



 **ANPOWER**
RESOURCES GUIDE
FOR INFOCOMM TECHNOLOGY INDUSTRY



PREFACE

Labour market situation

The labour market performed well in 2010: Total employment grew by 3.9% (or 115,900) compared to 2009 and unemployment fell to 2.2%, lower than the 3% a year ago. For 2011, the Ministry of Trade and Industry expects Singapore's Gross Domestic Product to grow 5 to 6%. In the second quarter of 2011, overall employment increased by 24,800 and unemployment rate remain low at 2.1% With positive economic growth and a tight labour market, there is a need to moderate the demand for foreign workers while at the same time raise productivity. Foreign worker levies will be increased in six-monthly intervals up to July 2013 to reduce the reliance on foreign manpower and create the necessary impetus for employers to turn to productivity improvement instead.

Need to improve productivity

There are government initiatives such as the S\$2 billion National Productivity Fund (NPF) and the enhanced Productivity and Innovation Credit (PIC), which aim to assist companies to focus on raising productivity for sustainable growth. Productivity-driven growth is the main thrust to deliver sustainable and inclusive economic development. It is, therefore, important for companies to continue to invest in productivity initiatives, improve the skills of workers and optimize the allocation of foreign manpower.

What is the Manpower Resources Guide?

Manpower Resources Guide is a new initiative by the Ministry of Manpower, in collaboration with other agencies and education institutions, to highlight the sources of local manpower on which companies can tap to meet their immediate and near-term manpower needs. This first edition of Manpower Resources Guide covers the Infocomm, Food & Beverage and Biomedical Sciences industries.

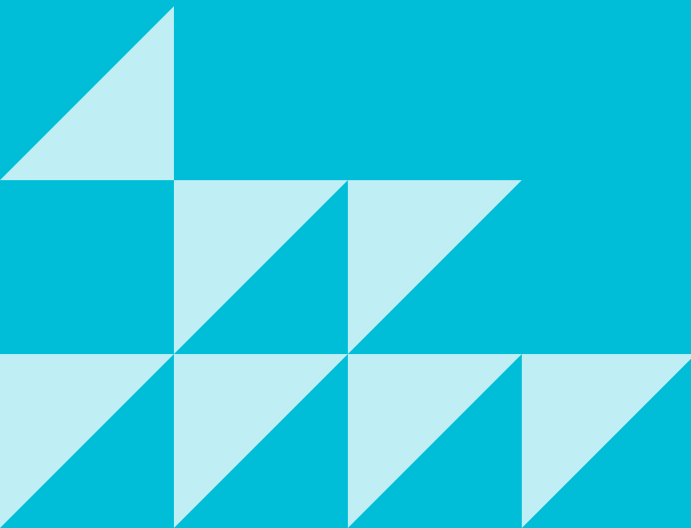


How Manpower Resources Guide helps employers

Manpower Resources Guide provides information on the pipeline of manpower that will be available from tertiary education institutions (i.e. ITE, polytechnics, universities) over the period 2011–2015. The publication also outlines the specific skill sets in which this manpower supply will be trained, as well as the salary ranges of occupations. This will help employers to find and attract the right talent for their needs. Included in this publication is a special feature on other viable sources of manpower (i.e. older workers and back-to-work women) that employers could consider, especially in the tight labour market. The publication provides contact information for each manpower resource to help employers recruit directly from specific sources.

Feedback is welcomed

We hope that you will find this publication useful in helping you to meet your company's manpower needs. We welcome feedback on how Manpower Resources Guide has helped you, as well as suggestions for improvement, especially in terms of other industries you would like to see featured. We can be reached at MOM_MPP@mom.gov.sg.



CONCEPTS AND DEFINITIONS¹

Occupations in demand¹ are obtained from MOM's industry engagements. They are selected because they are key occupations in the **Infocomm** industry and have good career growth potential. These occupations in demand are indicative and may change according to economic and labour market conditions.

Relevant qualifications and skills are programmes/courses that train graduates to be ready for a particular occupation. They outline the skills that graduates are taught as part of the specific programme/course. The programmes/courses are obtained from MOM's industry engagements as well as from the respective tertiary education institutions. However, employers are not restricted to hiring workers from the stated courses. They may also hire workers who have acquired the relevant skills from other programmes/courses.

