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# CRITICAL OCCUPATIONS LIST 2018/2019

## OCCUPATION REPORT

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# CSC

*Critical Skills Monitoring Committee*



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## OCCUPATIONS ON THE 2018/2019 CRITICAL OCCUPATIONS LIST

The **Critical Occupations List (COL)** shows occupations that are **skilled, sought-after, and strategic** across 18 sectors in Malaysia.

**Table 1: Critical Occupations List – Full List (59 Occupations)**

No.	Critical Occupation (MASCO Code)	Additional Information
1	Managing Director and Chief Executive (1121)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Chief Executive Officer; Chief Operating Officer; Executive Director; Company Director; Deputy Executive Director; Managing Director; Manager; General Manager; Operations Manager; Administrator; President; Technical Manager; Head of Operation</li> </ul>
2	Finance Manager (1211)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Finance Manager; Account Manager; Audit Manager; Audit and Risk Management Manager; Chief Financial Officer; Credit Manager; Insurance Manager; Fund Manager; Treasury Manager; Transaction Monitoring Manager; Tax Manager; Finance Director; Chief Financial Controller; Risk Manager; Head of Procurement; Procurement Manager; Actuarial Valuation Manager</li> </ul>
3	Human Resource Manager (1212)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Human Resource Manager; Training Manager; Industrial Relations Manager; Occupational Safety and Health Manager; Recruitment Manager; Occupational Safety Manager; Learning &amp; Organization Development Manager; Compensation &amp; Benefits Manager; Talent and Organization Performance Manager</li> </ul>
4	Policy and Planning Manager (1213)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Policy and Planning Manager; Strategic Planning Manager; Corporate Planning Manager; Policy and Research Manager; Project Planning Manager; Project Leader; Programme Manager; Regulatory Affairs Manager</li> </ul>
5	Business Service Manager (1214)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Production Manager; Production and Business Operation Manager; Business Services Development Manager; Production Planner; Production Controller; Business Development Manager; Compliance Manager</li> </ul>

**Table 1: Critical Occupations List – Full List (59 Occupations)**

No.	Critical Occupation (MASCO Code)	Additional Information
6	Business Services and Administration Manager Not Elsewhere Classified (1219)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Purchasing Manager; Quality Control Manager; Corporate Services Manager; Quality Assurance Manager; Quality Assurance Manager (Halal Food Manufacturing)</li> </ul>
7	Sales and Marketing Manager (1221)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Sales Manager; Sales and Marketing Manager; Marketing Manager; Market Research Manager; Product Manager; Brand Manager; Shopping Centre Manager; Outlet Manager; Sales Director</li> </ul>
8	Advertising and Public Relations Manager (1222)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>General Affairs Manager; Communications Manager; Public Relations Manager; Customer Service Manager; Customer Relationship Manager</li> </ul>
9	Research and Development Manager (1223)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Research and Development Manager; Product Development Manager; Research Manager</li> </ul>
10	Manufacturing Manager (1321)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Manufacturing Manager; Production and Operation Manager (Manufacturing); Factory Manager; Mechanical Manager; Oil Mill Manager</li> </ul>
11	Construction Manager (1323)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Construction Manager; Production and Operation Manager (Construction); Contract Manager; Project Manager; Site Manager; Engineering Director</li> </ul>

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No.	Critical Occupation (MASCO Code)	Additional Information
12	Information and Communications Technology (ICT) Manager (1511)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Chief Information Technology Officer; Information Technology Manager; Application Development Manager; Data Operations Manager; Network Manager; Audio Visual Manager; Database Manager; Information Technology Infrastructure Manager; Information Technology Sales Manager; Creative Multimedia Manager; Chief Information Security Officer; Information Technology Business Development Manager; Software Development Manager</li> </ul>
13	Chemist (2113)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Chemist, Analysis; Chemist (Research and Development); Petrophysicist</li> </ul>
14	Geologist and Geophysicist (2114)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Geophysicist; Geologist; Geologist (Mining); Hydrologist; Petroleum Geoscientist; Geoscientist; Reservoir Geologist; Geomechanic; Sedimentologist</li> </ul>
15	Mathematician, Actuary and Statistician (2121)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Data Scientist; Data Analyst; Data Modeller; Appointed Actuary; Pricing Actuary; Valuation Actuary; Big Data Engineer</li> </ul>
16	Industrial and Production Engineer (2141)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Automation Engineer; Industrial Engineer; Production Engineer; Systems Analyst (Except Computers); Planning Engineer; Systems Engineer (Except Computers); Industrial Efficiency Engineer; Printing Technologist; Plant Engineer; Process Development Engineer; Facilities Competent Engineer; Reliability Engineer; Automation Design Engineer; Robotic Process Automation (RPA) Expert; Business Process Automation Expert; Techno Functional Consultant</li> </ul>
17	Civil Engineer (2142)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Engineer; Civil Engineer; Site Engineer; Civil Engineer (Construction); Civil Engineer (Building Construction); Civil Engineer (Building Structure); Maintenance Engineer; Inspection Engineer</li> </ul>

