2016 MANPOWER SURVEY REPORT

ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES

電子及電訊業

2016 年人力調查報告

ELECTRONICS AND TELECOMMUNICATIONS TRAINING BOARD

VOCATIONAL TRAINING COUNCIL

職業訓練局

電子及電訊業訓練委員會

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Executive Summary of the 2016 Manpower Survey Report of the Electronics and Telecommunications Industries

Introduction

1. The survey was conducted in April 2016 by the Electronics and Telecommunications Training Board of the Vocational Training Council (VTC) to collect up-to-date manpower information by principal job in the electronics and telecommunications industries.

Scope of the Survey

2. With the assistance from the Census and Statistics Department (C&SD), the survey covered 704 sampled establishments selected by stratified sampling method from a total of 7 529 establishments from the central registrar maintained by the C&SD. The survey data collected from the selected establishments were scaled up statistically to reflect the overall manpower situation of the two industries. The survey scope covered the following six sectors:

Sector	No. of Sampled Establishments
1. Manufacturing	70
2. Trading and Services	378
3. Telecommunications Services	129
4. Wholesale	89
5. Design Houses and Relevant Departments in Universities and Government	28
6. Retail Shops for Electronics Products	10
Total	704

Survey Findings

3. The survey revealed that in April 2016, a total of 144 985 persons were employed in the Hong Kong electronics and telecommunications industries. Of the 144 985 employees, 63 311 were employed in principal jobs of electronics engineering and related disciplines in the two industries. A comparison of the distribution of employees by job level and by sector of the electronics and telecommunications industries between 2014 and 2016 is illustrated in Table A:

Table A : Comparison of Employees by Job Level by Sector between 2014 and 2016

Sector	Job Level				**Total (Annual Change %)**
	Technologist	Technician	Craftsman	Operative	
1. Manufacturing	**792** 797 (-0.3%)	**1 868** 2 158 (-7.0%)	**610** 352 (+31.6%)	**1 110** 1 367 (-9.9%)	**4 380** 4 674 (-3.2%)
2. Trading and Services	**10 259** 9 847 (+2.1%)	**24 013** 23 113 (+1.9%)	**4 735** 4 295 (+5.0%)	**510** 1 021 (-29.3%)	**39 517** 38 276 (+1.6%)
3. Telecommunications Services	**2 388** 2 302 (+1.9%)	**4 440** 4 602 (-1.8%)	**922** 614 (+22.5%)	**305** 142 (+46.6%)	**8 055** 7 660 (+2.5%)
4. Wholesale	**339** 390 (-6.8%)	**3 321** 3 502 (-2.6%)	**291** 249 (+8.1%)	**50** 97 (-28.2%)	**4 001** 4 238 (-2.8%)
5. Design Houses and Relevant Departments in Universities and Government	**1 537** 1 302 (+8.7%)	**2 000** 2 019 (-0.5%)	**813** 858 (-2.7%)	**53** 73 (-14.8%)	**4 403** 4 252 (+1.8%)
6. Retail Shops for Electronics Products (10 large shops)	**25** 4 (+150%)	**2 877** 3 495 (-9.3%)	**53** 0 (-)	**0** 0 (-)	**2 955** 3 499 (-8.1%)
Total	**15 340** 14 642 (+2.4%)	**38 519** 38 889 (-0.5%)	**7 424** 6 368 (+8%)	**2 028** 2 700 (-13.3%)	**63 311** 62 599 (+0.6%)

Remark : Bolded figures are those for 2016

4. At the time of the survey, employers reported a total of 1 078 trainees and 1 687 vacancies in electronics engineering and related disciplines, representing 1.7% and 2.7% respectively of the total workforce. Besides, employers also forecasted that the two industries would require 65 260 employees by April 2017, an increase of 3.1% (1 949) of the manpower in April 2016.

Manpower Changes

5. The total manpower in principal jobs of electronics and related disciplines of the electronics and telecommunications industries has increased from 62 599 employees in 2014 to 63 311 in 2016, representing 1.1% increase. Table A reveals that the manpower of Trading & Services (Sector 2) had the largest number of 39 517 manpower (62.4%), whereas for Retails Shops for Electronics Products (Sector 6) had the smallest number of 2 955 manpower (4.7%). The survey also revealed that the manpower situation has been stable over the past two years.

6. Comparison of manpower changes by sector and by job level are shown in Figures A & B respectively.

Figure A : Comparison of Manpower Changes by Sector

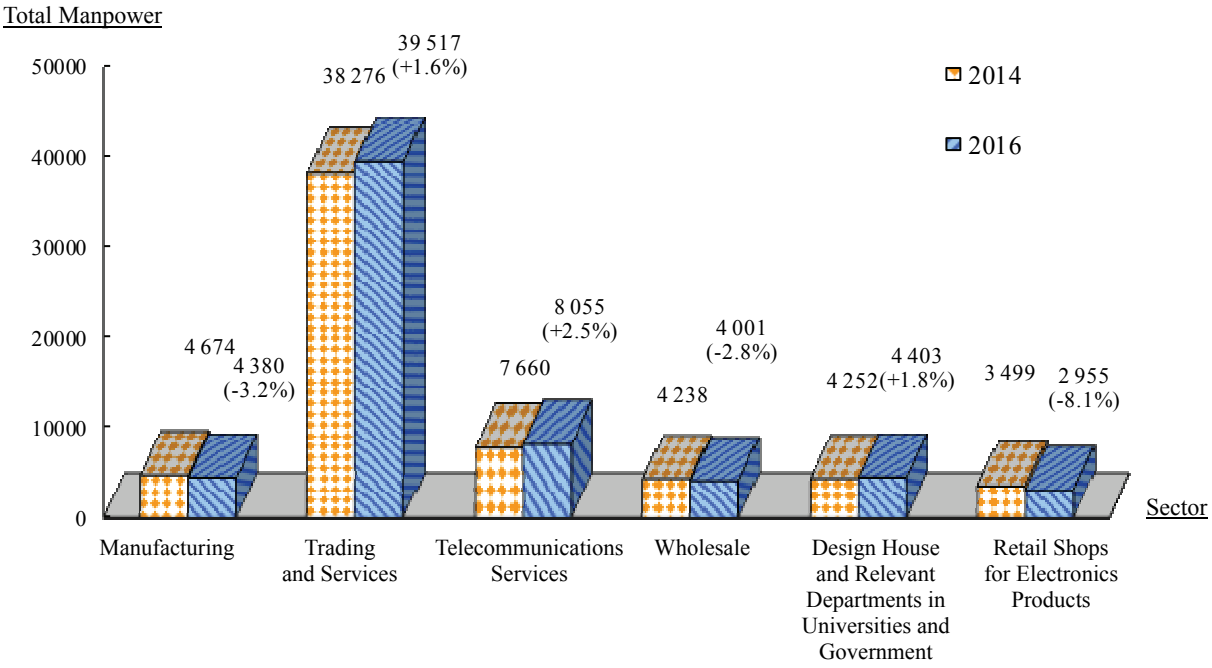
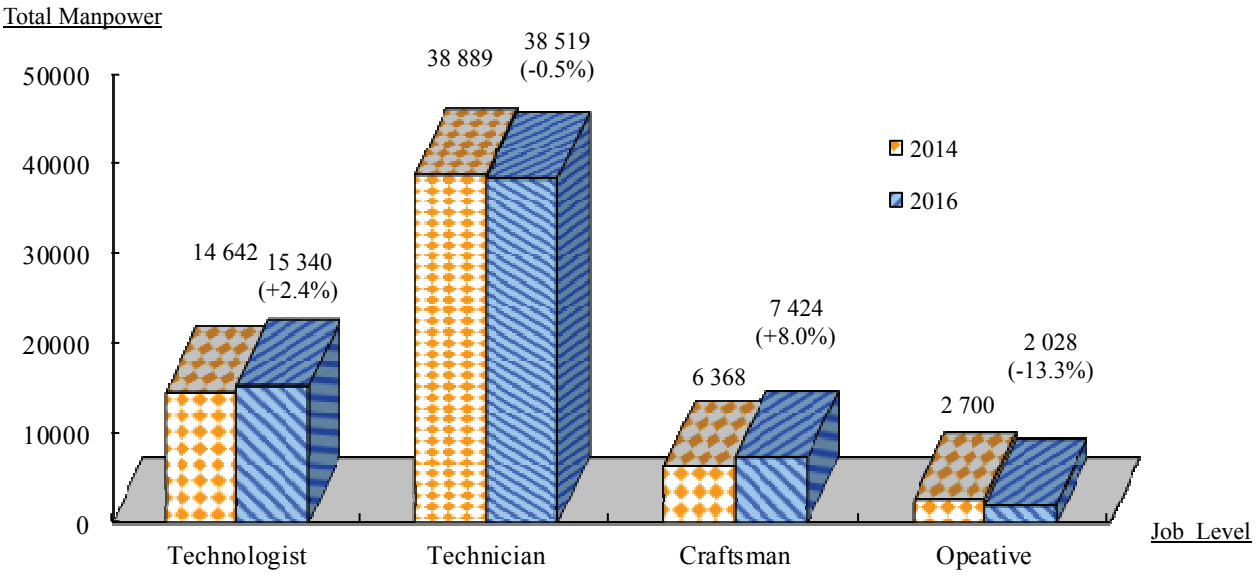


Figure B : Comparison of Manpower Changes by Job Level



7. Training Board is of the view that the following reasons have attributed to the manpower changes by sector:

(i) For manufacturing companies, the number of large companies remained steady, i.e. a total of 19 companies with employment size of 50 and above in 2016 comparing with 18 in 2014. On the other hand, a general decrease of manpower at the technician level but an increase in craftsman level surveyed. As a result, it recorded an annual manpower decrease of 3.2% in the Sector. It is anticipated that some of the manufacturing companies had experienced difficulties in recruiting technicians that they resorted to implement the robotics/ automation technology in order to reduce the rising labour cost. This trend was also attributed to the incentive schemes introduced by the provincial government of Guangdong that the manufacturing companies were encouraged to invest in automation in their production facilities.

(ii) Due to the close business and manpower nature of Sectors 2 and 4, the two sectors will be combined together for analysis. An annual manpower increase of 1.2% was noted in Sectors 2 and 4 owing to a mild increase of basic construction work and special overseas project carried out by a few engineering services companies in Sector 2 in the past two years. Hence, more skilled manpower was required in the first three job levels. On the other hand, the operative level recorded an annual manpower decrease in 2016.

(iii) The increase of employees in sector 3 might be due to the development of enhanced services for internet access and communication services (e.g. 4G & 4.5G). Hence, additional skilled manpower was required in such companies to capture more market shares that a mild annual increase of 2.5% of manpower was surveyed in 2016. Also, a general manpower increase occurred across the job levels except the technician level. The reasons for the decrease of technicians was due to the closing down of a major broadcasting company and the manpower restructure of several large companies.

(iv) A very mild annual increase of 1.8% of manpower was surveyed in Sector 5 due to the fact that the manpower engaged in the engineering departments of the universities and Government departments as well as the design houses remained steady in the past two years. However, there is a 8.7% increase of manpower in the technologist level, probably to cope with the new technological development (for example, Augmented Reality (AR) / virtual reality (VR), Smart City, Internet of Things (IoT), Open Data, Cyber Security, etc.).

(v) The annual decrease of manpower of 8.1% recorded in Sector 6 was resulted from the general decrease in the number of tourists from the Mainland. The Survey also showed the increase of manpower of technologists due to the demand for high-tech products. Using kiosks in shopping malls and shops to engage and enhance customer experience, for example; had increased the demand for technologists who are equipped with hard technology skills as well as soft skill. On the other hand, the Retail Technology Adoption Assistance Scheme (ReTAAS) funded by the government also helped the retail industry to adopt high-tech technology.

Factors Affecting Manpower Requirements

8. Accounting for 64% of Hong Kong's total export in 2015 [(1)], 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) Hong Kong's economy is forecasted to maintain a growth of 2% to 2.7% in 2017.

(ii) The Mainland is moving towards a lower but more sustainable growth path under the National 13th Five-Year Plan for 2016-2020. The Government will continue to forge closer economic ties with the Mainland through CEPA and other regional co-operation platforms. Separately, the Government will strive to strengthen economic co-operation with new and emerging markets. In particular, the Mainland's "Belt and Road" Initiative, which encompasses over 60 economies (including many emerging market economies in Southeast and Central Asia, Central and Eastern Europe, as well as Africa), will bring forth extensive business opportunities stemming from infrastructural investments, deepening of financing linkages, trade expansion and people-to-people connectivity. Hong Kong is well-positioned to serve as a trade and logistics hub, as well as an investment springboard when tapping into these markets with huge growth potential.

(iii) The continuous depreciation of Renminbi, rise in wage, taxes and duties, and the fluctuation of oil price, interest rate and currencies, making fluctuation costs of energy and materials, cause a great challenge to the industry.

Note (1): Source : Hong Kong External Merchandise Trade Statistics, Census and Statistics Department
Economics Markets Strategy 4Q 2016 DBS Group Research Sept 2016

(iv) The Mainland recorded a 26-year low economic growth of 6.5% in 2016 showing its slow economic pace of growth, also a reflection of the global economy.

(v) Looking ahead, the global economy will likely continue to expand at a modest pace in the rest of the year, with the US economy regaining some steam and many Asian economies showing signs of improvement. This should hopefully provide some support to Hong Kong's goods exports in the coming quarters. While the UK vote to leave the EU has added uncertainty, the pledges by major central banks to safeguard global financial stability and the quick stabilisation of global financial markets after the vote have mitigated the more acute risks. In addition, the event of Brexit is still unfolding, and the possibility of further repercussions on the global economic and financial environment could not be ruled out.

(vi) Various external downside risks still persist and warrant close monitoring. These include the uncertainty about US interest rate normalisation, monetary policy divergence among major central banks, fragile recoveries of the euro area and Japan, and heightened geopolitical tensions in various regions.

9. 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 will bring more business opportunities to the world as well as the two industries in Hong Kong.

Future Manpower Demand

10. In view of the manpower trend, business outlook of the electronics and telecommunications industries and employers' forecast of future manpower requirements, the Training Board believes that there will be on-going demand for well-trained technologists, technicians and craftsman required to maintain the development of the industries. The manpower for operatives will be stable.

11. Based on the latest development of the industry, the Training Board has also estimated the turnover at different job levels due to workers leaving the electronics and telecommunications industries through retirement, migration to other industries and other causes. The Training Board has adopted an annual wastage rate of 3% for the loss of manpower at the technologist, technician and craftsman levels.

12. The Training Board has estimated, by using the Adaptive Filtering Method for the manpower projection for the technologist, technician and craftsman levels. The additional manpower required by the electronics and telecommunications industries for 2017 – 2019 is summarized in Table B.

Table B: Annual Manpower Demand in the Electronics and Telecommunications Industries from 2017 to 2019

Job Level	Annual Average Additional Demand for Employees	
	Total	±10% Range
Technologist	777	699 – 855
Technician	1 238	1 114 – 1 362
Craftsman	402	362 – 442

Recommendation

13. 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 employers:

(i) To develop more intelligent and creative new products / services with respect to the new technology trend to enhance product and market differentiation;

(ii) To streamline and enhance the manufacturing facilities or operation by means of automation or robotics technologies;

(iii) To upgrade the overall skill level and competency of the staff, especially those new technology knowledge and skills in 5G, Smart City, Internet of Things (IoT), etc., by providing them appropriate training leading to establish a much stronger and competitive workforce;

(iv) To explore new business opportunities and expand market share in other overseas countries, i.e. exploration of other overseas markets such as Middle East, Africa and South America;

(v) To promote the professional image of the practitioners working in the sectors such that more youngsters are encouraged to join the industries;

(vi) As the industry development is heading towards 5G, Smart City, IoT, etc., training providers could consider to strengthen the programme development in the areas of smart sensors design, user interface, data compression technique, business intelligence and analytics skills, data security and network monitoring techniques so that the students can equip with the necessary knowledge and skills to meet the industry demand.

(vii) 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.

viii) Employees of the industries are also encouraged to upgrade their technical skills and knowledge by means of the government funded training schemes to meet the industry need.

14. On top of the individual company's training needs, the Training Board suggests that the "Skills Employees Need to Enhance" at Appendix 9 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. By participating in the New Technology Training Scheme, they could encourage their employees to strengthen their technical skills and knowledge. The Training Board also recommends the Vocational Training Council and other training organizations 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.

15. The Training Board will conduct another manpower survey of the electronics and telecommunications industries in 2020 to review and update the manpower requirements of the two industries.

SECTION I

INTRODUCTION

The Training Board

1.1 The Electronics and Telecommunications Training Board of the Vocational Training Council (VTC) is a statutory body appointed by the Government of the Hong Kong Special Administration Region (HKSAR) to be responsible for matters pertaining to manpower training in the electronics and telecommunications industries. The Training Board comprises members nominated by major trade associations, professional bodies, worker unions, training and educational institutions, as well as representatives from government departments. The membership and terms of reference of the Training Board are given in Annexes A and B respectively.

1.2 The Training Board is required by its terms of reference to determine the manpower needs of the electronics and telecommunications industries and to recommend to the VTC the development of vocational and professional education and training facilities to meet such needs.

The Manpower Survey

1.3 The Training Board conducted a survey in April 2016 to collect up-to-date information on the manpower situation of the electronics and telecommunications industries. The survey was conducted with the assistance of the Census and Statistics Department of the HKSAR Government. Follow-up of the fieldwork and data processing were completed in November 2016.

1.4 The following manpower statistics and information were collected from the survey:

(i) number of employees in various principal jobs at the time of the survey;

(ii) number of existing vacancies;

(iii) number of trainees;

(iv) employers' forecast of the total number of employees by April 2017;

(v) average monthly income of employees; and

(vi) employers' views on the preferred education, training mode and training period of employees.

1.5 Employers were also requested to provide other information such as the number of technologists, technicians and craftsmen who had been promoted in the past 12 months, and also those who had been deployed to work for more than 6 months outside Hong Kong during the 12 months prior to the survey, as well as the skills employees needed to enhance.

Scope of Survey

1.6 The survey covered firms, relevant departments in the government and educational institutions in the following six sectors of the electronics and telecommunications industries:

Sector 1: Manufacturing

Manufacturers of :

(a) Computers and peripheral equipment (HSICs 262000, 281700, 952100);

(b) Audio and video equipment (HSICs 264000, 953100);

(c) Communications equipment and cables (HSICs 263000, 273100, 952200);

(d) Magnetic and optical media, and reproduction of recorded media (HSICs 182000, 268000);

(e) Electronic parts and components for computer and telecommunication equipment (HSIC 261100);

(f) Electronic parts and components not elsewhere classified (HSIC 261900);

(g) Electronic games and toys (HSIC 324500); and

(h) Electronic industrial apparatus, and measuring testing, navigating and control equipment (HSICs 265100, 331300).

Sector 2: Trading and Services

Establishments of :

(a) Anti-burglar system, intercommunication system, and telecommunications equipment, installation and maintenance (HSICs 432104, 432105, 432106);

(b) Imports and exports of:

(i) Scientific and professional instruments and apparatus (HSICs 451631, 452631)*;

(ii) Telecommunications equipment and parts (HSICs 451611, 452611)*;

(iii) Electrical goods (HSICs 451452, 452452)*;

(iv) Computers and computer peripherals and computer software (HSICs 451601, 451602, 452601, 452602)*;

(v) Office appliances and equipment (HSICs 451634, 452634)*;

(vi) Electronic parts (HSICs 451613, 452613)*

(c) Data processing, hosting and related activities (HSICs 620121, 620199, 620200, 620900, 631100)*; and

(d) Other electronics engineering services not included in (a) to (c).

Sector 3: Telecommunications Services

Establishments of :

(a) Telecommunications network operation services (HSIC 611000);

(b) Other miscellaneous telecommunications activities nowhere else classified (HSIC 619900);

(c) Internet access services (HSIC 619100); and

(d) Radio broadcasting, motion picture, video and television programming, and broadcasting activities (HSICs 591100, 601000, 602000).

Sector 4: Wholesale

Establishments of wholesale of :

(a) Telecommunications equipment and parts (HSIC 460611);

(b) Electrical goods (excluding machinery, office and telecommunications equipment and appliances) (HSIC 460452);

(c) Computers and computer peripheral equipment (HSICs 460601, 460602); and

(d) Office machines, appliances and equipment (excluding computer, furniture and fixtures) (HSIC 460634).

Sector 5: Design Houses and Relevant Departments in Universities and Government

(a) Electronics design houses;

(b) Relevant educational institutions; and

(c) Relevant government departments.

Sector 6: Retail Shops for Electronics Products (10 large shops)

(a) Large retail shops for electronics products.

Notes: (1) HSIC denotes Hong Kong Standard Industrial Classification

*(2) * Excluding those establishments with an employment size below 10 as they are unlikely to have a significant number of technical staff.*

(3) List of supplementary samples in branch 4, 7 and 8 are presented in Annex G.

1.7 Prior to the survey, the Census and Statistics Department recorded some 7 529 establishments in the above six sectors of the electronics and telecommunications industries in Hong Kong. A stratified random sampling method was adopted and a total of 704 (2 new discovery cases) samples were selected to be surveyed. The sampling plan of the survey is shown in Annex H. The data collected were then processed and scaled up statistically to give an overall picture of the manpower situation of the two industries.

Method of the Survey

1.8 Two weeks before the survey, relevant survey documents including questionnaire (Annex D), explanatory notes (Annex E) and list of principal jobs (Annex F) were mailed to the 704 establishments. Prior publicity was also given through the VTC website and relevant trade and industrial organizations to solicit employers' co-operation in the survey.

1.9 During the survey period, interviewing officers of the Census and Statistics Department visited all 704 establishments to collect the completed questionnaires and, where required, to assist employers in completing them. All returned questionnaires were scrutinized and where necessary, cross checked with the respondents.

Response to the Survey

1.10 Of the 704 establishments, 432 completed the questionnaires and 36 refused to supply information. The remaining 236 establishments had either moved, closed and could not be traced, or no longer engaged in the trade. The effective response rate was 92.3%.

1.11 During the survey, some of the establishments just provided the rough figures of manpower information and did not give details of their employees' monthly income, number of trainees or number of vacancies at the date of survey. The reasons were that they were too busy and/or not willing to provide confidential information of their organizations.

The Report

1.12 After follow-up work and analyzing the data, the Training Board had in December 2016, compiled a statistical report which presented the manpower data collected from the survey. The statistical report was subsequently uploaded on the VTC website for public information.

1.13 This report presents all the findings of the survey together with the Training Board's forecast of the training needs of the electronics and telecommunications industries and recommendations on measures to meet these needs. In the report, the terms "employees", "workers" and "manpower" refer to the total number of persons employed in the principal jobs at the time of the survey but excluding trainees and apprentices. The term "trainees" means all persons receiving any form of training including those registered apprentices under a contract of apprenticeship.

SECTION II

SUMMARY OF SURVEY FINDINGS

Number of Persons Employed

2.1 The survey revealed that in April 2016, a total of 144 985 persons were employed in the electronics and telecommunications industries in Hong Kong. Of them, 63 311 were engaged in the principal jobs of electronics engineering and related disciplines. The following paragraphs present only the manpower statistics of those employees employed in the principal jobs.

Comparison and Distribution of Employees by Job Level and by Sector

2.2 The comparison and distribution of employees by job level and by sector of the electronics and telecommunications industries is shown in Table 2.1, Figure 2.1 and Figure 2.2.

Table 2.1 Comparison of Employees by Job Level by Sector between 2014 and 2016

Sector	Job Level				**Total (Annual Change %)**
	Technologist	Technician	Craftsman	Operative	
1. Manufacturing	**792** 797 (-0.3%)	**1 868** 2 158 (-7.0%)	**610** 352 (+31.6%)	**1 110** 1 367 (-9.9%)	**4 380** 4 674 (-3.2%)
2. Trading and Services	**10 259** 9 847 (+2.1%)	**24 013** 23 113 (+1.9%)	**4 735** 4 295 (+5.0%)	**510** 1 021 (-29.3%)	**39 517** 38 276 (+1.6%)
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Total	**15 340** 14 642 (+2.4%)	**38 519** 38 889 (-0.5%)	**7 424** 6 368 (+8%)	**2 028** 2 700 (-13.3%)	**63 311** 62 599 (+0.6%)

Remark : Bolded figures are those for 2016

Figure 2.1 : Distribution of Employees by Job Level

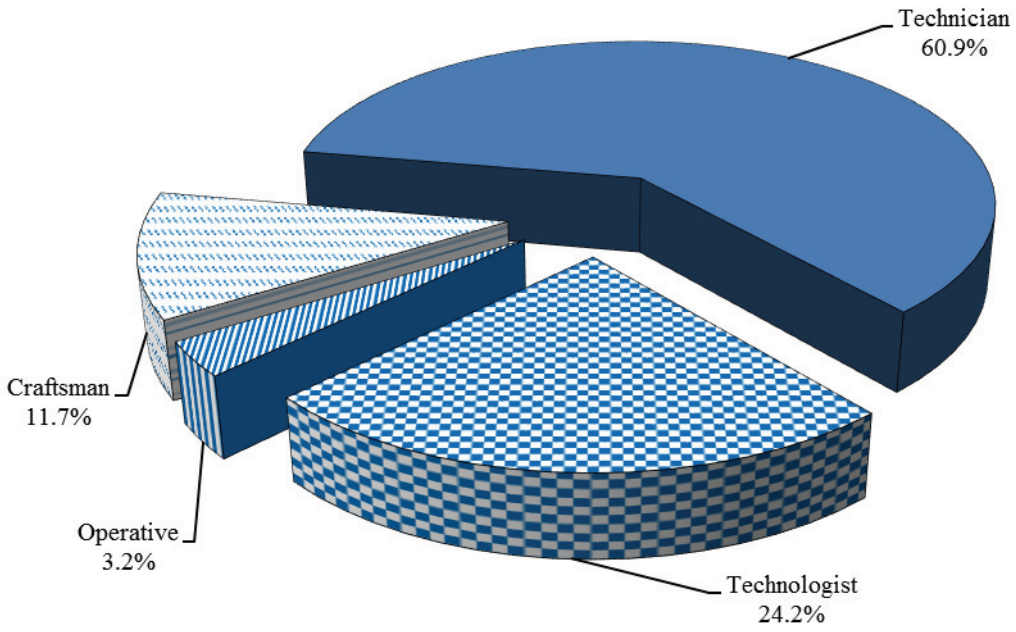
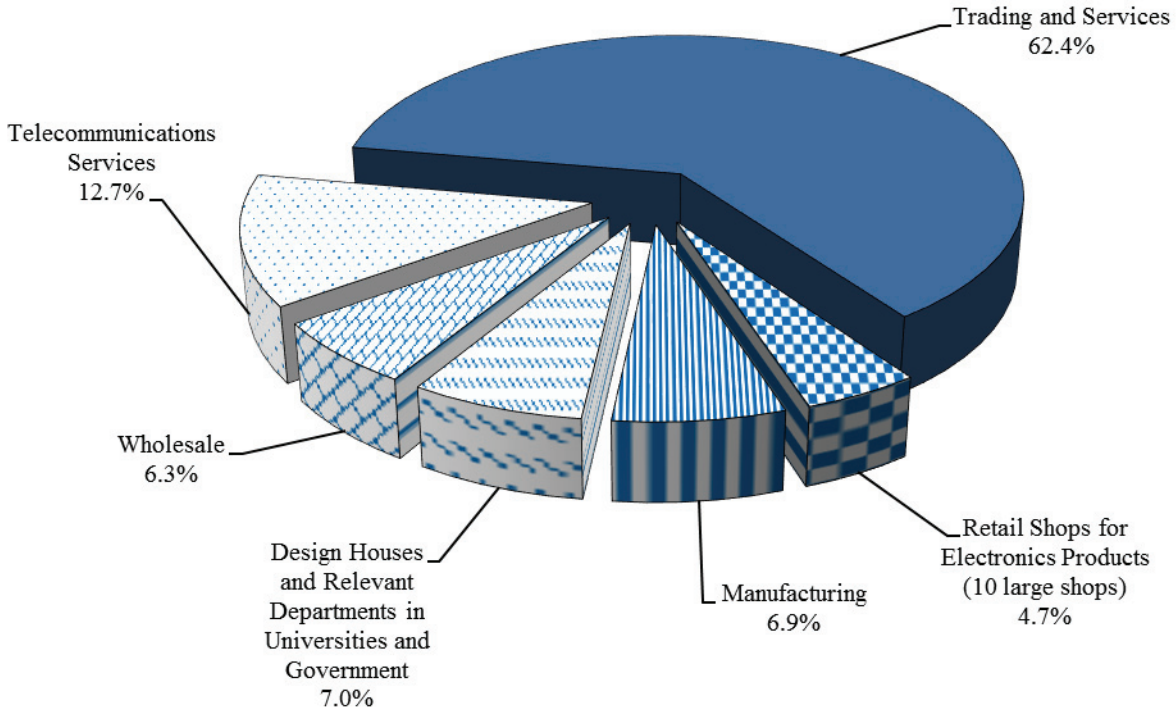


Figure 2.2 : Distribution of Employees by Job Sector



Number of Trainees

2.3 At the time of the survey, there were 1 078 trainees in the electronics and telecommunications industries. Their distribution by job level is shown in Table 2.2:

Table 2.2 : Distribution of Trainees by Job Level

Job Level	No. of Trainees (a)	No. of Employees (b)	Percentage $\frac{(a)}{(b)} \times 100\%$
Technologist	129	15 340	0.8%
Technician	393	38 519	1.0%
Craftsman	556	7 424	7.5%
Operative	-	2 028	0.0%
Total	**1 078**	**63 311**	**1.7%**

Number of Vacancies at Time of Survey and Forecast Manpower by April 2017

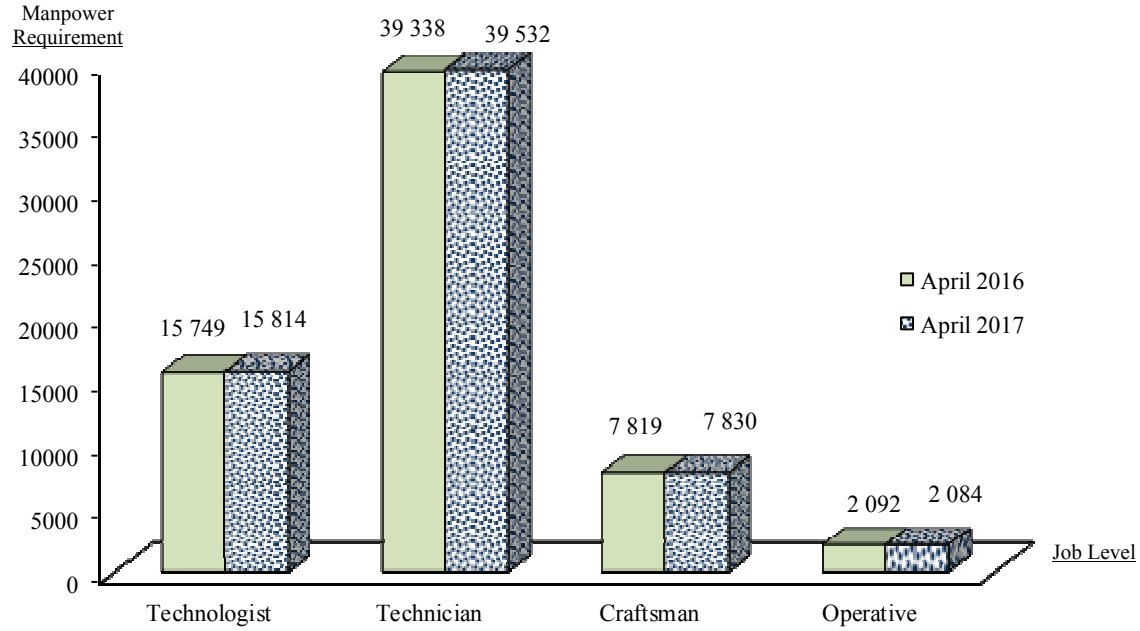
2.4 The total number of job vacancies was 1 687, or 2.7% of the total number employed in the electronics and telecommunications industries at the time of the survey. Employers also forecast that there would be 65 260 employees in the two industries by April 2017, which is 1 949 employees (+3.1%) more than that in April 2016.