Wage range refers to the gross median monthly wages that workers of a particular occupation receive in the labour market. The wage range by age band gives an indication of the salary a worker can expect as he stays on in that occupation. A worker who has performed well in an occupation could be promoted to a higher position, and the wage level could be adjusted accordingly. The wage data is from MOM's Occupational Wage Survey 2010 as well as from respective agencies' inputs. Wages may have changed since MOM's survey was last conducted.

Supply numbers are the projected number of graduates for a particular programme/course. The numbers are obtained from the tertiary education institutions. The numbers are rounded off and are meant to be indicative. The actual numbers may differ due to factors such as change in intake numbers and attrition.

¹The content of this publication is provided on an "as is" basis without warranties of any kind. To the fullest extent permitted by law, MOM does not warrant and hereby disclaims any warranty as to the accuracy, correctness, completeness, reliability, timeliness, non-infringement, title, merchantability or fitness for any particular purpose of the contents of this publication.

The Infocomm Technology (ICT) industry is a key contributor to Singapore's economic development and social growth. The ICT industry supports many industries in Singapore in harnessing infocomm technology to enable business growth. Such industries include education, health care, manufacturing, tourism and hospitality, and finance. Today, many top technology companies like Microsoft, Oracle, Amazon Web Services, Salesforce.com, Google and IBM have made Singapore a key node in their global network – a strong testament to the country's strategic positioning as a global infocomm hub. Many multinational end-user companies have also set up their global IT offices here to drive their worldwide business operations.

The ICT industry has been growing on a strong uptrend since 2005, at an annual growth rate in excess of 13%, underscoring the key enabling role of ICT and its continued importance. Revenue grew by 8.0% to reach \$62.74 billion in 2009, from \$58.10 billion in 2008. The pool of infocomm manpower in Singapore has been growing steadily for the past four years, rising at an annual growth rate of 6%. The total number of infocomm jobs in 2009 reached 140,800 compared to 111,400 in 2005.

The outlook for the ICT industry is very promising. The borderless nature of ICT presents opportunities for local infocomm companies to export their services. To further exploit the potential of ICT, the IDA launched the Intelligent Nation 2015 (iN2015) plan with the aim of positioning Singapore as a world leader at harnessing ICT to add value to the economy and society. iN2015 aims to double the value-add of the Infocomm industry to S\$26 billion by 2015, generating a threefold increase in infocomm export revenue to S\$60 billion and creating 80,000 infocomm and infocomm-related jobs by 2015. In addition, iN2015 targets to achieve broadband connectivity in 90% of homes as well as 100% computer ownership in all homes with school-going children by 2015.

INFOCOMM TECHNOLOGY INDUSTRY



Indicative Number of Graduates by Course and Year for the Infocomm Technology Industry

SOFTWARE ENGINEER



Wage range

\$3,200
(25-29 years old)

\$3,599
(30-34 years old)

\$4,672
(35 years old and above)

NTU

Bachelor's Degree in Computer Science

SUPPLY				
2011	2012	2013	2014	2015
100	180	200	200	Not available

- Graduates have a solid foundation and strong practical training to rise up to challenges brought about by the rapid pace of technological advances. They are equipped with a full range of skills to analyse specifications; and innovate, design and develop efficient, reliable and maintainable software systems, information systems and integrated engineering systems, both small and large scale for the ICT industries.
- Graduates have the skills to design algorithms and data structures, and are well versed in computing language paradigms. They are also trained in software engineering, operating systems, databases and computer networks.

For recruitment matters, please contact:

(I) NTU Career & Attachment Office

Tel: 6790 5242

Email: cao@ntu.edu.sg

(II) Ms Lora Wong

Tel: 6790 4451

Email: mywong@ntu.edu.sg

SOFTWARE ENGINEER



Wage range

\$3,200
(25-29 years old)

\$3,599
(30-34 years old)

\$4,672
(35 years old and above)

NTU

Bachelor's Degree in Computer Engineering

SUPPLY				
2011	2012	2013	2014	2015
180	150	130	130	Not available

- Graduates possess a range of expertise to exploit technologies in the design of software and firmware for computing systems, embedded systems and mobile devices. They are also well versed in the design of digital systems, real-time applications and software for the ICT and engineering industries.
- Graduates are able to integrate knowledge from both computer science and electronics engineering. They possess the analytical skills of a computer scientist and the design and practical skills of an electronics engineer.
- Graduates possess broad knowledge of programming, software engineering, networking and digital systems as well as electronics, microcontrollers, signal processing and computer networking.