**Table 1: Critical Occupations List – Full List (59 Occupations)**

No.	Critical Occupation (MASCO Code)	Additional Information
18	Mechanical Engineer (2144)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Engineer (Mechanical) Grade J41; Mechanical Engineer; Machinery and Tools Industrial Engineer; Heating Ventilation Air-Conditioning and Refrigeration Engineer; Mechanical Engineer (Motor and Engine); Steam Engineer; Technology Technical Engineer; Welding Engineer; Mechanical Maintenance Engineer; Rotating Equipment Engineer; Operation Engineer; Platform Superintendents; R&amp;D Engineers; Offshore Equipment Engineer; CNC Machining Engineer; CAD/CAM Engineer; Computer-Aided Design (CAD) Design Automation Engineer</li> </ul>
19	Chemical Engineer (2145)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Chemical Engineer; Chemical Process Engineer; Food and Drinks Technologist; Rubber Technologist; Process Control Engineer</li> </ul>
20	Mining Engineer, Metallurgist and Related Professional (2146)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Mining Engineer; Drilling Engineer; Production Technologist; Renewable Energy Engineer; Product Design R&amp;D Engineer; Pipeline Mechanical Engineer; Blasting Expert; Radioactive Expert; Well Engineer</li> </ul>
21	Engineering Professional (Excluding Electrotechnology) Not Elsewhere Classified (2149)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Quantity Surveyor; Project Engineer; Process Engineer; Quality Assurance Engineer; Quality Control Engineer; Biomedical Engineer; Materials Engineer; Inspector (Factory and Machinery); Procurement Engineer; Inspection (QA/QC) Engineer</li> </ul>
22	Electrical Engineer (2151)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Assistant Engineer (Electrical) J29; Electrical Engineer; Embedded System/Firmware Engineer; R&amp;D Electrical Engineer (includes Product Design); Electrical Consultant; R&amp;D Electrical Design Engineer</li> </ul>
23	Electronic Engineer (2152)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Electronics Engineer; Electronics Engineer (Computer Hardware Design); Wirebond Engineer; Semiconductor Packaging Engineer; Electronic Component Design Engineer</li> </ul>

**Table 1: Critical Occupations List – Full List (59 Occupations)**

No.	Critical Occupation (MASCO Code)	Additional Information
24	Graphic and Multimedia Designer (2166)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Web Designer; Graphic Designer; Designer Artist; Digital Artist; Animator; Creative Designer; Computer Graphics (CG) Artist; 3D Modeller; Visual Effects Artist; Creative Artist; Lighting Artist; UI Designer</li> </ul>
25	Aircraft Pilot and Related Professional (2173)	<p>The following job title within this occupation is included:</p> <ul style="list-style-type: none"> <li>Pilot</li> </ul>
26	Manufacturing Professional (2182)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Quality Assurance Executive; Quality Control Executive; Production Executive; Warehouse Executive; Store Executive; Maintenance Executive; Manufacturing Quality Controller Executive; Product Quality Controller; Manufacturing Specialist; Supply Chain/Procurement Specialist; Manufacturing Engineer; Technical Executive; Production Executive (Halal Food Manufacturing)</li> </ul>
27	Environmental and Occupational Health and Hygiene Professional (2263)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Hazardous Waste Management Technologist; Occupational Health and Safety Officer; Environmental Safety and Health Technologist; Environmental Officer; Safety and Health Officer; Occupational Safety and Health Officer; Occupational Safety Officer; Waste Management Competence Person; Landfill Engineer</li> </ul>
28	University and Higher Education Professional Teacher (2311)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Medical Lecturer Grade DU51P; Dental Lecturer Grade DUG51P; Lecturer; Lecturer (College); Lecturer (University)</li> </ul>
29	Early Childhood Educator (2342)	<p>All job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>Pre-Primary School Teacher; Kindergarten Teacher; Pre-school Teacher; Early Childhood Educator; Nursery Teacher</li> </ul>

**Table 1: Critical Occupations List – Full List (59 Occupations)**

No.	Critical Occupation (MASCO Code)	Additional Information
30	Accountant (2411)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Auditing Accountant; Accountant; Tax Accountant; Tax Consultant; Liquidator; Group Accountant; Management Accountant; Account Executive; Financial Controller; Account Receivable Executive; Account Payable Executive; Auditor; Audit Executive; Audit and Risk Assessment Executive; Payroll Executive; Project Accountant; Adjuster; Internal Auditor</li> </ul>
31	Financial and Investment Adviser (2412)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Corporate Financial Adviser; Finance Executive; Bank Executive Officer; Financial Planner; Property Executive; Sales Analyst; High-net-worth Client Advisor; Financial Adviser</li> </ul>
32	Financial Analyst (2413)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Financial Analyst; Investment Consultant; Risk Operation Analyst; Research Analyst; Investment Analyst; Equity Analyst; Risk Management Officer; Market Risk Officer; Risk Analyst; Credit Risk Management Officer; Anti-Money Laundering Specialist</li> </ul>
33	Advertising and Marketing Professional (2431)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Sales Promotion Officer; Business Executive; Sales Specialist; Business Compliance Executive; Marketing Communications Specialist; Compliance Officer; Shariah Compliance Officer; Compliance Analyst; Trade Product Specialist; Business Development Engineer</li> </ul>
34	Systems Analyst (2511)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• IT Systems Consultant; Information Technology Business Analyst; Information Technology Security Analyst; Information Technology Specialist (.Net); Technical Specialist (.Net); Java Consultant; Java Application Consultant; Information Technology System Analyst (JDE); Application Specialist Support (Navision); System Technical Writer; Oracle E-Business Suite Consultant; System Engineer (Oracle); Security Analyst (IT); SAP Consultant; Cyber Security Analyst</li> </ul>



