ceased operation, closed, and so on.

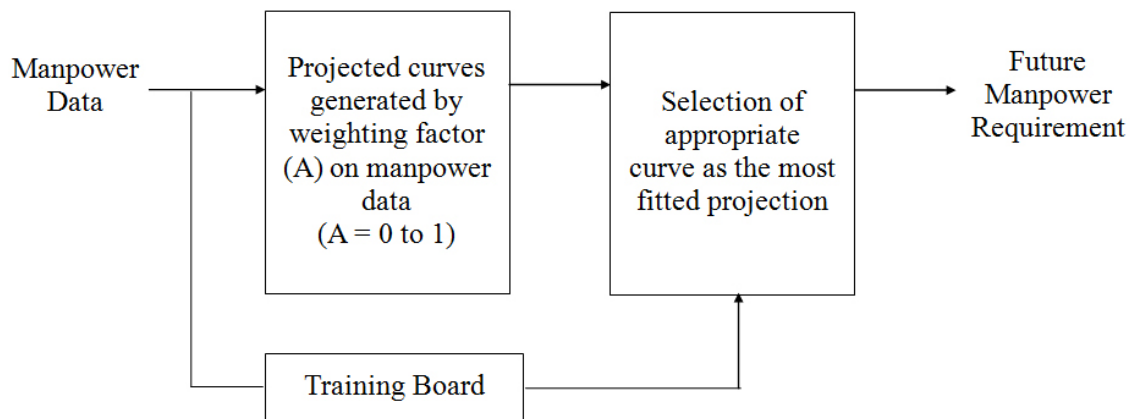
Manpower Projection Methodology

Adaptive Filtering Method

1. The Adaptive Filtering Method is a forecasting method which rested on the principle of “Weighted Exponential Smoothing”. In this method, past manpower data are weighted and heavier weightings are given to the more recent data. The forecast is more dependent on the recent manpower information. The degree of emphasis on the more recent survey data can be varied by adjusting the weighting factor (A). Thus, the higher the value of ‘A’, the heavier the weightings of the more recent data.

2. The forecast may also be optimised to suit the decisions made by the Training Boards based on the factors such as the market trends, technological developments, social-economic factors, future expectations, etc. The method is illustrated in Figure 1 below.

Figure 1 Adaptive Filtering Method



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Appendix 9A

Manpower Statistics of the Electronics and Telecommunications Industries

電子及電訊業人力統計數字

Section 1: Manufacturing 門類一：製造

	As at Survey Reference Date 在統計日期的			Forecast Number of Employees as at June 2021 預計在 2021 年 6 月的僱員人數
	Number of Employees 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies 空缺額	
TECHNOLOGIST LEVEL 技師級				
Electronics / Computer Engineer ; Telecommunications Engineer 電子／電腦工程師；電訊工程師	277	0	0	277
Electrical Engineer 電機工程師	2	0	0	2
Mechanical Engineer 機械工程師	61	0	0	61
Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證／控制工程師	163	0	0	163
Chemical Engineer 化學工程師	0	0	0	0
Product/Graphic Designer 產品／平面設計員	4	0	0	4
System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer 系統分析員；軟件工程師；人工智能工程師；機器學習專家； 用戶體驗設計師	35	0	0	35
Other Technologist 其他技師	0	0	0	0
Sub-total 小計	542	0	0	542
TECHNICIAN LEVEL 技術員級				
Electronics Technician ; Telecommunications Technician 電子技術員；電訊技術員	1024	0	2	1026
Mechanical Technician 機械技術員	102	0	0	102
Draughtsman 繪圖員	0	0	0	0
Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員；品質保證／控制技術員	147	0	0	147
Supervisor ; Foreman ; Leader 監督；管工；組長	202	0	0	202
Programmer ; Software Technician 程式編製員；軟件技術員	19	0	0	19
Web Developer / Designer ; Computer Game Designer 網站開發員／設計員；電腦遊戲設計員	17	0	0	17
Sales Technician 推銷技術員	205	0	0	205
Sub-total 小計	1,716	0	2	1,718
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工；電纜連接技工	12	0	2	14
Electronics Craftsman 電子技工	573	0	20	593
Electrician 電氣技工	0	0	0	0
Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工(保養／裝配打磨工、機床工、工具／工模製造及修理工)	53	0	0	53
Sub-total 小計	638	0	22	660
OPERATIVE LEVEL 操作工級				
Operator ; Quality Assurance / Control Operator ; General Worker 操作工；品質保證／控制工；雜工	717	0	4	720
Sub-total 小計	717	0	4	720
Total 總數	3,613	0	28	3,640

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Appendix 9B

Manpower Statistics of the Electronics and Telecommunications Industries

電子及電訊業人力統計數字

Section 2: Trading and Services 門類：貿易及服務

	As at Survey Reference Date 在統計日期的			Forecast Number of Employees as at June 2021 預計在 2021 年 6 月的僱員人數
	Number of Employees 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies 空缺額	
TECHNOLOGIST LEVEL 技師級				
Electronics / Computer Engineer ; Telecommunications Engineer 電子／電腦工程師；電訊工程師	5194	9	82	5276
Electrical Engineer 電機工程師	812	7	41	853
Mechanical Engineer 機械工程師	677	4	24	701
Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證／控制工程師	579	1	0	580
Chemical Engineer 化學工程師	15	0	0	15
Product/Graphic Designer 產品／平面設計員	306	0	4	310
System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer 系統分析員；軟件工程師；人工智能工程師；機器學習專家； 用戶體驗設計師	2213	6	54	2267
Other Technologist 其他技師	50	0	0	50
Sub-total 小計	9,846	27	205	10,052
TECHNICIAN LEVEL 技術員級				
Electronics Technician ; Telecommunications Technician 電子技術員；電訊技術員	8100	47	188	8291
Mechanical Technician 機械技術員	1786	46	27	1813
Draughtsman 繪圖員	156	0	0	150
Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員；品質保證／控制技術員	395	0	0	395
Supervisor ; Foreman ; Leader 監督；管工；組長	1041	0	0	1041
Programmer ; Software Technician 程式編製員；軟件技術員	4378	28	50	4434
Web Developer / Designer ; Computer Game Designer 網站開發員／設計員；電腦遊戲設計員	738	1	0	738
Sales Technician 推銷技術員	8253	0	88	8341
Sub-total 小計	24,847	122	353	25,203
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工；電纜連接技工	241	17	0	241
Electronics Craftsman 電子技工	3193	33	47	3240
Electrician 電氣技工	433	50	1	434
Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工(保養／裝配打磨工、機床工、工具／工模製造及修理工)	526	66	1	527
Sub-total 小計	4,393	166	49	4,442
OPERATIVE LEVEL 操作工級				
Operator ; Quality Assurance / Control Operator ; General Worker 操作工；品質保證／控制工；雜工	518	0	5	523
Sub-total 小計	518	0	5	523
Total 總數	39,604	315	612	40,220