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SOFTWARE ENGINEER



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NUS

Bachelor of Computing in Information Systems

SUPPLY				
2011	2012	2013	2014	2015
70	120	140	120	120

- Graduates are equipped with the skills to integrate infocomm technology fundamentals with domain expertise to develop innovative solutions for organisations.
- Graduates have an in-depth and relevant understanding of the application of infocomm technology through projects and case studies that are aligned with industry best practices.
- Graduates are proficient in the design and development of infocomm solutions and the management of infocomm projects, which are skills emphasised in the iN2015 plan.

For recruitment matters, please contact:

(I) NUS Career Centre

Tel: 6516 1385

Email: careers@nus.edu.sg

(II) Ms Cammie Tan

Email: tancammie@nus.edu.sg

SOFTWARE ENGINEER



Wage range

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(25-29 years old)

\$3,599
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\$4,672
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SUPPLY				
2011	2012	2013	2014	2015
70	90	130	120	120

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- Graduates are adept in analysing an application problem, understanding users' requirements, formulating the problem in terms of computational requirements, conceiving novel solution ideas, designing appropriate solutions that meet the requirements, implementing the solution and evaluating the effectiveness of the solution.
- Graduates possess the ability to function in a multidisciplinary team, working with a range of technologies to develop computer systems and solutions of a multidisciplinary nature.

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SUPPLY				
2011	2012	2013	2014	2015
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- Graduates possess both technical breadth (i.e. knowledge in technical areas relevant to Computer Engineering) as well as the ability to use relevant engineering tools to solve problems in one or more specialisations of Computer Engineering.

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SMU

Bachelor of Science (Information Systems Management)

SUPPLY				
2011	2012	2013	2014	2015
220	260	280	300	320

- Graduates are equipped with skills to design, build, deploy and manage software applications that address business challenges.
- Graduates have the competencies to create innovative solutions to help people in business and government organisations to work smarter, improve productivity and offer new types of services to their customers.

For recruitment matters, please contact:

SMU Career Services

Tel: 6828 0177

Email: employer@smu.edu.sg

PROJECT MANAGER



Wage range

Not available
(25–29 years old)

\$4,375
(30–34 years old)

\$ 6,417
(35 years old and above)

NTU

Bachelor's Degree in Computer Science

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BUSINESS ANALYST



Wage range

\$3,247
(25–29 years old)

\$4,000
(30–34 years old)

\$4,938
(35 years old and above)

NTU

Bachelor's Degree in Computer Science and Bachelor's Degree in Business (IT)

SUPPLY				
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20	20	20	20	Not available

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DATABASE ADMINISTRATOR



Wage range

\$3,967
(25–29 years old)

\$4,892
(30–34 years old)

\$5,044
(35 years old and above)

NTU

Bachelor's Degree in Computer Science

SUPPLY				
2011	2012	2013	2014	2015
100	180	200	200	Not available

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IT SECURITY CONSULTANT



Wage range

\$2,965
(25–29 years old)

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For recruitment matters, please contact:

(I) NUS Career Centre

Tel: 6516 1385

Email: careers@nus.edu.sg

(II) Ms Cammie Tan

Email: tancammie@nus.edu.sg

ENTERPRISE RESOURCE PLANNING CONSULTANT



Wage range

\$3,100
(25–29 years old)

\$3,790
(30–34 years old)

\$5,087
(35 years old and above)

NTU

Bachelor's Degree in Computer Engineering

SUPPLY				
2011	2012	2013	2014	2015
180	150	130	130	Not available

- Graduates possess a range of expertise to exploit technologies in the design of software and firmware for computing systems, embedded systems and mobile devices. They are also well versed in the design of digital systems and real-time applications as well as software for the ICT and engineering industries.
- Graduates are able to integrate knowledge from both computer science and electronics engineering. They possess the analytical skills of a computer scientist and the design and practical skills of an electronics engineer.
- Graduates possess broad knowledge of programming, software engineering, networking and digital systems as well as electronics, microcontrollers, signal processing and computer networking.