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No.	Critical Occupation (MASCO Code)	Additional Information
35	Software Developer (2512)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Software Developer; Software Designer; Design Engineer; .Net Developer; Application Developer (.Net); Software Engineer (.Net); C/C++ Software Engineer; Java Developer; Hypertext Preprocessor (PHP) Developer; Web Programmer (PHP); Software Design Engineer; Root Cause Failure Analysis (RCFA) Engineer; SAP IT and Finance Applications Developer; Network Security; Computer Engineer (Software)</li> </ul>
36	Applications Programmer (2514)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Computer Programmer; Software Programmer; Technical Programmer; Database Programmer; Systems Programmer; Analyst Programmer; Software Programmer (.Net); Cobol Programmer; Java Programmer</li> </ul>
37	Software and Applications Developer and Analyst Not Elsewhere Classified (2519)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Software Tester; Test Engineer (IT); Solution Architect (IT); Application Security Engineer (IT); Internal Auditor (IT)</li> </ul>
38	Systems Administrator (2522)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Information System Officer; Information Technology Support Officer; Systems Administrator; Information Technology Executive; Project Coordinator (IT); System Engineer (IT); Information System Executive; System Support Specialist; Cloud Computing Solution Architect; Web and Mobility Developer; IT Architect; Cloud Technology Specialist; Infrastructure Specialists (IT); User Experience Engineer; Systems Engineer</li> </ul>
39	Computer Network Professional (2523)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Network Administrator; Network Infrastructure Administrator; Network Engineer; Network Systems Engineer; IT Network System Engineer</li> </ul>
40	Database and Network Professional Not Elsewhere Classified (2529)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Cyber Security Executive; Digital Forensic Specialist; Security Specialist (IT)</li> </ul>

**Table 1: Critical Occupations List – Full List (59 Occupations)**

No.	Critical Occupation (MASCO Code)	Additional Information
41	Civil Engineering Technician (3112)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Clerk-Of-Work; Technician</li> </ul>
42	Electrical Engineering Technician (3113)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Electrical Engineering Technician; Electrical Supervisor; Car Electrical Technician; Electrical Technician; Debug Technician</li> </ul>
43	Mechanical Engineering Technician (3115)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Mechanical Engineering Technician; Mechanical Engineering Technician (Industrial Machinery and Tools); Mechanical Engineering Technician (Motors and Engines); Refrigeration and Air-Conditioning System Engineering Technician; Machinery Technician; CNC Technician; Welding Technician; Mechanical Technician; CNC Supervisor; CAD/CAM Technician; Spinning Technician; Knitting Technician; Weaving Technician</li> </ul>
44	Physical and Engineering Science Technician Not Elsewhere Classified (3119)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Quantity Surveying Technician; Engineering Technician, Production; Robotics Technician; Maintenance Technician; Quality Control Technician; Industrial Technician; Production Technician; Moulding Technician; Equipment Technician; Dyeing Technician; Finishing Technician; Printing Technician</li> </ul>
45	Manufacturing Supervisor (3122)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Manufacturing Supervisor; Production Supervisor; Sawmill Supervisor; Quality Control Inspector</li> </ul>
46	Others Supervisor Not Elsewhere Classified (3129)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Facilities Supervisor; Supervisor; Logistic Supervisor; Store Supervisor; Shift Supervisor</li> </ul>

**Table 1: Critical Occupations List – Full List (59 Occupations)**

No.	Critical Occupation (MASCO Code)	Additional Information
47	Commercial Sales Agent (3322)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Salesperson; After Sales Service Adviser; Sales Representative; Salesperson (Travel); Technical Sales Agent; Sales Executive; Marketing Executive; Business Development Executive; Product Brand Executive; Pre-Sales Support; Salesperson (Car); Salesperson (Motorcycle); Regional Sales Executive; Offshore Sales Executive; Sales Engineer; Marketing Engineer; Technical Sales Engineer; Digital Marketing Executive</li> </ul>
48	Chef (3641)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Chef; Chefs De Partie; Executive Chef; Kitchen Coordinator; Pastry Chef</li> </ul>
49	Receptionist (4224)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Receptionist; Front Office Receptionist; Front Office Assistant; Hotel Receptionist; Hotel Front Desk Clerk; Reservation Supervisor</li> </ul>
50	Welder and Flame Cutter (7212)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Welder; Metal Welder; Gas Pipe Welder</li> </ul>
51	Agricultural and Industrial Machinery Mechanic and Repairer (7233)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• Machinery Mechanic; Farm Machinery Repairer; Industrial Machinist; CNC Machinist</li> </ul>
52	Electrical Mechanic and Fitter (7412)	<p>The following job titles within this occupation are included:</p> <ul style="list-style-type: none"> <li>• High Voltage Restriction Chargeman; Wireman; Foreman (Electrical); Chargeman</li> </ul>