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Appendix 9C

Manpower Statistics of the Electronics and Telecommunications Industries

電子及電訊業人力統計數字

Section 3: Telecommunications 門類三：電訊

	As at Survey Reference Date 在統計日期的			Forecast Number of Employees as at June 2021 預計在 2021 年 6 月的僱員人數
	Number of Employees 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies 空缺額	
TECHNOLOGIST LEVEL 技師級				
Electronics / Computer Engineer ; Telecommunications Engineer 電子／電腦工程師；電訊工程師	2977	50	7	2984
Electrical Engineer 電機工程師	43	0	0	43
Mechanical Engineer 機械工程師	7	0	0	7
Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證／控制工程師	36	0	0	36
Chemical Engineer 化學工程師	0	0	0	0
Product/Graphic Designer 產品／平面設計員	77	0	0	77
System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer 系統分析員；軟件工程師；人工智能工程師；機器學習專家； 用戶體驗設計師	482	0	3	485
Other Technologist 其他技師	0	0	0	0
Sub-total 小計	3,622	50	10	3,632
TECHNICIAN LEVEL 技術員級				
Electronics Technician ; Telecommunications Technician 電子技術員；電訊技術員	2552	0	31	2583
Mechanical Technician 機械技術員	10	0	0	10
Draughtsman 繪圖員	43	0	0	43
Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員；品質保證／控制技術員	54	0	0	54
Supervisor ; Foreman ; Leader 監督；管工；組長	318	0	1	319
Programmer ; Software Technician 程式編製員；軟件技術員	530	0	10	540
Web Developer / Designer ; Computer Game Designer 網站開發員／設計員；電腦遊戲設計員	710	0	0	705
Sales Technician 推銷技術員	1095	0	0	1051
Sub-total 小計	5,312	0	42	5,305
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工；電纜連接技工	469	0	6	475
Electronics Craftsman 電子技工	2913	0	17	2925
Electrician 電氣技工	326	0	0	326
Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工(保養／裝配打磨工、機床工、工具／工模製造及修理工)	3	0	0	3
Sub-total 小計	3,711	0	23	3,729
OPERATIVE LEVEL 操作工級				
Operator ; Quality Assurance / Control Operator ; General Worker 操作工；品質保證／控制工；雜工	7	0	0	7
Sub-total 小計	7	0	0	7
Total 總數	12,652	50	75	12,673

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Appendix 9D

Manpower Statistics of the Electronics and Telecommunications Industries

電子及電訊業人力統計數字

Section 4: Wholesale 門類四：批發

	As at Survey Reference Date 在統計日期的			Forecast Number of Employees as at June 2021 預計在 2021 年 6 月的僱員人數
	Number of Employees 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies 空缺額	
TECHNOLOGIST LEVEL 技師級				
Electronics / Computer Engineer ; Telecommunications Engineer 電子／電腦工程師；電訊工程師	230	0	0	230
Electrical Engineer 電機工程師	0	0	0	0
Mechanical Engineer 機械工程師	0	0	0	0
Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證／控制工程師	34	0	0	34
Chemical Engineer 化學工程師	0	0	0	0
Product/Graphic Designer 產品／平面設計員	3	0	0	3
System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer 系統分析員；軟件工程師；人工智能工程師；機器學習專家； 用戶體驗設計師	58	0	0	58
Other Technologist 其他技師	0	0	0	0
Sub-total 小計	325	0	0	325
TECHNICIAN LEVEL 技術員級				
Electronics Technician ; Telecommunications Technician 電子技術員；電訊技術員	585	0	2	587
Mechanical Technician 機械技術員	0	0	0	0
Draughtsman 繪圖員	0	0	0	0
Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員；品質保證／控制技術員	0	0	0	0
Supervisor ; Foreman ; Leader 監督；管工；組長	117	0	5	122
Programmer ; Software Technician 程式編製員；軟件技術員	185	0	1	186
Web Developer / Designer ; Computer Game Designer 網站開發員／設計員；電腦遊戲設計員	22	0	0	22
Sales Technician 推銷技術員	2687	0	5	2692
Sub-total 小計	3,596	0	13	3,609
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工；電纜連接技工	0	0	0	0
Electronics Craftsman 電子技工	250	0	16	266
Electrician 電氣技工	0	0	0	0
Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工(保養／裝配打磨工、機床工、工具／工模製造及修理工)	0	0	0	0
Sub-total 小計	250	0	16	266
OPERATIVE LEVEL 操作工級				
Operator ; Quality Assurance / Control Operator ; General Worker 操作工；品質保證／控制工；雜工	2	0	0	2
Sub-total 小計	2	0	0	2
Total 總數	4,173	0	29	4,202

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Appendix 9E

Manpower Statistics of the Electronics and Telecommunications Industries

電子及電訊業人力統計數字

Section 5: Design Houses, Universities & Government 門類五：設計公司、大學及相關政府部門

	As at Survey Reference Date 在統計日期的			Forecast Number of Employees as at June 2021 預計在 2021 年 6 月的僱員人數
	Number of Employees 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies 空缺額	
TECHNOLOGIST LEVEL 技師級				
Electronics / Computer Engineer ; Telecommunications Engineer 電子／電腦工程師；電訊工程師	804	8	30	832
Electrical Engineer 電機工程師	448	21	30	478
Mechanical Engineer 機械工程師	108	0	2	110
Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證／控制工程師	52	0	6	58
Chemical Engineer 化學工程師	2	0	0	2
Product/Graphic Designer 產品／平面設計員	2	0	0	2
System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer 系統分析員；軟件工程師；人工智能工程師；機器學習專家； 用戶體驗設計師	442	0	2	449
Other Technologist 其他技師	0	0	0	0
Sub-total 小計	1,858	29	70	1,931
TECHNICIAN LEVEL 技術員級				
Electronics Technician ; Telecommunications Technician 電子技術員；電訊技術員	937	88	53	986
Mechanical Technician 機械技術員	279	140	13	292
Draughtsman 繪圖員	7	0	0	7
Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員；品質保證／控制技術員	27	0	0	27
Supervisor ; Foreman ; Leader 監督；管工；組長	721	154	66	787
Programmer ; Software Technician 程式編製員；軟件技術員	256	1	7	288
Web Developer / Designer ; Computer Game Designer 網站開發員／設計員；電腦遊戲設計員	18	0	0	18
Sales Technician 推銷技術員	29	0	2	31
Sub-total 小計	2,274	383	141	2,436
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工；電纜連接技工	0	0	0	0
Electronics Craftsman 電子技工	232	32	5	238
Electrician 電氣技工	238	162	50	288
Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工(保養／裝配打磨工、機床工、工具／工模製造及修理工)	346	112	55	401
Sub-total 小計	816	306	110	927
OPERATIVE LEVEL 操作工級				
Operator ; Quality Assurance / Control Operator ; General Worker 操作工；品質保證／控制工；雜工	25	0	16	42
Sub-total 小計	25	0	16	42
Total 總數	4,973	718	337	5,336