2.5 A comparison of the manpower requirement at the time of survey and the employers' forecast of the number of employees by April 2017 are shown in Table 2.3 and Figure 2.3:

Table 2.3 : Comparison of Manpower Requirement by April 2016 and April 2017

Job Level	At Time of Survey (April 2016)			Forecast Total No. of Employees by April 2017	Forecast Increase/Decrease in Manpower Requirement
	No. of Employees	No. of Vacancies	Total Manpower Requirement		
Technologist	15 340	409	15 749	15 814	+0.4%
Technician	38 519	819	39 338	39 532	+0.5%
Craftsman	7 424	395	7 819	7 830	+0.1%
Operative	2 028	64	2 092	2 084	-0.4%
Total	**63 311**	**1 687**	**64 998**	**65 260**	**+0.4%**

Figure 2.3 : Comparison of Manpower Requirement by April 2016 and April 2017



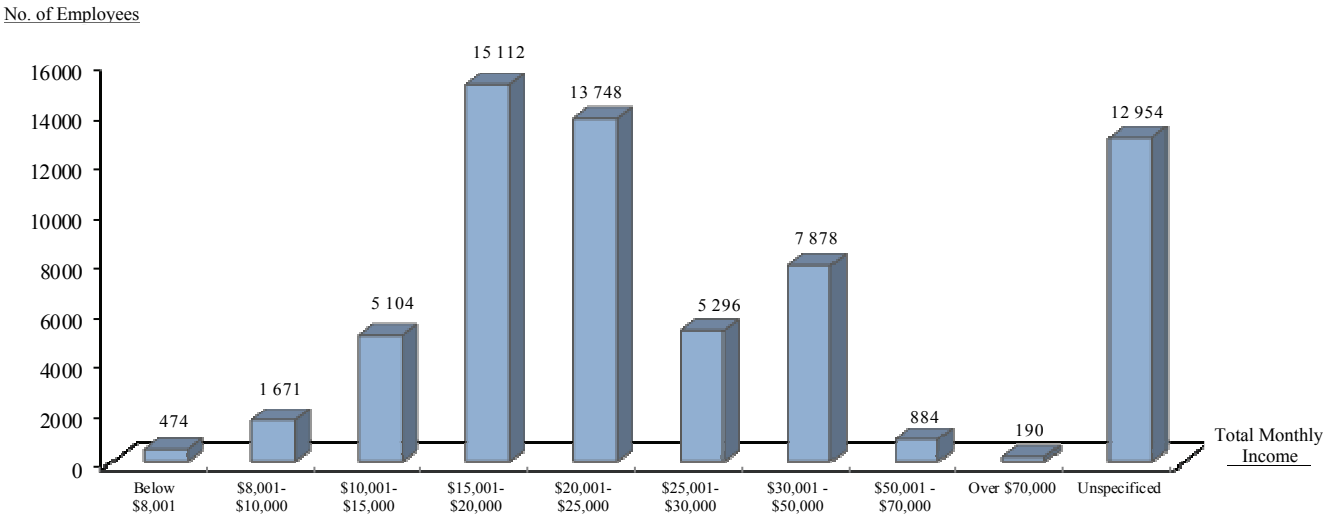
Total Monthly Income Range of Employees

2.6 The distribution of employees by total monthly income range in the electronics and telecommunications industries is shown in Table 2.4 and Figure 2.4:

Table 2.4 : Distribution of Employees by Total Monthly Income Range

Job Level	Below $8,001	$8,001-$10,000	$10,001-$15,000	$15,001-$20,000	$20,001-$25,000	$25,001-$30,000	$30,001-$50,000	$50,001-$70,000	Over $70,000	Un-specified	Total
Technologist	-	-	3	493	1 750	2 817	5 163	833	190	4 091	15 340
Technician	69	286	3 094	11 031	10 892	2 477	2 715	51	-	7 904	38 519
Craftsman	107	446	1 529	3 588	1 101	2	-	-	-	651	7 424
Operative	298	939	478	-	5	-	-	-	-	308	2 028
Total	**474**	**1 671**	**5 104**	**15 112**	**13 748**	**5 296**	**7 878**	**884**	**190**	**12 954**	**63 311**

Figure 2.4 : Distribution of Employees by Total Monthly Income Range



Preferred Education, Mode of Training and Period of Training of Employees

2.7 The majority of employers' views on the preferred education, mode of training and period of training of their technologists, technicians and craftsmen are shown in Table 2.5:

Table 2.5 : Preferred Education, Mode of Training and Period of Training of Employees

Job Level	Preferred Education	Preferred Mode of Training	Preferred Period of Training
Technologist	First degree or equivalent	On-the-job Training	4 years or above
Technician	Higher Certificate; Professional Diploma; Higher Diploma; Associate Degree or equivalent	On-the-job Training	3 to less than 4 years
Craftsman	Secondary 4-6; Hong Kong Diploma of Secondary Education (HKDSE); Diploma of Vocational Education/Diploma of Foundation Studies/Yi Ji; Diploma or equivalent	On-the-job Training	1 to less than 2 years

Internal Promotion

2.8 In the twelve months prior to the survey, a total of 620 employees were promoted to higher level jobs in their own companies. Their distributions in each job level are shown in table 2.6 below:

Table 2.6 : Internal Promotion

Internal Promotion	No. of Employees Promoted (a)	Total No. of Employees at the Promoted Level (b)	Percentage $\frac{(a)}{(b)} \times 100\%$
From Technician to Technologist	304	15 340	2.0%
From Craftsman to Technician	266	38 519	0.7%
From Other Levels to Craftsman	50	7 424	0.7%
Total	**620**	**61 283**	**1.0%**

Employees Deployed to Work Outside Hong Kong

2.9 In Table 2.7, employers reported the following number of employees who had been deployed to work outside Hong Kong for more than 6 months during the period of 12 months prior to the survey:

Table 2.7 : No. of Employees Deployed to Work Outside Hong Kong

Job Level	No. of Employees Deployed to Work Outside Hong Kong (a)	Total No. of Employees at Same Job Level (b)	Percentage $\frac{(a)}{(b)} \times 100\%$
Technologist	326	15 340	2.1%
Technician	135	38 519	0.4%
Craftsman	-	7 424	-
Total	**461**	**61 283**	**0.8%**

Skills Employees Need to Enhance

2.10 The employers consider that the three most important skills that employees need to enhance are shown in Table 2.8:

Table 2.8 : No. of Employees by Skills Need to Enhance

Job Level	The 3 most important skills that employees need to enhance			
	Order	Code	Skills/ Knowledge/ Attributes	No. of Employees
Technologist	1.	103	Project management	3 084
	2.	401	Problem solving	2 648
	3.	107	Leadership skills	2 557
Technician	1.	401	Problem solving	6 599
	2.	404	Communication skills	5 620
	3.	406	Time management skills	4 411
Craftsman	1.	404	Communication skills	2 313
	2.	413	Ability to learn/adapt new skills/knowledge	1 189
	3.	503	Servicing/Troubleshooting	1 064

Statistical Tables

2.11 Detailed manpower statistics analysed by principal job and by sector of the electronics and telecommunications industries are shown in Appendices 1 to 7. The distribution of employees by their monthly income range is shown in Appendix 8 and the number of employees by skills need to enhance is shown in Appendix 9.

SECTION III

CONCLUSIONS

3.1 The Training Board has carefully examined the survey findings and is of the view that they generally reflect the employment situation of the electronics and telecommunications industries at the time of the survey.

3.2 The total manpower in principal jobs of electronics and related disciplines of the two industries has increased by 0.6% per annum from 62 599 workers in 2014 to 63 311 in 2016. An analysis of the manpower changes by sector and by skill level is described in detail in the following paragraphs. In Sector 6 (Retail Shops for Electronics Products), it was not a full survey on the sector as only the manpower of 10 Retail Shops for electronics products was invited to participate in the survey. Thus, for a better and direct manpower comparison, Sector 6 is not included in the analysis but the 2014 and 2016 manpower of the Sector are shown separately in Table 3.2 for reference purpose. Because of the close business and manpower nature of Sector 2 (Trading & Services) and Sector 4 (Wholesale), they are combined for manpower comparison and analysis purpose. As a whole, the distribution and comparison of manpower in 2016 and 2014 by skill level and by sector is summarized in Table 3.1 below:

Table 3.1 : Comparison of Manpower in 2016 by Skill Level and by Sector with the Manpower in 2014 (shown in bracket)

Skill Level	Sector 1 Manufacturing	Sectors 2 & 4 Trading, Services and Wholesale	Sector 3 Telecom Services	Sector 5 Design Houses & Relevant Dept in Universities & Gov't	Total	**Annual Change**
Technologist	792 (797)	10 598 (10 237)	2 388 (2 302)	1 537 (1 302)	15 315 (14 638)	**+2.3%**
Technician	1 868 (2 158)	27 334 (26 615)	4 440 (4 602)	2 000 (2 019)	35 642 (35 394)	**+0.3%**
Craftsman	610 (352)	5 026 (4 544)	922 (614)	813 (858)	7 371 (6 368)	**+7.6 %**
Operative	1 110 (1 367)	560 (1 118)	305 (142)	53 (73)	2 028 (2 700)	**-13.3%**
Total	4 380 (4 674)	43 518 (42 514)	8 055 (7 660)	4 403 (4 252)	60 356 (59 100)	**+1.1%**
Annual Change	**-3.2%**	**+1.2%**	**+2.5%**	**+1.8%**	**+1.1%**	

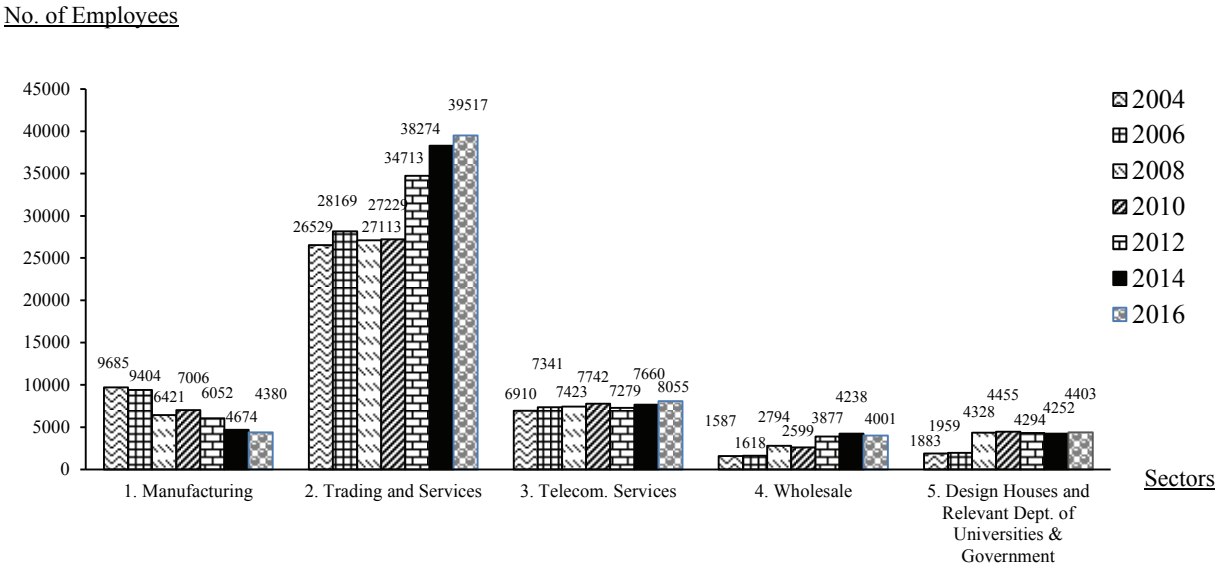
Table 3.2 : Comparison of Manpower in 2016 by Skill Level of Sector 6 with the Manpower in 2014 (for reference)

Sector 6 – Retail Shops for Electronics Products

Year	Technologist	Technician	Craftsman	Operative	Total	**Annual Change**
2016 (10 large shops for electronics products)	25 (+150.0%)	2 877 (-9.3%)	53	-	2 955	**-8.1%**
2014 (8 large shops for electronics products)	4	3 495	-	-	3 499	**+20.3%**

3.3 Figure 3.1 shows the manpower changes by sector of the electronics and telecommunications industries between 2004 and 2016. It also demonstrates the manpower change of the two industries during the past several years since the scope of the manpower survey of the two industries has been revised significantly.

Figure 3.1 : Manpower Changes by Sector (1 to 5) between 2004 and 2016



Manpower Changes by Sector

3.4 The total manpower in principal jobs of electronics and related disciplines of the electronics and telecommunications industries has increased from 62 599 employees in 2014 to 63 311 in 2016, representing 1.1% increase. Table 2.1 reveals that the manpower of Trading & Services (Sector 2) had the largest number of 39 517 manpower (62.4%), whereas for Retails Shops for Electronics Products (Sector 6) had the smallest number of 2 955 manpower (4.7%). The survey also revealed that the manpower situation has been stable over the past two years.

3.5 Comparison of manpower changes by sector and by job level are shown in Figures 3.2 & 3.3 respectively.

Figure 3.2 : Comparison of Manpower Changes by Sector

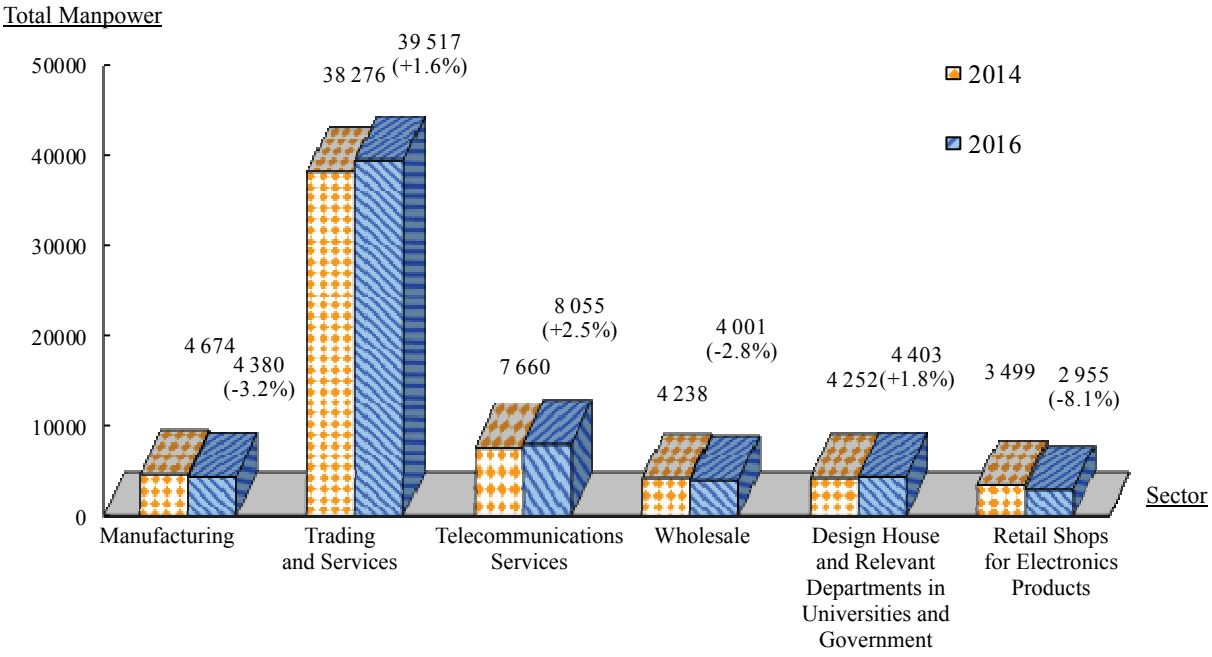
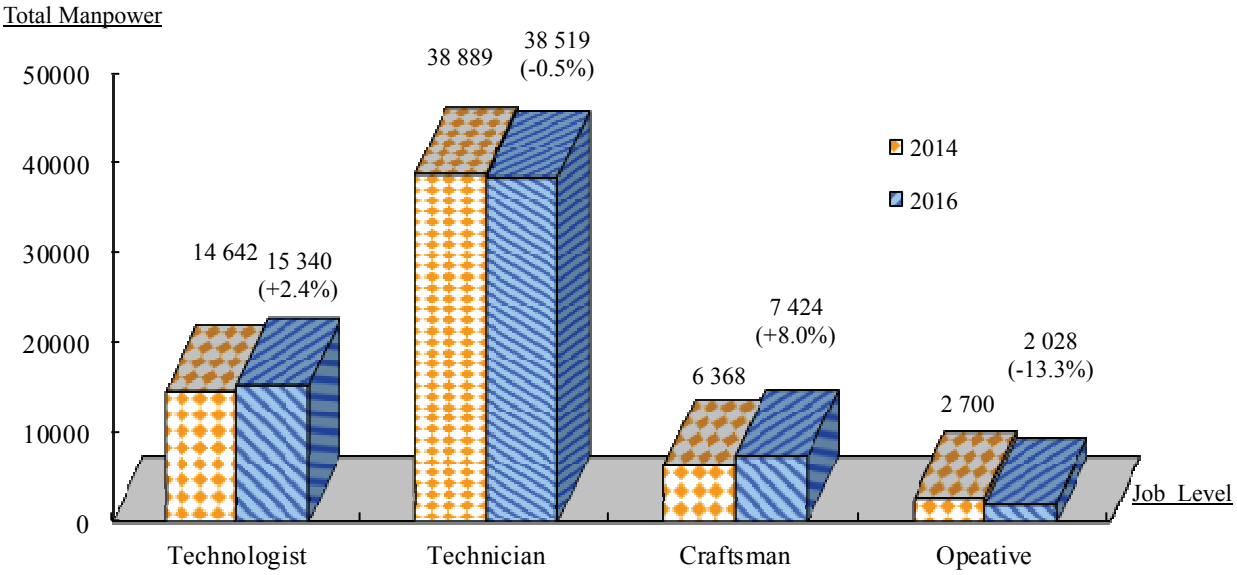


Figure 3.3 : Comparison of Manpower Changes by Job Level



3.6 Training Board is of the view that the following reasons have attributed to the manpower changes by sector:

(i) For manufacturing companies, the number of large companies remained steady, i.e. a total of 19 companies with employment size of 50 and above in 2016 comparing with 18 in 2014. On the other hand, a general decrease of manpower at the technician level but an increase in craftsman level surveyed. As a result, it recorded an annual manpower decrease of 3.2% in the Sector. It is anticipated that some of the manufacturing companies had experienced difficulties in recruiting technicians that they resorted to implement the robotics/ automation technology in order to reduce the rising labour cost. This trend was also attributed to the incentive schemes introduced by the provincial government of Guangdong that the manufacturing companies were encouraged to invest in automation in their production facilities.

(ii) Due to the close business and manpower nature of Sectors 2 and 4, the two sectors will be combined together for analysis. An annual manpower increase of 1.2% was noted in Sectors 2 and 4 owing to a mild increase of basic construction work and special overseas project carried out by a few engineering services companies in Sector 2 in the past two years. Hence, more skilled manpower was required in the first three job levels. On the other hand, the operative level recorded an annual manpower decrease in 2016.

(iii) The increase of employees in sector 3 might be due to the development of enhanced services for internet access and communication services (e.g. 4G & 4.5G). Hence, additional skilled manpower was required in such companies to capture more market shares that a mild annual increase of 2.5% of manpower was surveyed in 2016. Also, a general manpower increase occurred across the job levels except the technician level. The reasons for the decrease of technicians was due to the closing down of a major broadcasting company and the manpower restructure of several large companies.

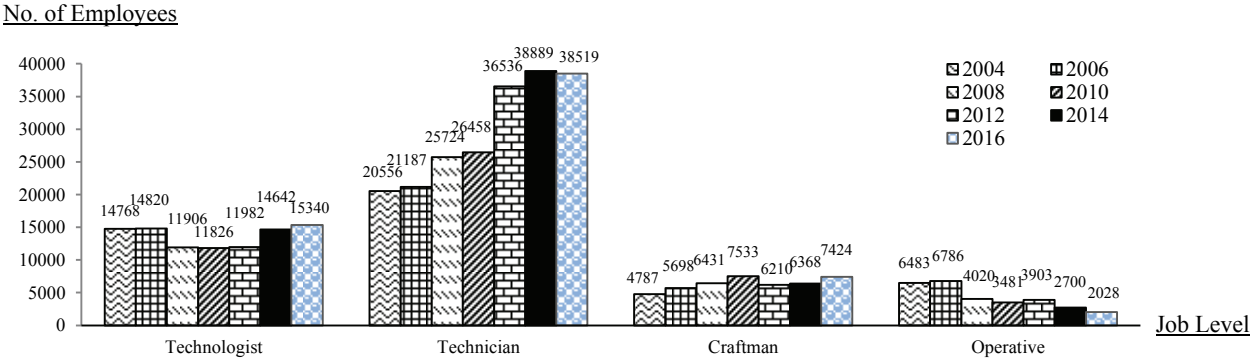
(iv) A very mild annual increase of 1.8% of manpower was surveyed in Sector 5 due to the fact that the manpower engaged in the engineering departments of the universities and Government departments as well as the design houses remained steady in the past two years. However, there is a 8.7% increase of manpower in the technologist level, probably to cope with the new technological development (for example, Augmented Reality (AR) / virtual reality (VR), Smart City, Internet of Things (IoT), Open Data, Cyber Security, etc.).

(v) The annual decrease of manpower of 8.1% recorded in Sector 6 was resulted from the general decrease in the number of tourists from the Mainland. The Survey also showed the increase of manpower of technologists due to the demand for high-tech products. Using kiosks in shopping malls and shops to engage and enhance customer experience, for example; had increased the demand for technologists who are equipped with hard technology skills as well as soft skill. On the other hand, the Retail Technology Adoption Assistance Scheme (ReTAAS) funded by the government also helped the retail industry to adopt high-tech technology.

Manpower Changes by Principal Job at Job Level

3.7 The manpower change by job level from 2004 to 2016 is shown in Figure 3.4:

Figure 3.4 : Manpower Changes by Job Level between 2004 and 2016



3.8 Among the four skill levels, the following tables show a substantial annual increase (2.4%) of manpower in technologist, an annual mild decrease (-0.5%) in technician and an increase (8%) in craftsman between 2014 and 2016. It also records a sharp annual decrease (-13.3%) in operative workers in the past two years. Table 3.1 reveals that such decrease of manpower was mainly contributed by Sectors 1, 2 & 4 and 5 because there was a continuous decline in Manufacturing Sector and less operative workers were required in Sectors 2 & 4 as well as Sector 5. As a result, there was an annual manpower drop of 18.8% (257), 49.9% (558) and 27.4% (20) of operative workers in Sector 1, Sectors 2 & 4 and Sector 5 respectively. The followings attributed to such manpower changes in the other three job levels:

(i) Table 3.3 below reveals the annual increase of 2.4% (or total increase of 698) of technologists when compared with 2014. The increase of manpower was mainly due to the continuous demand for basic construction work and special overseas projects carried out by a few engineering services companies in Sector 2 over the past two years. As a result, an annual increase of electrical engineers (4.9%) mechanical engineers (5.5%) and system analysts (4.9%) were surveyed. Besides, it is noted that there is an increase of chemical engineers (18.6%) in both Sector 1 and 5. This might be due to the increasing importance of safety regulations and strict environmental protection specification requirement in the market, particularly in toys companies.

Table 3.3 : Manpower Changes by Principal Job at Technologist Level between 2014 and 2016

Principal Job at Technologist Level	1n 2014	In 2016	Annual Change (%)
Electronics Engineer	8 503	8 702	+1.2%
Electrical Engineer	1 645	1 811	+4.9%
Mechanical Engineer	624	695	+5.5%
Manufacturing/Quality Assurance Engineer	1 068	1 060	-0.4%
Chemical Engineer	54	76	+18.6%
Product/Graphic Designer	419	431	+1.4%
System Analyst	2 329	2 565	+4.9%
Total	**14 642**	**15 340**	**+2.4%**

(ii) The annual mild decrease of 0.5% of technician was attributed by the decrease of sales technicians in Sector 4 and 6 due to the reduction of number of tourists. Besides, as shown in Table 3.4 below, the survey also revealed that an annual increase of 6.7% of web developer/designer and 4.9% of programmers were probably due to demand for developing the electronic commerce platform and over-the-top content (OTT) in Sectors 1 to 4. The decrease in Manufacturing/Quality Assurance Technician is due to the transformation of the use of automation/robotics in the manufacturing companies.

Table 3.4 : Manpower Changes by Principal Job at Technician Level between 2014 and 2016

Principal Job at Technician Level	1n 2014	In 2016	Annual Change (%)
Electronics Technician	12 328	11 743	-2.4%
Mechanical Technician	1 894	2 070	+4.5%
Draughtsman	231	202	-6.5%
Manufacturing/Quality Assurance Technician	604	522	-7.0%
Supervisor/Foreman/ Leader	3 551	4 052	+6.8%
Programmer	4 365	4 803	+4.9%
Web Developer/Designer	1 494	1 702	+6.7%
Sales Technician	14 422	13 425	-3.5%
Total	**38 889**	**38 519**	**-0.5%**

(iii) Table 3.5 shows that an annual increase of 8.0% of craftsman was mainly due to an increase of craftsmen in Sector 1 to 4 (5 510 in 2014 to 6 558 in 2016), which covered more than the loss of craftsmen in Sector 5 (loss of 45 from 2014 to 2016). The survey also revealed that an annual increase (12.5%) in electronic craftsman in all Sectors except Sector 5.

Table 3.5 : Manpower Changes by Principal Job at Craftsman Level between 2014 and 2016

Principal Job at Craftsman Level	1n 2014	In 2016	Annual Change (%)
High Speed Data Network & Wireless Data System Integrator	583	545	-3.3%
Electronics Craftsman	4 011	5 079	+12.5%
Electrician	1 193	1 277	+3.5%
Mechanic	581	523	-5.1%
Total	**6 368**	**7 424**	**+8.0%**

Business Outlook

Whole Industry

3.9 The electronics and telecommunications industries are still the largest local merchandise export earner, contributing 64% of Hong Kong's total export in 2015. Hong Kong's economy is forecasted to continue to grow by 2% to 2.7% in 2017. A substantial portion of such exports, largely re-export business, are regarded as high-tech products, especially those related to telecommunications equipment, semiconductors and computer items.

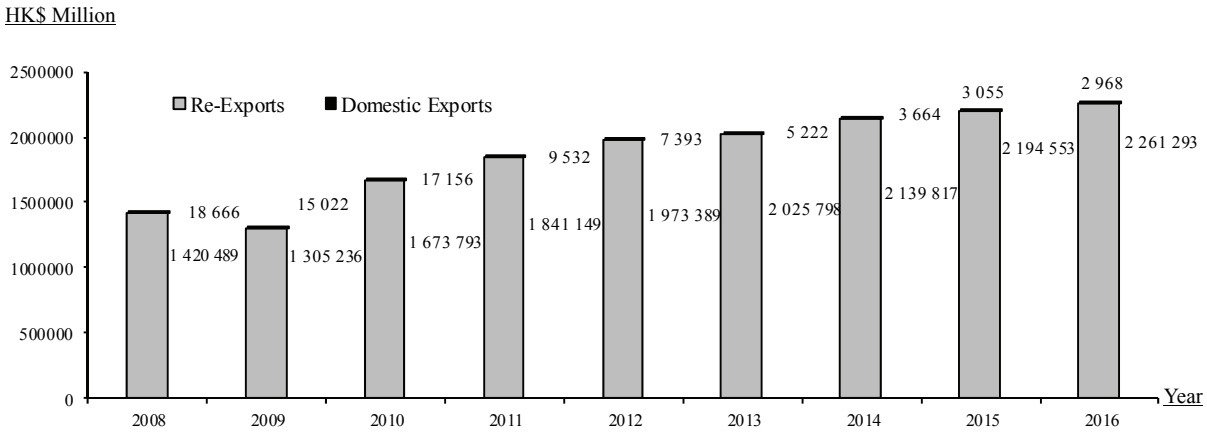
3.10 According to the latest available statistics, Hong Kong was the world's largest exporter of telephones/mobile phones; the second largest exporter of computer parts/accessories, video recording apparatus and electronic integrated circuits; and the world's third largest exporter of sound recording apparatus and electric micro motors and in value terms in 2014. In 2016, the total exports of electronic products increased by 3% over the previous year to HK$2,264,261 million. Details of the export values of electronic products between 2008 and 2016 are shown in Table 3.6 and Figure 3.5.

Table 3.6 : Export Values of Electronic Products Between 2008 and 2016

Electronic Products Value (HK$ Million) in Year	Domestic Exports	Re-Exports	Total Exports
2008	18 666	1 420 489	1 439 155
2009	15 022	1 305 236	1 320 258
2010	17 156	1 673 793	1 690 949
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

Source : Hong Kong External Merchandise Trade Statistics, Census and Statistics Department
Economics Markets Strategy 4Q 2016 DBS Group Research Sept 2016

Figure 3.5 : Export Values of Electronic Products



3.11 From the increased export values of electronics products and manpower, the Hong Kong electronics industry had a steady growth in the past two years. However, the continuous depreciation of Renminbi, 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 is moving towards a lower but more sustainable growth path under the National 13th Five-Year Plan for 2016-2020. The Government will continue to forge closer economic ties with the Mainland through CEPA and other regional co-operation platforms. In particular, the Mainland's "Belt and Road" Initiative, which encompasses over 60 economies (including many emerging market economies in Southeast and Central Asia, Central and Eastern Europe, as well as Africa), will bring forth extensive business opportunities stemming from infrastructural investments, deepening of financing linkages, trade expansion and people-to-people connectivity.

3.12 The global economy will likely continue to expand at a modest pace in the rest of the year, with the US economy regaining some steam and many Asian economies showing signs of improvement. This should hopefully provide some support to Hong Kong's goods exports in the coming quarters. While the UK vote to leave the EU has added uncertainty, the pledges by major central banks to safeguard global financial stability and the quick stabilisation of global financial markets after the vote have mitigated the more acute risks. That said, the event of Brexit is still unfolding, and the possibility of further repercussions on the global economic and financial environment could not be ruled out. The uncertainty about US interest rate normalisation, monetary policy divergence among major central banks, fragile recoveries of the euro area and Japan, and heightened geopolitical tensions in various regions will impose certain effects on the electronics and telecommunications industries in the coming years.

3.13 On the other hand, Hong Kong companies are capable of meeting the technical requirements of relevant authorities in overseas markets. These include the safety requirements of UL/ETL listing or equivalent in the US, as well as the relevant safety directives and CE requirements of the EU. With regard to electromagnetic compatibility (EMC), Hong Kong companies can well observe that products sold to the US require compliance with FCC standard, while EU's CE-mark has also required the compliance with relevant EMC directives. As for sales in the China market, most electronic products have to be in compliance with the safety and other requirements of a unified compulsory product certification system known as 3C (China Compulsory Certification or CCC). Meanwhile, Hong Kong companies are also attentive to the growing popularity of green consumerism in the marketplace. Especially in Europe, consumers are generally conscious of environmental protection. Not surprisingly, the EU has adopted a number of directives for environmental protection, which may have an impact on the sales of electronic products. These include the restrictions on batteries and accumulators that contain mercury, the Directive on Waste Electrical and Electronic Equipment (WEEE) and the Directive on Restriction of Hazardous Substances (RoHS). The Chinese mainland has adopted similar environmental protection regulations. These include the already effective Management Methods on Prevention and Control of Pollution Caused by Electronic Information Products and the Management Methods on Prevention of Waste Electronic Equipment Pollution on Environment. The regulation on recycling and treatment of waste electrical and electronic equipment has also come into effect since 1 January 2011.