**Table 1: Critical Occupations List – Full List (59 Occupations)**

No.	Critical Occupation (MASCO Code)	Additional Information
53	Bakers, Pastry, Pasta and Confectionery Maker (7512)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Baker; Pastry Baker</li> </ul>
54	Tailor, Dressmaker, Furrier and Hatter (7621)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Tailor; Dressmaker; Operator (Sewing); Sewer; Worker (Sewing)</li> </ul>
55	Rubber Products Machine Operator (8141)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Rubber Products Machine Operator</li> </ul>
56	Steam Engine and Boiler Operator (8182)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Boilerman; Steam Boiler Plant Operator; Engine Driver</li> </ul>
57	Stationary Plant and Machine Operator Not Elsewhere Classified (8189)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Machine Operator; Production Operator; Equipment &amp; Machine Operator; Line Leader</li> </ul>
58	Heavy Truck and Lorry Driver (8332)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Lorry Driver; Truck Driver; Tanker Driver; Tow Truck Driver</li> </ul>
59	Mobile Farm and Forestry Plant Operator (8341)	The following job titles within this occupation are included: <ul style="list-style-type: none"> <li>Operator (Motorized Farm Equipment); Driver (Farm Tractor); Operator (Harvester)</li> </ul>

Note: The Critical Occupations List (COL) is constructed based on the Malaysia Standard Classification of Occupations (MASCO) 2013  
Source: Authors



## DOVETAILING REPORTS OF OCCUPATIONS ON THE 2018/2019 CRITICAL OCCUPATIONS LIST

<b>Occupation: MANAGING DIRECTORS AND CHIEF EXECUTIVES</b>			
<b>MASCO 2013 (4-Digit Code):</b> 1121			
<b>MASCO 2013 (6-Digit Code):</b> 1121-01; 1121-02; 1121-03; 1121-04; 1121-05; 1121-06; 1121-20; 1121-21; 1121-23; 1121-25; 1121-26; 1121-28; 1121-32			
Only the following job titles within this occupation are included in the Critical Occupations List (COL):		Chief Executive Officer; Chief Operating Officer; Executive Director; Company Director; Deputy Executive Director; Managing Director; Manager; General Manager; Operations Manager; Administrator; President; Technical Manager; Head of Operation	
<b>This occupation appears on COL:</b>			
	2015	No	
	2016	Yes	
	2017	Yes	
<b>Source of evidence:</b>			
	<b>Top-down indicators</b>	Passes 3 out of 14 indicators	
	<b>Bottom-up CfE survey</b>	105 nominations	
	<b>Consultation</b>	2 nominations	
	<b>Talent/Skills studies</b>	-	
<b>Top-down data:</b>			
Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	No	Wage premium growth - 1 year	No
Foreign workers – 3 years	No	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 107 nominations from 79 companies in 15 sectors, with the top three sectors being the manufacturing; financial and insurance/takaful activities; and professional, scientific and technical activities. The job titles nominated reflect mostly the need for general managers, followed by operations managers, and managing directors.
- ii. The majority of companies have reported that vacancies within this occupation group are for senior managers with equivalent to 5 to 10 years working experience. In addition, the applicants lack relevant job experience, the required credential or certification, and technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is at least more than 5 months. However, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. There is evidence that there is some gap in specialised certifications. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, some respondents reported that applicants need particular certifications to qualify for this occupation such as Chartered Banker or Professional Credit Certification and certificates in the area of shipping field.
- iv. Consistent with the claim that this occupation requires a particular set of technical skills, most respondents do not report hiring less well qualified workers. Instead, the companies have resorted to raising wages, expanding local recruitment efforts, and increasing worker training to address the shortage.
- v. The Malaysian Association of Private Colleges and Universities (MAPCU) have also highlighted the shortage of supply in senior management with academic authority, education leadership and corporate mindset, and talent poaching within industries due to the competitive market.
- vi. With high nominations of bottom-up evidence and additional input from validation, there is strong evidence this occupation does point to a widespread shortage. Therefore, we recommend that this occupation to be included in the COL.