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Appendix 9F

Manpower Statistics of the Electronics and Telecommunications Industries

電子及電訊業人力統計數字

Section 6: Retail 門類六：零售

	As at Survey Reference Date 在統計日期的			Forecast Number of Employees as at June 2021 預計在 2021 年 6 月的僱員人數
	Number of Employees 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies 空缺額	
TECHNOLOGIST LEVEL 技師級				
Electronics / Computer Engineer ; Telecommunications Engineer 電子／電腦工程師；電訊工程師	4	0	0	4
Electrical Engineer 電機工程師	0	0	0	0
Mechanical Engineer 機械工程師	0	0	0	0
Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證／控制工程師	0	0	0	0
Chemical Engineer 化學工程師	0	0	0	0
Product/Graphic Designer 產品／平面設計員	0	0	0	0
System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer 系統分析員；軟件工程師；人工智能工程師；機器學習專家； 用戶體驗設計師	0	0	0	0
Other Technologist 其他技師	0	0	0	0
Sub-total 小計	4	0	0	4
TECHNICIAN LEVEL 技術員級				
Electronics Technician ; Telecommunications Technician 電子技術員；電訊技術員	0	0	0	0
Mechanical Technician 機械技術員	0	0	0	0
Draughtsman 繪圖員	0	0	0	0
Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員；品質保證／控制技術員	0	0	0	0
Supervisor ; Foreman ; Leader 監督；管工；組長	20	0	0	20
Programmer ; Software Technician 程式編製員；軟件技術員	0	0	0	0
Web Developer / Designer ; Computer Game Designer 網站開發員／設計員；電腦遊戲設計員	0	0	0	0
Sales Technician 推銷技術員	1755	0	3	1755
Sub-total 小計	1,775	0	3	1,775
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工；電纜連接技工	0	0	0	0
Electronics Craftsman 電子技工	290	0	0	290
Electrician 電氣技工	0	0	0	0
Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工(保養／裝配打磨工、機床工、工具／工模製造及修理工)	0	0	0	0
Sub-total 小計	290	0	0	290
OPERATIVE LEVEL 操作工級				
Operator ; Quality Assurance / Control Operator ; General Worker 操作工；品質保證／控制工；雜工	0	0	0	0
Sub-total 小計	0	0	0	0
Total 總數	2,069	0	3	2,069

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Appendix 9G

Manpower Statistics of the Electronics and Telecommunications Industries

電子及電訊業人力統計數字

All Sections 各門類

	As at Survey Reference Date 在統計日期的			Forecast Number of Employees as at June 2021 預計在 2021 年 6 月的僱員人數
	Number of Employees 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies 空缺額	
TECHNOLOGIST LEVEL 技師級				
Electronics / Computer Engineer ; Telecommunications Engineer 電子／電腦工程師；電訊工程師	9486	67	119	9603
Electrical Engineer 電機工程師	1305	28	71	1376
Mechanical Engineer 機械工程師	853	4	26	879
Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證／控制工程師	864	1	6	871
Chemical Engineer 化學工程師	17	0	0	17
Product/Graphic Designer 產品／平面設計員	392	0	4	396
System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer 系統分析員；軟件工程師；人工智能工程師；機器學習專家； 用戶體驗設計師	3230	6	59	3294
Other Technologist 其他技師	50	0	0	50
Sub-total 小計	16,197	106	285	16,486
TECHNICIAN LEVEL 技術員級				
Electronics Technician ; Telecommunications Technician 電子技術員；電訊技術員	13198	135	276	13473
Mechanical Technician 機械技術員	2177	186	40	2217
Draughtsman 繪圖員	206	0	0	200
Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員；品質保證／控制技術員	623	0	0	623
Supervisor ; Foreman ; Leader 監督；管工；組長	2419	154	72	2491
Programmer ; Software Technician 程式編製員；軟件技術員	5368	29	68	5467
Web Developer / Designer ; Computer Game Designer 網站開發員／設計員；電腦遊戲設計員	1505	1	0	1500
Sales Technician 推銷技術員	14024	0	98	14075
Sub-total 小計	39,520	505	554	40,046
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工；電纜連接技工	722	17	8	730
Electronics Craftsman 電子技工	7451	65	105	7552
Electrician 電氣技工	997	212	51	1048
Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工(保養／裝配打磨工、機床工、工具／工模製造及修理工)	928	178	56	984
Sub-total 小計	10,098	472	220	10,314
OPERATIVE LEVEL 操作工級				
Operator ; Quality Assurance / Control Operator ; General Worker 操作工；品質保證／控制工；雜工	1,269	0	25	1,294
Sub-total 小計	1,269	0	25	1,294
Total 總數	67,084	1,083	1,084	68,140

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Appendix 9H

Distribution of Employees by Monthly Income Range (All Sectors)