3.14 The mobile broadband penetration rate of Hong Kong stood at 212% as of September 2016. As one of the most developed cities in the world, Hong Kong is always a forerunner in adopting cutting-edge wireless communications technologies. In the mobile broadband arena, mobile operators are using carrier aggregation technology overlaid on their 4G LTE networks in pursuit of higher data rates as well as larger network capacity. Carrier aggregation, which combines two or more intra-band or inter-band carriers to provide high throughputs, is well-positioned to meet the growing demand for mobile data traffic before the commercial deployment of 5G services earliest by 2020. Interestingly, technological breakthrough today has allowed carrier aggregation to be implemented across heterogeneous 4G LTE networks employing frequency division duplex and time division duplex platforms. These enhanced services are branded as 4.5G LTE network services offering a data rate of 450 Mbps to improve user experience. On the fixed broadband front, the combined penetration rate of fibre-to-the-home (FTTH) and fibre-to-the-building (FTTB) reached 71 % as of September 2016. While other advanced cities are targeting the roll-out of 1 Gbps FTTH services, Hong Kong is the first place in the world that can provide 10 Gbps FTTH services. Reaping the benefits from the intensive competition in the fixed broadband market, there is room for the penetration rates of FTTH/FTTB to achieve significant growth in the coming years.

3.15 Both fixed and mobile telecommunications sectors in Hong Kong will remain highly competitive, in particular for the mobile telecommunications sector. Owing to alternative solutions available for roaming data & roaming voice including those Over-the-Top (OTT) mobile applications, Mobile Virtual Network Operator (MVNO) solution & local prepaid service, the downtrend of the roaming revenue is expected. On the other hand, the popularity of mobile entertainment, games especially AR & VR types of game and mobility solutions such as utility metering & fleet management will become the new revenue streams for the telecommunications industry. The mobile device is the MUST-carry personal belongings for most of Hong Kong people nowadays. The mobile device not only acts as a communication device, but an entertainer, a notebook and a camera and even a digital wallet. It is anticipated that mobile users will consume more and more mobile data/ wifi data and this positive momentum will remain robust in the coming years.

3.16 On the other hand, with a fast and ubiquitous network as the cornerstone, a broad range of emerging network services, such as carrier-grade Cloud Computing services, Network Function Virtualization (NFV) and Software Defined Networking (SDN) are being developed and increasingly adopted by the commercial market for improving efficiency & effectiveness. In the consumer market, with the rise of Internet-of-Things (IoT) and Smart City, telecommunication industry is further expanding the footprint to the development of more converged services that leverage connectivity, smart devices, and analytics ecosystem to bring convenience to consumers. Smart-living, e-education, mobile payment, location-based services are some of the examples. While Hong Kong has its unique position as an eminent telecommunications hub in the Asia-Pacific region, coupled with the above-mentioned latest technologies, it is anticipated that the Hong Kong's telecommunication industry (Sector 3) will continue to prosper and the manpower demand is projected to grow considerably.

3.17 Household broadband penetrations are on the rise on a worldwide. Given the positive growth, online video services have become increasingly viable for content delivery. The coming years see OTT service as the main trend of the content delivery service. It will change the viewing behavior of people according to the functional capability of OTT such as Time-shift, Catch up and VoD etc. It also provides the opportunity to advertisers. Targeting advertisement and useful user behavior can be captured by the interactive activities on the OTT platform. Furthermore, more value added services and interactivities service can be provided on OTT platform such as on-line shopping, gaming, ticketing and probably gambling/betting.

3.18 Content Distribution Network (CDN) is a main trust to drive the OTT service development. It improves the Quality of experience (QoE) of OTT users. There are two CDN models which can be deployed by content providers. The easier and faster way is to use the services of third party CDN providers such as Amazon, Akamai, Microsoft Azure and Comcast etc. The other model is DIY CDN. Content providers can build their own CDN by deploying edge servers for caching the content. Nowadays, Multi-CDN or Hybrid-CDN (third party CDN mixed with DIY CDN) model are being developed for improving the QoE and achieving cost saving. In addition, content watermarking that put invisible watermark into the video/ audio signal is visualized as an effective tool to detect the privacy infringement.

3.19 Hong Kong is one of the major electronics exporters of telephone/mobile phones, computer parts and accessories, video and sound recording apparatus and integrated circuits, but recorded a decrease of 2% exports in first half 2016. Consumer electronics also posted a volume sales decline because of the maturity of certain categories such as home video, computers and peripherals and home audio-visual equipment. The appreciation of the Hong Kong dollar and decrease in the number and spending of Chinese tourists, also resulted the significant impact on the growth of tablets, smartphone and digital camera as the three categories totally accounted for 75% of total retail volume sales of consumer electronic products. However, wireless audio products like wireless speaker, karaoke-mic and wearable electronics become more popular. As a result, the close business nature of Sector 2 (Trading & Services), Sector 4 (Wholesale) and Sector 6 (Retail Shops for Electronics Products) will benefit from the growth. The strong IoT (internet of things) wide applications anticipates demand of smart-living products, automation in home, commerce and city applications that control appliances, lighting, HVAC and security. Virtual reality (VR) and augmented reality (AR) drive the demand in audio-visual home entertainment products, 3D photography, head mounted smart display/glasses and mobile games. The diversify application of nano material and printed electronic also innovate new technology for thermal conductivity in component and flexible application for various shape application enhance the development of bio-health care electronic products and small wearable devices.

Product Trend

A) Virtual Reality (VR) and Augmented Reality (AR)

3.20 High investments continue in this field including companies like Facebook, Microsoft and Sony. Facebook acquire Oculus for $2 billion in 2014 and release the Oculus Rift - a virtual reality headset in March 2016. In 2016, many VR related products have been launched as the technology has become commercialize. Microsoft releases developer version of HoloLens – a mixed reality head mounted smartglasses in March 2016. Sony launches its virtual reality head mounted display Playstation VR in October 2016. HTC launches a virtual reality headset Vive in April 2016. More VR contents will be expected to become available and drive the growth. Youtube launched a site for 360 degree video contents. Hardware cost are dropping and become more affordable to end user. Lower cost products used together with mobile phone for the display become popular. Products like Google Daydream, Homido, Samsung Gear VR, Zeiss VR One. AR/VR currently focus on game and entertainment sectors but more applications in other fields like medical training and education learning will be more be common.

B) Artificial Intelligence (AI)

3.21 AI technology develops fast in line with the cloud computing in the recent years. Some products like AI assistants that provide intelligent answers to conversational questions, automate controls through voice commands like Apple's Siri, Google assistant, Amazon Alexa, Microsoft Cortana. Other AI applications include AI equipped Robots allows more interactivity with human e.g. companion robot from Blue Frog Robotics' Buddy, SoftBank's Pepper and Future Robot's FURo-i Home Robot. Auto-piloting is another example of AI application in future development of automobile industry. In the near future, domestic robots and industrial robots, with the abilities of learning, analysis and applying what having learnt will be developed and become a trend.

C) Drones

3.22 Market continue to explode, Allied Business Intelligence (ABI) research predicts more than 90 million consumer drones will ship in 2025 compared with 4.9 million in 2014. More hobbyist will use more drone products and will surpass the prosumer users in near future. More drones are equipped with even more than one camera and may be controlled by smartphone instead of dedicated controller. More autonomous like HEXO+ self-flying camera targets to develop and film the user in any situation.

D) Wearable Devices

3.23 Recent years, fast evolution of IoT and wearables stimulate our daily living as they pair together to revolutionize the enterprise and consumer markets with unprecedented growth. The Consumer Technology Association predicts that 38 million wearables devices will be sold in 2016. Brands like Fitbit, Apple, Garmin, Pebble, Samsung, Xiaomi, Huawei, LG are offering various wearable devices to monitor body temperature, heartbeat, blood pressure, alcohol consumption, sport activity data and health care records. Fashion brands enter the market of activity tracking wearable devices. Smart clothing are another form of wearable devices. Instead of having to wear smart band or watches, clothing with health tracking/monitoring device embedded like OMsignal Bra, Sensoria fitness socks, Owlet Smart Sock are available. Products like Athos core take a further step of integrating Biometric sensors in the apparel for monitoring muscle activity, heart rate and respiration in real time. Demand of wearable devices are driving the battery technology development that better suits this type of products. Together with the application of nano material and printed electronic also innovate new technology for flexible application for various shape, enhancing the development of bio-health care electronic products and small wearable devices. For example, bendable or flexible battery are being developed.

E) Digital Imaging

3.24 The recent development in digital imaging products focus in large scale digital TVs with 3D effects. Internet connectivity also drive the development of smart TV, as well as the ultra-high definition TV (UHDTV) of resolution of 4K and in future the of 8K resolution. Japan targets to start broadcasting 8K TV signal for 2020 Tokyo Olympic Games.

F) Smart Home and Energy Saving

3.25 To achieve better quality of life and environmental protection, the development of smart home products, home security with energy saving consideration, especially for the elderly and disabled, is another hot area. By using various sensors, IoT, big data together with cloud computing, a lot of home devices like security cameras, window curtains, lighting control, air-conditioners, home entertainment systems, and electrical appliances can be connected to the Internet and controlled by a smartphone or a personal computer. IoT for utility meeting, fleet management, monitoring/surveillance, care for senior can be applied. Smart-building systems for energy saving consideration, with centralized control of appliances, lighting, HVAC and security has been considered in new city planning projects.

G) Intelligent Digital Camera

3.26 With the further development in image processing and image recognition, intelligent digital cameras with features of learning capability, human detection, facial recognition and night vision is a promising market and it further enhances the performance, reliability and quality of security application.

H) Gaming Industry

3.27 A video game is an electronic game that can be played on a computing device, such as a personal computer, gaming console or mobile phone. Depending on the platform, video games can be subcategorized into computer games and console games. In recent years however, the emergence of social networks, smartphones and tablets introduced new categories such as mobile and social games. Video games have come a long way since the first games emerged in the 1970s. Today's video games offer photorealistic graphics and simulate reality to a degree which is astonishing in many cases. Video games are a billion-dollar business and have been for many years. Technologies such as virtual reality and augmented reality are major drivers for game hardware and gameplay development. The 2010s have seen a larger shift to casual and mobile gaming; in 2016, the mobile gaming market is estimated to have taken $38 billion in revenues, compared to $6 billion for the console market and $33 billion for personal computing gaming. The industry will drive the development of more advanced hardware and software products.

I) Smart Wheelchairs

3.28 A smart wheelchair typically consists of either a standard power wheelchair to which a computer and a collection of sensors have been added or a mobile robot base to which a seat has been attached. Smart wheelchairs have been designed that provide navigation assistance to the user in a number of different ways, such as assuring collision-free travel, aiding the performance of specific tasks (e.g., passing through doorways), and autonomously transporting the user between locations.

J) Smart Hearing Aids

3.29 At the 2015 International Consumer Electronics Show (CES), several brands are unveiling smart hearing aids – their latest in wearable hearing technology. The hearing aids can be discreetly controlled via both iPhone and Android devices, with latest models clinically proven to outperform people with normal hearing in background noise. When two hearing aids are worn (the most common case). New smart hearing aids utilize intelligent, two-way wireless communication to focus on the desired speech with pinpoint accuracy. This enables better-than-normal hearing in crowded situations like noisy restaurants and cocktail parties where background chatter has historically been a challenge.

Future Manpower Demand

3.30 In view of the manpower trend, business outlook of the electronics and telecommunications industries and employers' forecast of future manpower requirements, the Training Board believes that there will be on-going demand for well-trained technologists, technicians and craftsman required to maintain the development of the industries. The manpower for operatives will be stable.

3.31 Based on the latest development of the industry, the Training Board has also estimated the turnover at different job levels due to workers leaving the electronics and telecommunications industries through retirement, migration to other industries and other causes. The Training Board has adopted an annual wastage rate of 3% for the loss of manpower at the technologist, technician and craftsman levels.

3.32 The Training Board has estimated, by using the Adaptive Filtering Method for the manpower projection for the technologist, technician and craftsman levels. The additional manpower required by the electronics and telecommunications industries for 2017 – 2019 is summarized in Table 3.7 below. A breakdown of the training requirements into principal jobs is shown in Appendix 10.

Table 3.7: Annual Manpower Demand in the Electronics and Telecommunications Industries from 2017 to 2019

Job Level	Annual Average Additional Demand for Employees	
	Total	±10% Range
Technologist	777	699 – 855
Technician	1 238	1 114 – 1 362
Craftsman	402	362 – 442

3.33 The Training Board will conduct another manpower survey of the electronics and telecommunications industries in 2020 to review and update the manpower requirements of the industry.

SECTION IV

RECOMMENDATIONS

4.1 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:

(i) To develop more intelligent and creative new products / services with respect to the new technology trend to enhance product and market differentiation;

(ii) To streamline and enhance the manufacturing facilities or operation by means of automation or robotics technologies;

(iii) To upgrade the overall skill level and competency of the staff, especially those new technology knowledge and skills in 5G, Smart City, Internet of Things (IoT), etc., by providing them appropriate training leading to establish a much stronger and competitive workforce;

(iv) To explore new business opportunities and expand market share in other overseas countries, i.e. exploration of other overseas markets such as Middle East, Africa and South America;

(v) To promote the professional image of the practitioners working in the sectors such that more youngsters are encouraged to join the industries;

(vi) As the industry development is heading towards 5G, Smart City, IoT, etc., training providers could consider to strengthen the programme development in the areas of smart sensors design, user interface, data compression technique, business intelligence and analytics skills, data security and network monitoring techniques so that the students can equip with the necessary knowledge and skills to meet the industry demand.

(vii) 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.

(viii) Employees of the industries are also encouraged to upgrade their technical skills and knowledge by means of the government funded training schemes to meet the industry need.

4.2 On top of the individual company's training needs, the Training Board suggests that the "Skills Employees Need to Enhance" at Appendix 9 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. By participating in the New Technology Training Scheme, they could encourage their employees to strengthen their technical skills and knowledge. The Training Board also recommends the Vocational Training Council and other training organizations 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.

Annual Intake of Trainees

4.3 At the time of the survey, there were only 129, 393 and 556 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.

4.4 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 3.32 for 2017 – 2019. A breakdown of the manpower requirements into various principal jobs is given at Appendix 10. 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 5.0%, 3.2% and 5.4% respectively of the total number of technologists, technicians and craftsmen presently employed.

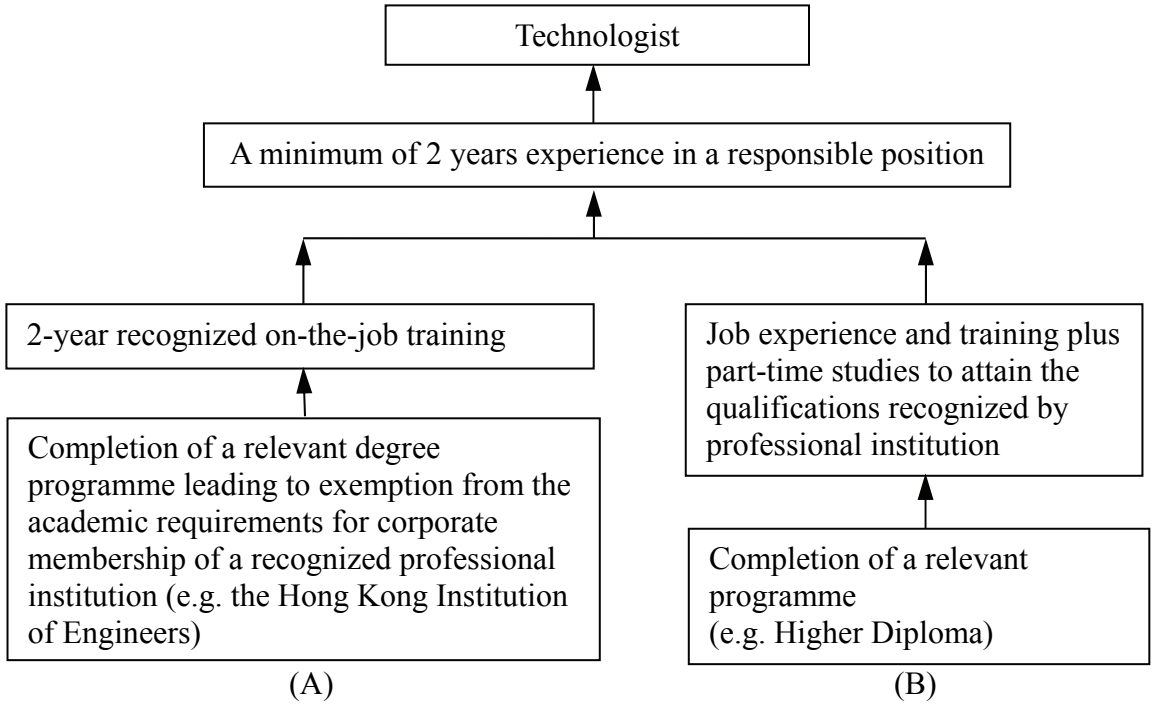
4.5 The recommended training routes for technologists, technicians and craftsmen are outlined in the following paragraphs.

Training of Technologists

4.6 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 analyzing 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.

4.7 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 4.1 : Training of Technologists



4.8 A number of local educational institutions funded by the University Grants Committee (UGC) offer various degree courses in electronic engineering and related disciplines. The following table shows the estimated number of graduates from these full-time engineering degree courses in 2017/18 and 2018/19:

Table 4.1: Estimated Number of Graduates from UGC-funded Institutions in 2017/18 and 2018/19

Institution[1]	Full-time Degree Programme	Estimated No. of Local Graduates per Annum
CityU, PolyU, HKUST	Electronic Engineering	187
CityU, CUHK, HKUST	Computer Engineering	201
CityU, CUHK, HKUST	Information Engineering	254
CityU	Electronic and Communication Engineering	115
PolyU, EU	Electronic and Information Engineering	220
CityU, CUHK	System Engineering & Engineering Management	103
	Total	**1 080**

[1] CityU : City University of Hong Kong
CUHK : The Chinese University of Hong Kong
HKUST : Hong Kong University of Science and Technology
PolyU : The Hong Kong Polytechnic University
EU : The Education University of Hong Kong

4.9 The forecast demand for related technologist level jobs (Electronics Engineer, Manufacturing/Quality Assurance Engineer and System Analyst) in the industry is about 561 - 687 annually in the next three years. The supply of graduates from electronic engineering and related disciplines should be able to meet the forecast demand. Nevertheless, 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. Hence, the manpower supply and demand at the professional/technologist level should be considered as roughly matching.

Engineering Graduate Training Scheme (EGTS)

4.10 To bring about more well-structured practical training opportunities in local industries for engineering graduates, the Innovation and Technology Training Board of the Vocational Training Council is operating a subsidized training scheme to provide engineering graduates with 18 months practical training of a standard acceptable for corporate membership of the Hong Kong Institution of Engineers. Each graduate receiving training under the scheme is granted a subsidy through his employer as part of his salary and the training progress is monitored by the Training Board.

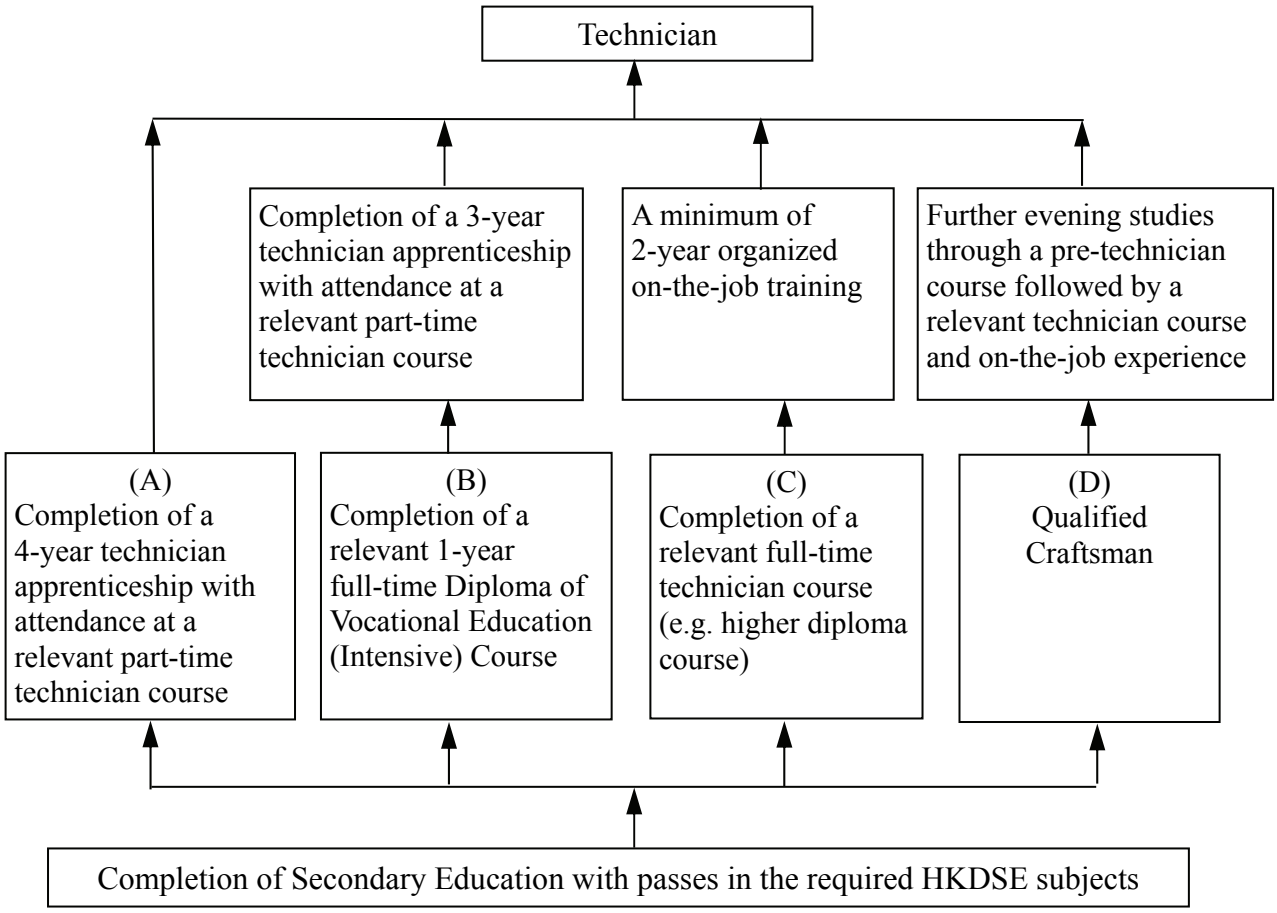
New Technology Training Scheme (NTTS)

4.11 Since 1992, the Vocational Training Council has been operating the New Technology Training Scheme to provide assistance to companies in Hong Kong that wish to have their staff trained in a technology that would be useful to their business. In the context of the scheme, new technologies include those which are not widely applied in Hong Kong and the absorption and application of which will benefit Hong Kong. Any employer in Hong Kong wishing to acquire a new technology for industrial and commercial application may apply for training grant under the Scheme. The Training Board encourages companies to make good use of the Scheme.

Training of Technicians

4.12 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 4.2.

Figure 4.2: Training of Technicians



4.13 The Hong Kong Polytechnic University and the Hong Kong Institute of Vocational Education (IVE) of the VTC offer a range of higher diploma courses in electronic engineering and related disciplines. The following table shows the estimated number of graduates from the relevant full-time higher diploma courses of these two institutions:

Table 4.2: Estimated Number of Higher Diploma Graduates in 2017/18 and 2018/19

Institution[1]	Programme	Estimated No. of Graduates per annum	Estimated No. of Graduates Entering into Employment per annum
IVE	Electronic and Communications Engineering[2]	55	33
PolyU	Electronic & Information Engineering[3]	118	32
IVE	Computer Engineering[2]	55	33
PolyU	Multimedia Design & Technology[3]	62	18
	Total	**290**	**116**

[1] IVE : Hong Kong Institute of Vocational Education
PolyU : The Hong Kong Polytechnic University

[2] As advised by IVE, about 60% graduates will enter into employment.

[3] As advised by PolyU, about 27% and 29% of graduates will enter into employment based on 2015 figures for the two programmes respectively.

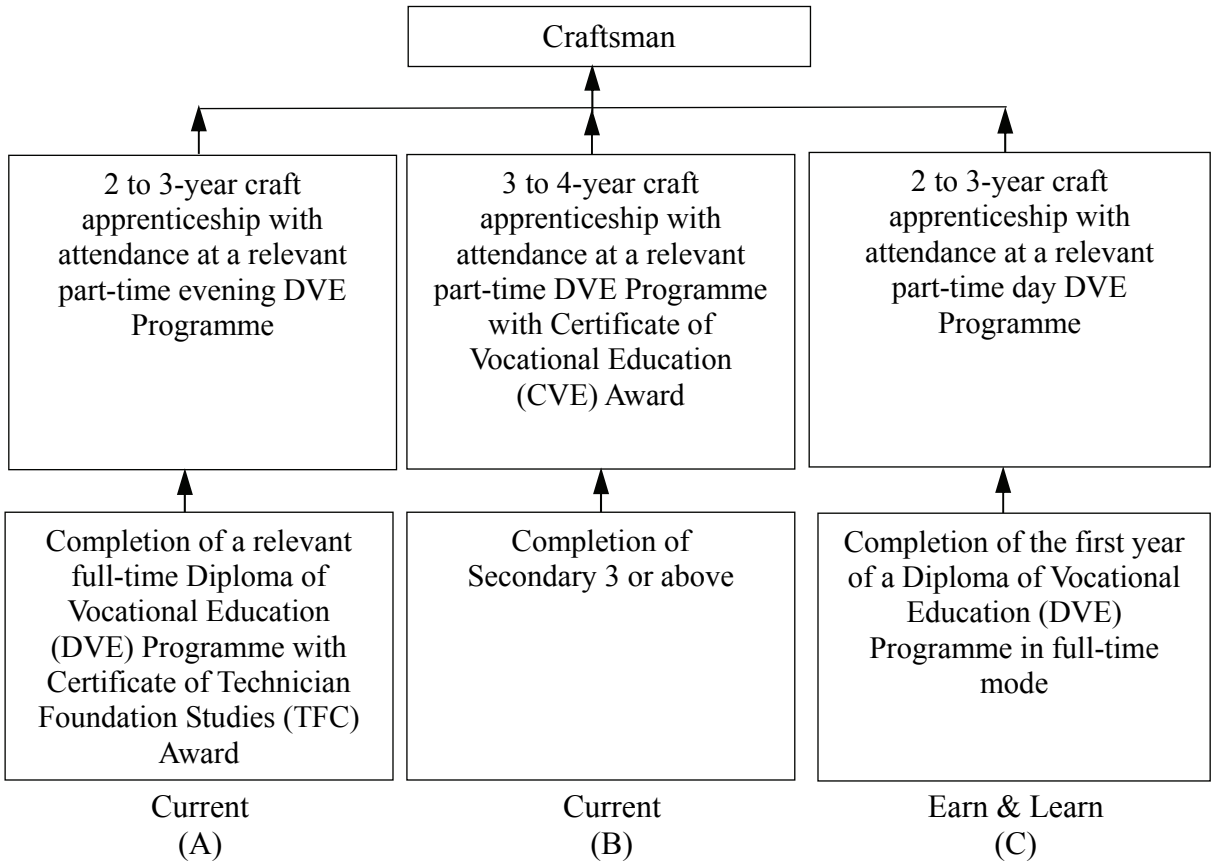
4.14 The Pro-Act Training and Development Centre (Electronics) collaborates with Youth College of the VTC to offer a 1-year full-time Diploma of Vocational Education Awards of a DVE Programme - Digital Electronics Technology for Secondary 6 school leavers. The estimated number of graduates from the course is about 60 from 2017/2018 onwards (about 12 graduates will enter employment upon graduation).

4.15 The forecast demand for related technician level jobs (Electronics Technician, Sales Technician, Draughtsman, Manufacturing/Quality Assurance Technician, Programmer, and Web Developer/Designer) in the industry for the period from 2017 to 2019 is 937 – 1 146 annually. The total supply of Higher Diploma graduates and Diploma of Vocational Education graduates in 2017/2018 is 128 which is lower than the forecast demand. However, some of the technician jobs may be filled by the training of secondary school leavers through apprenticeship and internal promotion of experienced craftsmen. It is noted that there were 393 technician trainees in the industry at the time of the survey, and a total of 266 employees were promoted to the technician level jobs in the twelve months prior to the survey. It is anticipated that there will be demand for technician and the training institutions should strengthen their curriculum and increase the corresponding training places to attract more students.

Training of Craftsmen

4.16 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 4.3:

Figure 4.3: Training of Craftsmen



4.17 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.

4.18 The Pro-Act Training and Development Centre (Electronics) works in collaboration with Youth College of the VTC to offer a Multi-Entry-Multi-Exit (MEME) Diploma of Vocational Education (DVE) Programme - Digital Electronics Technology for Secondary 3 school leavers. Some 150 students of the DVE programme have planned to receive training on competence and award of craftsman for respective jobs in the electronics and telecommunications industries annually from 2017/18 onwards. The forecast demand for related craft jobs (High Speed Data Network & Wireless Data System Integrator, and Electronics Craftsman) in the two industries for the period from 2017 to 2019 is 275 - 335 annually. The output from the Pro-Act Training and Development Centre (Electronics) is various as the graduates could pursue further studies instead of serving the two industries. However, there were 556 craft trainees in the two industries at the time of the survey and a total of 50 employees were promoted to the craftsman level jobs in the twelve months prior to the survey. The total craftsmen available will be 606, which exceeds the demand. In general, the graduates may take up electronics craftsman jobs and related jobs in other industries such as electrical and mechanical services, building services and manufacturing. Hence, the manpower supply and demand at the craftsman level should be considered as matching.

4.19 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.

Educational and Training Institutions

4.20 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

4.21 The Hong Kong Science and Technology Parks Corporation (HKSTP) was established in 2001 by the HKSAR Government to offer one-stop infrastructural support services to technology-based companies and activities in a synergetic manner, ranging from nurturing start-ups through incubation programmes, providing premises and services in the HKSTP for applied research and development activities, creating and sustaining a design cluster in the InnoCentre, to offering land and premises in industrial estates for production. As a whole, the HKSTP provides 20 state-of-the-art laboratory-fitted buildings offering 220 000 square meter office space – an effective research and development environment and support services to facilitate collaboration and synergy among its 600 tenant and incubate companies. Its technology focuses are under five clusters – engaging in integrated circuits and electronics; precision engineering, biotechnology, green technology and ICT industries; and drive 3 application platforms – Healthy Ageing, Smart City, and Robotics. Through the

Data Studio and Robotic Garage, companies can develop innovative solutions and new applications. Advanced facilities and services provided include EDA tools and IC Probe & Test Services, Reliability Test Services, IC Failure Analysis Services, and Biotechnology Support Centre. The Training Board urges employers to make good use of the facilities and services offered by the HKSTP, especially those for IC design.

Hong Kong Applied Science and Technology Research Institute

4.22 Hong Kong Applied Science and Technology Research Institute (ASTRI) was founded by the Government of the Hong Kong Special Administrative Region in 2000 with the mission of enhancing Hong Kong's competitiveness in technology-based industries through applied research. ASTRI's core R&D competences in various areas are grouped under seven Technology Divisions, namely Communications Technologies, Electronics Components, IC Design Analog, IC Design Digital, Opto-electronics, Security and Data Sciences, and Software and Systems. Five areas of applications including financial technologies, intelligent manufacturing, next generation network, medical and health, and smart city are identified for major pursuit. As a Hong Kong R&D centre, one of ASTRI's important goals is to help customers capture business opportunities from the thriving technology market and increase their competitive strengths. Customers and partners can improve their efficacy by drawing on ASTRI's expertise and research achievements. ASTRI has a rich portfolio of commercially viable technologies readily available for customers' deployment. The number of technology transfers conducted through research contract, technology licensing and other forms of partnership has exceeded 700, generating a total sum of over HK$450 million income received from industry. ASTRI has produced a volume of home-grown and patent-protected technologies. Since establishment, ASTRI has filed more than 900 patents with over 500 granted. The Training Board urges employers to seek assistance from ASTRI for R&D development and technology transfers.