## Occupation: FINANCE MANAGERS

**MASCO 2013 (4-Digit Code):** 1211

**MASCO 2013 (6-Digit Code):** 1211-01; 1211-02; 1211-04; 1211-05; 1211-06; 1211-07; 1211-08; 1211-09; 1211-10; 1211-13; 1211-14; 1211-16; 1211-17; 1211-19; 1211-20; 1211-21; 1211-23

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Finance Manager; Account Manager; Audit Manager; Audit and Risk Management Manager; Chief Financial Officer; Credit Manager; Insurance Manager; Fund Manager; Treasury Manager; Transaction Monitoring Manager; Tax Manager; Finance Director; Chief Financial Controller; Risk Manager; Head of Procurement; Procurement Manager; Actuarial Valuation Manager

### This occupation appears on COL:

2015	Yes
2016	Yes
2017	Yes

### Source of evidence:

<b>Top-down indicators</b>	Passes 4 out of 14 indicators
<b>Bottom-up CfE survey</b>	84 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>• Chemical and Petrochemical Environmental Scan</li> <li>• Food and Beverage Environmental Scan</li> </ul>

### Top-down data:

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	No	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 84 nominations from 66 companies in 15 sectors, with the top three sectors being the financial and insurance/takaful activities; professional, scientific and technical activities; and information and communication. The job titles nominated reflect mostly the need for finance managers, followed by account managers, and audit and risk management managers.
- ii. The majority of companies have reported that vacancies within this occupation group are for middle level candidates with 5 to 10 years of work experience. The applicants lack relevant job experience and the required credential or certification as well as insufficient applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is within 5 to 6 months. In addition, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago. Nevertheless, a significant number of respondents stated that this occupation is harder to fill.
- iii. There is evidence that there is some gap in specialised certifications. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants need particular certifications such as:
  - a) Association of Chartered Certified Accountants (ACCA)
  - b) Members of Malaysian Institute of Accountant (MIA)
  - c) Professional Credit Certification (PCC)
  - d) A minimum pass of any professional actuarial exams, for example: Fellow of Actuarial Society
- iv. Most respondents have reported to expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.) and raising wages to mitigate the shortage of this occupation.
- v. Chemical and Petrochemical Environmental Scan highlighted that many companies faced challenges in hiring finance managers in chemical, petrochemical and oleochemical sub-industries. Particularly in the rubber products sub-industry, the longest average time taken to fill this occupation is almost a year. Food and Beverage Environmental Scan also mentioned that this occupation is critical in food and beverage halal industry.
- vi. Considering the high nominations of bottom-up evidence and strong evidence from related studies, we believe that this does point to a widespread shortage. Therefore, this occupation is included in the COL.





## Occupation: HUMAN RESOURCE MANAGERS

**MASCO 2013 (4-Digit Code):** 1212

**MASCO 2013 (6-Digit Code):** 1212-01; 1212-02; 1212-03; 1212-04; 1212-06; 1212-07; 1212-08; 1212-09; 1212-10

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Human Resource Manager; Training Manager; Industrial Relations Manager; Occupational Safety and Health Manager; Recruitment Manager; Occupational Safety Manager; Learning & Organization Development Manager; Compensation & Benefits Manager; Talent and Organization Performance Manager

**This occupation appears on COL:**

2015	No
2016	Yes
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 5 out of 14 indicators
<b>Bottom-up CfE survey</b>	28 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> <li>Food and Beverage Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	No	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 28 nominations from 27 companies in 10 sectors, with the top three sectors being the financial and insurance/takaful activities; transportation and storage; and manufacturing. The job titles nominated reflect mostly the need for occupational safety & health managers and human resource managers.
- ii. The majority of companies have reported that vacancies within this occupation group are for middle and senior level positions. In addition, the applicants lack relevant job experience and the required credential or certification are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation has been reported to be within 5 to 6 months. However, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago, although some stated this occupation harder to fill.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants for occupational safety and health managers require safety and health certification to qualify for this occupation.
- iv. To address this shortage, the companies have resorted to expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.), increasing worker training and raising wages.
- v. Chemical and Petrochemical Environmental Scan mentioned that human resource managers are hard to fill and critical to the business development in rubber product sub industry, with the average time taken to fill the vacancies is up to 12 months. In addition, Food and Beverage Environmental Scan also cited that this position to be critical in food and beverage halal industry.
- vi. Further input from Malaysian Institute of Human Resource Management (MIHRM) have also pointed this occupation as critical, especially strategic human resource management manager.
- vii. Therefore, considering the strong bottom-up evidence and additional input from various studies and association that points to a shortage, we recommend this occupation to be included in the COL.