根據每月總收入幅度的僱員人數分布情況（各門類）

	Total no. of full-time employees 全職僱員人數	Average Monthly Remuneration Package 每月平均薪酬						
		\$10,000 or below 或以下	10,001 - \$15,000	\$15,001 - \$20,000	\$20,001 - \$25,000	\$25,001 - \$30,000	\$30,001 - \$50,000	"\$50,001 or above 或以上"
TECHNOLOGIST LEVEL 技師級								
Electronics / Computer Engineer ; Telecommunications Engineer 電子／電腦工程師；電訊工程師	9486	0.0%	0.0%	0.0%	11.7%	21.5%	58.8%	7.9%
Electrical Engineer 電機工程師	1305	0.0%	0.0%	0.0%	6.4%	18.1%	69.9%	5.6%
Mechanical Engineer 機械工程師	853	0.0%	0.0%	0.0%	11.9%	2.3%	81.0%	4.8%
Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證／控制工程師	864	0.0%	0.0%	0.0%	20.4%	25.4%	49.7%	4.5%
Chemical Engineer 化學工程師	17	0.0%	0.0%	0.0%	0.0%	0.0%	88.2%	11.8%
Product/Graphic Designer 產品／平面設計員	392	0.0%	0.0%	0.0%	19.3%	64.9%	15.8%	0.0%
System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer 系統分析員；軟件工程師；人工智能工程師；機器學習專家；用戶體驗設計師	3230	0.0%	0.0%	0.0%	6.1%	19.6%	48.4%	25.9%
Other Technologist 其他技師	50	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%
Sub-total 小計	16197	0.0%	0.0%	0.0%	10.8%	21.3%	57.5%	10.5%
TECHNICIAN LEVEL 技術員級								
Electronics Technician; Telecommunications Technician 電子技術員；電訊技術員	13198	0.0%	0.0%	20.0%	36.6%	29.0%	13.9%	0.5%
Mechanical Technician 機械技術員	2177	0.0%	0.0%	3.2%	33.1%	49.0%	14.0%	0.7%
Draughtsman 繪圖員	206	0.0%	0.0%	2.4%	62.7%	34.9%	0.0%	0.0%
Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員；品質保證／控制技術員	623	0.0%	0.0%	35.0%	45.9%	19.1%	0.0%	0.0%
Supervisor ; Foreman ; Leader 監督；管工；組長	2419	0.0%	0.0%	6.7%	28.0%	61.6%	3.6%	0.0%
Programmer ; Software Technician 程式編製員；軟件技術員	5368	0.0%	0.0%	8.7%	31.8%	24.9%	16.4%	18.4%
Web Developer / Designer ; Computer Game Designer 網站開發員／設計員；電腦遊戲設計員	1505	0.0%	0.0%	4.5%	82.1%	13.4%	0.0%	0.0%
Sales Technician 推銷技術員	14024	0.0%	0.0%	30.9%	56.5%	7.0%	2.3%	3.3%
Sub-total 小計	39520	0.0%	0.0%	20.1%	44.0%	23.7%	8.6%	3.6%
CRAFTSMAN LEVEL 技工級								
High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工；電纜連接技工	722	0.0%	29.8%	48.3%	21.9%	0.0%	0.0%	0.0%
Electronics Craftsman 電子技工	7451	0.5%	2.3%	73.0%	20.7%	3.5%	0.0%	0.0%
Electrician 電氣技工	997	0.0%	0.0%	57.8%	42.2%	0.0%	0.0%	0.0%
Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工（保養／裝配打磨工、機床工、工具／工模製造及修理工）	928	0.0%	0.9%	55.3%	43.0%	0.9%	0.0%	0.0%
Sub-total 小計	10098	0.3%	3.9%	67.3%	25.9%	2.6%	0.0%	0.0%
OPERATIVE LEVEL 操作工級								
Operator ; Quality Assurance / Control Operator ; General Worker 操作工；品質保證／控制工；雜工	1269	3.8%	66.5%	29.1%	0.5%	0.0%	0.0%	0.0%
Sub-total 小計	1269	3.8%	66.5%	29.1%	0.5%	0.0%	0.0%	0.0%
Total 總數	67084	0.1%	1.9%	21.3%	32.4%	19.9%	19.7%	4.8%

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Appendix 9I

Skills employees need to enhance

僱員需要加強培訓的技能

	Percentage 百分比		
	Technologist Level 技師級	Technician Level 技術員級	Craftsman Level 技工級
(i) Business continuity management 業務持續性管理	28.7%	9.0%	2.8%
(ii) Quality management 質量管理	30.1%	13.1%	0.0%
(iii) Risk management 風險管理	21.2%	9.6%	0.0%
(iv) Strategy Planning and Implementation 戰略規劃及推行	9.6%	1.9%	0.0%
(i) Automation Management 自動化管理	8.2%	4.2%	3.2%
(ii) Artificial Intelligence and Big Data Analytics 人工智能及大數據分析	11.7%	10.1%	1.1%
(iii) Maintenance 保養	18.8%	24.4%	66.1%
(iv) Manufacturing and Operations 製造與運營	9.6%	12.0%	4.7%
(v) Network Technology Management 網絡技術管理	22.0%	18.6%	6.1%
(vi) Production Management 生產管理	8.6%	3.5%	5.1%
(vii) Product Development and Testing 產品開發與測試	10.7%	6.3%	5.2%
(viii) Productivity and Innovation 生產力與創新	8.3%	5.2%	5.2%
(ix) System Integration 系統整合	10.1%	9.6%	9.8%
(x) Information Security 資訊保安	18.3%	20.0%	12.4%
(i) Business Network Building 商業網絡建設	19.7%	12.2%	3.4%
(ii) Organisational Development 組織發展	12.4%	8.1%	0.3%
(iii) People Management 人事管理	15.0%	8.8%	5.8%
Number of companies with such level of staff 具有此技能等級員工的公司數量	1913	5422	751

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Appendix 9J

RECOMMENDED NUMBER OF TRAINEES
TO BE TAKEN ON ANNUALLY FOR THE NEXT FEW YEARS

建議未來幾年每年應取錄的受訓者人數

Job Title 職稱	No. of Workers Employed at Time of Survey (2020) 調查期間 (2020年) 僱員人數	Recommended Number of Trainees to be Taken on Annually Starting from 2020 建議由2020年起 每年取錄的受訓者人數
TECHNOLOGIST LEVEL 技師級		
Electronics Engineer ; Telecommunications Engineer 電子工程師；電訊工程師	9 486	319 – 389
Electrical Engineer 電機工程師	1 305	44 – 54
Mechanical Engineer 機械工程師	853	29 – 35
Manufacturing Engineer ; Quality Assurance / Control Engineer 製造工程師；品質保證／控制工程師	864	33 – 40
Chemical Engineer 化學工程師	17	1 – 2
Product/Graphic Designer 產品／平面設計員	392	13 – 16
System Analyst ; Software Engineer ; AI Engineer ; Machine Learning Specialist ; UX Designer 系統分析員；軟件工程師；人工智能工程師； 機器學習專家；用戶體驗設計師	3 230	110 – 134
Other Technologist 其他技師	50	2 – 3
Sub-total 小計	16 197	551 – 673
TECHNICIAN LEVEL 技術員級		
Electronics Technician ; Telecommunications Technician 電子技術員；電訊技術員	13 198	418 – 512
Mechanical Technician 機械技術員	2 177	69 – 84
Draughtsman 繪圖員	206	7 – 8
Manufacturing Technician ; Quality Assurance / Control Technician 製造技術員；品質保證／控制技術員	623	20 – 24
Supervisor ; Foreman ; Leader 監督；管工；組長	2 419	77 – 94
Programmer ; Software Technician 程式編製員；軟件技術員	5 368	170 – 208
Web Developer / Designer ; Computer Game Designer 網站開發員／設計員；電腦遊戲設計員	1 505	48 – 58
Sales Technician 推銷技術員	14 024	445 – 544
Sub-total 小計	39 520	1 254 – 1 532