STEM Education

4.23 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. Along this line, the Student Education Fair on Science, Technology and Mathematics 2016, jointly organised by the Education Bureau and the Hong Kong Science & Technology Parks Corporation, aimed to showcase and celebrate a wide range of student achievements on Science, Technology, Engineering and Mathematics (STEM) related areas. This signature event will provide quality learning experiences for students to enhance their interests in learning, creativity and innovation as well as to strengthen their ability in integrating and applying cross-disciplinary knowledge and skills. 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 (ELS)

4.24 With the approval of funding by the Financial Committee of the Legislative Council in July 2014, the VTC Earn & Learn Scheme (also known as Pilot Training & Support Scheme) was officially launched. The scheme offers vocational education and training by integrating structured apprenticeship training programmes with clear career progression pathways. Under the scheme, in addition to a guaranteed salary, the apprentice will receive $72,000 allowance from the Government and $30,800 from the participating industry during the apprenticeship period, such that the young people can earn a steady income while equipping themselves with knowledge and skills to pursue a promising career. Graduates of the Schemes can also pursue further studies to gain higher academic qualifications for the professional advancement.

Apprenticeship Training organised by the Vocational Training Council

4.25 The Vocational Training Council offers free services to help employers organize 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 the Council for assistance in setting up training schemes and recruiting apprentices/trainees.

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電子及電訊業

2016年人力調查報告摘要

引言

1. 職業訓練局轄下電子及電訊業訓練委員會（前稱「電子及電訊業訓練委員會」）於 2016年 4月進行人力調查，蒐集業界主要職務的最新人力資料。.

調查範圍

2. 電子及電訊業訓練委員會（下稱「本會」）得政府統計處協助，由該處中央紀錄共 7 529 間電子及電訊業機構之中，以分層隨機抽樣方法選出共 704間機構為調查對象。調查所得資料其後以統計方法倍大，以反映業內的整體人力情況。 調查涵蓋以下六個電子及電訊業門類：

門類	抽樣數目
1. 製造	70
2. 貿易及服務	378
3. 電訊服務	129
4. 批發	89
5. 設計公司、相關院校學系及政府部門	28
6. 電子產品零售公司	10
總計	704

調查結果

3. 是次調查顯示，2016年 4月時本港電子及電訊行業共僱用 144 985人，其中 63 311 人擔任電子工程及相關範疇主要職務。本會將 2014 年與2016年各類機構不同技能等級僱員的分布情況作一比較，見表 A：

表 A： 各類機構各技能等級僱員分布情況比較（2014 年與 2016 年）

門類	技能等級				人力總數（按年增減百分率）
	技師	技術員	技工	操作工	
1. 製造	**792**	**1 868**	**610**	**1 110**	**4 380**
	797	2 158	352	1 367	4 674
	(-0.3%)	(-7.0%)	(+31.6%)	(-9.9%)	(-3.2%)
2. 貿易及服務	**10 259**	**24 013**	**4 735**	**510**	**39 517**
	9 847	23 113	4 295	1 021	38 276
	(+2.1%)	(+1.9%)	(+5.0%)	(-29.3%)	(+1.6%)
3. 電訊服務	**2 388**	**4 440**	**922**	**305**	**8 055**
	2 302	4 602	614	142	7 660
	(+1.9%)	(-1.8%)	(+22.5%)	(+46.6%)	(+2.5%)
4. 批發	**339**	**3 321**	**291**	**50**	**4 001**
	390	3 502	249	97	4 238
	(-6.8%)	(-2.6%)	(+8.1%)	(-28.2%)	(-2.8%)
5. 設計公司、相關院校學系及政府部門	**1 537**	**2 000**	**813**	**53**	**4 403**
	1 302	2 019	858	73	4 252
	(+8.7%)	(-0.5%)	(-2.7%)	(-14.8%)	(+1.8%)
6. 電子產品零售公司（10 間大型公司）	**25**	**2 877**	**53**	**0**	**2 955**
	4	3 495	0	0	3 499
	(+150%)	(-9.3%)	(-)	(-)	(-8.1%)
總數	**15 340**	**38 519**	**7 424**	**2 028**	**63 311**
	14 642	38 889	6 368	2 700	62 599
	(+2.4%)	(-0.5%)	(+8%)	(-13.3%)	(+0.6%)

註：2016 年數字以粗體顯示

4. 據僱主填報資料，調查期間電子工程及相關範疇共有 1 078 名受訓者，空缺則有 1 687 個，分別佔業內總人力的 1.7%及 2.7%。僱主亦預測至 2017 年 4 月時，業內將需要 65 260 名僱員，較 2016 年 4 月時增加 3.1%（1 949 人）。

人力變化

5. 業內擔任電子及相關範疇主要職務的僱員由 2014 年 62 599 人增至 2016 年 63 311 人，增加了 1.1%。表 A 所見，門類二（貿易及服務）僱員最多，有 39 517 人（62.4%）；而門類六（電子產品零售公司）僱員最少，有 2 955 人（4.7%）。調查亦顯示業內人力在過往兩年均告穩定。

6. 各門類不同技能等級的人力變化分別見圖 A 及圖 B。

圖 A：各門類人力變化比較

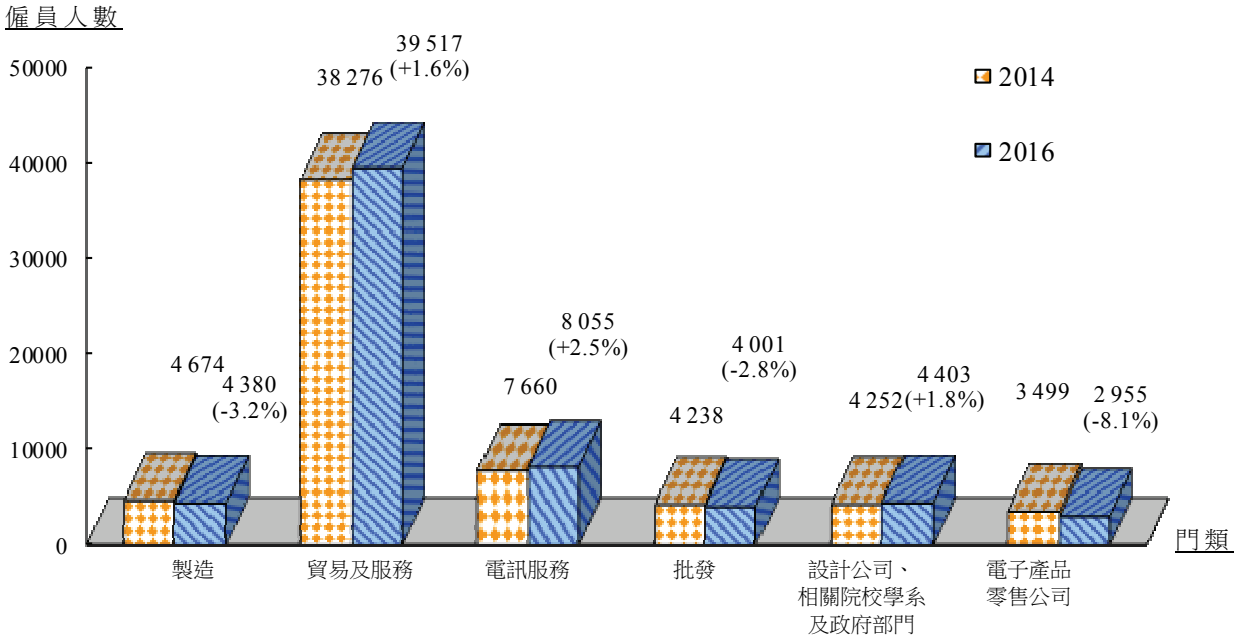
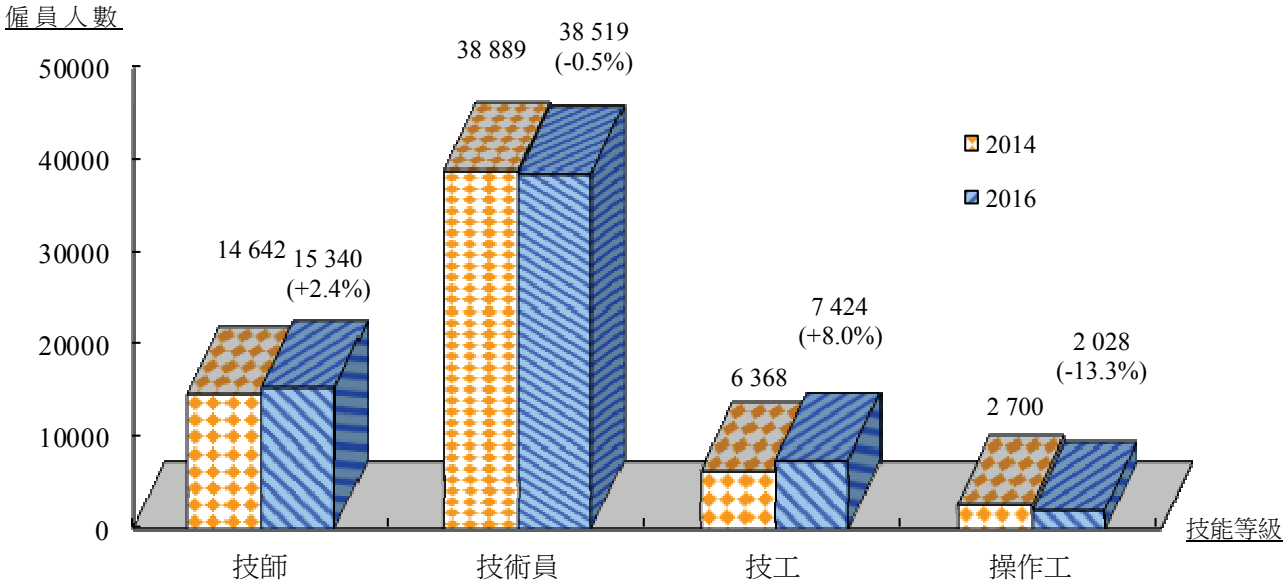


圖 B：各技能等級人力變化比較



7. 本會認為各門類的人力變化原因如下：

(i) 製造（門類一）-- 大型公司數目保持平穩，僱用 50 人或以上的公司數目 2014 年有 18 間，而 2016 年則有 19 間。另一方面，調查反映技術員級僱員人數普遍減少，雖然技工級別僱員有所增長，但整體仍錄得每年 3.2%人力減幅。估計由於招聘技術員困難，部分公司轉而使用機械人技術或自動化科技，以減低上漲的人工成本；同時，由於廣東省政府推出獎勵計劃，鼓勵製造公司投資自動化生產設施，亦導致僱員人數下降的趨勢。

(ii) 貿易及服務（門類二）及批發（門類四）-- 因業務及人力性質類近，合併比較。屬於門類二的數間工程服務公司過去數年進行的基礎建設及海外專項工程稍為增多，所以，這兩個門類的人力按年增加 1.2%。因此，首三個技能等級均需要較多的技術人手，但操作工級人手於 2016 年卻錄得按年跌幅。

(iii) 電訊服務（門類三）-- 或因互聯網及通訊業發展增值服務（例如 4G 及 4.5G 網速），需要額外的技術人員以爭取更多市場佔有率，此類公司的僱員人數按年微升 2.5%。除技術員級別外，其他技能等級的僱員人數均普遍增加。鑑於有某間大型廣播公司結束業務，及數間大型公司亦重整人手，令技術員的僱員人數減少。

(iv) 設計公司、相關院校學系及政府部門（門類五）-- 過去兩年僱員人數保持穩定，只錄得十分輕微的 1.8% 按年升幅。不過，或基於新技術的發展需要，例如擴增實境（AR）、虛擬實境（VR）、智慧城市、物聯網（IoT）、開放數據、網絡安全等等，技師級別人數錄得 8.7% 升幅。

(v) 電子產品零售公司（門類六）-- 由於內地旅客人數整體下降，令這個門類的僱員人數按年減少 8.1%。調查亦顯示，在高科技產品的市場需求帶動下，技師僱員人數有所上升。舉例來說，商場及店舖內使用資訊專櫃來吸引顧客，加強購物體驗，需要僱用硬件及軟件技巧兼備的技師級人手，所以對這類僱員的需求增加。同時，政府資助的「零售業人力需求管理科技應用支援計劃」（ReTAAS），亦有助推動零售業採用高科技。

人力需求及影響因素

8. 電子及電訊業仍是香港出口商品貨值最高的行業，佔 2015 年本地出口總值的 64% (1)。 本會認為各項影響業內發展的因素如下：

(i) 預期本港經濟於 2017 年可保持 2%至 2.7%的增長。

(ii) 在 2016 至 2020 年「十三五」規劃的框架下，中國內地經濟增長逐步放緩，進入持續發展期。香港政府會繼續透過《內地與香港關於建立更緊密經貿關係的安排》（CEPA）及其他區域合作平台，與內地保持緊密經濟關係。此外，香港會致力鞏固與新興市場之間的經濟合作，尤其重視中國內地「一帶一路」的倡議。「一帶一路」貫穿超過六十個經濟體系，包括東南亞、中亞、中歐、東歐及非洲不少新興市場經濟體，當中涉及投資基礎建設、深化金融聯繫、擴展貿易，以及聯繫人民，將帶來廣泛商機。面對這些極有發展潛力的市場，香港大有優勢充當貿易及物流樞紐，並且是通往這些市場投資的跳板。

(iii) 人民幣繼續貶值、工資上漲、稅項增加、油價不穩、利息及貨幣匯率反覆引致能源及原料價格波動，均是業界所面對的重大挑戰。

(iv) 2016 年中國內地經濟增長為 6.5%，是 26 年來最低，增長步伐緩慢，反映全球經濟增長亦如是。

(v) 下半年全球經濟可望繼續溫和增長，美國經濟重拾復甦步伐，而各個亞洲經濟體亦出現改善跡象，有望支援未來幾季香港出口貨品。雖然英國公投脫歐增加了不穩定的氣氛，但主要央行承諾會一同捍衞金融市場，在公投後快速穩住全球金融市場，令危機不致加劇。然而，英國脫歐仍在演變中，不能排除往後對全球經濟及金融環境仍有迴響。

(vi) 外圍環境低迷，風險仍在，須步步為營。各種不明朗因素包括：美國利率正常化、主要央行貨幣政策分歧、歐元區及日本復甦脆弱，以及不少地區的地緣政治局勢緊張等等。

註 (1): 資料來源： 政府統計處《香港對外商品貿易統計》
星展集團 2016 年 9 月研究報告《Economics Markets Strategy 4Q 2016》

9. 以上所有情況將會對往後電子及電訊業的發展有一定影響。不過，中國內地的改革和持續發展勢頭可為全球帶來更多商機，香港的電子及電訊業亦同樣受惠。

未來人力需求

10. 觀察上述的人力趨勢、電子及電訊業的業務前景，以及僱主對未來人力需求的預測，本會相信業界將繼續需要訓練有素的技師、技術員及技工，支持業務持續發展；而操作工的人力需求則會平穩。

11. 本會根據業內最新發展，並因應退休、轉業及其他原因，估算各技能等級人力的流動率，並採用每年 3% 的正常流失率，估算技師、技術員及技工技能等級的人手流失情況。

12. 本會採用「調節過濾法」，預測技師、技術員、技工三個技能等級的人力需求。電子及電訊業在 2017 至 2019 年間需求的額外人力摘要見下表 B。

表 B： 電子及電訊業
2017 年至 2019 年每年新增人力需求

技能等級	平均每年新增人力需求	
	總數	幅度（±10%）
技師	777	699 – 855
技術員	1 238	1 114 – 1 362
技工	402	362 – 442

建議

13. 考慮到上述各方面，本會持審慎樂觀看法，相信電子及電訊業會持續穩健增長。建議僱主採取以下措施，應對目前形勢和未來挑戰：

(i) 研發更多創新的智能產品／服務，配合新科技趨勢，優化產品，在市場中突圍而出；

(ii) 採用自動化技術或機械人科技，精簡並提升製造設施或運作模式；

(iii) 透過合適訓練，提升員工整體知識、技術水平和能力，特別是 5G、智慧城市及物聯網等新科技範疇，造就更強大兼具競爭優勢的人力隊伍；

(iv) 在其他海外國家開拓新商機、拓展市場佔有率，例如發掘中東、非洲及南美等海外市場；

(v) 推廣從業員的專業形象，鼓勵更多年輕人入行；

(vi) 工業朝著 5G、智慧城市及物聯網等範疇推進發展，培訓機構可考慮加強發展以下領域的課程：智能感應器設計、用戶界面、數據壓縮技術、商業情報和分析技巧、數據保安及網絡監測技術，為學生裝備所需知識及技巧，配合業界所需；

(vii) 科技發展是業界不可缺少的一部分，可見向學生提供科學、科技、工程及數學等學科的教育（簡稱 STEM 教育）至關重要，有助推動業界持續發展。為配合香港特區政府的策略方針，職業訓練局(VTC)最近已成立 STEM 教育中心，支援學習，並向中學師生推廣這方面的教育工作；

(viii) 鼓勵業內僱員參與政府資助的培訓計劃，提升技術水平及知識，以配合業界需求。

14. 僱主規劃培訓時，除了考慮公司的個別培訓需求，本會認為附錄 9「僱員需要加強培訓的技能」亦甚具參考價值。為了緊貼科技發展，與時俱新，建議僱主加強僱員培訓，確保他們訓練有素，能迎接面臨的挑戰及商機。僱主亦可參與新科技培訓計劃，鼓勵僱員加強技術和知識。本會亦建議 VTC 及其他培訓機構密切留意電子及電訊業的培訓需求，提供合適合時的訓練課程。

15. 本會將於 2020 年進行另一次電子及電訊業人力調查，檢視業內人力需求並更新有關數據。

第一章

緒　論

電子及電訊業訓練委員會

1.1　電子及電訊業訓練委員會（下稱「本會」）是隸屬職業訓練局（VTC）的法定委員會，由香港特別行政區政府委任，負責制訂與電子及電訊業人力培訓相關之事宜。本會委員乃由主要行業商會、專業學會、工會、訓練及教育機構，以及政府部門提名代表出任。委員名單及職權範圍分別載於附件 A 及 B。

1.2　按職權規定，本會需負責確定電子及電訊業的人力需求，並向 VTC 提出發展職業專才教育及培訓設施的建議，配合業界所需。

人力調查

1.3　本會於 2016 年 4 月進行電子及電訊業人力調查，蒐集最新資料。是次調查在政府統計處協助下進行，並於 2016 年 11 月完成跟進及數據處理工作。

1.4　是次調查蒐集以下之人力統計數據及資料：

(i) 調查期間各主要職務的僱員人數；

(ii) 現有空缺額；

(iii) 受訓僱員人數；

(iv) 僱主預測 2017 年 4 月時的僱員總數；

(v) 僱員每月平均收入；以及

(vi) 僱主對僱員宜有的教育程度、訓練方式及訓練期的意見。

1.5　本會亦請僱主填報調查進行前 12 個月內，獲得晉升或派駐香港以外地區工作超過六個月的技師、技術員及技工人數，以及僱員需要加強的技能培訓。

調查範圍

1.6 是次調查涵蓋電子及電訊業六個門類，包括業內公司、相關院校學系及政府部門：

第一類：製造

下列產品的製造商：

(a) 電腦及周邊設備（HSICs 262000, 281700, 952100）；

(b) 影音器材（HSICs 264000, 953100）；

(c) 通訊設備及電纜（HSICs 263000, 273100, 952200）；

(d) 磁性及光學媒體、已儲錄資料媒體的複製（HSICs 182000, 268000）；

(e) 電腦及電訊設備之電子零件與組件（HSIC 261100）；

(f) 其他電子零件及組件（HSIC 261900）；

(g) 電子遊戲用品及玩具（HSIC 324500）；以及

(h) 工業用電子儀器及量度、檢驗、導航與控制用設備（HSICs 265100, 331300）。

第二類：貿易及服務

下列公司：

(a) 防盜系統、閉路通訊系統及電訊設備安裝及保養公司（HSICs 432104, 432105, 432106）；

(b) 下列產品的進出口貿易公司：

(i) 科學及專業儀器（HSICs 451631, 452631）*；

(ii) 電訊設備及零件（HSICs 451611, 452611）*；

(iii) 電器（HSICs 451452, 452452）*；

(iv) 電腦、電腦周邊設備及套裝軟件（HSICs 451601, 451602, 452601, 452602）*；

(v) 辦公室器材及設備（HSICs 451634, 452634）*；

(vi) 電子零件（HSICs 451613, 452613）*

(c) 資料處理、寄存及相關活動公司（HSICs 620121, 620199, 620200, 620900, 631100）*；以及

(d) （a）至（c）以外的其他電子工程服務公司。

第三類：電訊服務

提供下列服務的公司：

(a) 電訊網絡營運服務（HSIC 611000）；

(b) 其他雜項電訊服務（HSIC 619900）；

(c) 互聯網接駁服務（HSIC 619100）；以及

(d) 電台廣播，電影、錄像及電視節目編製與廣播活動（HSICs 591100, 601000, 602000）。

第四類：批發

下列批發公司：

(a) 電訊設備及零件（HSIC 460611）；

(b) 電器（不包括機械、辦公室及電訊設備及器材（HSIC 460452）；

(c) 電腦及電腦周邊設備（HSICs 460601, 460602）；以及

(d) 辦公室器材及設備（不包括電腦、傢具及固定裝置）（HSIC 460634）。

第五類：設計公司、相關院校學系及政府部門

(a) 電子設計公司；

(b) 相關院校學系；

(c) 相關政府部門。

第六類：電子產品零售公司（10間大型公司）

(a) 電子產品大型零售商店。

附註：(1) HSIC—香港標準行業分類。

*(2) *因所涉技術人員不多，僱用 10 名以下職員的機構並不包括在內。*

(3) 行業類別 4、7、8 的補充樣本見附件 G。

1.7 調查前，政府統計處錄得香港電子及電訊業六個門類約共 7 529 間機構。鑑於資源有限，本會採用分層隨機抽樣方法，選出共704間機構為調查對象（其中 2 間為新發現個案)。抽樣細則見附件 H。調查所得資料其後以統計方法倍大，以反映業內的整體人力情況。

調查方法

1.8 調查進行前兩星期，本會向該 704 間選定機構寄發調查文件，包括調查表（附件 D)、附註（附件 E) 及主要職務工作說明（附件 F)。另亦透過 VTC 網頁和有關行業組織宣傳是次調查，促請僱主合作。

1.9 調查期間，政府統計處派員到全部 704 間機構收回填妥的調查表，並於有需要時協助僱主填寫。收回的調查表均經詳細審核，如有需要，會與填覆機構核對。

回應

1.10 在 704 間選定的機構中，432 間填覆調查表，36 間拒絕作答；而其餘 236間則已搬遷、結業、未能聯絡，或已轉營他業。是次調查的有效填覆率為 92.3 %。

1.11　部分機構因業務繁忙和不願披露機構的機密資料，只提供粗略的資料，並無詳細列出調查期間的僱員每月收入、受訓僱員人數和空缺數目。

調查報告

1.12　本會在跟進調查及分析數據後，於 2016 年 12 月編製統計報告，列載調查所蒐集的人力數據。統計報告其後上載 VTC 網站，以便公眾參考。

1.13　本報告書詳載是次調查結果、本會對電子及電訊業培訓需求的預測，以及對應的建議措施。報告書內，「僱員」、「從業員」和「人力」均指調查期間業內各主要職務的僱員總數，但不包括受訓者及學徒。「受訓者」指正在接受各種形式訓練的人士，包括已簽署學徒合約的註冊學徒。

第二章

調查結果摘要

僱員人數

2.1 是次調查顯示，2016年4月本港電子及電訊業共僱用144 985人，其中63 311人受僱擔任電子工程及相關範疇的主要職務。下文各段只列載與業內主要職務僱員相關的人力統計數字。

各類機構各技能等級僱員的比較與分布情況

2.2 電子及電訊業各類機構內各技能等級僱員的比較與分布情況見表2.1及圖2.1、2.2。

表2.1： 各類機構各技能等級的僱員比較（2014年與2016年）

門類	技能等級				人力總數（按年增減百分率）
	技師	技術員	技工	操作工	
7. 製造	**792** 797 (-0.3%)	**1 868** 2 158 (-7.0%)	**610** 352 (+31.6%)	**1 110** 1 367 (-9.9%)	**4 380** 4 674 (-3.2%)
8. 貿易及服務	**10 259** 9 847 (+2.1%)	**24 013** 23 113 (+1.9%)	**4 735** 4 295 (+5.0%)	**510** 1 021 (-29.3%)	**39 517** 38 276 (+1.6%)
9. 電訊服務	**2 388** 2 302 (+1.9%)	**4 440** 4 602 (-1.8%)	**922** 614 (+22.5%)	**305** 142 (+46.6%)	**8 055** 7 660 (+2.5%)
10. 批發	**339** 390 (-6.8%)	**3 321** 3 502 (-2.6%)	**291** 249 (+8.1%)	**50** 97 (-28.2%)	**4 001** 4 238 (-2.8%)
11. 設計公司、相關院校學系及政府部門	**1 537** 1 302 (+8.7%)	**2 000** 2 019 (-0.5%)	**813** 858 (-2.7%)	**53** 73 (-14.8%)	**4 403** 4 252 (+1.8%)
12. 電子產品零售公司（10間大型公司）	**25** 4 (+150%)	**2 877** 3 495 (-9.3%)	**53** 0 (-)	**0** 0 (-)	**2 955** 3 499 (-8.1%)
總數	**15 340** 14 642 (+2.4%)	**38 519** 38 889 (-0.5%)	**7 424** 6 368 (+8%)	**2 028** 2 700 (-13.3%)	**63 311** 62 599 (+0.6%)

註：2016年數字以粗體顯示

圖 2.1： 各技能等級的僱員分布情況

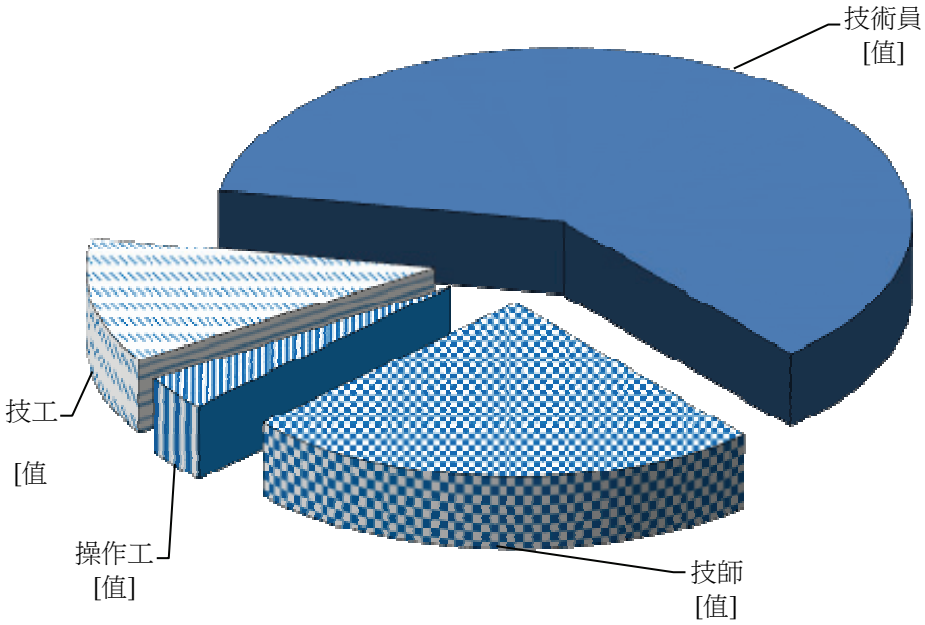
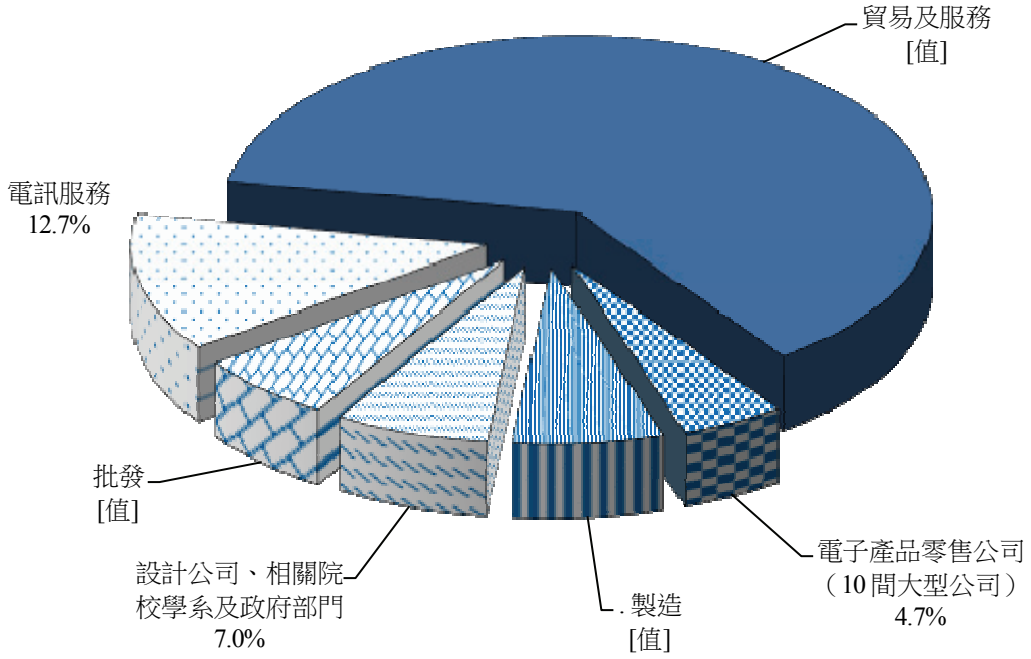


圖 2.2： 各類機構的僱員分布情況



受訓僱員人數

2.3 調查期間，業內共有 1 078 名受訓僱員。按技能等級的分布情況見表 2.2：

表 2.2： 各技能等級受訓僱員分布情況

技能等級	受訓僱員人數 (a)	僱員人數 b)	百分率 $\frac{(a)}{(b)}$ x100%
技師	129	15 340	0.8%
技術員	393	38 519	1.0%
技工	556	7 424	7.5%
操作工	-	2 028	0.0%
總數	**1 078**	**63 311**	**1.7%**

調查期間空缺數目及 2017 年 4 月人力預測

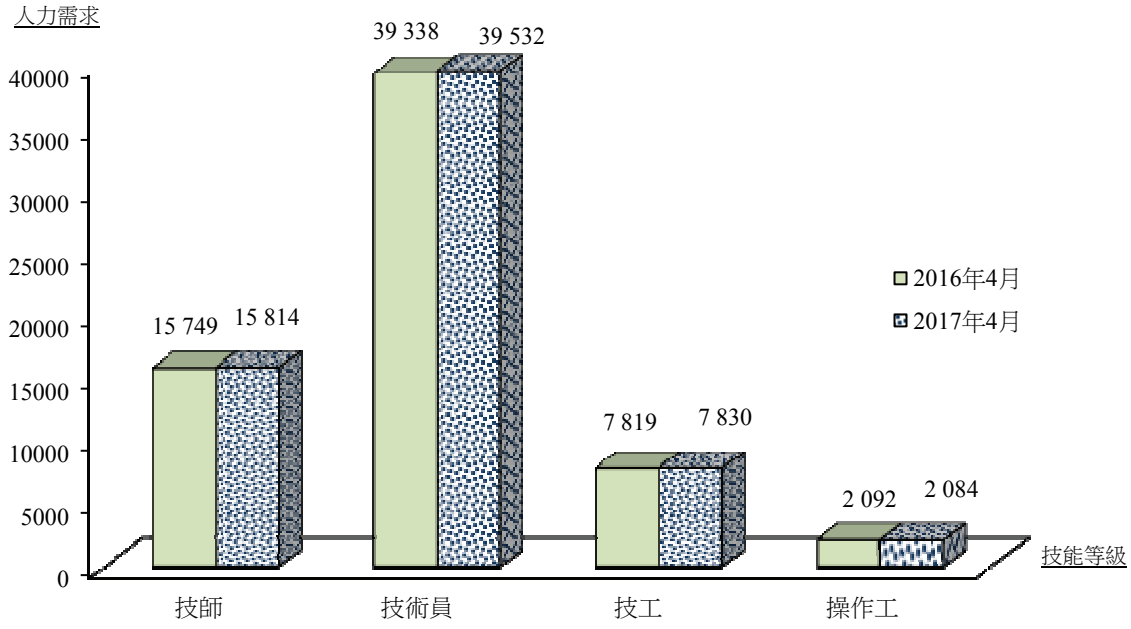
2.4 調查期間，電子及電訊業共有 1 687 個空缺，佔業內僱員總數 2.7%。此外，僱主預測，至 2017 年 4 月時兩個行業將需要 65 260 名僱員，較 2016 年 4 月增加 1 949 人，增幅為 3.1%。