For recruitment matters, please contact:

(I) NTU Career & Attachment Office

Tel: 6790 5242

Email: cao@ntu.edu.sg

(II) Ms Lora Wong

Tel: 6790 4451

Email: mywong@ntu.edu.sg

ENTERPRISE RESOURCE PLANNING CONSULTANT



Wage range

\$3,100
(25–29 years old)

\$3,790
(30–34 years old)

\$5,087
(35 years old and above)

NUS

Bachelor of Computing in Information Systems

SUPPLY				
2011	2012	2013	2014	2015
70	120	140	120	120

- Graduates are equipped with the skills to integrate infocomm technology fundamentals with domain expertise to develop innovative solutions for organisations.
- Graduates have an in-depth and relevant understanding of the application of infocomm technology through projects and case studies that are aligned with industry best practices.
- Graduates are proficient in the design and development of infocomm solutions and the management of infocomm projects, which are skills emphasised in the iN2015 plan.

For recruitment matters, please contact:

(I) NUS Career Centre

Tel: 6516 1385

Email: careers@nus.edu.sg

(II) Ms Cammie Tan

Email: tancammie@nus.edu.sg

ENTERPRISE RESOURCE PLANNING CONSULTANT



Wage range

\$3,100
(25–29 years old)

\$3,790
(30–34 years old)

\$5,087
(35 years old and above)

SMU

Bachelor of Science (Information Systems Management)

SUPPLY				
2011	2012	2013	2014	2015
220	260	280	300	320

- Graduates are equipped with skills to design, build, deploy and manage software applications that address business challenges.
- Graduates have the competencies to create innovative solutions to help people in business and government organisations to work smarter, improve productivity and offer new types of services to their customers.

For recruitment matters, please contact:

SMU Career Services

Tel: 6828 0177

Email: employer@smu.edu.sg

*List of CET Centres and WSQ Courses Relevant for
the Infocomm Technology Industry*

Institute of Systems Science (ISS)



- Graduates are equipped with skills and knowledge to manage, plan and implement information systems. Through the courses* offered, graduates are able to create and maintain IT systems that meet business needs.
- Please refer to this link for a complete listing of courses offered by ISS:
http://www.iss.nus.edu.sg/iss/article_display.jsp?link=link_course_funded&artid=1464&name=Course_Funded

** Courses conducted are aligned to the National Infocomm Competency Framework (NICF) and accredited by WDA. NICF defines the competencies needed for various key infocomm job roles. It enables infocomm professionals to plan their career development, have greater clarity on the content of training courses and obtain recognised certifications.*

Contact details:

National University of Singapore

25 Heng Mui Keng Terrace

Singapore 119615

Tel: 6516 2020/ 6516 2009/ 6516 2096/ 6516 5777

Fax: 6778 2571

Email: isstraining@nus.edu.sg

Strategic Technology Management Institute (STMI)



- Courses* offered have a strong industry orientation to ensure that graduates are imparted with the relevant competencies, best practices and necessary job skills to keep pace with the rapid developments in the Infocomm sector.
- Please refer to this link for a complete listing of courses offered by STMI:
http://stmi.nus.edu.sg/index.php?option=com_content&view=category&layout=stmilisting&id=3&Itemid=9

** Courses conducted are aligned to the National Infocomm Competency Framework (NICF) and accredited by WDA. NICF defines the competencies needed for various key infocomm job roles. It enables infocomm professionals to plan their career development, have greater clarity on the content of training courses and obtain recognised certifications.*

Contact details:

National University of Singapore

I-Cube, #03-01

21 Heng Mui Keng Terrace

Singapore 119613

Tel: 6601 1040

Fax: 6776 2856

Email: stmi@nus.edu.sg

Ngee Ann Polytechnic (NYP)



- Graduates received high-quality training from courses relevant to the info-comm sector.
- Please refer to this link for a complete listing of courses offered by NYP:
<http://www.np.edu.sg/cet/courses/Pages/course.aspx>

** Courses conducted are aligned to the National Infocomm Competency Framework (NICF) and accredited by WDA. NICF defines the competencies needed for various key infocomm job roles. It enables infocomm professionals to plan their career development, have greater clarity on the content of training courses and obtain recognised certifications.*

Contact details:

Blk 56, #01-04

535 Clementi Road

Singapore 599489

Tel: 6460 6353

Fax: 6462 0075

Email: enquiryCET@np.edu.sg

SPECIAL FEATURE: OTHER VIABLE SOURCES OF MANPOWER

As the labour market tightens, businesses will need to tap on new sources of manpower to support their growth. Back-to-work women and older workers represent viable sources of manpower that employers could consider, especially in the current tight labour market. This section outlines the characteristics and profiles of economically inactive women and older workers so that employers can better understand their job preferences and better leverage them to meet manpower demands.