## Occupation: POLICY AND PLANNING MANAGERS

**MASCO 2013 (4-Digit Code):** 1213

**MASCO 2013 (6-Digit Code):** 1213-01; 1213-02; 1213-03; 1213-04; 1213-05; 1213-06; 1213-07; 1213-08

All the following job titles within this occupation are included in the Critical Occupations List (COL):

Policy and Planning Manager; Strategic Planning Manager; Corporate Planning Manager; Policy and Research Manager; Project Planning Manager; Project Leader; Programme Manager; Regulatory Affairs Manager

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 6 indicators
<b>Bottom-up CfE survey</b>	21 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

### Top-down data:

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 21 nominations from 18 companies in 9 sectors, with the top three sectors being the financial and insurance/takaful activities; construction; and information and communication. The job titles nominated mostly the need for strategic planning managers.
- ii. The majority of companies have reported that vacancies within this occupation group are for middle and senior level candidates. In addition, there are few applicants, applicants lack relevant job experience and the required technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported up to 6 months. Companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. Most respondents do not report hiring less well qualified workers to tackle the shortage of this occupation. Instead, the companies have resorted to expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.) and raising wages.
- v. We have also gathered additional insight from the Public Relations Consultants' Association of Malaysia (PRCA) which confirms that the shortage in this occupation is common in the industry, especially that of Corporate Planning Manager, Regulatory Affairs Manager (which is also known as Corporate Affairs Manager).
- vi. Therefore, considering the number of bottom-up nominations and evidence that these are senior level positions that require a combination of specialised skills and experience, as well as top-down evidence that points to a shortage, we recommend for this occupation to be included in the COL.



**Occupation: BUSINESS SERVICES MANAGERS**

**MASCO 2013 (4-Digit Code):** 1214

**MASCO 2013 (6-Digit Code):** 1214-01; 1214-02; 1214-03; 1214-04; 1214-05; 1214-06; 1214-07

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Production Manager; Production and Business Operation Manager; Business Services Development Manager; Production Planner; Production Controller; Business Development Manager; Compliance Manager

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 10 indicators
<b>Bottom-up CfE survey</b>	55 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	No
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 55 nominations from 50 companies in 9 sectors, with the top two sectors being the manufacturing; and financial and takaful/insurance activities. The job titles nominated reflect mostly the need for business development managers, production managers and production planners.
- ii. The majority of companies have reported that vacancies within this occupation group are for middle level positions. In addition, applicants lack relevant job experience, too few or no applicants, and applicants lack the required technical skills have been cited by companies to be the main reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is within 3 to 6 months and to some extent is more than 6 months. Companies have also reported that this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, some respondents have highlighted the need for qualifications or licensing for compliance managers such as:
  - a) Securities Commission Malaysia's licensing exams (Modules 9, 10 and 11)
  - b) Association of Chartered Certified Accountants (ACCA) certificate
- iv. To address the talent shortage, most companies have resorted to expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.) and raising wages.
- v. Based on the strong bottom up evidence, we recommend for this occupation to be included in the COL.



**Occupation: BUSINESS SERVICES AND ADMINISTRATION MANAGERS NOT ELSEWHERE CLASSIFIED**

**MASCO 2013 (4-Digit Code):** 1219

**MASCO 2013 (6-Digit Code):** 1219-01; 1219-02; 1219-03; 1219-05; 1219-06

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Purchasing Manager; Quality Control Manager; Corporate Services Manager; Quality Assurance Manager; Quality Assurance Manager (Halal Food Manufacturing)

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 6 out of 12 indicators
<b>Bottom-up CfE survey</b>	17 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	Yes	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	Yes
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	No	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 17 nominations from 17 companies in 3 sectors, with the three sectors being the manufacturing; professional, scientific and technical activities; and administrative and support service activities. The job titles nominated reflect mostly the need for quality assurance managers, followed by corporate services managers, and quality control managers.
- ii. The majority of companies have reported that most vacancies within this occupation group are for middle level candidates with 5 to 10 years of work experience. In addition, the applicants lack relevant job experience, the required technical skills, and other skills such as time management, ability to get along with others and problem solving are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is more than 6 months. However, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants do not need any particular certifications to qualify for this occupation.
- iv. Most companies have resorted to expanding local recruitment efforts, raising wages and increasing workers training as part of their strategies to address shortages of this occupation.
- v. The Chemical and Petrochemical Environmental Scan also cited quality assurance managers are critical in the plastic products sub-industry. The average time taken to fill vacancies varies among positions, at between 3 to 6 months, with a minimum qualification requirement of a bachelor's degree.
- vi. With high nominations of bottom-up evidence, validation from the environmental scan study as well as this occupation passed the top-down shortage threshold, we believe that this does point to a widespread shortage and it is included in the COL.





## Occupation: SALES AND MARKETING MANAGERS

**MASCO 2013 (4-Digit Code):** 1221

**MASCO 2013 (6-Digit Code):** 1221-01; 1221-02; 1221-03; 1221-05; 1221-06; 1221-07; 1221-09; 1221-10; 1221-12

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Sales Manager; Sales and Marketing Manager; Marketing Manager; Market Research Manager; Product Manager; Brand Manager; Shopping Centre Manager; Outlet Manager; Sales Director