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CRAFTSMAN LEVEL 技工級		
High Speed Data Network & Wireless Data System Integrator ; Cable Joiner 高速資訊網絡及無線系統技工；電纜連接技工	722	55 – 67
Electronics Craftsman 電子技工	7 451	566 – 692
Electrician 電氣技工	997	76 – 92
Mechanic (Maintenance Mechanic / Fitter, Machinist, Mould / Tool and Die Maker and Repairer) 機械工（保養／裝配打磨工、機床工、工具／工模製造及修理工）	928	70 – 86
Sub-total 小 計	10 098	767 – 937

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Appendix 10

Sampling Plan for 2020 Manpower Survey of the Electronics and Telecommunications Industries

Sector	HSIC/ <i>dummy HSIC</i>	Economic Sector	Employment Size	Stratum	Sample Size
1	261100, 261900, 262000, 263000, 264000, 265100, 265202, 266000, 268000, 273100, 281700, 324500, 331300, 952100, 952200, 953100	Manufacturing	1-9	1	44
			10-19	2	17
			20-29	3	20
			50-99	4	8
			100-199	5	2
			200 & over	6	1
			Sub-total		92
2	432104, 432105, 432106	Engineering Services	1-9	1	17
			10-19	2	43
			20-29	3	45
			50-99	4	7
			100-199	5	4
			200 & over	6	2
			Sub-total		118
3A	620101, 620199, 620200, 620900, 631100 (employment size > 9)	Information technology services	10-19	2	14
			20-29	3	29
			50-99	4	25
			100-199	5	28
			200 & over	6	20
			Sub-total		116
3B	451452, 452452, 451445, 452445, 451601, 452601, 451602, 452602, 451611, 452611, 451613, 452613, 451631, 452631, 451634, 452634	Import and Export trading	10-19	2	26
			20-29	3	46
			50-99	4	45
			100-199	5	20
			200 & over	6	19
			Sub-total		156
4	400000	<i>Supplementary Sample (Sizeable companies related to Electronics and Telecommunications Industry)</i>	Sub-total		22
5	591100 (for employment size > 99), 591200, 601000, 602000, 611000, 619100, 619900	Telecommunications Services	1-9	1	17
			10-19	2	14
			20-29	3	15
			50-99	4	14
			100-199	5	12
			200 & over	6	28
Sub-total		100			
6	460445, 460452, 460601 460602, 460611, 460613 460631, 460634	Wholesale	1-9	1	47
			10-19	2	21
			20-29	3	24
			50-99	4	10
			100-199	5	5
			200 & over	6	4
Sub-total		111			

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Sector	HSIC/ <i>dummy HSIC</i>	Economic Sector	Employment Size	Stratum	Sample Size
7	700000	<i>Supplementary Sample (Design Houses, Universities and Related Government Bureau/ Departments)</i>	Sub-total		26
8	Relevant HSIC related to Retail (i.e. 475905) (employment size > 19)	Retail	20-49	3	5
			50-99	4	5
			100-199	5	3
			200 & over	6	5
			Sub-total		18

Note: Data for Sector 1, 2, 3, 5, 6 & 8 were collected at establishment level (i.e. by location), while Sector 4 & 7 (supplementary samples) were collected at company level

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Supplementary List for 2020 Manpower Survey of the Electronics and Telecommunications Industries

Branch 4: Sizeable companies related to Electronics and Telecommunications Industry

The Hong Kong Jockey Club
MTR Corporation Limited
Hong Kong Aircraft Engineering Company Limited
The Hong Kong & China Gas Co Ltd
The Hongkong Electric Co., Ltd
Intertek Testing Services Hong Kong Limited
Sgs Hong Kong Limited
Peoplebank Hong Kong Limited
Shun Hing Electric Service Centre Ltd
Ngong Ping 360 Limited
Shun Hing Engineering Contracting Company Limited
The Hong Kong Standards and Testing Centre Ltd
Rohm Semiconductor Hong Kong Company Limited
Evergrand Technologies Limited
Telecom Service One Limited
Toshiba Hong Kong Limited
Hong Kong Science and Technology Parks Corporation - Product Analysis Laboratory
Mad Mobile Application Development Limited
HP Enterprise Services (Hong Kong) Limited
Telefield Medical Devices Limited
Aviton Care Limited*
Megasoft Limited*

Branch 7: Supplementary of Design Houses, Universities & Government

Vocational Training Council
Hong Kong Applied Science and Technology Research Institute Company Limited
Solomon Systech Limited
Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling
Novalux Hong Kong Electronics Ltd
Kodec Development Limited
Micom Tech Ltd
Jess Technology Company Limited
Integration-Linkage Technology Limited
Ocean Unicorn Technology Limited
Semic Technology Limited
New Spirit Technology Limited
The Electronics Engineering Dept. The Chinese University of Hong Kong
The Electrical and Electronics Engineering Department, The University of Hong Kong
The Electronic and Computer Eng. Dept. Hk University of Science and Technology
The Electronics & Information Engineering Department The Hong Kong Poly University
The Electrical Engineering Department, City University of Hong Kong
The Technical & Planning Division of The Civil Aviation Department
The Electrical & Mechanical Services Department (Electronics Div)
The Communications Authority (Past: The Office of The Telecommunications Authority)
The Hong Kong Productivity Council (Electronics Services Division)
The Innovation and Technology Commission
The Chief Staff Officer Communications Branch
The Hong Kong Observatory
The Department Of Computer Science, Hong Kong Baptist University
School Of Science and Technology, The Open University Of Hong Kong