Economically inactive women

In 2010, there were 900,000 resident females in the labour force. Nonetheless, there is a sizeable pool of economic inactive females. The proportion of female residents of prime working age 25–54 not in employment was 28.3%. A survey conducted by MOM indicated that the vast majority of economically inactive women are looking for part-time work arrangements as it allows them to balance work commitments with their family responsibilities. The availability of part-time/flexible work arrangements, followed by having jobs near home, was the main motivator that could influence a sizeable number of economically inactive women who are not intending to work to do so.

Potential female entrants with relevant tertiary qualifications are suitable for project or freelance work, for example, in the IT industry. They could also serve as a complementary source of labour to students working part-time, for example, in the F&B industry, as students might not be able to work at certain times or during exam periods. Much can be done to attract women back to the workforce by promoting flexible working arrangements, reaching out to potential entrants, training those who are interested to return to work and providing support for childcare.



Older workers

In 1998, our resident older workers population (aged 55 and above) was 14%. This will increase to 27% by the year 2020.

Research¹ had shown that there is no significant difference between the job performance of older and younger workers. Positions that older workers could perform better are those which require relationship forged between business partners where experience and understanding is critical. Examples of such jobs are retail, counselling, social services and consultancy. Also, in jobs that require a substantial amount of training and experience such as professional and highly technical work, older workers can maintain high levels of performance.

As Singapore moves towards a knowledge-based economy, age may become less important than skills in sustaining employment. In addition, the growing importance of the services industry, in fact, augurs well for the employment of older workers, as the nature of work will be less dependent on physical stamina but requires softer skills, for example, communications and service delivery.

The Government will enact re-employment legislation by 2012 to enable more people to continue working beyond the current statutory retirement age of 62. Older workers will form the core pool of manpower supply as the population ages, and employers will have to think about how to better tap on older workers. Some of the measures to promote the employment of older workers in Singapore include the extension of the retirement age, reduction in the cost of employing older workers, guidelines on non-discriminatory job advertisements and skills retraining of older workers. While the various measures can contribute to the continued employment of older workers, success hinges on employers changing their attitudes so as not to base employment decisions on preconceived ideas about age.

¹ Warr, P. (1994); 'Age and job performance', in Snel, J. and Cremer, R. (1994).



List of Community Development Councils for Tapping on Older Workers and Back-to-Work Women

CENTRAL

Contact details:

Central Singapore CDC Main Office, HDB Hub Bizthree
490 Lorong 6 Toa Payoh, #04-10, Singapore 310 490

Tel: 6370 9901

Fax: 6370 9928

Email: feedback@centralsingapore.org.sg

NORTHEAST

Contact details:

North East Community Development Council,
300 Tampines Ave 5 #06-01, NTUC Income Tampines Junction, Singapore 529653

Tel: 6424 4000

Fax: 6424 4066

Email: ask@northeast.org.sg

NORTHWEST

Contact details:

(I) 900 South Woodlands Drive
#01-04 Woodlands Civic Centre, Singapore 730900.

Tel: 6767 2288

Fax: 6219 1176

Email: Northwest_CDC@pa.gov.sg

(II) 170 Ghim Moh Road #06-01
Ulu Pandan Community Building, Singapore 279621.

Tel: 6463 3626

Fax: 6469 0403

Email: Northwest_CDC@pa.gov.sg

*List of Community Development Councils for
Tapping on Older Workers and Back-to-Work Women*

SOUTHEAST

Contact details:

South East Community Development Council
10 Eunos Road 8 #02-01, Singapore 408600
Tel: 6243 8753
Fax: 6243 3130
Email: southeast_cdc@pa.gov.sg

SOUTHWEST

Contact details:

South West Community Development Council (Service Centre)
The JTC Summit
8 Jurong Town Hall Road, #03-11 Singapore 609434
Tel: 6316 1616
Fax: 6316 7251
Email: southwest_cdc@pa.gov.sg

WOMEN'S DEVELOPMENT SECRETARIAT

Contact details:

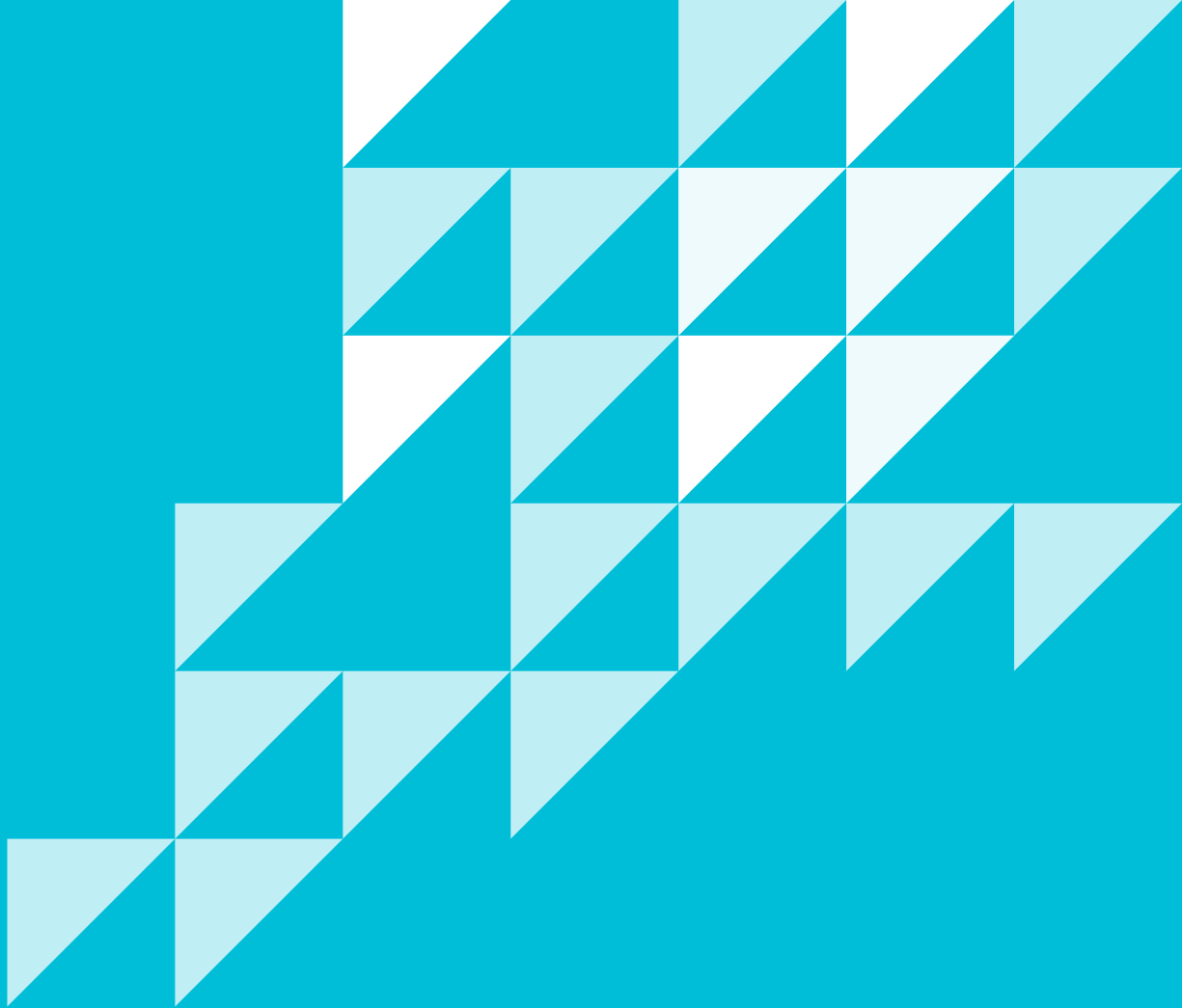
Ms Poh Poh Hong
Tel: 6213 8269
Email: pohph@ntuc.org.sg

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National University of Singapore (NUS)
Ngee Ann Polytechnic (NP)
Republic Polytechnic (RP)
Singapore Management University (SMU)
Singapore Polytechnic (SP)
Singapore Workforce Development Agency (WDA)
Spring Singapore (SPRING)
Temasek Polytechnic (TP)

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MINISTRY OF
MANPOWER