**This occupation appears on COL:**

2015	No
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 6 out of 14 indicators
<b>Bottom-up CfE survey</b>	55 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> <li>Medical Devices Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 55 nominations from 50 companies in 14 sectors, with the top two sectors being the manufacturing; and accommodation and food service. The job titles nominated reflect mostly the need for sales and marketing managers.
- ii. Companies have reported that vacancies within this occupation group are diversified from middle to senior level, with significant respond from companies are looking for more than 5 years working experience candidates. Companies have also stated that the main reasons why this occupation is hard-to-fill are applicants lack relevant job experience, too few or no applicants, and applicants lack the required technical skills. The most common time to fill for this occupation reported is within 3 to 6 months. In addition, majority of companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago. However, some respondents stated this occupation harder to fill with extreme cases of companies taking more than 6 months to fill up vacancies.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. Companies have resorted to expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.), raising wages and increasing worker training as strategies to address the talent shortage.
- v. The Chemical and Petrochemical Environmental Scan have reported sales and marketing managers as well as sales promotion managers as the critical occupations in the chemical, petrochemical and oleochemical subsectors, with an average time taken to fill vacancies is within 6 to 12 months. Sales and marketing managers were also reported to be critical in the plastics product and rubber product subsectors with an average time taken of 3 to 6 and 12 months to fill up vacancies respectively. Their respondents have also cited for a minimum requirement of a bachelor's degree or equivalent for all subsectors.
- vi. Based on the Medical Devices Environmental Scan also highlighted that companies in non-consumables segment have difficulty finding qualified applicants for this occupation.
- vii. There is a strong bottom-up evidence to include this occupation in the COL, and also supported by top-down evidence and two environmental scans that indicate this occupation is facing a widespread shortage.



**Occupation: ADVERTISING AND PUBLIC RELATIONS MANAGERS**

**MASCO 2013 (4-Digit Code):** 1222

**MASCO 2013 (6-Digit Code):** 1222-02; 1222-03; 1222-04; 1222-06; 1222-12

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

General Affairs Manager; Communications Manager; Public Relations Manager; Customer Service Manager; Customer Relationship Manager

**This occupation appears on COL:**

2015	No
2016	Yes
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 6 indicators
<b>Bottom-up CfE survey</b>	10 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 10 nominations from 9 companies in 5 sectors, with the top two sectors being the financial and insurance/takaful activities; and manufacturing. The job titles nominated reflect mostly the need for customer relationship managers, followed by the public relations managers.
- ii. The majority of companies have reported that vacancies within this occupation group are for middle candidates, with working experience 5 to 10 years. However, too few or no applicants, applicants lack relevant job experience and required technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time taken to fill up vacancies for this occupation is reported 2 to 4 months. Furthermore, respondents have reported that this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of a bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. To address the shortage of this occupation, none of the respondents have reported hiring less well qualified workers. Instead, the companies have resorted to expanding local and international recruitment efforts, increasing workers training as well as raising wages.
- v. Further insight from the Public Relations Consultants' Association of Malaysia (PRCA) have pointed that advertising and public relations managers are critical in the industry, which may be due to the increase in trend of digital assets & managing social medias. This is especially that of middle level positions that require talents to have 5 to 8 years of experience. In addition to that, the role of public relations managers itself has expanded. For example, apart from writing up news releases, public relations managers are also required to add value in terms of advice to Chief Executive Officer (CEOs) in terms of communication strategies and how to deal with certain stakeholders. Apart from a limited pool of talent which makes firms compete within and between industries to get the right talent for this position, language competency in English and Bahasa (both written and spoken) is also one of the contributing factors as to why there is a shortage in this occupation.
- vi. MDEC Digital Talent Report 2017 have also highlighted this occupation as one of the top trending jobs in the industry. Additional input from ROOTS Public Relations indicated that they are facing challenges to recruit public relations managers as most senior candidate will prefer to work in-house rather than staying in their agency.
- vii. In overall, this occupation passed the top-down shortage threshold. In addition, input from association and talent study solidifies the evidence pointing to the shortage of this occupation across industries. Therefore, it is best to recommend that this occupation is included in the COL.



**Occupation: RESEARCH AND DEVELOPMENT MANAGERS**

**MASCO 2013 (4-Digit Code):** 1223

**MASCO 2013 (6-Digit Code):** 1223-01; 1223-02; 1223-03

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Research and Development Manager; Product Development Manager; Research Manager

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 6 indicators
<b>Bottom-up CfE survey</b>	9 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	No	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 9 nominations from 8 companies in 3 sectors, being the manufacturing; financial and insurance/takaful activities; and information and communication. The job titles nominated reflect mostly the need product development managers, followed by research development managers.
- ii. The majority of companies have reported that vacancies within this occupation group are for middle level candidates with at least 5 years working experiences. In addition, the applicants lack of required technical skills, credential or certification, and too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is within 5 to 6 months. Furthermore, companies have reported this occupation has become harder to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. With the fact that this occupation requires experienced workers and technical skills, it is consistent with our finding that most respondents do not report hiring less well qualified workers. Instead, the companies have resorted to expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.) and raising wages.
- v. The Chemical and Petrochemical Environmental Scan cited that this occupation is critical with the average time to fill vacancies for the occupation is between 6 to 24 months in plastic products sub-industry and 12 months in rubber products sub-industry.
- vi. Congruent to the bottom-up against top-down evidence, we believe that this occupation does point to the widespread of shortage across the industries. Hence, we recommend this occupation to be included in the COL.