2.5 表 2.3 及圖 2.3 比較調查期間及僱主預測至 2017 年 4 月時的人力需求：

表 2.3： 人力需求比較
（2016 年 4 月與 2017 年 4 月）

技能等級	調查期間（2016 年 4 月）			預測至 2017 年 4 月時的僱員總數	預測人力需求增減
	僱員人數	空缺數目	總人力需求		
技師	15 340	409	15 749	15 814	+0.4%
技術員	38 519	819	39 338	39 532	+0.5%
技工	7 424	395	7 819	7 830	+0.1%
操作工	2 028	64	2 092	2 084	-0.4%
總數	**63 311**	**1 687**	**64 998**	**65 260**	**+0.4%**

圖 2.3： 人力需求比較
（2016 年 4 月與 2017 年 4 月）



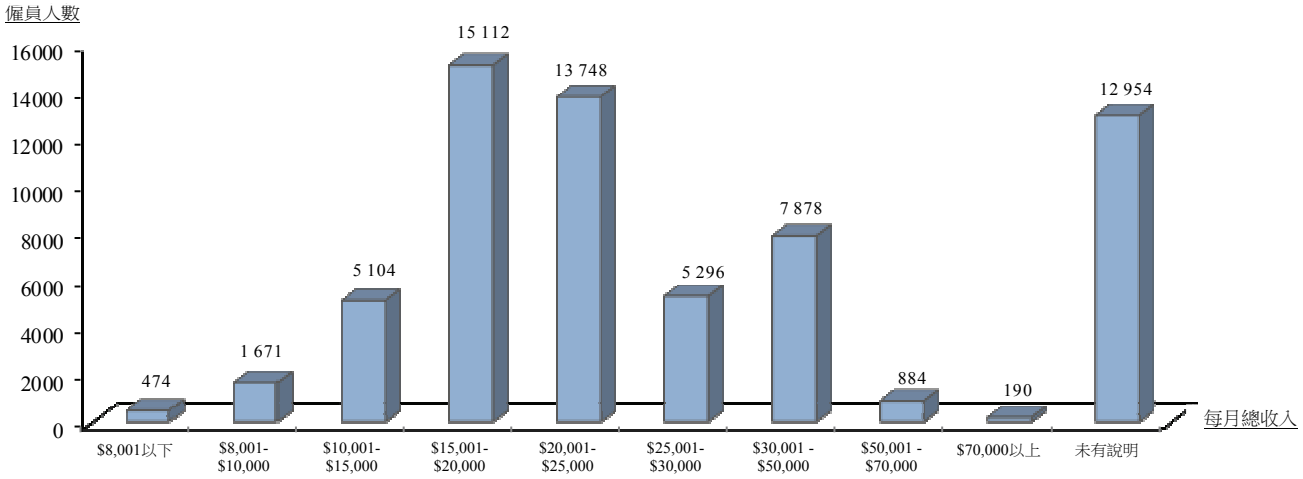
僱員每月總收入幅度

2.6 按每月總收入幅度劃分的僱員分布情況見表 2.4 及圖 2.4：

表 2.4： 按每月總收入幅度劃分的僱員人數分布情況

技能等級	$8,001 以下	$8,001-$10,000	$10,001-$15,000	$15,001-$20,000	$20,001-$25,000	$25,001-$30,000	$30,001-$50,000	$50,001-$70,000	$70,000 以上	未有說明	總數
技師	-	-	3	493	1 750	2 817	5 163	833	190	4 091	15 340
技術員	69	286	3 094	11 031	10 892	2 477	2 715	51	-	7 904	38 519
技工	107	446	1 529	3 588	1 101	2	-	-	-	651	7 424
操作工	298	939	478	-	5	-	-	-	-	308	2 028
總數	**474**	**1 671**	**5 104**	**15 112**	**13 748**	**5 296**	**7 878**	**884**	**190**	**12 954**	**63 311**

圖 2.4： 按每月總收入幅度劃分的僱員人數分布情況



僱員宜有教育程度、訓練方式及訓練期

2.7 大部份僱主對技師、技術員及技工級僱員宜有的教育程度、訓練方式及訓練期的意見列於表 2.5：

表 2.5： 僱員宜有的教育程度、訓練方式及訓練期

技能等級	宜有教育程度	宜有訓練方式	宜有訓練期
技師	大學學位或同等學歷	職內訓練	4 年或以上
技術員	高級證書、專業文憑、高級文憑、副學士或同等學歷	職內訓練	3 年至 4 年以下
技工	中四至中六、香港中學文憑、職專文憑／基礎課程文憑／毅進、文憑或同等學歷	職內訓練	1 年至 2 年以下

內部晉升情況

2.8 調查前 12 個月內，本業共有 620 名僱員獲內部晉升至較高級職位。各技能等級的內部晉升僱員人數分布見表 2.6。

表 2.6： 內部晉升情況

內部晉升	獲晉升僱員人數 (a)	晉升職級的僱員總數 (b)	百分率 $\frac{(a)}{(b)}$ x100%
由技術員晉升至技師	304	15 340	2.0%
由技工晉升至技術員	266	38 519	0.7%
由其他職級晉升至技工	50	7 424	0.7%
總數	**620**	**61 283**	**1.0%**

派駐香港以外地區工作的僱員

2.9 據僱主填報，調查前 12 個月內，派駐香港以外地區工作超過 6 個月的僱員人數，見表 2.7。

表 2.7： 駐港外地區工作僱員人數

技能等級	派駐香港以外地區工作的僱員人數 (a)	同一技能等級的僱員總數 (b)	百分率 $\frac{(a)}{(b)}$ x100%
技師	326	15 340	2.1%
技術員	135	38 519	0.4%
技工	-	7 424	-
總數	**461**	**61 283**	**0.8%**

僱員需要加強培訓的技能

2.10　僱主認為僱員最需要加強培訓的三項技能見表 2.8：

表 2.8：　僱員最需要加強培訓的技能分布情況

技能等級	僱員最需要加強培訓的三項技能			
	次序	編號	技能／知識／個人特質	僱員人數
技師	1.	103	項目管理	3 084
	2.	401	解決問題	2 648
	3.	107	領導能力	2 557
技術員	1.	401	解決問題	6 599
	2.	404	溝通技巧	5 620
	3.	406	時間管理技巧	4 411
技工	1.	404	溝通技巧	2 313
	2.	413	學習或適應新技能、新知識的能力	1 189
	3.	503	維修／故障檢修	1 064

統計表

2.11　電子及電訊業各類機構各主要職務的詳細人力統計數字分析載於附錄 1至 7；僱員按每月收入幅度劃分的分布情況載於附錄 8；僱員需要加強培訓的技能之統計數字則載於附錄 9。

第三章

結　論

3.1　　本會仔細審閱調查結果，認為相關數據大致能反映調查期間電子及電訊業內的就業狀況。

3.2　　在電子及電訊業內，擔任電子及相關主要職務的總人力每年增加0.6%，由 2014 的 62 599 人增至 2016 年的 63 311 人。下文各段將按門類及技能等級，闡析業界的人力變化。鑑於只有 10 間電子產品零售店參與門類六（電子產品零售公司）的調查，並不涵蓋整個門類的所有機構；因此，為更有效及直接地比較各門類人力狀況，下文分析並不包括門類六之數據。該門類於 2014 年及 2016 年之人力狀況分別載於表 3.2，以供參考。由於門類二（貿易及服務）及門類四（批發）之業務及人力性質類近，兩個門類將合併比較及分析。表 3.1 概述 2014 年及 2016 年不同門類及技能等級的人力分布及變化。

表 3.1：　各門類各技能等級
2014 年與 2016 年人力比較
（括弧內為 2014 年數據）

技能等級	門類一 製造	門類二及四 貿易及服務：批發	門類三 電訊服務	門類五 設計公司、相關院校學系及政府部門	總數	**按年增減幅度**
技師	792 （797）	10 598 （10 237）	2 388 （2 302）	1 537 （1 302）	15 315 （14 638）	**+2.3%**
技術員	1 868 （2 158）	27 334 （26 615）	4 440 （4 602）	2 000 （2 019）	35 642 （35 394）	**+0.3%**
技工	610 （352）	5 026 （4 544）	922 （614）	813 （858）	7 371 （6 368）	**+7.6 %**
操作工	1 110 （1 367）	560 （1 118）	305 （142）	53 （73）	2 028 （2 700）	**-13.3%**
總數	4 380 （4 674）	43 518 （42 514）	8 055 （7 660）	4 403 （4 252）	60 356 （59 100）	**+1.1%**
按年增減幅度	**-3.2%**	**+1.2%**	**+2.5%**	**+1.8%**	**+1.1%**	

表 3.2： 門類六各技能等級
2016年與2014年人力比較（供參考）

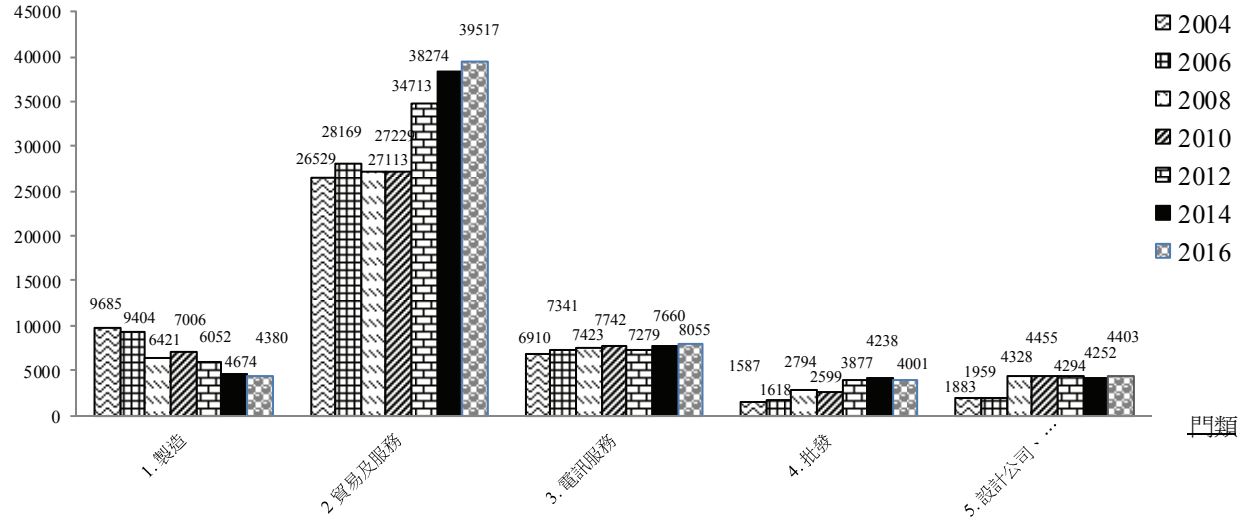
門類六：電子產品零售公司

年份	技師	技術員	技工	操作工	總數	按年增減幅度
2016（十間大型電子產品零售店）	25（+150.0%）	2 877（-9.3%）	53	-	2 955	**-8.1%**
2014（八間大型電子產品零售店）	4	3 495	-	-	3 499	**+20.3%**

3.3 圖 3.1 展示 2004 年至 2016 年間電子及電訊業各門類的人力變化，並反映在人力調查範圍大幅修訂之後，兩個行業過去數年的人力變化。

圖 3.1： 各門類（一至五）
2004年至2016年間人力變化

僱員人數



各門類人力變化

3.4 在電子及電訊業內，從事電子及相關主要職務的僱員，總數由2014的62 599人增至2016年的63 311人，共上升1.1%。根據表2.1所示，貿易及服務（門類二）的僱員人數最多，佔總僱員人數的62.4%（共39 517人）；而電子產品零售公司（門類六）則人數最少，佔僱員總數的4.7%（共2 955人）。同時，調查亦顯示過去兩年的人手狀況穩定，無大幅變化。

3.5　　圖 3.2 及圖 3.3 分別比較各門類及技能等級的人力變化。

圖 3.2：各門類人力變化比較

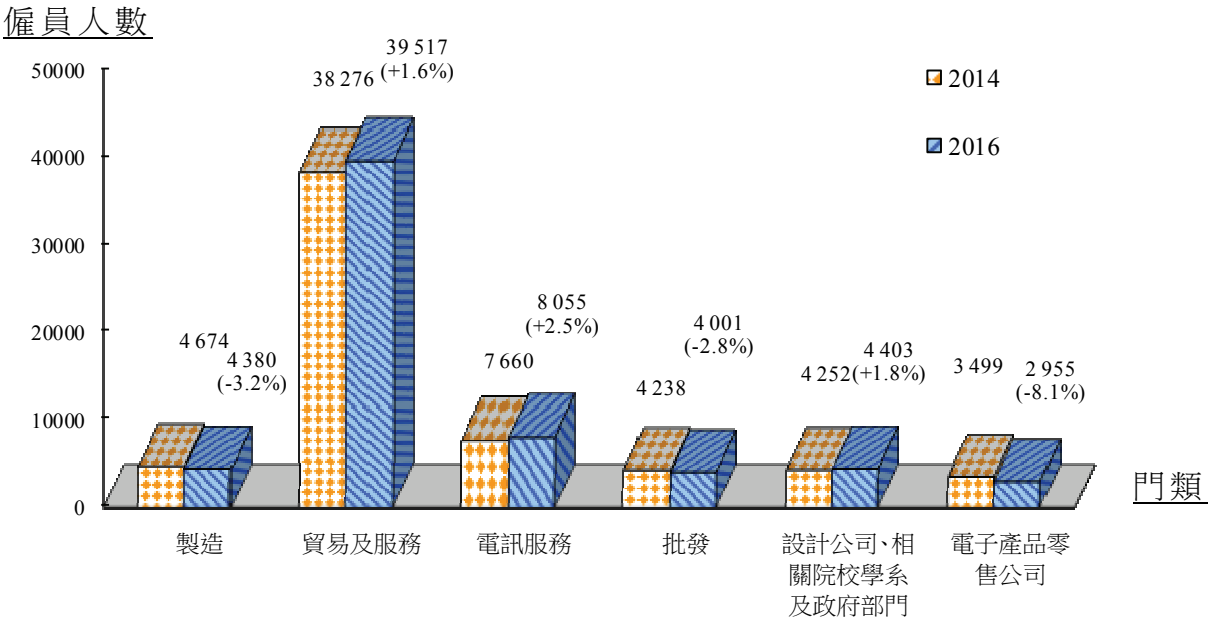
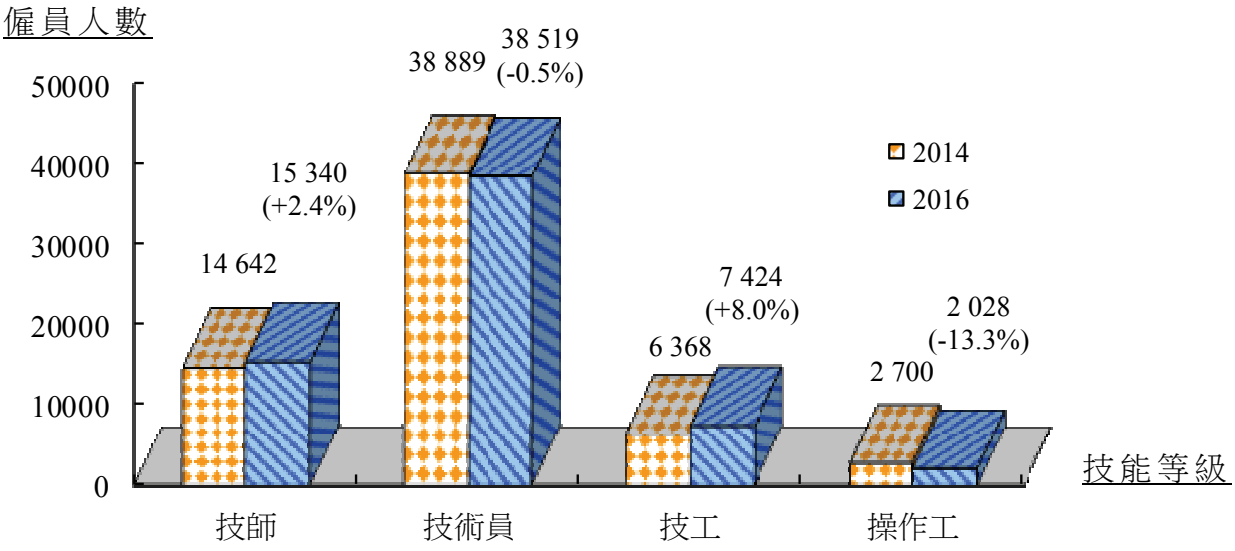


圖 3.3：各技能等級人力變化比較



3.6 本會認為各門類的人力變化原因如下：

(i) 製造（門類一）-- 大型公司數目保持平穩，僱用 50 人或以上的公司數目 2014 年有 18 間，而 2016 年則有 19 間。另一方面，調查反映技術員級僱員人數普遍減少，雖然技工級別僱員有所增長，但整體仍錄得每年 3.2%人力減幅。估計由於招聘技術員困難，部分公司轉而使用機械人技術或自動化科技，以減低上漲的人工成本；同時，由於廣東省政府推出獎勵計劃，鼓勵製造公司投資自動化生產設施，亦導致僱員人數下降的趨勢。

(ii) 貿易及服務（門類二）及批發（門類四）-- 因業務及人力性質類近，合併比較。屬於門類二的數間工程服務公司過去數年進行的基礎建設及海外專項工程稍為增多，所以，這兩個門類的人力按年增加 1.2%。因此，首三個技能等級均需要較多的技術人手，但操作工級人手於 2016 年卻錄得按年跌幅。

(iii) 電訊服務（門類三）-- 或因互聯網及通訊業發展增值服務（例如 4G 及 4.5G 網速），需要額外的技術人員以爭取更多市場佔有率，此類公司的僱員人數按年微升 2.5%。除技術員級別外，其他技能等級的僱員人數均普遍增加。鑑於有某間大型廣播公司結束業務，及數間大型公司亦重整人手，令技術員的僱員人數減少。

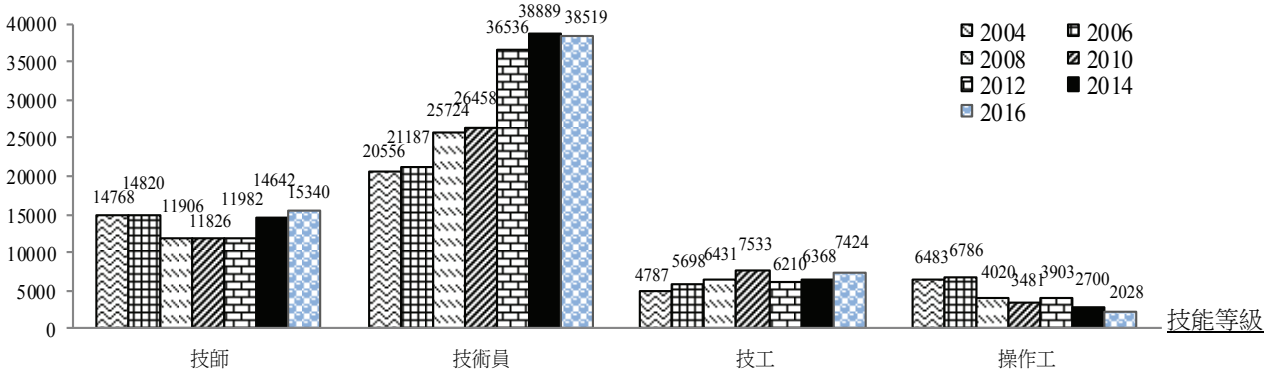
(iv) 設計公司、相關院校學系及政府部門（門類五）-- 過去兩年僱員人數保持穩定，只錄得十分輕微的 1.8% 按年升幅。不過，或基於新技術的發展需要，例如擴增實境（AR）、虛擬實境（VR）、智慧城市、物聯網（IoT）、開放數據、網絡安全等等，技師級別人數錄得 8.7% 升幅。

(v) 電子產品零售公司（門類六）-- 由於內地旅客人數整體下降，令這個門類的僱員人數按年減少 8.1%。調查亦顯示，在高科技產品的市場需求帶動下，技師僱員人數有所上升。舉例來說，商場及店舖內使用資訊專櫃來吸引顧客，加強購物體驗，需要僱用硬件及軟件技巧兼備的技師級人手，所以對這類僱員的需求增加。同時，政府資助的「零售業人力需求管理科技應用支援計劃」（ReTAAS），亦有助推動零售業採用高科技。

各技能等級主要職務人力變化

3.7 圖 3.4 可見由 2004 年至 2016 年各技能等級的人力變化：

圖 3.4： 2004 年至 2016 年各技能等級人力變化



3.8 見下述各表，在四個技能等級中，技師級僱員人數在 2014 至 2016 年間按年有相當升幅（2.4%），技術員級每年輕微減少 0.5%，技工級則有 8% 的升幅。此外，調查錄得過去兩年操作工級的僱員人數急跌 13.3%。表 3.1 顯示因製造門類一、門類二、四及五放緩而使門類二、四及五對操作工級別的僱員需求均減少。操作工級人手跌幅主要在這幾個門類：門類一按年減少 18.8%（257 人），門類二及四按年減少 49.9%（558 人），門類五則按年減少 27.4%（20 人）。而其他三個技能等級的人力變化則由以下原因造成：

(i) 表 3.3 所見，技師級人手自 2014 年按年增長 2.4%（共增加 698 人）。技師級僱員人數有所增加，主要由於門類二的數間工程服務公司過去兩年持續需要承接基礎建設及海外專項工程，調查錄得電機工程師按年增加 4.9%、機械工程師按年增加 5.5%、系統分析員按年增加 4.9%。此外，由於市場上，尤其玩具公司，愈來愈重視安全規例，對環保要求日趨嚴格，亦可能是門類一及門類五的化學工程師增加 18.6% 的原因。

表 3.3： 2014 年及 2016 年技師級別主要職務人力變化

技師級別主要職務	2014 年	2016 年	按年增減幅度（%）
電子工程師	8 503	8 702	+1.2%
電機工程師	1 645	1 811	+4.9%
機械工程師	624	695	+5.5%
製造／品質保證工程師	1 068	1 060	-0.4%
化學工程師	54	76	+18.6%
產品／平面設計員	419	431	+1.4%
系統分析員	2 329	2 565	+4.9%
總計	**14 642**	**15 340**	**+2.4%**

(ii) 由於旅客人數減少，門類四及門類六的推銷技術員相應減少，導致技術員數目按年微跌 0.5%。再者，可能因門類一至四開發電子商務平台以及 OTT網絡電視興起所帶動，表 3.4 顯示網站開發員／設計員數目按年增加 6.7%，程序編製員數目按年增加 4.9%。而製造公司轉用機械人或自動化技術，則令到製造／品質保證技術員人數遞減。

表 3.4： 2014 年及 2016 年技術員級別主要職務人力變化

技術員級別主要職務	2014 年	2016 年	按年增減幅度（%）
電子技術員	12 328	11 743	-2.4%
機械技術員	1 894	2 070	+4.5%
繪圖員	231	202	-6.5%
製造／品質保證技術員	604	522	-7.0%
監督／管工／組長	3 551	4 052	+6.8%
程序編製員	4 365	4 803	+4.9%
網站開發員／設計員	1 494	1 702	+6.7%
推銷技術員	14 422	13 425	-3.5%
總計	**38 889**	**38 519**	**-0.5%**

(iii) 如表 3.5 所示，技工級別僱員人數按年增加 8.0%，門類一至四的技工級僱員由 2014 年的 5 510 人增加至 2016 年的 6 558 人，足以彌補門類五在此段期間流失的 45 名技工。所以，除門類五外，所有門類的電子技工均錄得按年 12.5%的增幅。

表 3.5： 2014 年及 2016 年技工級別主要職務人力變化

技工級別主要職務	2014 年	2016 年	按年增減幅度（%）
高速資訊網絡及無線系統技工	583	545	-3.3%
電子技工	4 011	5 079	+12.5%
電氣技工	1 193	1 277	+3.5%
技工	581	523	-5.1%
總計	**6 368**	**7 424**	**+8.0%**

業務前景

行業整體

3.9 電子及電訊業仍是香港出口商品貨值最高的行業，佔 2015 年本地出口總值的 64%。預期本港經濟於 2017 年可保持 2%至 2.7%的增長。業內出口以轉口商品為主，多屬高科技產品，尤其是電訊器材、半導體及電腦用品。

3.10 根據最新統計，以價值計算，在 2014 年，香港是全球最大的電話／流動電話出口地，亦是全球第二大電腦零件／配件、影像錄製器具及電子集成電路出口地，以及全球第三大的錄音器材及微型電動機出口地。2016 年香港的電子產品總出口比上一年上升 3%，達港幣 22,642.61 億元。2008 年至 2016 年間電子產品的出口貨值詳見表 3.6 及圖 3.5。

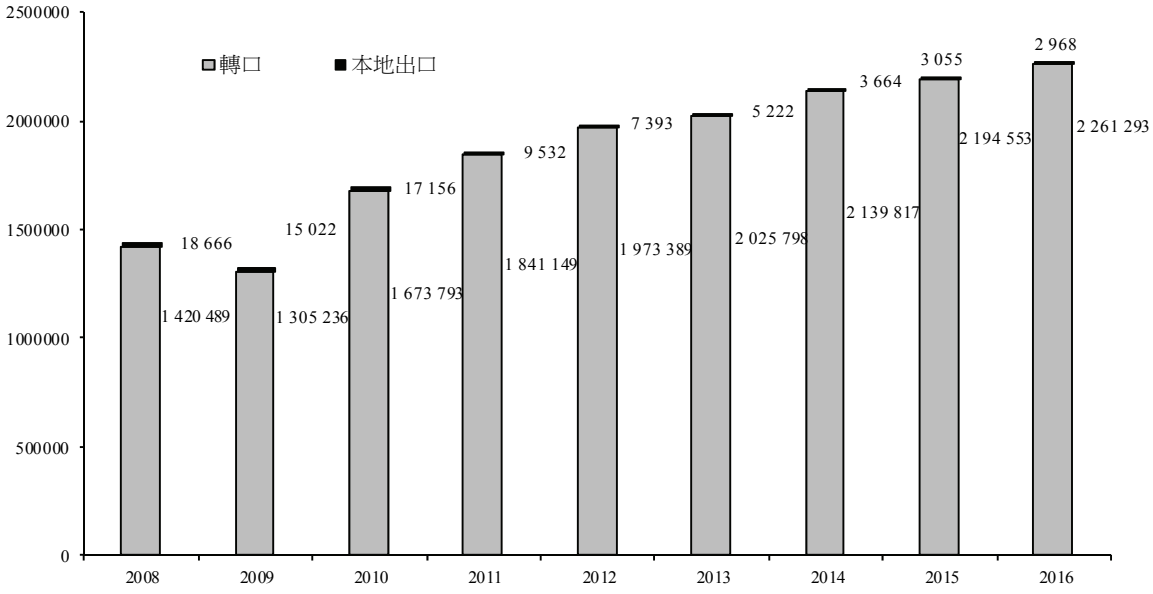
表 3.6： 2008 年至 2016 年間電子產品出口貨值

全年電子產品貨值（百萬港元）	本地出口	轉口	總出口
2008	18 666	1 420 489	1 439 155
2009	15 022	1 305 236	1 320 258
2010	17 156	1 673 793	1 690 949
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

資料來源： 政府統計處《香港對外商品貿易統計》
星展集團 2016 年 9 月研究報告《Economics Markets Strategy 4Q2016》

圖 3.5： 電子產品出口貨值

百萬港元



3.11　電子產品出口貨值及人力增加，香港電子業於過去兩年穩步增長。不過，人民幣繼續貶值、工資上漲、稅項增加、油價不穩、利息及貨幣匯率反覆引致能源及原料價格波動，均是電子業所面對的重大挑戰。在2016至2020年「十三五」規劃的框架下，中國內地經濟增長逐步放緩，進入持續發展期。香港政府會繼續透過《內地與香港關於建立更緊密經貿關係的安排》（CEPA）及其他區域合作平台，與內地保持緊密經濟關係。特別是內地「一帶一路」的倡議，貫穿超過六十個經濟體系，包括東南亞、中亞、中歐、東歐及非洲不少新興市場經濟體，當中涉及投資基礎建設、深化金融聯繫、擴展貿易，以及聯繫人民，將帶來廣泛商機。

3.12　下半年全球經濟可望繼續溫和增長，美國經濟重拾復甦步伐，而各個亞洲經濟體亦出現改善跡象，有望支援未來幾季香港出口貨品。雖然英國公投脫歐增加了不穩定的氣氛，但主要央行承諾會一同捍衞金融市場，在公投後快速穩住全球金融市場，令危機不致加劇。然而，英國脫歐仍在演變中，不能排除往後對全球經濟及金融環境仍有迴響。而各種不明朗因素，包括：美國利率正常化、主要央行貨幣政策分歧、歐元區及日本復甦脆弱，以及不少地區的地緣政治局勢緊張等等，未來數年均會為電子及電訊業帶來一定影響。

3.13　另一方面，香港公司均能夠符合海外市場的相關技術規定。包括：美國安全檢測實驗室（UL）、電子測試實驗室（ETL）或同等的安全規定、歐盟的相關安全指引和「符合歐洲標準」（CE）規定。在電磁兼容性(EMC)方面，香港公司售往美國之產品須遵照美國聯邦通信委員會（FCC）標準，亦須符合歐盟CE-Mark所訂的EMC指引。在中國內地，亦訂立強制性產品認證制度，大部分電子產品均須符合簡稱「3C」（中國強制性產品認證或CCC認證）安全和其他規定。與此同時，香港公司亦關注海外市場日盛的環保消費風氣。特別是在歐洲，消費者普遍的環保意識很高；自然而然，歐盟已採納一系列環境保護指令，可能影響電子產品的銷售情況。這些措施包括：對含汞電池和蓄電池的限制、《電器及電子設備廢料指令》（WEEE指令），以及《限制電動及電子設備使用有害物質指令》（RoHS指令）。中國內地亦已採納相似的環保規例，　包括已經生效的《電子信息產品污染控制管理辦法》及《電子廢物污染環境防治管理辦法》。此外，《廢棄電器電子產品回收處理管理條例》亦於2011年1月1日起生效。

3.14　香港的流動寬頻滲透率於2016年9月高達212%。香港是全球最先進的城市之一，向來領先採用新式無線通訊科技。於流動寬頻市場，流動網絡營辦商正使用載波聚合技術覆蓋4G LTE網絡，以提高數據速率及擴大網絡容量。載波聚合技術是指將兩個或以上、相同或不同的頻段整合，以提高流量。雖然商用5G服務最快於2020年才能面世，但這段期間載波聚合技術已能迎合日益增長的流動數據流量需求；現時，載波聚合技術能融合頻分雙工和時分雙工平台，支援不同的4G LTE網絡。這項升級服務被包裝為4.5G LTE網絡服務，為使用者提供450Mbps的數據流量，科技上的突破帶來更佳用戶體驗。至2016年9月，固網寬頻的光纖到戶（FTTH）及光纖到樓（FTTB）綜合滲透率達到71%。當其他先進城市以推出1 Gbps的光纖到戶服務為目標時，香港已成為全球首個提供10 Gbps到戶服務的城市。受惠於固網寬頻市場的激烈競爭，未來數年光纖到戶及光纖到樓的滲透率可望有顯著增長。