Note *: Newly added in 2020 survey

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Appendix 11

Coverage of the Survey

Branch	Industry (HSIC 2.0)	Remarks	
1 Manufacturing	261100	Manufacture of electronic parts and components for computer and telecommunications equipment	
	261900	Manufacture of electronic parts and components n.e.c.	
	262000	Manufacture of computers and peripheral equipment	
	263000	Manufacture of communication equipment	
	264000	Manufacture of audio and video equipment	
	265100	Manufacture of measuring, testing, navigating and control equipment	
	265202	Manufacture of electronic watches, watch movements, electronic clocks and clock movements	Newly added in 2020 survey
	266000	Manufacture of irradiation, electromedical and electrotherapeutic equipment	Newly added in 2020 survey
	268000	Manufacture of magnetic and optical media	
	273100	Manufacture of electric wire, fibre optic cables and other cables	
	281700	Manufacture of office machinery and equipment (except computers and peripheral equipment)	
	324500	Manufacture of electronic games and toys	
	331300	Repair of electronic and optical equipment	
	952100	Repair of computers and peripheral equipment	
	952200	Repair of communications equipment	
953100	Repair of audio and visual electronic products		
2 Engineering Services	432104	Anti-burglar system, installation and maintenance	
	432105	Intercommunication system, installation and maintenance	
	432106	Telecommunications equipment, installation and maintenance	
3a Information technology service [employment size > 9 only]	620101	Development of computer games	
	620199	Development of other softwares and programming activities	
	620200	Information technology consultancy activities and computer facilities management activities	
	620900	Other information technology service activities	
	631100	Data processing, hosting and related activities	
3b Import and Export trading [employment size > 9 only]	451452	Export trading of electrical goods (excl. machinery, office and telecommunications equipment and appliances)	
	452452	Import for wholesale of electrical goods (excl. machinery, office and telecommunications equipment and appliances)	
	451445	Export trading of computer games	Newly added in 2020 survey
	452445	Import for wholesale of computer games	Newly added in 2020 survey
	451601	Export trading of computers and computer peripheral equipment	
	452601	Import for wholesale of computers and computer peripheral equipment	
	451602	Export trading of computer software	
	452602	Import for wholesale of computer software	
	451611	Export trading of telecommunications equipment	
	452611	Import for wholesale of telecommunications equipment	
	451613	Export trading of electronic parts	
	452613	Import for wholesale of electronic parts	
	451631	Export trading of scientific and professional instruments (excl. medical and dental instruments)	
	452631	Import for wholesale of scientific and professional instruments (excl. medical and dental instruments)	
	451634	Export trading of office appliances and equipment (excl. computers, furniture and fixtures)	
452634	Import for wholesale of office appliances and equipment (excl. computers, furniture and fixtures)		

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4 Supplementary of sizeable companies related to Electronics and Telecommunications Industry

5	Telecommunications	591100	Motion picture, video and television programme production activities [employment size > 99 only]	All establishments included in 2016 survey
		591200	Motion picture, video and television programme post-production activities	Newly added in 2020 survey
		601000	Radio broadcasting	
		602000	Television programming and broadcasting activities	
		611000	Telecommunications network operation	
		619100	Internet access services	
		619900	Other miscellaneous telecommunications	
6	Wholesale	460445	Wholesale of computer games	Newly added in 2020 survey
		460452	Wholesale of electrical goods (excl. machinery, office and telecommunications equipment and appliances)	
		460601	Wholesale of computers and computer peripheral equipment	
		460602	Wholesale of computer software	
		460611	Wholesale of telecommunications equipment and parts	
		460613	Wholesale of electronic parts	Newly added in 2020 survey
		460631	Wholesale of scientific and professional instruments (excl. medical and dental instruments)	Newly added in 2020 survey
		460634	Wholesale of office appliances and equipment (excl. computers, furniture and fixtures)	
7 Supplementary of Design Houses, Universities & Government				
8	Retail [employment size > 19 only]	474101	Retail sale of telecommunications equipment	Newly added in 2020 survey
		474102	Retail sale of computers and peripheral units	Newly added in 2020 survey
		474103	Retail sale of computer software	Newly added in 2020 survey
		474200	Retail sale of audio and video equipment	Newly added in 2020 survey
		476402	Retail sale of computer games	Newly added in 2020 survey
		477418	Retail sale of scientific & professional instruments (excl. medical & dental equipment and appliances)	Newly added in 2020 survey
		477422	Retail sale of office appliances and equipment (excl. computers, furniture and fixtures)	Newly added in 2020 survey
		475905	Retail sale of electrical goods (excl. machinery, office and telecommunications equipment and appliances, audio and video equipment)	Newly added in 2020 survey

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Appendix 12A

List of Electronics and Telecommunications related degree programmes offered by local education institutions funded by the University Grants Committee

<u>Education Institutions</u>	<u>Programme Name</u>
City University of Hong Kong	Bachelor of Engineering in Computer and Data Engineering
	Bachelor of Engineering in Computer Engineering
	Bachelor of Engineering in Information Engineering
	Bachelor of Engineering in Electronic and Communication Engineering
	Bachelor of Engineering in Systems Engineering and Management
	Bachelor of Engineering in Data and Systems Engineering
	Bachelor of Science in Data Science
The Chinese University of Hong Kong	B.Eng. Electronic Engineering
	B.Eng. Computer Engineering
	B.Eng. Information Engineering
The University of Hong Kong	Bachelor of Engineering *
Hong Kong University of Science and Technology	BEng Electronic Engineering
	BEng/BBA Electronic Engineering and General Business Management
	BEng Computer Engineering
	BEng/BBA Computer Engineering and General Business Management
	BSc Data Science and Technology
The Hong Kong Polytechnic University	BEng (Hons) Electronic & Information Engineering
	BSc (Hons) Information Security
	BSc (Hons) Internet & Multimedia Technologies

Note: * Only included those major in Electronic Engineering and Computer Engineering.