3.15 香港的固網及流動電訊業競爭仍然十分激烈，特別是流動電訊業。由於有不少方案能替代漫遊數據及漫遊話音通話，例如：雲端（OTT）流動應用程式、流動虛擬網絡營辦商（MVNO）方案，及本地預繳服務，因此預期漫遊的營業額會有下降趨勢。另一方面，流動娛樂如視像遊戲（特別是擴增實境及虛擬實境遊戲）及流動方案（如公用設施計算收費及車隊管理），會成為電訊業的新收入來源。對現今香港人來說，流動裝置已經成為不可或缺的隨身物品，不僅用作通訊，更可作為娛樂、筆記本、相機，甚至電子錢包。故此可以預期流動用戶會消耗愈來愈多流動數據或 wifi 數據，而這股動力於未來數年將維持強勁。

3.16 與此同時，在快速普及的網絡基礎之上，新興的網絡服務開始發展，例如企業級雲端運算服務、網絡功能虛擬化（NFV）、軟體定義網絡（SDN）。為改善服務速率及效益，商業市場普遍採用。在消費者市場，物聯網（IoT）及智慧城市的概念興起，令電訊業進一步擴充，拓展綜合服務，充份利用聯通網絡、智能裝置、生態系統分析，便利消費者；智能家居、網上教學、流動付款、行動定位服務等等，便是其中之例子。香港的電訊樞紐聞名亞太，享有獨特地位，有這些尖端科技配合，料想香港電訊業（門類三）會繼續蓬勃發展，亦預期人力需求有相當增長。

3.17 全球家居寬頻的滲透率不斷增長，令網上視頻的內容傳輸服務愈來愈可行。未來數年，OTT 會成為內容傳輸服務的主流。OTT 的強大功能會改變用戶的觀看習慣，例如時移錄影、節目重溫、影片點播等等。同時，這個趨勢亦為廣告商提供商機，透過 OTT 平台的互動選項，捕捉用戶的行為模式，針對他們的需要推出廣告。其次，OTT 平台可以提供更多增值及互動服務，例如網上購物、遊戲、購票、甚至可能作投注賭博之用。

3.18 OTT 服務發展主要依靠內容傳遞網路（CDN）驅動，以提供更高質素的 OTT 用戶體驗。現時內容傳遞網路的模式主要有兩種。較簡單快捷的模式，是使用第三方供應商提供的內容傳遞網路，例如亞馬遜、Akamai、Microsoft Azure、Comcast 等等；另外，亦可以利用邊緣伺服器緩存內容，自製內容傳遞網路 (DIY CDN)。現時正在發展的是跨內容傳遞網路或混合內容傳遞網路（第三方網絡與 DIY CDN 混合）模式，可提升用戶體驗質素及節省成本。再者，於影片或聲頻中加入隱形水印（內容水印），亦可有效偵察侵權行為。

3.19 香港是主要的電子產品出口地之一，包括出口電話、流動電話、電腦零件及配件、影像及影音錄製器材、電子集成電路等等。不過，2016年上半年的出口量卻錄得 2%的跌幅。由於數個範疇的消費電子產品，例如家庭影視設備、電腦及周邊產品、家庭影院系統等等步入成熟期，因此消費電子產品的銷售量亦減少。平板電腦、智能電話、數碼相機共佔消費電子產品總零售銷量的 75%；港元升值，加上內地遊客減少及消費金額下降，對這三類產品增長亦有莫大影響。不過，無線視聽產品，例如無線喇叭、卡拉 OK 麥克風、可穿戴式電子產品等等，卻更受消費者歡迎；所以，性質類近的門類二（貿易及服務）、門類四（批發）及門類六（電子產品零售公司）均可受益。物聯網的廣泛應用，預料會帶動各方面產品的需求增加，包括智能生活產品，以及家居、商業及城市自動化程式操控電器、照明、空調裝置及保安系統。擴增實境及虛擬實境技術則帶動家居視聽娛樂產品、3D 攝影、頭戴式智能顯示設備／眼鏡，流動遊戲的需求增加。納米物料及電子印刷技術普及，改革了導熱科技，能靈活應用於不同形態的部件，從而改進生物保健電子產品及小型可戴式裝置的發展。

產品趨勢

A) 虛擬實境（VR）及擴增實境（AR）

3.20 企業如 Facebook、微軟及索尼繼續向這個領域大力投資。Facebook 於 2014 年以 20 億元購入 Oculus，並於 2016 年推出頭戴式虛擬實境顯示器 Oculus Rift。隨着虛擬實境科技走向商業化，相關產品於 2016 年相繼推出。微軟於 2016 年 3 月推出混合現實頭戴式智能眼鏡 HoloLens 的開發者版本；索尼則於 2016 年 10 月推出虛擬實境頭戴式顯示器 Playstation VR；HTC 亦在 2016 年 4 月推出虛擬實境頭戴式顯示器 Vive。估計更多虛擬實境內容將相繼出現，並帶動此類產品增長，例如 Youtube 推出的 360 度視頻網頁。硬件成本下降至終端用戶能負擔的水平，低成本產品與流動電話顯示屏合併使用亦變得普及，例如 Google Daydream、Homido、Samsung Gear VR、Zeiss VR One。現時，虛擬或擴增實境主要集中在遊戲及娛樂上使用，但可望日後普遍應用於醫學訓練或教學等其他領域。

B) 人工智能（AI）

3.21 近年人工智能技術與雲端運算同樣發展迅速。例如蘋果的 Siri、Google assistant、亞馬遜的 Alexa、微軟的 Cortana，均內置人工智能助理功能，透過語音指令進行自動化操作，以對話形式提供答案。其他尚包括人工智能的機械人，能與人類有更多互動，例如 Blue Frog Robotics 的陪伴型機械人 Buddy、SoftBank 的 Pepper、Future Robot 的 FURo-i Home Robot。另一例子是自動駕駛技術，將來可應用於汽車工業。預料在不久的將來，更會發展擁有學習、分析及學以致用能力的家用及工業用機械人，並會成為時尚。

C) 無人飛機

3.22 無人飛機市場繼續熾熱。根據 Allied Business Intelligence 研究，對比 2014 年的 490 萬架無人飛機，預料 2025 年將有多於 9,000 萬架消費者無人飛機。愈來愈多業餘愛好者將使用無人飛機產品，短期內會超越生產性消費者。配備多於一個鏡頭的無人飛機亦愈來愈多，只需使用智能手機即可控制，毋須使用專用遙控。同時，亦會發展擁有更大自主功能的航拍器，例如 HEXO+，如影隨形地為用家拍攝。

D) 可穿戴式裝置

3.23 近年，物聯網及可穿戴式裝置急速發展，以前所未見的增長速度革新企業及個人市場，刺激我們的日常生活。美國 Consumer Technology Association 估計，2016 將售出 3,800 萬件可穿戴式裝置。不少品牌如 Fitbit、Apple、Garmin、Pebble、三星、小米、華為及 LG 推出各種可穿戴式裝置，可以監測體溫、心跳、血壓、酒精量、運動數據及健康護理記錄。時裝品牌亦分一杯羹，推出能記錄活動量數據的可穿戴式裝置。智能手帶或手錶以外，亦有智能服裝，內置記錄或監測健康裝置，例如 OMsignal Bra、Sensoria fitness socks 及 Owlet Smart Sock。產品如 Athos core 更進一步融合服裝及生物特徵感應器，實時監測肌肉活動、心跳及呼吸。市場對可穿戴式裝置的需求亦推動了此類產品的電池技術發展。加上納米物料及電子印刷技術推陳出新，能以不同形態彈性應用，改進生物保健電子產品及小型可戴式裝置的發展，正在發展的可屈曲及彈性電池是其中一例。

E) 數碼影像

3.24 數碼影像產品的近期發展集中在 3D 大型數碼電視。互聯網連接亦促進了智能電視、4K 解像度的超高清電視，甚至是未來 8K 解像度電視的發展。日本亦正期望於 2020 年東京奧運會中，使用 8K 電視訊號廣播賽事。

F) 智能家居及節約能源

3.25 為提高生活質素及保護環境，發展智能家品及節能家居保安系統（尤其為長者及傷殘人士而設）是另一熱門範疇。透過使用不同感應器、物聯網、大數據及雲端運算，可將各類家居裝置如保安攝錄機、窗簾、照明、空調、家居娛樂系統、電器連接上互聯網，再以智能手機或個人電腦操控。物聯網亦可以應用於公用設施計算收費、車隊管理、監察控制及照顧長者。新的城市規劃項目中，已將節能智能大廈系統，包括中央控制的電器、照明、空調及保安系統等納入考慮。

G) 智能數碼相機

3.26 隨著影像處理及影像識別技術的進一步發展，配備學習能力、人像偵測、臉孔辨識及夜視功能的智能數碼相機將有更大的市場潛力，應用於保安時的性能、可靠度及質素亦能提升。

H) 視像遊戲行業

3.27 視像遊戲是一種使用運算裝置（例如個人電腦、遊戲機或流動電話）玩樂的電子遊戲，可再細分為電腦或電視作為操作平台。不過，近年新興的社交網絡、智能手機及平板電腦則催生了新的遊戲種類 -- 手機遊戲及社交網絡遊戲。自 1970 年推出以來，視像遊戲不斷蛻變。今時今日，視像遊戲的實感圖像及實境仿真程度令人驚嘆。視像遊戲多年來一直是一門上十億的生意。虛擬實境及擴增實境科技是驅動遊戲硬件及遊戲體驗發展的動力。2010 年代，市場大幅轉移至休閒遊戲及流動遊戲；於 2016 年，流動遊戲市場收益預計高達 380 億元；電視遊戲機收益有 60 億元；而個人電腦遊戲則達 330 億元。視像遊戲行業的蓬勃，將會刺激更先進的硬件及軟件產品發展。

I) 智能輪椅

3.28 智能輪椅由電動的標準輪椅加上一系列感應器及電腦裝置，又或由可移動電子機械底板加上座墊而組成，向用家提供不同方式的導航協助，例如：確保旅程零碰撞、協助進行特別任務（如：跨越門廊）、自動點對點載送用家。

J) 智能助聽器

3.29 2015 年的國際消費電子展（CES）中，展示了數個最先進的智能助聽器品牌。這種可配戴式的助聽科技可以接駁 iPhone 或 Android 操控使用。經臨床證實，當用家配戴起一對最新型號的助聽器（這是最普遍的使用方法），即使背景嘈雜，聽力比配戴一般助聽器時為佳。最新的智能助聽器採用智慧型雙向無線溝通技術，精確定位用家所想聽到的言語。配帶助聽器人士身處食肆及酒會派對中，背景的雜聲對他們的聽力向來是一種考驗，但有了此項技術，他們就能夠於嘈雜的情況下保持聽力，比平時更佳。

未來人力需求

3.30 觀察上述的人力趨勢、電子及電訊業的業務前景，以及僱主對未來人力需求的預測，本會相信業界將繼續需要訓練有素的技師、技術員及技工，支持業務持續發展；而操作工的人力需求則會平穩。

3.31 本會根據業內最新發展，並因應退休、轉業及其他原因，估算各技能等級人力的流失，並採用每年 3% 的正常流失率，估算技師、技術員及技工技能等級的人手流失情況。

3.32 本會採用「調節過濾法」，預測技師、技術員、技工三個技能等級的人力需求。電子及電訊業在 2017 至 2019 年間需求的額外人力摘要見下表 3.7。而按主要職務劃分的培訓需求可見附錄 10。

表 3.7: 電子及電訊業
2017年至2019年每年新增人力需求

技能等級	平均每年新增人力需求	
	總數	幅度（±10%）
技師	777	699 – 855
技術員	1 238	1 114 – 1 362
技工	402	362 – 442

3.33 本會將於 2020年進行另一次電子及電訊業人力調查，檢視業內人力需求並更新有關數據。

第四章

建　議

4.1　　考慮到前文所述各方面，本會持審慎樂觀看法，相信電子及電訊業會持續穩健增長。建議僱主採取以下措施，應對目前形勢和未來挑戰：

(i) 研發更多創新的智能產品／服務，配合新科技趨勢，優化產品，在市場中突圍而出；

(ii) 採用自動化技術或機械人科技，精簡並提升製造設施或運作模式；

(iii) 透過合適訓練，提升員工整體知識、技術水平和能力，特別是 5G、智慧城市及物聯網等新科技範疇，造就更強大兼具競爭優勢的人力隊伍；

(iv) 在其他海外國家開拓新商機、拓展市場佔有率，例如發掘中東、非洲及南美等海外市場；

(v) 推廣從業員的專業形象，鼓勵更多年輕人入行；

(vi) 工業朝著 5G、智慧城市及物聯網等範疇推進發展，培訓機構可考慮加強發展以下領域的課程：智能感應器設計、用戶界面、數據壓縮技術、商業情報和分析技巧、數據保安及網絡監測技術，為學生裝備所需知識及技巧，配合業界所需；

(vii) 科技發展是業界不可缺少的一部分，可見向學生提供科學、科技、工程及數學等學科的教育（簡稱 STEM 教育）至關重要，有助推動業界持續發展。為配合香港特區政府的策略方針，職業訓練局 (VTC) 最近已成立 STEM 教育中心，支援學習，並向中學師生推廣這方面的教育工作；

(viii) 鼓勵業內僱員參與政府資助的培訓計劃，提升技術水平及知識，以配合業界需求。

4.2 僱主規劃培訓時，除了考慮公司的個別培訓需求，本會認為附錄9「僱員需要加強培訓的技能」亦甚具參考價值。為了緊貼科技發展，與時俱新，建議僱主加強僱員培訓，確保他們訓練有素，能迎接面臨的挑戰及商機。僱主亦可參與新科技培訓計劃，鼓勵僱員加強技術和知識。本會亦建議 VTC 及其他培訓機構密切留意電子及電訊業的培訓需求，提供合適合時的訓練課程。

每年受訓人數

4.3 在調查期間，技師、技術員及技工級的受訓者分別只有 129、393 和 556 人。由於培訓技師通常需時 2 至 4 年，培訓技術員或技工則需要 3 至 4 年，目前僱主提供的培訓，明顯未能滿足行業需求。

4.4 本會建議電子及電訊業於 2017 至 2019 年以第 3.32 段所述的規模推行培訓計劃。各主要職務的人力需求載於附錄 10。按現有的人手計算，平均每年需受訓的人數分別約佔現職技師、技術員及技工總數的 5.0%、3.2%和 5.4%，僱主為機構策劃人力時請留意。

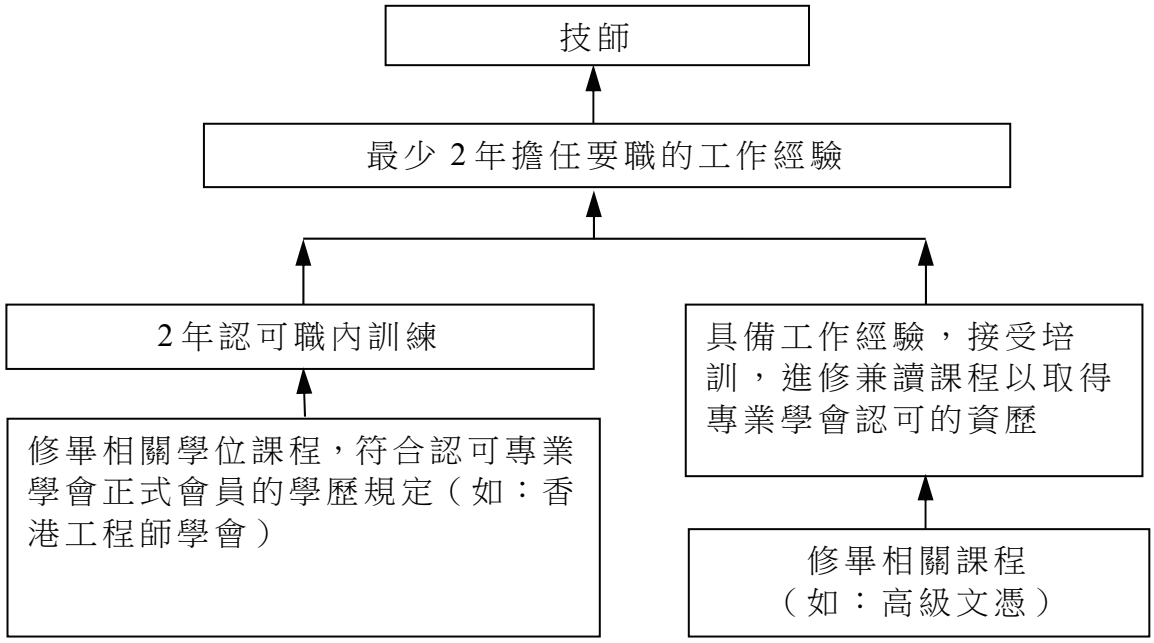
4.5 下文概述技師、技術員及技工的建議培訓途徑。

技師訓練

4.6 技師須具備相當於專業學會正式會員所需的學歷和經驗，且能夠分析和解決各種技術問題。此外，技師亦須負責發展及應用工程原理，具創見和判斷力，緊貼行業的科技發展，採用最新技術，並督導和培訓下屬。

4.7 在改善管理和革新科技方面，技師肩負重任。本會建議循以下途徑訓練技師：

圖 4.1： 技師訓練



4.8 大學教育資助委員會（教資會）資助的多所本地院校，均有開辦各類電子工程及相關學科的學位課程。下表列出這些全日制工程科學位課程在 2017/18 及 2018/19 年度的預計畢業生人數：

表 4.1： 預計 2017/18 及 2018/19 年度
教資會資助院校畢業生人數

院校 [1]	全日制學位課程	預計每年本地畢業生人數
CityU, PolyU, HKUST	電子工程	187
CityU, CUHK, HKUST	電腦工程	201
CityU, CUHK, HKUST	資訊工程	254
CityU	電子及通訊工程	115
PolyU, EU	電子及資訊工程	220
CityU, CUHK	系統工程及工程管理	103
	總數	**1 080**

[1] CityU： 香港城市大學
CUHK： 香港中文大學
HKUST： 香港科技大學
PolyU： 香港理工大學
EU： 香港教育大學

4.9 預測未來三年，業界每年約需招聘 561 至 687 名有關的技師級人員（電子工程師、製造／品質保證工程師、系統分析員）。電子工程及相關學科的畢業生人數應可滿足預測需求。然而，並非所有畢業生會選擇投身這一行；畢業生普遍亦會在機電工程、屋宇設備、資訊科技及製造等其他行業，從事電子工程及相關工作。基於這個原因，專業／技師級的人力供需可算大致相符。

工科畢業生訓練計劃 (EGTS)

4.10 為了讓工程科畢業生在本地行業接受更有系統的實習，VTC 轄下創新及科技訓練委員會正推行一項資助的工科畢業生訓練計劃 (Engineering Graduate Training Scheme, EGTS)，向工科畢業生提供 18 個月的實習訓練，程度符合香港工程師學會正式會員的資格要求。訓練津貼會經由僱主發放，作為受訓者部分薪金，而培訓進度則由創新及科技訓練委員會負責監察。

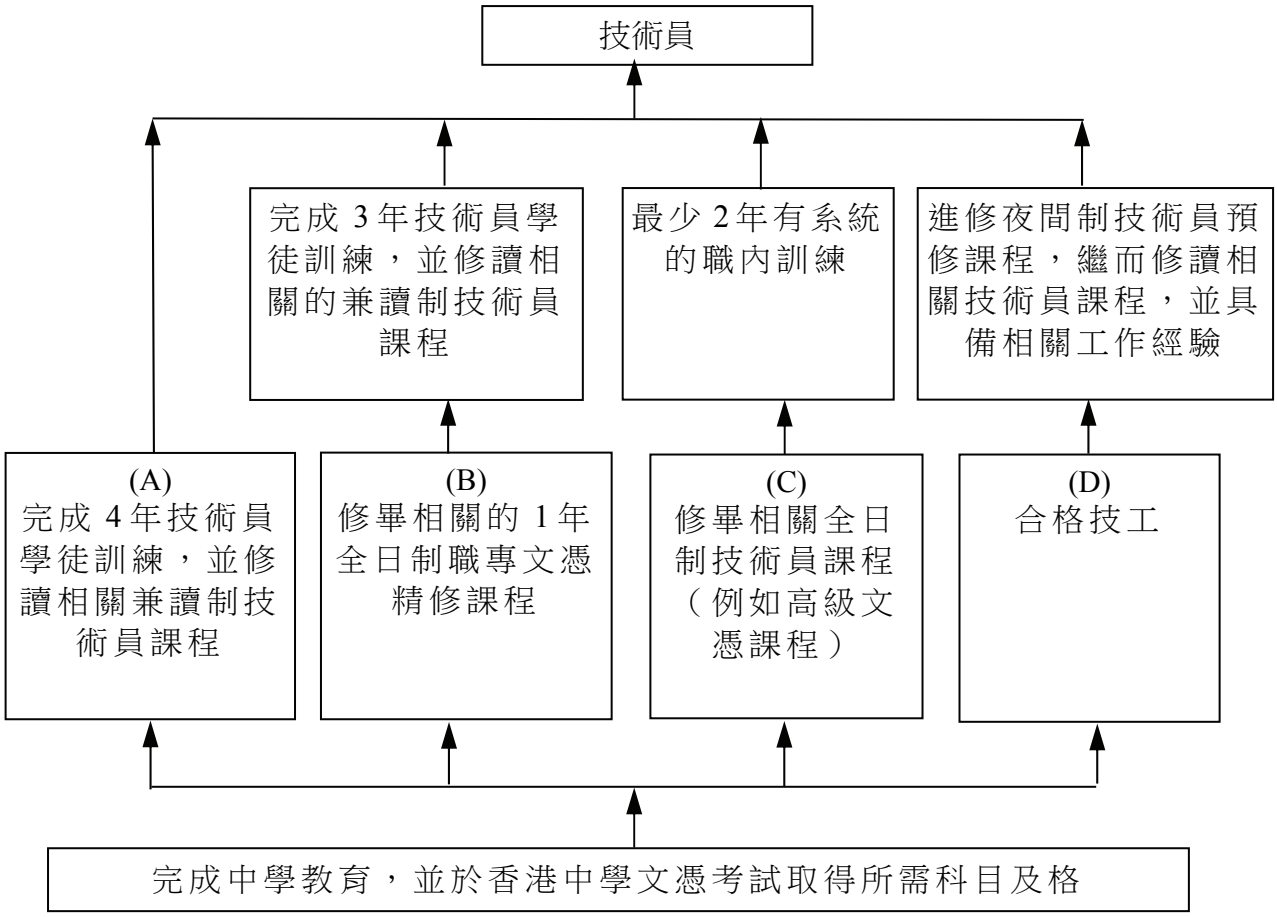
新科技培訓計劃 (NTTS)

4.11 VTC 自 1992 年起一直開辦新科技培訓計劃 (New Technology Training Scheme, NTTS)，為有意讓員工接受新科技培訓以促進業務發展的本地公司提供協助。該項計劃所界定的新科技是指：未在香港廣泛應用，但吸納和應用會有助本港發展的科技。本地僱主如欲引進新科技作工商業用途，可申請計劃的訓練津貼。本會鼓勵僱主善用這項計劃。

技術員訓練

4.12 技術員乃指職級介乎技師與技工之間的從業員，有一定的學歷、受過訓練和具備實務經驗，能運用已確立的方法來解決技術問題；此外，他們一般能在技師督導下，肩負技術責任。訓練技術員的途徑見圖 4.2。

圖 4.2： 技術員訓練



4.13 香港理工大學及 VTC 轄下香港專業教育學院 (IVE) 開辦多項電子工程及相關學科的高級文憑課程。下表列出兩間院校此等全日制高級文憑課程的預計畢業生人數：

表 4.2： 預計 2017/18 及 2018/19 年度高級文憑課程畢業生人數

院校 [1]	課程	預計每年畢業生人數	預計每年投身社會工作的畢業生人數
IVE	電子及通訊工程 [2]	55	33
PolyU	電子及資訊工程 [3]	118	32
IVE	電腦工程 [2]	55	33
PolyU	多媒體設計及科技 [3]	62	18
	總數	**290**	**116**

[1] IVE： 香港專業教育學院
PolyU： 香港理工大學

[2] 據 IVE 估計，約有 60%畢業生會投身社會工作。

[3] 據 PolyU 按照 2015 年數字估計，兩個課程約有 27%和 29%畢業生會投身社會工作。

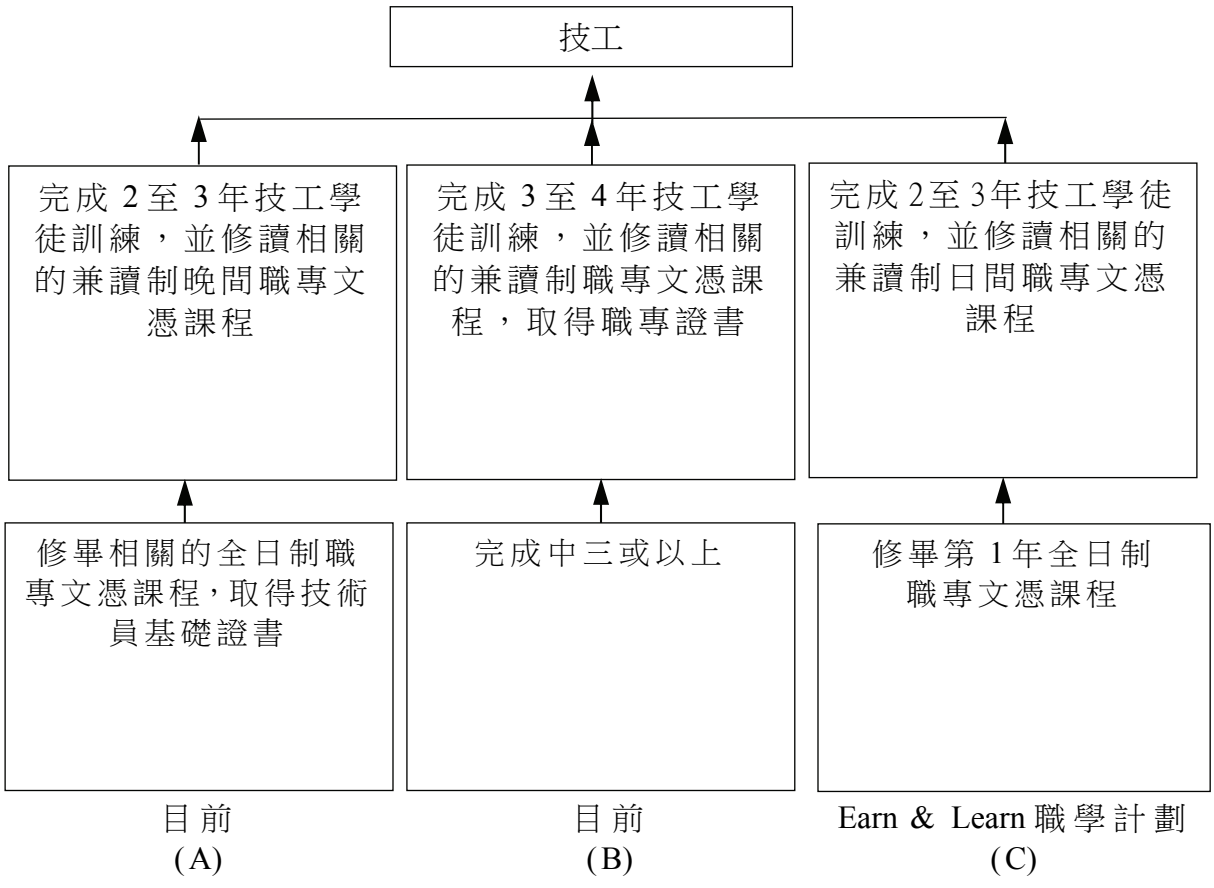
4.14 VTC 轄下的卓越培訓發展中心（電子業）與青年學院合辦一年全日制職專文憑課程（數碼電子科技），供中六離校生修讀。由 2017/18 年度起，估計每年約有 60 名畢業生（當中約 12 名投身社會工作）。

4.15 根據預測，電子及電訊業由 2017 至 2019 年每年需招聘 937 至 1 146 名技術員級人員（電子技術員、推銷技術員、繪圖員、製造／品質保證技術員、程序編製員及網站開發員／設計員），而 2017/2018 年度高級文憑課程及職專文憑課程的畢業生合共 128 人，少於預測的人力需求。不過，部分技術員職位可透過以學徒訓練計劃培訓中學離校生，以及內部晉升具經驗的技工來填補。調查期間，業內有 393 名見習技術員，而調查之前的 12 個月內，共有 266 名僱員晉升為技術員。預期業界將一直需要這個等級的人手，培訓機構應加強課程內容，同時增加相關學額，吸引更多學生報讀。

技工訓練

4.16 技工擁有熟練技術，能夠在極少指導和監督下，將多方面的技能應用到工作上。不但要有實際技能，還須具備相關的理論知識，才能適應科技發展；完善的技工學徒訓練會兼備這兩方面的培訓。訓練技工的一般途徑見圖 4.3：

圖 4.3： 技工訓練



4.17 本會推薦途徑(A)和(C)，因為訓練期較短，而且學徒已受過足夠的基本訓練，於學徒訓練開始時即可執行工作。

4.18 VTC轄下的卓越培訓發展中心（電子業）與青年學院攜手，為中三離校生開辦多階進出修讀模式的數碼電子科技職專文憑課程。由2017/18年起每年約150名學員擬以技工證書的學銜結業，擔任電子及電訊業相關職務。該兩個行業在2017年至2019年期間每年需招聘275至335名技工（高速資訊網絡及無線系統技工及電子技工），但由於畢業生可能選擇繼續進修而非投身本業工作，卓越培訓發展中心（電子業）畢業生入行的人數不定。不過，調查期間，兩個行業有556名見習技工；而調查之前的12個月內，共有50名僱員晉升為技工。因此，可供僱用的技工將有606名，大於需求。一般而言，畢業生亦可投身如機電工程、屋宇裝備工程及製造等其他行業，擔任電子技工及相關職務。因此，技工級的人力供需可算大致相符。

4.19 現今年輕人有更多選擇，僱主應繼續推廣業界形象及前景，吸引更多中學離校生考慮投身電子及電訊業發展。

教育及培訓機構

4.20 VTC轄下香港專業教育學院及卓越培訓發展中心（電子業），以及幾所大專院校，均有為電子及電訊業人員提供多類的職前及在職培訓課程。本會鼓勵業內僱主聘請這些課程的畢業生擔任學徒或見習員，並資助從業員進修。

香港科技園公司

4.21 香港特區政府於2001年成立香港科技園公司（香港科技園），透過協作形式為以科技為主業的公司及有關活動提供一站式基礎支援服務，包括推出培育計劃協助剛起步的科技公司、在園內為應用研發活動提供場所及服務、於創新中心設置匯聚設計行業的辦公場地，以及在各個工業邨內提供生產業務所需的用地和廠房。總括而言，香港科技園備有20幢先進的實驗室配套大樓，辦公空間面積達220 000平方米，提供良好的研發環境及支援服務，以便600間入駐公司及創業公司互相合作和發揮協同效益。這些公司分屬五個科技領域－集成電路及電子、精密工程、生物科技、綠色科技，以及資訊及通訊科技；同時推動三大應用科技平台－健康老齡化、智慧城市及機械人技術。公司可透過數據工作室和機械人創作坊，研發創新方案和新應用技術。園內的先進設施及服務包括：電子設計自動化工具、集成電路探測及測試服務、可靠性測試服務、集成電路失效分析，以及生物科技支援中心。本會促請僱主善用香港科技園提供的設施和服務，尤其是集成電路設計方面。

香港應用科技研究院

4.22 香港特區政府於 2000 年成立香港應用科技研究院（應科院），透過應用科技研究，協助發展以科技為基礎的產業，藉此提升香港的競爭力。應科院的主要科技研發領域可歸納為七個科技部門，包括：通訊技術、電子元件、集成電路設計（類比）、集成電路設計（數碼）、光電子、信息安全與數據科學，以及軟件與系統。而技術研發主要應用在五項重點範疇：金融科技、智能製造、新一代通訊網絡、健康科技和智慧城市。應科院是香港的研發中心，主要在協助產業在蓬勃的科技市場掌握商機，提升產業的競爭優勢。客戶和合作夥伴可分享應科院的專業技術和研發成果，讓整個科技產業界受惠。應科院為客戶研發嶄新且適合商品化的科技，並已取得相當成果。亦已透過研發合約、特許授權及其他合作模式將技術轉移給產業界合共超過 700 項，由此而從業界取得的收入逾 4.5 億港元。除了開發多項港產科技並取得知識產權，自成立至今，已申請超過 900 項技術專利，其中獲發專利逾 500 項。本會建議僱主可聯絡應科院商討協助研發發展及技術轉移方面的工作。