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Appendix 12B

**List of Electronics and Telecommunications related
Higher Diploma (HD) programmes
offered by Hong Kong Institute of Vocational Education and
The Hong Kong Polytechnic University**

<u>Education Institutions</u>	<u>Programme Name</u>
The Hong Kong Polytechnic University	HD Electronic and Information Engineering
	HD Multimedia Design and Technology
Hong Kong Institute of Vocational Education	HD in Telecommunications and Networking
	HD in Information and Network Security
	HD in Software Engineering
	HD in Cloud and Data Centre Administration
	HD in Data Science and Analytics
	HD in Multimedia
	HD in Computer System Administration
	HD in Web Design and Development
	HD in AI and Mobile Applications Development
	HD in Audio-Visual Entertainment Technology
	HD in Cybersecurity
	HD in AI and Smart Technology
	HD in Multimedia, VR and Interactive Technology
	Higher Diploma in Cloud and Data Centre Administration
	HD in Electronic and Communications Engineering
HD in Computer Engineering	
HD in Computer and Electronic Engineering	

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Appendix 12C

**List of Electronics and Telecommunications related
Diploma of Vocational Education (DVE) Programmes
offered by Vocational Training Council**

<u>Education Institutions</u>	<u>Programme Name</u>
Vocational Training Council	DVE in Digital Electronics Technology
	DVE in Electronic and Computer Engineering
	DVE in Artificial Intelligence and Robotics
	DVE in Information Technology
	CVE in Digital Electronics Technology

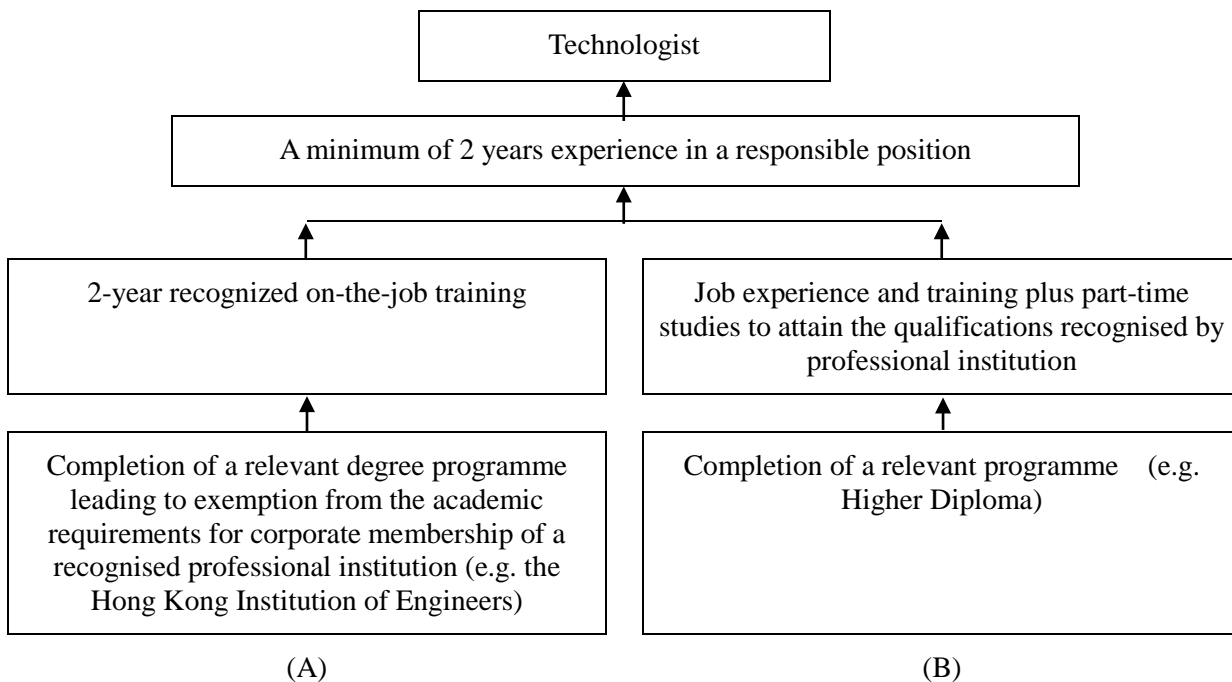
The Recommended Training Routes

Training of Technologists

A technologist is a person who has the qualifications and experience equivalent to those required for corporate membership of a professional institution. He should be competent in analysing and solving a wide range of technical problems. Furthermore, he should be able to assume personal responsibility for the development and application of engineering principles, exercise original thought and judgment, follow progress in his field of technology, apply the latest techniques, supervise and develop his sub-ordinates.

Technologists play an important role in bringing about improvement in management and technological innovations. The Training Board recommends that technologists should be trained via the following route:

Figure 1 : Training of Technologists



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Engineering Graduate Training Scheme (EGTS)

To bring about more training opportunities to engineering graduates to help them meet the training requirements of the Hong Kong Institution of Engineers (HKIE) and obtain professional status as an engineer, the Innovation and Technology Training Board of the Vocational Training Council (VTC) is responsible for administering the EGTS. Employers participating in the EGTS are required to provide up to 18 months practical training of a standard acceptable for Corporate Membership of the HKIE. Employers wishing to participate in the EGTS have to register their training programmes pre-approved by the HKIE under its Scheme “A” training with the VTC. Each trainee being trained under the EGTS is granted a subsidy to be paid through his employer as part of his/her salary. The subsidy period is up to a maximum of 18 months.

Reindustrialisation and Technology Training Programme (RTTP)