STEM 教育

4.23 推廣科學、科技、工程及數學(STEM)教育，裝備學生應付社會和世界經濟、科學及科技迅速發展帶來的改變和挑戰，正好配合全球的教育趨勢。有見及此，教育局和香港科技園公司合辦「科學、科技及數學教育學生博覽會 2016」，展示並表揚學生在 STEM 範疇的各項成果。這場盛事能豐富學生的學習體驗，提升他們對學習、創意及創新發明的興趣，加強他們對跨學科知識和技巧的綜合應用。科技發展已成為業界不可缺少的一部分，可見向學生提供 STEM 教育至關重要，有助推動業界持續發展。為配合香港特區政府的策略方針，VTC 最近已成立 STEM 教育中心，支援學習，並向中學師生推廣這方面的教育工作。

VTC Earn & Learn 職學計劃

4.24 2014 年 7 月獲立法會財務委員會批准撥款後，VTC Earn & Learn 職學計劃（又名「職」學創前路先導計劃）正式推行，結合有系統的學徒計劃，提供職業教育培訓，設有清晰的事業進階路徑。培訓期間，學員不但能賺取特定薪酬，還會獲得政府及參與行業分別提供的 72,000 元和 30,800 元津貼，讓他們學習專業知識及技術的同時，獲取穩定收入，並有理想的事業前景。畢業生亦可繼續進修，取得更高學歷，提高專業發展機會。

職業訓練局學徒訓練

4.25 VTC 免費協助僱主籌辦法定的學徒訓練計劃，為技術員和技工安排有效培訓，切合電子及電訊業所需。本會建議僱主與 VTC 聯絡，協助策劃訓練計劃和招聘學徒／受訓者。

Appendices and Annexes

附 錄 及 附 件

MANPOWER STATISTICS OF THE ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES
電子及電訊業人力統計數字
Sector 1: Manufacturing (門類一：製造)

Job Title 職稱	Number of Workers Employed 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies at Date of Survey 調查期間空缺數目	Forecast of Total Workers by April 2017 預測至 2017 年 4 月時的僱員總數
TECHNOLOGIST LEVEL 技師級				
Electronics Engineer 電子工程師	325	9	15	342
Electrical Engineer 電機工程師	6	-	-	6
Mechanical Engineer 機械工程師	113	9	7	121
Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	230	-	21	252
Chemical Engineer 化學工程師	26	-	-	28
Product/Graphic Designer 產品／平面設計員	22	-	-	22
System Analyst 系統分析員	70	-	-	70
Sub-total 小 計	792	18	43	841
TECHNICIAN LEVEL 技術員級				
Electronics Technician 電子技術員	974	-	3	982
Mechanical Technician 機械技術員	152	-	-	153
Draughtsman 繪圖員	2	-	-	2
Manufacturing/Quality Assurance Technician 製造／品質保證技術員	164	-	-	165
Supervisor/Foreman/Leader 監督／管工／組長	248	-	-	253
Programmer 程序編製員	30	-	3	33
Web Developer/Designer 網站開發員／設計員	39	-	-	39
Sales Technician 推銷技術員	259	-	-	259
Sub-total 小 計	1 868	0	6	1 886
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	20	-	-	20
Electronics Craftsman 電子技工	537	-	17	551
Electrician 電氣技工	17	-	-	17
Mechanic 技工	36	-	-	36
Sub-total 小 計	610	0	17	624
OPERATIVE LEVEL 操作工級				
Operator 生產線操作工	1 110	-	28	1 140
Sub-total 小 計	1 110	-	28	1 140
GRAND TOTAL 總 計	**4 380**	**18**	**94**	**4 491**

MANPOWER STATISTICS OF THE ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES
電子及電訊業人力統計數字
Sector 2: Trading and Services (門類二：貿易及服務)

Job Title 職稱	Number of Workers Employed 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies at Date of Survey 調查期間空缺數目	Forecast of Total Workers by April 2017 預測至 2017 年 4 月時的僱員總數
TECHNOLOGIST LEVEL 技師級				
Electronics Engineer 電子工程師	5 055	12	75	5 146
Electrical Engineer 電機工程師	1 523	34	48	1 571
Mechanical Engineer 機械工程師	508	20	9	517
Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	749	6	12	774
Chemical Engineer 化學工程師	17	-	-	17
Product/Graphic Designer 產品／平面設計員	358	-	14	385
System Analyst 系統分析員	2 049	-	72	2 125
Sub-total 小 計	10 259	72	230	10 535
TECHNICIAN LEVEL 技術員級				
Electronics Technician 電子技術員	6 951	209	214	7 229
Mechanical Technician 機械技術員	1 722	109	71	1 801
Draughtsman 繪圖員	149	-	1	150
Manufacturing/Quality Assurance Technician 製造／品質保證技術員	344	-	5	349
Supervisor/Foreman/Leader 監督／管工／組長	2 309	-	50	2 368
Programmer 程序編製員	4 018	6	98	4 122
Web Developer/Designer 網站開發員／設計員	930	-	41	971
Sales Technician 推銷技術員	7 590	-	44	7 660
Sub-total 小 計	24 013	324	524	24 650
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	524	35	13	537
Electronics Craftsman 電子技工	3 303	211	242	3 538
Electrician 電氣技工	769	30	29	798
Mechanic 技工	139	11	3	144
Sub-total 小 計	4 735	287	287	5 017
OPERATIVE LEVEL 操作工級				
Operator 生產線操作工	510	-	2	512
Sub-total 小 計	510	-	2	512
GRAND TOTAL 總 計	**39 517**	**683**	**1 043**	**40 714**

MANPOWER STATISTICS OF THE ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES
電子及電訊業人力統計數字
Sector 3: Telecommunications Services (門類三：電訊服務)

Job Title 職稱	Number of Workers Employed 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies at Date of Survey 調查期間空缺數目	Forecast of Total Workers by April 2017 預測至 2017 年 4 月時的僱員總數
TECHNOLOGIST LEVEL 技師級				
Electronics Engineer 電子工程師	1 970	-	41	2 011
Electrical Engineer 電機工程師	29	-	3	32
Mechanical Engineer 機械工程師	-	-	-	-
Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	29	-	2	31
Chemical Engineer 化學工程師	-	-	-	-
Product/Graphic Designer 產品／平面設計員	49	-	-	49
System Analyst 系統分析員	311	-	15	326
Sub-total 小 計	2 388	-	61	2 449
TECHNICIAN LEVEL 技術員級				
Electronics Technician 電子技術員	2 020	-	93	2 113
Mechanical Technician 機械技術員	-	-	-	-
Draughtsman 繪圖員	44	-	-	44
Manufacturing/Quality Assurance Technician 製造／品質保證技術員	-	-	-	-
Supervisor/Foreman/Leader 監督／管工／組長	140	-	-	140
Programmer 程序編製員	434	-	34	468
Web Developer/Designer 網站開發員／設計員	695	-	14	709
Sales Technician 推銷技術員	1 107	-	8	1 115
Sub-total 小 計	4 440	-	149	4 589
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	1	-	-	1
Electronics Craftsman 電子技工	766	-	41	807
Electrician 電氣技工	152	-	2	154
Mechanic 技工	3	-	-	3
Sub-total 小 計	922	-	43	965
OPERATIVE LEVEL 操作工級				
Operator 生產線操作工	305	-	24	329
Sub-total 小 計	305	-	24	329
GRAND TOTAL 總 計	**8 055**	**-**	**277**	**8 332**

MANPOWER STATISTICS OF THE ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES
電子及電訊業人力統計數字
Sector 4: Wholesale (門類四：批發)

Job Title 職稱	Number of Workers Employed 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies at Date of Survey 調查期間空缺數目	Forecast of Total Workers by April 2017 預測至 2017 年 4 月時的僱員總數
TECHNOLOGIST LEVEL 技師級				
Electronics Engineer 電子工程師	270	-	8	278
Electrical Engineer 電機工程師	-	-	-	-
Mechanical Engineer 機械工程師	-	-	-	-
Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	20	-	-	20
Chemical Engineer 化學工程師	-	-	-	-
Product/Graphic Designer 產品／平面設計員	-	-	-	-
System Analyst 系統分析員	49	-	-	49
Sub-total 小 計	339	-	8	347
TECHNICIAN LEVEL 技術員級				
Electronics Technician 電子技術員	900	-	10	910
Mechanical Technician 機械技術員	6	-	-	6
Draughtsman 繪圖員	-	-	-	-
Manufacturing/Quality Assurance Technician 製造／品質保證技術員	-	-	-	-
Supervisor/Foreman/Leader 監督／管工／組長	280	-	-	280
Programmer 程序編製員	178	-	9	187
Web Developer/Designer 網站開發員／設計員	38	-	-	38
Sales Technician 推銷技術員	1 919	-	21	1 940
Sub-total 小 計	3 321	-	40	3 361
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	-	-	-	-
Electronics Craftsman 電子技工	231	-	6	237
Electrician 電氣技工	50	-	-	50
Mechanic 技工	10	-	-	10
Sub-total 小 計	291	-	6	297
OPERATIVE LEVEL 操作工級				
Operator 生產線操作工	50	-	-	50
Sub-total 小 計	50	-	-	50
GRAND TOTAL 總 計	**4 001**	**-**	**54**	**4 055**

MANPOWER STATISTICS OF THE ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES
電子及電訊業人力統計數字
Sector 5: Design Houses and Relevant Departments in Universities and Government
(門類五：設計公司、相關院校學系及政府部門)

Job Title 職稱	Number of Workers Employed 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies at Date of Survey 調查期間空缺數目	Forecast of Total Workers by April 2017 預測至 2017 年 4 月時的僱員總數
TECHNOLOGIST LEVEL 技師級				
Electronics Engineer 電子工程師	1057	19	33	1 080
Electrical Engineer 電機工程師	253	20	16	292
Mechanical Engineer 機械工程師	74	-	5	79
Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	32	-	-	32
Chemical Engineer 化學工程師	33	-	-	33
Product/Graphic Designer 產品／平面設計員	2	-	-	2
System Analyst 系統分析員	86	-	13	99
Sub-total 小 計	1 537	39	67	1 617
TECHNICIAN LEVEL 技術員級				
Electronics Technician 電子技術員	895	2	33	936
Mechanical Technician 機械技術員	190	-	5	221
Draughtsman 繪圖員	7	-	-	7
Manufacturing/Quality Assurance Technician 製造／品質保證技術員	14	-	2	16
Supervisor/Foreman/Leader 監督／管工／組長	726	67	24	786
Programmer 程序編製員	143	-	5	147
Web Developer/Designer 網站開發員／設計員	-	-	-	-
Sales Technician 推銷技術員	25	-	2	27
Sub-total 小 計	2 000	69	71	2 140
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	-	-	-	-
Electronics Craftsman 電子技工	189	28	12	203
Electrician 電氣技工	289	101	7	311
Mechanic 技工	335	140	23	360
Sub-total 小 計	813	269	42	874
OPERATIVE LEVEL 操作工級				
Operator 生產線操作工	53	-	10	53
Sub-total 小 計	53	-	10	53
GRAND TOTAL 總 計	**4 403**	**377**	**190**	**4 684**

MANPOWER STATISTICS OF THE ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES
電子及電訊業人力統計數字
Sector 6: Retail Shops for Electronics Products (10 large shops)
(門類六：零售－10 間大型電子產品零售公司)

Job Title 職稱	Number of Workers Employed 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies at Date of Survey 調查期間空缺數目	Forecast of Total Workers by April 2017 預測至 2017 年 4 月時的僱員總數
TECHNOLOGIST LEVEL 技師級				
Electronics Engineer 電子工程師	25	-	-	25
Electrical Engineer 電機工程師	-	-	-	-
Mechanical Engineer 機械工程師	-	-	-	-
Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	-	-	-	-
Chemical Engineer 化學工程師	-	-	-	-
Product/Graphic Designer 產品／平面設計員	-	-	-	-
System Analyst 系統分析員	-	-	-	-
Sub-total 小 計	25	-	-	25
TECHNICIAN LEVEL 技術員級				
Electronics Technician 電子技術員	3	-	-	3
Mechanical Technician 機械技術員	-	-	-	-
Draughtsman 繪圖員	-	-	-	-
Manufacturing/Quality Assurance Technician 製造／品質保證技術員	-	-	-	-
Supervisor/Foreman/Leader 監督／管工／組長	349	-	-	349
Programmer 程序編製員	-	-	-	-
Web Developer/Designer 網站開發員／設計員	-	-	-	-
Sales Technician 推銷技術員	2 525	-	29	2 554
Sub-total 小 計	2 877	-	29	2 906
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	-	-	-	-
Electronics Craftsman 電子技工	53	-	-	53
Electrician 電氣技工	-	-	-	-
Mechanic 技工	-	-	-	-
Sub-total 小 計	53	-	-	53
OPERATIVE LEVEL 操作工級				
Operator 生產線操作工	-	-	-	-
Sub-total 小 計	-	-	-	-
GRAND TOTAL 總 計	**2 955**	**-**	**29**	**2 984**

MANPOWER STATISTICS OF THE ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES (ALL SECTORS)
電子及電訊業人力統計數字（各門類）

Job Title 職稱	Number of Workers Employed 僱員人數	Number of Trainees 受訓者人數	Number of Vacancies at Date of Survey 調查期間空缺數目	Forecast of Total Workers by April 2017 預測至 2017 年 4 月時的僱員總數
TECHNOLOGIST LEVEL 技師級				
Electronics Engineer 電子工程師	8 702	40	172	8 882
Electrical Engineer 電機工程師	1 811	54	67	1 901
Mechanical Engineer 機械工程師	695	29	21	717
Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	1 060	6	35	1 109
Chemical Engineer 化學工程師	76	-	-	78
Product/Graphic Designer 產品／平面設計員	431	-	14	458
System Analyst 系統分析員	2 565	-	100	2 669
Sub-total 小 計	15 340	129	409	15 814
TECHNICIAN LEVEL 技術員級				
Electronics Technician 電子技術員	11 743	211	353	12 173
Mechanical Technician 機械技術員	2 070	109	76	2 181
Draughtsman 繪圖員	202	-	1	203
Manufacturing/Quality Assurance Technician 製造／品質保證技術員	522	-	7	530
Supervisor/Foreman/Leader 監督／管工／組長	4 052	67	74	4 176
Programmer 程序編製員	4 803	6	149	4 957
Web Developer/Designer 網站開發員／設計員	1 702	-	55	1 757
Sales Technician 推銷技術員	13 425	-	104	13 555
Sub-total 小 計	38 519	393	819	39 532
CRAFTSMAN LEVEL 技工級				
High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	545	35	13	558
Electronics Craftsman 電子技工	5 079	239	318	5 389
Electrician 電氣技工	1 277	131	38	1 330
Mechanic 技工	523	151	26	553
Sub-total 小 計	7 424	556	395	7 830
OPERATIVE LEVEL 操作工級				
Operator 生產線操作工	2 028	-	64	2 084
Sub-total 小 計	2 028	-	64	2 084
GRAND TOTAL 總 計	**63 311**	**1 078**	**1 687**	**65 260**

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）

Job Title 職稱	Below $8,001 以下	$8,001 - $10,000	$10,001 - $15,000	$15,001 - $20,000	$20,001 - $25,000	$25,001 - $30,000	$30,001 - $50,000	$5,0001 - $70,000	Over $70,000	Unspecified 未有說明	Total
TECHNOLOGIST LEVEL 技師級											
Electronics Engineer 電子工程師	-	-	3	364	1 398	1 249	2 678	286	181	2 543	8 702
Electrical Engineer 電機工程師	-	-	-	22	62	825	627	226	1	48	1 811
Mechanical Engineer 機械工程師	-	-	-	20	57	131	221	25	-	241	695
Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	-	-	-	24	49	132	512	-	2	341	1 060
Chemical Engineer 化學工程師	-	-	-	4	16	20	28	5	-	3	76
Product/Graphic Designer 產品／平面設計員	-	-	-	18	125	3	214	-	3	68	431
System Analyst 系統分析員	-	-	-	41	43	457	883	291	3	847	2 565
Sub-total 小 計	-	-	3	493	1 750	2 817	5163	833	190	4 091	15 340
TECHNICAN LEVEL 技術員級											
Electronics Technician 電子技術員	-	49	1 154	3 626	3 467	517	309	2	-	2 619	11 743
Mechanical Technician 機械技術員	-	-	34	316	1 333	56	183	-	-	148	2 070
Draughtsman 繪圖員	-	2	6	58	19	32	-	-	-	85	202
Manufacturing/Quality Assurance Technician 製造／品質保證技術員	-	13	34	50	50	12	-	-	-	363	522
Supervisor/Foreman/Leader 監督／管工／組長	1	4	97	396	2087	937	162	-	-	368	4 052
Programmer 程序編製員	-	-	279	406	1 315	210	1 148	-	-	1 445	4 803
Web Developer/Designer 網站開發員／設計員	-	-	164	485	167	135	-	-	-	751	1 702
Sales Technician 推銷技術員	68	218	1 326	5 694	2 454	578	913	49	-	2 125	13 425
Sub-total 小 計	69	286	3 094	11 031	10 892	2 477	2 715	51	-	7 904	38 519
CRAFTSMAN LEVEL 技工級											
High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	-	50	30	307	1	-	-	-	-	157	545
Electronics Craftsman 電子技工	107	396	1 373	2 395	463	-	-	-	-	345	5 079
Electrician 電氣技工	-	-	104	439	585	-	-	-	-	149	1 277
Mechanic 技工	-	-	22	447	52	2	-	-	-	-	523
Sub-total 小 計	107	446	1 529	3 588	1 101	2	-	-	-	651	7 424
Operator 生產線操作工	298	939	478	-	5	-	-	-	-	308	2 028
Sub-total 小 計	298	939	478	-	5	-	-	-	-	308	2 028
GRAND TOTAL 總 計	**474**	**1 671**	**5 104**	**15 112**	**13 748**	**5 296**	**7 878**	**884**	**190**	**12 954**	**63 311**

SKILLS EMPLOYEES NEED TO ENHANCE
僱員需要加強培訓的技能

Skills 技能	No. of Employees 僱員人數			
	Technologist 技師	Technician 技術員	Craftsman 技工	All 總數
Management Skills 管理技能				
101 Production and engineering management 工業生產及工程管理	1 276	981	34	2 291
102 Marketing management 經銷管理	684	367	-	1 051
103 Project management 項目管理	3 084	1 727	-	4 811
104 Quality management 品質管理	1 608	913	5	2 526
105 Purchasing management 採購管理	266	67	-	333
106 People management 人事管理	1 678	68	-	1 746
107 Leadership skills	2 557	2 844	-	5 401
China-related Knowledge and World Vision 有關中國的知識及世界視野				
201 Social and economic development in China 在中國內地的社會和經濟發展	143	143	-	286
202 Laws and regulatory restrictions to China 進入中國市場的法律和規條限制	280	-	-	280
203 Trade practices in the mainland of China 在中國內地的營商常規	-	-	-	-
204 Cross-cultural knowledge 跨文化的知識	-	-	-	-
205 World vision 世界視野	301	140	-	441
Language Skills 語文能力				
301 Spoken English 英語會話	117	328	403	848
302 Written English 英文書寫能力	179	198	15	392
303 Putonghua 普通話	99	164	12	275
304 Written Chinese 中文書寫能力	12	66	28	106
Interpersonal and Intrapersonal Skills for the Workplace 工作間的人際及個人才能				
401 Problem solving 解決問題	2 648	6 599	824	10 071
402 Creativity 創意力	87	820	1 031	1 938
403 Critical thinking 批判思考能力	190	312	4	506
404 Communication skills 溝通技巧	1 613	5 620	2 313	9 546
405 Team building 團隊建立	859	2 619	850	4 328
406 Time management skills 時間管理技巧	772	4 411	530	5 713
407 Optimism/Positive 樂觀/積極	217	1 090	42	1 349
408 Self-esteem 自尊	-	-	-	-
409 Perseverance 毅力	-	1 154	36	1 190
410 Change management skills 變革管理技巧	1 643	5	-	1 648
411 Customer services skills 客戶服務技巧	219	2 731	108	3 058
412 Numerical skills 數學運用技巧	-	1	-	1
413 Ability to learn/adapt new skills/knowledge 學習或適應新科技、新知識的能力	951	1 846	1 189	3 986
Technical Skills 專業技能				
501 Design 設計	425	59	-	484
502 Production/Manufacturing 生產／製造	356	893	283	1 532
503 Servicing/Troubleshooting 維修／故障檢修	203	2 456	1 064	3 723
Others 其他				
699 Others	589	1 244	150	1 983

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 (2016) 調查期間（2016 年）僱員人數	Recommended Number of Trainees to be Taken on Annually Starting from 2016 建議由 2016 年起每年取錄的受訓者人數
TECHNOLOGIST LEVEL 技師級		
Electronics Engineer 電子工程師	8 702	397 – 485
Electrical Engineer 電機工程師	1 811	83 – 101
Mechanical Engineer 機械工程師	695	32 – 39
Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	1 060	48 – 59
Chemical Engineer 化學工程師	76	3 – 4
Product/Graphic Designer 產品／平面設計員	431	20 – 24
System Analyst 系統分析員	2 565	116 – 143
Sub-total 小 計	**15 340**	**699 – 855**
Electronics Technician 電子技術員	11 743	340 - 415
Mechanical Technician 機械技術員	2 070	60 – 73
Draughtsman 繪圖員	202	6 – 7
Manufacturing/Quality Assurance Technician 製造／品質保證技術員	522	15 – 18
Supervisor/Foreman/Leader 監督／管工／組長	4 052	117 – 143
Programmer 程序編製員	4 803	139 – 170
Web Developer/Designer 網站開發員／設計員	1 702	49 – 60
Sales Technician 推銷技術員	13 425	388 – 476
Sub-total 小 計	**38 519**	**1 114 – 1 362**
Cable Jointer/Wireman 電纜接駁技工／駁線技工	545	27 – 32
Electronics Craftsman 電子技工	5 079	248 – 303
Electrician 電氣技工	1 277	62 – 76
Mechanic 技工	523	25 – 31
Sub-total 小 計	**7 424**	**362 – 442**

Annex A
附件甲

Membership of the Electronics and Telecommunications Training Board
(October 2016)

電子及電訊業訓練委員會委員名單
（2016年10月）

Chairman:
主席

Mr Johnny YEUNG Chi-hung, MH 楊志雄先生, MH	(nominated by the Hong Kong Electronic Industries Association Limited) （香港電子業商會提名）

Vice-Chairman:
副主席

Mr Christopher TSE Hung-keung 謝鴻強先生	(nominated by the Federation of Hong Kong Industries) （香港工業總會提名）

Members:
委員

Dr Lawrence CHEUNG Chi-chong 張梓昌博士	(nominated by the Hong Kong Productivity Council) （香港生產力促進局提名）
Mr Kenny CHEUNG 張惠權先生	(nominated by an electronics manufacturing company (semi-conductor)) （一間半導體製造公司提名）
Mr. CHU Hon-chung 儲漢松先生	(nominated by the Hong Kong & Kowloon Electronics Industry Employees' General Union) （港九電子工業職工總會提名）
Mr HO Kam-fai, Kelvin 何錦輝先生	(nominated by a telecommunication company (the mobile telecommunicaton network services sector)) （一間流動電訊網絡服務公司提名）
Mr. HUI Kin-sang, Sam 許健生先生	(nominated by an electronics manufacturing company (computers and related peripherals)) （一間電腦及有關周邊裝置製造公司提名）

Dr Measure HUNG Kim-fung 洪劍峰博士	(nominated by an electronics trading/engineering services company) （一間電子貿易/工程服務公司提名）
Mr KWAN Man-lung 關文龍先生	(nominated by an electronics manufacturing company (components/parts)) （一間電子元件及配件製造公司提名）
Ir Ricky KWONG Wai-chuen 鄺偉銓工程師	(nominated by a telecommunication company (the fixed telecommunication network services sector)) （一間固定電訊網絡服務公司提名）
Dr LAM Hiu-fung 林曉鋒博士	(Ad personam) （獨立人士）
Mr LAM Yam-sui 林欽水先生	(nominated by a broadcasting company) （一間廣播公司提名）
Dr LO Tai-chin 羅台秦博士	(nominated by the Chinese Manufacturers' Association of Hong Kong) （香港中華廠商聯合會提名）
Mr MA Fung-on 馬逢安先生	(nominated by an electronics manufacturing company (consumer products)) （一間電子消費產品製造公司提名）
Prof Philip MOK Kwok-tai 莫國泰教授	(nominated by a local university) （本地一大學提名）
Ir Johnny POON Chung-yin 潘仲賢工程師	(nominated by the Hong Kong Institution of Engineers （香港工程師學會提名）
Mr William TSE Wing-nam 謝永南先生	(nominated by an electronics manufacturing company (telecommunications)) （一間電訊器材製造公司提名）
Ir Eric CHAK Ho-leung 陳浩樑工程師	(representative of the Director of Electrical and Mechanical Services) （機電工程署署長代表）
Mr CHEUNG Siu-wing, Samson 張兆榮先生	(representative of the Director-General of Trade and Industry) （工業貿易署署長代表）
MR KWOK Wing-hing, Warren 郭榮興先生	(representative of the Director-General of Communications) （通訊事務總監代表）

Dr LEUNG Hing-pong, Joseph 梁興邦博士	(representative of the Executive Director of the Vocational Training Council) （職業訓練局執行幹事代表）
Ir TANG Siu-sing, Peter 鄧兆誠工程師	(representative of the Executive Director of the Vocational Training Council) （職業訓練局執行幹事代表）

In Attendance:
列席者

Dr LAI Shui-yu, Andy 賴瑞瑜博士	Head of Department of Innovation and Information Technology 創新與信息科技學系 系主任
Mr LEE Kam-fat, Jonathan 李錦發先生	Head of Department of Engineering, Hong Kong Institute of Vocational Education (Shatin) 香港專業教育學院（沙田）工程系 系主任
Dr YAN Tsz-leung, Mark 甄子良博士	Manager-In-Charge, Pro-Act Training and Development Centre (Electronics) 卓越培訓發展中心（電子業）中心主管

Secretary:
秘書

Mr LEUNG Wing-kwan, Freddy 梁永鈞先生	(Vocational Training Council) （職業訓練局）

Annex B

Electronics and Telecommunications Training Board

Terms of Reference

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.

附件乙

電子及電訊業訓練委員會

職權範圍

1. 確定業內的人力需求，包括收集、分析相關的人力和學生／學員統計數字，以及關於社會經濟、科技及人力市場發展的資料。

2. 評估及研究本業的人力供求是否平衡。

3. 就發展業內職業專才教育及訓練設施應付人力需求，向職業訓練局（下稱「局方」）提供意見。

4. 就相關學科的課程發展策略及質素保證，向局方提出建議。

5. 擬訂本業主要職務的工作範圍，界定所需的技能及知識，審議訓練方案，包括訂定每種技能所需的訓練期。

6. 對技術評估、技能測驗及認證制度提供意見，以確定從業員、學徒及見習員的技能水平。

7. 就本業主要行業舉辦技能比賽提供意見，以推廣職業專才教育和派員參加國際賽事。

8. 與僱主、僱主聯會、工會、專業團體、訓練及教育機構、政府部門等聯絡，共商本業職業專才教育的發展與推廣事宜。

9. 為本業舉辦有關職業專才教育的研討會和會議。

10. 就訓練委員會工作和相關職業專才教育課程之推廣宣傳，向局方提供意見。

11. 每年向局方呈交訓練委員會工作報告，以及相關學科課程發展策略建議。

12. 根據《職業訓練局條例》第 7 條，負責局方所委派的其他工作。

Annex C

Vocational Training Council 職業訓練局

Headquarters (Industry Partnership) 總辦事處(行業合作)
30F, Billion Plaza II, 10 Cheung Yue Street, Cheung Sha Wan, Kowloon, Hong Kong
香港九龍長沙灣長裕街10號億京廣場2期30樓
www.vtc.edu.hk

Telephone No 電話 ( ) in EC/4/2 (2016) Facsimile No 傳真

Our Reference 本局檔號 Your Reference 來函檔號

8 April 2016

Dear Sir/Madam,

The 2016 Manpower Survey of the Electronics and Telecommunications Industries

The Electronics and Telecommunications Training Board of the Vocational Training Council is appointed by the Government of the Hong Kong Special Administrative Region to be responsible for all matters pertaining to the planning and training of manpower in the electronics and telecommunications industries.

With the assistance of the Census and Statistics Department, the Training Board will conduct the 2016 Manpower Survey of the Electronics and Telecommunications Industries from 25 April to 24 May 2016. Survey reference date is given as 1 April 2016, to collect the following information about each of the principal jobs in the industries:

(a) the number of employees at present employed,

(b) the number of employees at present under training,

(c) the number of existing vacancies, and

(d) a forecast of the total number of employees in 12 months' time.

The information collected will be handled in strict confidence and will be published only in the form of statistical summaries without reference to any individual establishment.

---- I am forwarding for your reference and completion, the following documents in both English and Chinese:

(a) a questionnaire (Appendix A);

(b) an explanatory note on the questionnaire (Appendix B); and

(c) a list of job descriptions for the principal jobs in the electronics and telecommunications industries (Appendix C).

During the period of the survey, an officer of the Census and Statistics Department will contact your office. The officer will assist in the completion of the questionnaire, if necessary, and collect the questionnaire for processing.

I sincerely hope that you will co-operate in this survey to enable the Training Board to make training plans for the benefit of the industries. The Manpower Survey Report will be uploaded onto the webpage of the Training Board under the VTC website at **http://ectb.vtc.edu.hk** .

Thank you for your kind participation and contribution to the electronics and telecommunications industries. Should you have any queries in connection with the survey, please contact the Manpower Statistics Section of the Census and Statistics Department by telephoning 2116 8375.

Yours faithfully,

(YEUNG Chi-hung, Johnny)
Chairman
Electronics and Telecommunications
Training Board

Vocational Training Council 職業訓練局

Headquarters (Industry Partnership) 總辦事處(行業合作)
30F, Billion Plaza II, 10 Cheung Yue Street, Cheung Sha Wan, Kowloon, Hong Kong
香港九龍長沙灣長裕街10號億京廣場2期30樓
www.vtc.edu.hk

Telephone No 電話 Facsimile No 傳真

Our Reference 本局檔號 ( ) in EC/4/2 (2016) Your Reference 來函檔號

附件丙

各位僱主：

電子業及電訊業二零一六年人力調查

職業訓練局電子業及電訊業訓練委員會由香港特別行政區政府委任，負責一切有關電子業及電訊業的人力策劃及訓練事宜。

在政府統計處協助下，本訓練委員會將於本年四月二十五日至五月二十四日期間，進行電子業及電訊業二零一六年人力調查。調查統計日期將定為二零一六年四月一日，蒐集本業各主要職務的資料：

(一) 現有僱員人數；
(二) 現有受訓人數；
(三) 現有空缺額；
(四) 預計十二個月後的僱員總數。

調查所得資料絕對保密，只以摘要統計數字發表，並不提及個別機構。

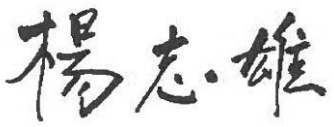
現附上以下中英對照文件，供貴機構參閱填寫：

(一) 調查表（附錄 A）；
(二) 調查表附註（附錄 B）；
(三) 電子業及電訊業主要職務工作說明（附錄 C）。

調查期間，政府統計處職員會聯絡 貴機構，收取調查表作資料處理，並於需要時協助填寫調查表。

是次調查，懇請 貴機構惠予合作，使本訓練委員會能為電子業及電訊業定出人力訓練計劃。當二零一六年人力調查報告完成後，亦會上載於職業訓練局網頁(網址：**http://ectb.vtc.edu.hk**)，歡迎下載。

如對調查有任何查詢，請致電 2116 8375 與政府統計處人力統計組聯絡。



電子業及電訊業訓練委員會
主席
楊志雄

二零一六年四月八日

Survey Reference Date: **1 April 2016**
統計日期：**2016年4月1日**

Appendix A
附錄A

CONFIDENTIAL
WHEN DATA ENTERED
填入數據後即成
機密文件

VOCATIONAL TRAINING COUNCIL
職業訓練局

THE 2016 MANPOWER SURVEY OF THE ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES
電子業及電訊業二零一六年人力調查

QUESTIONNAIRE
調查表

PLEASE READ THE EXPLANATORY NOTES BEFORE COMPLETING THIS QUESTIONNAIRE
填表前，請參閱附註

For official use only: 此欄毋須填寫	Rec. Type	Survey Code	Industry Code	Establishment No.	Enumerator's No.	Editor's No.	Check Digit	No. of Employees Covered by the Questionnaire
	1 (1)	0 5 (2 3)	(4 5 6 7 8 9)	(10 11 12 13 14 15)	(16 17)	(18 19)	(20 21 22)	(23 24 25 26 27)

NAME OF ESTABLISHMENT: _____
機構名稱

ADDRESS: _____
地址

TYPE OF PRODUCT/SERVICE: _____
產品／服務

TOTAL NUMBER OF PERSONS ENGAGED: _____
僱員總人數

NAME OF PERSON TO CONTACT: _____ (28–47)
聯絡人姓名

POSITION: _____
職位

TEL. NO.: _____ (48–55) - _____ (56–63)
電話

FAX NO.: _____
圖文傳真

E-MAIL: _____ (64–98)
電郵

VTC-EC-01

Part I 第一部份

	(A) Job 工作			(B) Average Monthly Income 每月平均收入	(C) No. of Employees as at 1.4.2016 (excl. trainees)	(D) Forecast of No. of Employees as at April 2017 (excl. trainees)	(E) No. of Vacancies as at 1.4.2016 (excl. trainees)	(F) No. of Trainees as at 1.4.2016
	Title 職稱	Rec. Type	Job Code 職位編號	Code 編號	在2016年4月1日的僱員人數（受訓者除外）	預計在2017年4月的僱員人數（受訓者除外）	在2016年4月1日的空缺額(受訓者除外)	在2016年4月1日的受訓者人數
	For Official Use Only → 此欄毋須填寫		8-10	11	12-15	16-19	20-22	23-25
	TECHNOLOGIST LEVEL 技師級							
1	Electronics Engineer 電子工程師	2	1 0 1					
2	Electrical Engineer 電機工程師	2	1 0 2					
3	Mechanical Engineer 機械工程師	2	1 0 3					
4	Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	2	1 0 4					
5	Chemical Engineer 化學工程師	2	1 0 5					
6	Product/Graphic Designer 產品／平面設計員	2	1 0 6					
7	System Analyst 系統分析員	2	1 0 7					
	TECHNICIAN LEVEL 技術員級							
8	Electronics Technician 電子技術員	2	2 0 1					
9	Mechanical Technician 機械技術員	2	2 0 2					
10	Draughtsman 繪圖員	2	2 0 3					
11	Manufacturing/Quality Assurance Technician 製造／品質保證技術員	2	2 0 4					
12	Supervisor/Foreman/Leader 監督／管工／組長	2	2 0 5					
13	Programmer 程式編製員	2	2 0 6					
14	Web Developer/Designer 網站開發員／設計員	2	2 0 7					
15	Sales Technician 推銷技術員	2	2 0 8					
	CRAFTSMAN LEVEL 技工級							
16	High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	2	3 0 1					
17	Electronics Craftsman 電子技工	2	3 0 2					
18	Electrician 電氣技工	2	3 0 3					
19	Mechanic 技工	2	3 0 4					
	OPERATIVE LEVEL 操作工級							
20	Operator 生產線操作工	2	4 0 1					
21	Others 其他	2						
22		2						
23		2						
24		2						
25		2						

Average Monthly Income
每月平均收入

Enter in column B employee's average monthly income range according to the following codes. The income should include basic wages, guaranteed year-end bonus, regular overtime pay, cost of living allowance, meal allowance etc.

請將僱員的每月平均收入幅度按照下列類別編號填入B欄內。「每月平均收入」包括底薪固定發放的年終花紅、定期超時工作工資、生活津貼、膳食津貼等。

Code 編號	Average Monthly Income Range 每月平均收入幅度
1	Under $8,001 以下
2	$8,001 - $10,000
3	$10,001 - $15,000
4	$15,001 - $20,000
5	$20,001 - $25,000
6	$25,001 - $30,000
7	$30,001 - $50,000
8	$50,001 - $70,000
9	Over $70,000 以上

Remark 備註

Note 1 If additional lines are necessary, please tick here ☐ and enter on supplementary sheet(s).
附註一 如此頁填滿，請先將（✓）號填入此 ☐ 內，然後在附頁繼續填寫 。

Note 2 The term 'trainees' includes all trainees receiving any form of training and apprentices under a contract of apprenticeship.
附註二 「受訓者」包括正在接受各種訓練的人士，以及簽有學徒合約的登記學徒。

Part II 第二部份

1. Internal Promotion
內部晉升

Please fill in the number of internal promotion in the past 12 months
請填寫過去十二個月內，內部晉升的人數

Rec. Type	From Technician to Technologist 由技術員晉升至技師	From Craftsman to Technician 由技工晉升至技術員	From Others to Craftsman 由其他職級晉升至技工	For official use only 此欄毋須填寫
3				
1	8 9 10	11 12 13	14 15 16	17

2. Hong Kong Technical Personnel Dispatched Outside Hong Kong
遣派香港以外的香港技術人員

Please enter below the number of technical personnel paid by Hong Kong who had been dispatched to work for more than half year outside Hong Kong during the 12 months prior to the survey.
請填寫調查前十二個月內，由香港支薪而被派往外地工作超過半年的技術人員數目

Number of Technologists 技師人數	Number of Technicians 技術員人數	Number of Craftsmen 技工人數	For official use only 此欄毋須填寫
18 19 20 21	22 23 24 25	26 27 28 29	30

3. Education and Training an Employee Should Have
僱員宜有的教育及訓練

Technologist 技師			Technician 技術員			Craftsman 技工		
Education 教育	Training Mode 訓練方式	Training Period 訓練時間	Education 教育	Training Mode 訓練方式	Training Period 訓練時間	Education 教育	Training Mode 訓練方式	Training Period 訓練時間
31	32	33	34	35	36	37	38	39

Please enter in the boxes the education and training an employee should have according to the following codes:
請將僱員宜有的教育及訓練按照下列類別編號填入格內：

Code 編號	Education 教育
1	Higher degrees (e.g. master degrees) or equivalent 高等學位（如碩士學位），或同等教育程度
2	First degree or equivalent 學士學位，或同等教育程度
3	Associate Degree; Higher Diploma; Professional Diploma; Higher Certificate or equivalent 副學士、高級文憑、專業文憑、高級證，或同等教育程度
4	Secondary 4-6; Diploma; Hong Kong Diploma of Secondary Education (HKDSE); Diploma of Vocational Education/Foundation Diploma/Yi Ji 中四、中五及中六、文憑、香港中學文憑考試、中專教育文憑／基礎文憑／毅進文憑課程，或同等教育程度
5	Secondary 1-3 or equivalent 中一、中二及中三，或同等教育程度

Code 編號	Training Mode 訓練方式
1	Graduate traineeship 工科畢業生訓練
2	On-the-job training 在職訓練
3	Apprenticeship 學徒訓練
4	Off-the-job training 職外訓練
5	Others 其他

Code 編號	Training Period 訓練時間
1	4 years or above 四年或以上
2	3 to less than 4 years 三年至四年以下
3	2 to less than 3 years 二年至三年以下
4	1 to less than 2 years 一年至二年以下
5	6 to less than 12 months 六至十二個月以下
6	Below 6 months 六個月以下

Part III 第三部份

1. Recruitment
招聘

(a) Please fill in the number of new recruits in the past 12 months
請填寫過去十二個月內，新招聘的僱員人數

Number of Technologists 技師人數	Number of Technicians 技術員人數	Number of Craftsmen 技工人數	Number of Operatives 操作工人數	For official use only 此欄毋須填寫
40 41 42 43	44 45 46 47	48 49 50 51	52 53 54 55	56

(b) Number of recruits who have performed electronics services related duties in their last jobs from item (a) above
上列(a)項中，在剛離職的工作崗位上曾執行電子業相關職務的人數

Number of Technologists 技師人數	Number of Technicians 技術員人數	Number of Craftsmen 技工人數	Number of Operatives 操作工人數
57 58 59 60	61 62 63 64	65 66 67 68	69 70 71 72

2. Employees Left
僱員離職

Please fill in the number of employees who had left your establishment in the past 12 months
請填寫過去十二個月內，離職的僱員人數

Number of Technologists 技師人數	Number of Technicians 技術員人數	Number of Craftsmen 技工人數	Number of Operatives 操作工人數	For official use only 此欄毋須填寫
73 74 75 76	77 78 79 80	81 82 83 84	85 86 87 88	89

3. Skills an Employee Need to Enhance
僱員需加強培訓的技能

Please indicate the three most important skills that your employees need to enhance. (Please see the table on the right for the choice of skills.)
你認為 貴機構現有僱員在那三方面技能最需要加強培訓。(請參閱右面的編號表以選擇技能。)

Technologist 技師	90 91 92	93 94 95	96 97 98
Technician 技術員	99 100 101	102 103 104	105 106 107
Craftsman 技工	108 109 110	111 112 113	114 115 116

Code 編號 — Types of skills / knowledge / attributes 技能/知識/個人特質的類別

Management skills 管理技能
- 101 Production and engineering management 工業生產及工程管理
- 102 Marketing management 經銷管理
- 103 Project management 計劃管理
- 104 Quality management 品質管理
- 105 Purchasing management 採購管理
- 106 Personnel management 人事管理
- 107 Leadership skills 領導能力

China-related knowledge and world vision 有關中國的知識及世界視野
- 201 Social and economic development in the mainland of China 在中國內地的社會和經濟發展
- 202 Laws and regulatory restrictions for access to China's market 進入中國市場的法律和規條限制
- 203 Trade practices in the mainland of China 在中國內地的營商常規
- 204 Cross-cultural knowledge 跨文化的知識
- 205 World vision 世界視野

Language skills 語文技能
- 301 Spoken English 英語會話
- 302 Written English 英文書寫能力
- 303 Putonghua 普通話
- 304 Written Chinese 中文書寫能力

Interpersonal and intrapersonal skills for the workplace 工作間的人際及個人才能
- 401 Problem solving 解決問題
- 402 Creativity 創意力
- 403 Critical thinking 批判思考能力
- 404 Communication skills 溝通技巧
- 405 Team building 團隊建立
- 406 Time management skills 時間管理技巧
- 407 Optimism/Positive 樂觀／積極
- 408 Self-esteem 自尊
- 409 Perseverance 毅力
- 410 Change management skills 變革管理技巧
- 411 Customer services skills 客戶服務技巧
- 412 Numerical skills 數學運用技巧
- 413 Ability to learn/adapt new skills/knowledge 學習或適應新技能、新知識的能力

Technical Skills 專業技能
- 501 Design 設計
- 502 Production/ Manufacturing 生產／製造
- 503 Servicing/ Troubleshooting 維修／故障檢修

- 699 Others * 其他 *

* Please specify if skills code = '699'.
* 若技能編號 = '699'， 請說明。

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此欄毋須填寫

Est No. _____

Annex E
附 件 戊

The 2016 Manpower Survey of the
Electronics and Telecommunications Industries
電 子 業 及 電 訊 業 二 零 一 六 年 人 力 調 查

Explanatory Note
附 註

1. Please ignore the numbers of the row immediately beneath the headings. They are purely for data processing.
每行標題下的號碼只供資料處理用，請毋須理會。

2. Before completing the questionnaire, please read carefully the job titles and job descriptions in Appendix C.
填寫調查表前，請先詳閱附錄 C 所列的職稱與工作說明。

3. Please complete the columns ('A' to 'F') of the questionnaire and insert a zero (0) for any column not applicable to your establishment.
請填寫表內各欄（「A」至「F」），並在不適用於 貴機構的各欄內填入（0）符號。

4. Please fill in information as accurate as possible because the information collected from this survey is vital for determining the manpower requirements of the industry in order that the Electronics and Telecommunications Industry Training Board can make meaningful recommendations to Government on how to meet training needs.
請填入準確資料，因是項資料對於確定本業的人力需求極為重要，而電子及電訊業訓練委員會亦將以此為根據，向政府提供解決訓練需求的建議。

5. Job Titles - Column 'A'
職稱 —— 「A」欄
   (a) The job titles and code numbers are pre-printed.
   職稱及職務編號已代為印上。
   (b) Please add in column 'A' titles of any technical jobs not mentioned in Appendix C, and briefly describe them and indicate their skill levels.
   如 貴機構另有技術性職務名稱未載於附錄 C 者，請一併填入「A」欄內，並扼要說明其工作性質及技能等級。
   (c) Please classify an employee according to his/her main duty irrespective of any additional secondary duties he/she may be required to perform (e.g. a technician, who works mainly as an electronics technician but is also required to perform the work of a draughtsman occasionally, should be classified as an electronics technician and not as a draughtsman).
   請根據僱員的主要職務分類，而不以其兼任的其他職務分類（例如，一名技術員的主要職務為電子技術員，但有時須擔任繪圖員的工作，則應歸類為電子技術員而非繪圖員）。

6. Average Monthly Income - Column 'B'
每月平均收入 —— 「B」欄
Please enter into this column the code for average monthly income range for each type of employees. The income should include basic wages, guaranteed year-end bonus, regular overtime pay, cost of living allowance, meal allowance etc., if any. If you have more than one employee doing the same job, please enter the average figure. (Please refer to the codes in the last column of the questionnaire.)
請在「B」欄填入每類僱員的每月平均收入編號，這包括底薪固定發放的年終花紅、定期超時工作工資、生活津貼、膳食津貼等。若從事同類工作的僱員多於一名，則請取其平均數字。（請參閱調查表最後一欄的類別編號）

7. Number of Employees as at 1.4.2016 (Excl. Trainees) - Column 'C'
在 2016 年 4 月 1 日的僱員人數（受訓者除外） —— 「C」欄
Please fill in the total number of employees (excluding trainees and apprentices) in your establishment.
請將 貴機構目前所僱用的全部僱員人數（受訓者及學徒除外）填入此欄。

8. Forecast of Number of Employees as at April 2017 (Excl. Trainees) - Column 'D'
預計在 2017 年 4 月的僱員人數（受訓者除外） —— 「D」欄
The forecast number of employed means the likely number of employees (excluding trainees and apprentices) you will be employing 12 months from now.
預計僱員人數指 貴機構於十二個月後可能僱用的員工總數（受訓者及學徒除外）。

9. Number of Vacancies as at 1.4.2016 (Excl. Trainees) - Column 'E'
在 2016 年 4 月 1 日的空缺額（受訓者除外） —— 「E」欄
Please fill in the number of existing vacancies (excluding those for trainees and apprentices).
請填入 貴機構現有的空缺額（受訓者及學徒的空缺數目除外）。
'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.
「現有空缺額」是指該職位在統計日期懸空，須立刻填補，而正積極招聘人員填補。

10. No. of Trainees as at 1.4.2016 - Column 'F'
在 2016 年 4 月 1 日的受訓者人數 —— 「F」欄
Please fill in the total number of trainees. The term 'trainees' includes all trainees receiving any form of training and apprentices under a contract of apprenticeship.
請將正在受訓者人數填入此欄。「受訓者」包括正在接受各種訓練的人士，以及簽有學徒合約的登記學徒。

11. Internal Promotion
內部晉升
An internal promotion is the promotion of an employee to a higher level job by virtue of his/her performance or abilities. Please fill in the no. of internal promotion from "Technician to Technologist", from "Craftsman to Technician" and from "Others to Craftsman" in the past 12 months （1.4.2015 to 31.3.2016）in the respective columns.
內部晉升指一名僱員由於表現良好或具工作才能而獲晉升至較高級職位。請將過去十二個月 (1.4.2015 至 31.3.2016) 貴機構內部由技術員晉升至技師、由技工晉升至技術員，以及由其他職級晉升至技工的人數填入所屬欄內。

12. Hong Kong Technical Personnel Dispatched Outside Hong Kong
遣派香港以外的香港技術人員
Please enter the number of technologists, technicians and craftsmen paid by Hong Kong who had been dispatched to work for more than half year outside Hong Kong in the past 12 months (1.4.2015 to 31.3.2016).
請填寫過去十二個月內 (1.4.2015 至 31.3.2016)，由香港支薪而被遣派往外地，工作超過半年的技師、技術員及技工數目。

13. Education and Training an Employee Should Have
僱員宜有的教育及訓練
The purpose of this column is to solicit your view on the education and training which an employee in a particular job should have if he/she was to carry out his/her work competently. (Please refer to the codes in the same page of the questionnaire.)
此欄目的在調查 貴機構的意見：各類職位的僱員宜具備何種教育及訓練，才能勝任其工作。(請參閱調查表同一頁的類別編號)。

14. Recruitment
招聘
(a) Please enter the number of new recruits in the past 12 months (1.4.2015 to 31.3.2016);
請填寫過去十二個月內 (1.4.2015 至 31.3.2016)， 貴機構新招聘的僱員人數；
(b) and the number of recruits who have performed electronics services related duties in their last jobs from items (a).
及在上列 (a) 項中，入職前是從事電子業相關職務的人數。

15. Employees Left
僱員離職
Please enter the number of employees who had left your establishment in the past 12 months (1.4.2015 to 31.3.2016)
請填寫過去十二個月內 (1.4.2015 至 31.3.2016)， 貴機構離職的僱員人數。

16. Skills an Employee Need to Enhance
僱員需加強培訓的技能
Please indicate the three most important skills that your employees need to enhance. (Please refer to the codes in the same page of the questionnaire.)
此欄目的在調查 貴機構的意見：各類職位的僱員在那三方面技能最需要加強培訓。(請參閱調查表同一頁的類別編號)。

17. Example
例子
To facilitate proper completion, an example is given below for your reference.
為協助閣下填表，現將例子附錄於後，以供參考。

Example 例子

Part I 第一部份

	(A) Job 工作 Title 職稱	Rec. Type	Job Code 職位編號	(B) Average Monthly Income 每月平均收入 Code 編號	(C) No. of Employees as at 1.4.2016 (excl. trainees) 在2016年4月1日的僱員人數（受訓者除外）	(D) Forecast of No. of Employees as at April 2017 (excl. trainees) 預計在2017年4月的僱員人數（受訓者除外）	(E) No. of Vacancies as at 1.4.2016 (excl. trainees) 在2016年4月1日的空缺額 (受訓者除外)	(F) No. of Trainees as at 1.4.2016 在2016年4月1日的受訓者人數
	For Official Use Only → 此欄毋須填寫		8-10	11	12-15	16-19	20-22	23-25
	TECHNOLOGIST LEVEL 技師級							
1	Electronics Engineer 電子工程師	2	1 0 1	8	5	6	1	1
2	Electrical Engineer 電機工程師	2	1 0 2	7	2	2	0	1
3	Mechanical Engineer 機械工程師	2	1 0 3	7	2	2	0	0
4	Manufacturing/Quality Assurance Engineer 製造／品質保證工程師	2	1 0 4	7	1	1	0	0
5	Chemical Engineer 化學工程師	2	1 0 5					
6	Product/Graphic Designer 產品／平面設計員	2	1 0 6					
7	System Analyst 系統分析員	2	1 0 7					
	TECHNICIAN LEVEL 技術員級							
8	Electronics Technician 電子技術員	2	2 0 1	6	3	4	1	1
9	Mechanical Technician 機械技術員	2	2 0 2	5	1	1	0	0
10	Draughtsman 繪圖員	2	2 0 3	4	2	2	0	0
11	Manufacturing/Quality Assurance Technician 製造／品質保證技術員	2	2 0 4					
12	Supervisor/Foreman/Leader 監督／管工／組長	2	2 0 5					
13	Programmer 程式編製員	2	2 0 6					
14	Web Developer/Designer 網站開發員／設計員	2	2 0 7					
15	Sales Technician 推銷技術員	2	2 0 8					
	CRAFTSMAN LEVEL 技工級							
16	High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	2	3 0 1					
17	Electronics Craftsman 電子技工	2	3 0 2	3	3	4	1	1
18	Electrician 電氣技工	2	3 0 3	3	1	1	0	0
19	Mechanic 技工	2	3 0 4					
	OPERATIVE LEVEL 操作工級							
20	Operator 生產線操作工	2	4 0 1	2	5 0	5 5	5	0
21	Others 其他	2						
22		2						
23		2						
24		2						
25		2						

Average Monthly Income 每月平均收入

Enter in column B employee's average monthly income range according to the following codes. The income should include basic wages, guaranteed year-end bonus, regular overtime pay, cost of living allowance, meal allowance etc.

請將僱員的每月平均收入幅度按照下列類別編號填入B欄內。「每月平均收入」包括底薪固定發放的年終花紅、定期超時工作工資、生活津貼、膳食津貼等。

Code 編號	Average Monthly Income Range 每月平均收入幅度
1	Under $8,001 以下
2	$8,001 - $10,000
3	$10,001 - $15,000
4	$15,001 - $20,000
5	$20,001 - $25,000
6	$25,001 - $30,000
7	$30,001 - $50,000
8	$50,001 - $70,000
9	Over $70,000 以上

Remark 備註

Note 1 If additional lines are necessary, please tick here ☐ and enter on supplementary sheet(s).
附註一 如此頁填滿，請先將（✓）號填入此 ☐ 內，然後在附頁繼續填寫 。

Note 2 The term 'trainees' includes all trainees receiving any form of training and apprentices under a contract of apprenticeship.
附註二 「受訓者」包括正在接受各種訓練的人士，以及簽有學徒合約的登記學徒。

JOB DESCRIPTIONS OF PRINCIPAL JOBS IN THE ELECTRONICS AND TELECOMMUNICATIONS INDUSTRIES
電子及電訊業主要職務工作說明

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
TECHNOLOGIST LEVEL		技師級
101	Electronics Engineer [Electronics Sales / Support Engineer, Telecommunications Engineer]	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 followings: (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) Other electronic engineering fields.
	電子工程師 [電子推銷／支援工程師，電訊工程師]	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) 電子工程其他方面的工作。

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
TECHNOLOGIST LEVEL (Continued) 技師級（續）		
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。
104	Manufacturing / Quality Assurance Engineer [Industrial Engineer, Quality Control Engineer] 製造／品質保證工程師 [工業工程師，品質控制工程師]	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。

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
TECHNOLOGIST LEVEL (Continued) 技師級（續）		
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] 系統分析員 [軟件工程師]	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. 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。

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
TECHNICIAN LEVEL 技術員級		
201	Electronics Technician [Electronics / Maintenance / Service Technician, Telecommunications Technician, Computer / Network Technician, Audio-Visual Technician, Electronic Support Technician]	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.
	電子技術員 [電子／保養／維修技術員，電訊技術員，電腦／網絡技術員，影音技術員，電子支援技術員]	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	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.
	機械技術員	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。

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
TECHNICIAN LEVEL (Continued) 技術員級（續）		
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 / Quality Assurance Technician [Quality Control Technician] 製造／品質保證技術員 [品質控制技術員]	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。
205	Supervisor / Foreman / Leader [Junior Supervisor] 監督／管工／組長 [初級監督]	Performs supervisory duties contributory to the planning and allocation of tasks to workers and trainees, and to the production, inspection, installation, operation, maintenance and repair of components, products, equipment and systems; 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； 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。

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
TECHNICIAN LEVEL (Continued) 技術員級（續）		
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 網站開發員／設計員	Uses tool set to design and create web pages / sites, 2D / 3D graphics and animation and/or other multimedia contents for integration to IT applications according to business requirement, strategy and direction in the mixed technical and creative works. 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 [Electronic Sales Technician, Electronic Merchandising Technician]	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 followings: (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.
	推銷技術員 [電子推銷技術員／電子採購技術員]	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。

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
CRAFTSMAN LEVEL 技工級		
301	High Speed Data Network & Wireless Data System Integrator 高速資訊網絡及無線系統技工	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 [Audio Visual, Electronic Servicing, Electronic System Installation, Telecommunications and Surveillance Technical Assistant] 電子技工 [影音、電子維修、電子系統安裝、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。

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
CRAFTSMAN LEVEL (Continued) 技工級（續）		
304	Mechanic [Maintenance Mechanic / Fitter / Machinist, Tool and Die Maker, Mould and Die Maker and Repairer]	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.
	技工 [保養技工／裝配打磨技工，機床工，工具及工模製造技工，工模製造及修理技工]	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。
OPERATIVE LEVEL 操作工級		
401	Operator [Assembler, Soldering Worker, Aligner / Tester, Quality, Assurance / Control Operator, Machine Operator / Attendant, Packer, Stock Handler, Electronic Data Processing Operator, General Worker]	Carries out any one of the operative jobs in assembly line in the areas of: (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;

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
OPERATIVE LEVEL (Continued) 操作工級（續）		
		(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 machines, 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.
	生產線操作工 [裝配工，焊錫工，校整／測試工，品質保證／控制工，機器操作工／看值工，包裝工，物料搬運工，電腦操作員／雜工]	擔任以下一項或多項工作： (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；塗膠及髹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；

Job Code 職位編號	Job Title 職稱	Job Description 工作說明
OPERATIVE LEVEL (Continued) 操作工級（續）		
		(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。

Remark: [ ] Equivalent
註： [ ] 其他名稱

Annex G
附 件 庚

List of Supplementary Samples for the Electronics and Telecommunications Industries
電子及電訊業補充樣本

Branch	Company Name
4	The Hong Kong Jockey Club
4	MTR Corporation Limited
4	Hong Kong Aircraft Engineering Company Limited
4	CLP Power Hong Kong Limited
4	The Hong Kong & China Gas Co Limited
4	The Hongkong Electric Co., Limited
4	Intertek Testing Services Hong Kong Limited
4	SGS Hong Kong Limited
4	Peoplebank Hong Kong Limited
4	Shun Hing Electric Service Centre Limited
4	Ngong Ping 360 Limited
4	Shun Hing Engineering Contracting Company Limited
4	The Hong Kong Standards and Testing Centre Limited
4	Honeywell Limited
4	Global Technology Integrator Limited
4	Rohm Semiconductor Hong Kong Company Limited
4	Evergrand Technologies Limited
4	Telecom Service One Limited
4	Toshiba Hong Kong Limited
4	Hong Kong Science and Technology Parks Corporation - Product Analysis Laboratory
4	Modern Medical Equipment Manufacturing Limited
4	Mad Mobile Application Development Limited
4	HP Enterprise Services (Hong Kong) Limited
4	Allan International Holdings Limited
4	Telefield Medical Devices Limited
7	Vocational Training Council
7	Hong Kong Applied Science and Technology Research Institute Company Limited
7	Solomon Systech Limited
7	Nano and Advanced Materials Institute Limited
7	Hong Kong R&D Centre for Logistics and Supply Chain Management Enabling Technologies Limited
7	Novalux Hong Kong Electronics Limited
7	The Hong Kong Research Institute of Textiles and Apparel Limited

Branch	Company Name
7	Kodec Development Limited
7	Micom Tech Limited
7	Jess Technology Company Limited
7	Integration-Linkage Technology Limited
7	Ocean Unicorn Technology Limited
7	Semic Technology Limited
7	New Spirit Technology Limited
7	Automotive Parts and Accessory Systems R&D Centre Limited
7	The Electronics Engineering Dept., The Chinese University of Hong Kong
7	The Electrical and Electronics Engineering Department, The University of Hong Kong
7	The Electrical & Electronics Eng. Dept., HK University of Science and Technology
7	The Electronics & Information Engineering Department, The Hong Kong Poly University
7	The Electronics Engineering Department, City University of Hong Kong
7	The Technical & Planning Division of The Civil Aviation Department
7	The Electrical & Mechanical Services Department (Electronics Div)
7	The Communications Authority (Past: The Office Of The Telecommunications Authority)
7	The Hong Kong Productivity Council (Electronics Services Division)
7	The Innovation and Technology Commission
7	The Chief Staff Officer Communications Branch
7	The Hong Kong Observatory
7	The Department of Computer Science, Hong Kong Baptist University
8	Fortress
8	Broadway Photo Supply Limited
8	Hongkong Suning Commerce Co., Limited
8	Chung Yuen Electrical Company, Limited
8	Wilson Communications
8	Wellent System Consultants Limited
8	Cheung Mao Kee Electrical Co Limited
8	Centralfield Computer Limited
8	Videocom
8	Foresoon Computer Engineering Company Limited

Annex H
附 件 辛

The 2016 Manpower Survey of the Electronics and Telecommunications Industries
Sampling Plan
(Establishment Level as at Q4/2015)
2016 年電子及電訊業人力調查報告
抽樣細則
(根據 2015 年第 4 季公司資料)

Sector 門類	Branch 業務	Industry (HSIC 2.0) 行業編號 (HSIC 2.0)	Stratum 層級	Employment size 僱員人數	Size of frame 機構數目	Sampling Fraction 抽樣比率	Sample Size 抽樣數目	New Discovery 新發現機構
1	1	Manufacturing 製造 (HSIC 182000, 261100, 261900, 262000, 263000, 264000, 265100, 268000, 273100, 281700, 324500, 331300, 952100, 952200, 953100)	1	1-9	944	0.030	28	
			2	10-19	36	0.300	11	
			3	20-49	29	0.400	12	
			4	50-99	6	1.000	6	
			5	100-199	9	1.000	9	
			6	200 & over	4	1.000	4	
				Total 總計	**1 028**		**70**	**0**
2	2	Engineering Services 工程服務 (HSIC 432104, 432105, 432106)	1	1-9	675	0.030	20	
			2	10-19	65	0.450	29	
			3	20-49	49	0.800	39	
			4	50-99	5	1.000	5	
			5	100-199	2	1.000	2	
			6	200 & over	3	1.000	3	
				Total 總計	**799**		**98**	**0**
	3	Trading & Service 貿易及服務 (HSIC 451452, 451601, 451602, 451611, 451613, 451631, 451634, 452452, 452601, 452602, 452611, 452613, 452631, 452634, 620101, 620199, 620200, 620900, 631100)	2	10-19	1 494	0.025	37	
			3	20-49	872	0.080	70	
			4	50-99	133	0.450	60	
			5	100-199	72	0.700	50	
			6	200 & over	37	1.000	37	1
				Total 總計	**2 608**		**254**	**1**
	4	**Supplementary Sample # 補充**		**Total 總計**	**25**	**1.000**	**25**	**0**
3	5	Telecommunications 電訊 (HSIC 591100, 601000, 602000, 611000, 619100, 619900)	1	1-9	1 574	0.025	39	
			2	10-19	65	0.250	16	
			3	20-49	57	0.350	20	
			4	50-99	12	1.000	12	
			5	100-199	9	1.000	9	
			6	200 & over	32	1.000	32	1
				Total 總計	**1 749**		**128**	**1**
4	6	Wholesale 批發 (HSIC 460452, 460601, 460602, 460611, 460634)	1	1-9	1 131	0.030	34	
			2	10-19	98	0.180	18	
			3	20-49	36	0.600	22	
			4	50-99	10	1.000	10	
			5	100-199	2	1.000	2	
			6	200 & over	3	1.000	3	
				Total 總計	**1 280**		**89**	**0**
5	7	**Supplementary of Design Houses, Universities & Government #** 設計公司、相關院校學系及政府部門補充		**Total 總計**	**28**	**1.000**	**28**	**0**
6	8	**Supplementary Sample of Retail Shop #** 電子產品零售公司補充		**Total 總計**	**10**	**1.000**	**10**	**0**
Grand Total 總 計					**7 527**		**702**	**2**