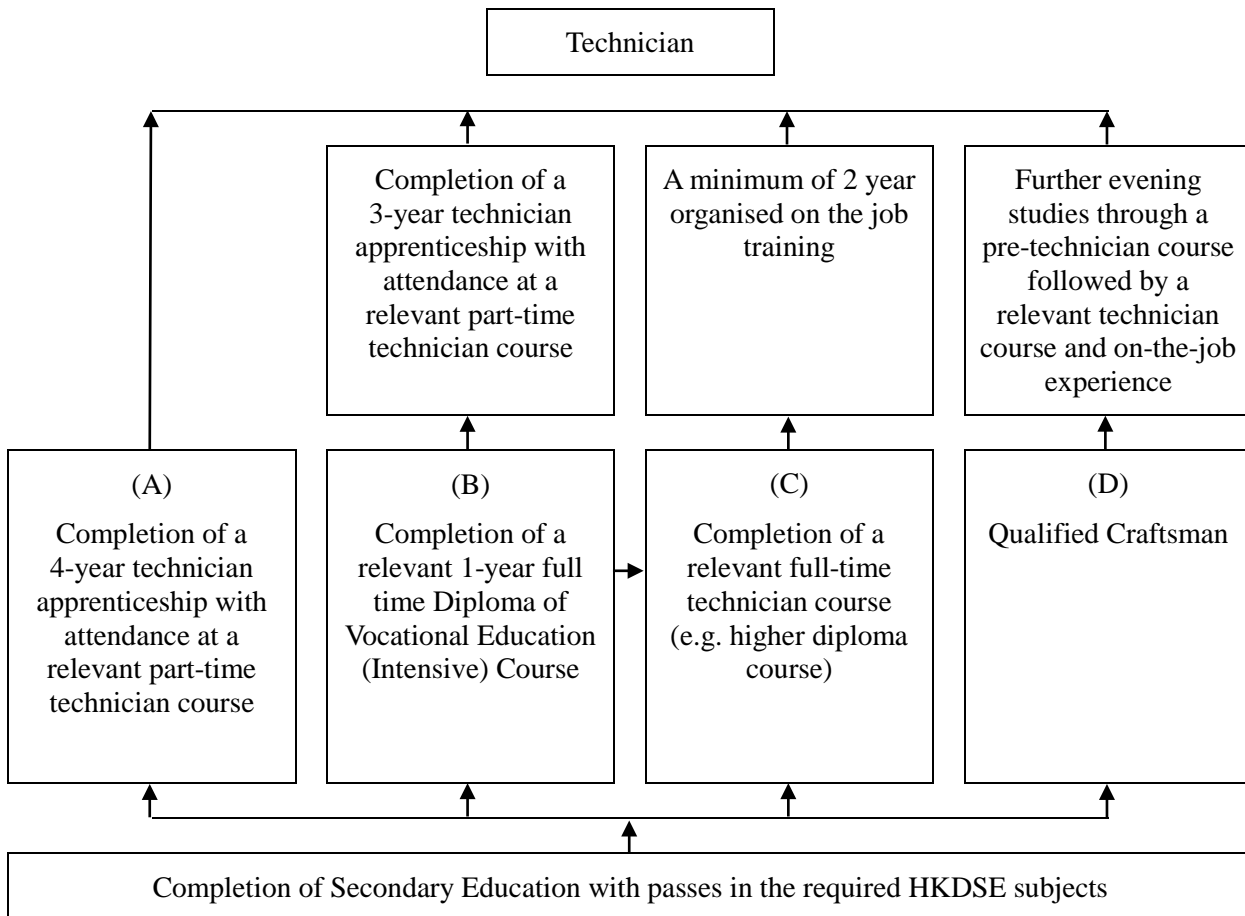
The HKSAR Government launched the RTTP in August 2018 under the Innovation and Technology Fund. It aims at subsidising local companies on a 2:1 matching basis to train their staff in advanced technologies. The RTTP supports local and non-local training in advanced technologies, in particular those related to “Industry 4.0”. These technologies should be advanced in nature and not yet widely adopted in Hong Kong. The adoption of such technologies should also benefit the economy of Hong Kong.

The Recommended Training Routes

Training of Technicians

A technician is one who occupies a position between the technologist and the craftsman. His education, training and practical experience should enable him to apply proven techniques to solve technical problems. He is expected to carry a measure of technical responsibility, normally under the guidance of a technologist. The routes available for training technicians are shown in Figure 2.

Figure 2: Training of Technicians

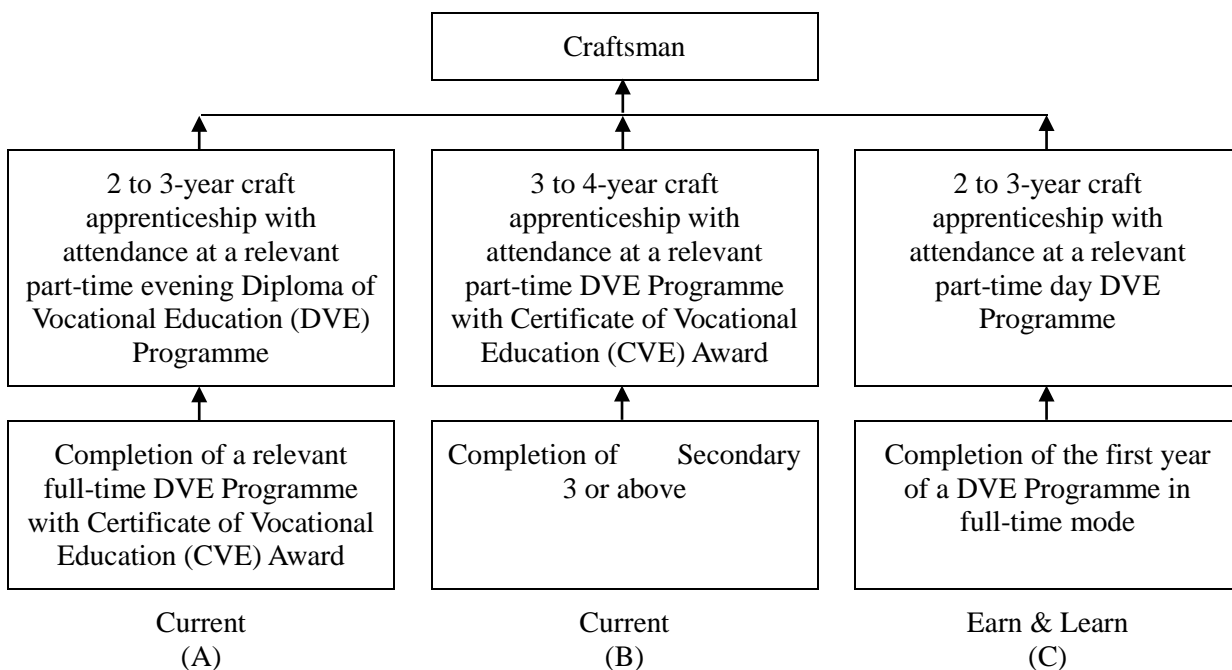


The Recommended Training Routes

Training of Craftsmen

6.34 A craftsman is a skilled worker who is able to apply a wide range of skills to his work with minimum direction and supervision. He requires not only practical skills but also related theoretical knowledge to enable him to adapt himself to new technologies. A proper craft apprenticeship would contain both components. The common routes for training craftsmen are shown in Figure 3:

Figure 3: Training of Craftsmen



The Training Board recommends route (A) and (C) because the apprenticeship period is shorter and the apprentices have already undergone proper basic training and would be productive right from the start of their apprenticeship.

Considering that youngsters have more choices nowadays, employers should keep on promoting the image and prospects of the industry so that more secondary school leavers will consider electronics and telecommunications industries for their career.