## Occupation: MANUFACTURING MANAGERS

**MASCO 2013 (4-Digit Code):** 1321

**MASCO 2013 (6-Digit Code):** 1321-01; 1321-02; 1321-03; 1321-07; 1321-09

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Manufacturing Manager; Production and Operation Manager (Manufacturing); Factory Manager; Mechanical Manager; Oil Mill Manager

**This occupation appears on COL:**

2015	No
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 14 indicators
<b>Bottom-up CfE survey</b>	19 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>• Chemical and Petrochemical Environmental Scan</li> <li>• Medical Devices Environmental Scan</li> <li>• Food and Beverage Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	No
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 20 nominations from 19 companies in 5 sectors, mainly in manufacturing. The job titles nominated reflect mostly the need for production and operation managers (manufacturing), mechanical managers, and manufacturing managers.
- ii. The majority of companies have reported that vacancies within this occupation group are for middle level positions. In addition, the applicants lack relevant job experience and required technical or occupational skills as well as too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is more than 6 months. Furthermore, companies have reported this occupation has become harder to fill as compared to a year ago.
- iii. There is evidence that there are some gaps in specialised certifications. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants need particular certifications such as Vocational Training Operation (VTO) from National Occupational Skills Standard (NOSS).
- iv. Companies have resorted to raising wages, expanding local recruitment efforts, and increasing worker training to mitigate the shortage.
- v. Consultation with Malaysian Furniture Council (MFC) indicated that production and operation managers are critical in furniture industry. There is an apparent shortage in which the industry is looking for experienced operation managers, who have extensive knowledge on administration and industry operation in factory production lines.
- vi. The Chemical and Petrochemical Environmental Scan also cited production and operations managers (manufacturing), and manufacturing managers to be critical in all five subsectors (chemical, petrochemical, oleochemical, plastic products and rubber products). The average time taken to fill vacancies varies among positions and subsectors at 3 to 12 months, with a minimum qualification requirement of a bachelor's degree. In the rubber products subsector, manufacturing managers are one of the prominent occupations nominated as critical by the respondents in their survey.
- vii. The Medical Devices and Food & Beverage Environmental Scan have mentioned for manufacturing managers is also critical in the respective industries.
- viii. Therefore, considering the high number of bottom-up nominations and validation from 3 environmental scan studies, there is strong evidence this occupation does point to a widespread shortage. Thus, this occupation is included in the COL.





**Occupation: CONSTRUCTION MANAGERS**

**MASCO 2013 (4-Digit Code):** 1323

**MASCO 2013 (6-Digit Code):** 1323-01; 1323-02; 1323-03; 1323-05; 1323-06; 1323-13

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Construction Manager; Production and Operation Manager (Construction); Contract Manager; Project Manager; Site Manager; Engineering Director

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 14 indicators
<b>Bottom-up CfE survey</b>	29 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	No	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 29 nominations from 26 companies in 8 sectors, with the top sector being the construction. The job titles nominated reflect mostly the need for project managers, followed by construction managers and site managers.
- ii. The majority of companies have reported that vacancies within this occupation group are for middle or senior level candidates. In addition, applicants lack relevant job experience, credentials or qualification and required technical skills are the most-cited reasons behind the occupation being hard-to-fill. The time taken to fill for this occupation reported are varies which include 3 to 6 months and more than 6 months. Companies have also reported that this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. Most respondents in our Call-for-Evidence survey reported requiring at least a bachelor's degree for this position.
- iv. The strategies used by companies to tackle the shortage are raising wages, expanding local recruitment efforts and outsourcing this job function.
- v. We have also gathered additional insight from the Master Builders Association Malaysia (MBAM) which confirms that the shortage in this occupation is common in the industry, especially that of safety & health manager (with tunnel experience) and contract manager (with contractual risk management experience). They also have pointed that lack of technical competency of the specific job requirement is one of the factors that contribute to a shortage of this occupation.
- vi. Therefore, considering high number of nominations and input received that these are senior level positions that require a combination of specialised skills and experience, we recommend for this occupation to be included in the COL.



**Occupation: INFORMATION AND COMMUNICATIONS TECHNOLOGY MANAGERS**

**MASCO 2013 (4-Digit Code):** 1511

**MASCO 2013 (6-Digit Code):** 1511-02; 1511-05; 1511-08; 1511-10; 1511-14; 1511-16; 1511-17; 1511-20; 1511-22; 1511-25; 1511-29; 1511-30; 1511-33

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Chief Information Technology Officer; Information Technology Manager; Application Development Manager; Data Operations Manager; Network Manager; Audio Visual Manager; Database Manager; Information Technology Infrastructure Manager; Information Technology Sales Manager; Creative Multimedia Manager; Chief Information Security Officer; Information Technology Business Development Manager; Software Development Manager

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 6 out of 14 indicators
<b>Bottom-up CfE survey</b>	28 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 28 nominations from 23 companies in 8 sectors, with the top two sectors being the information and communication; and financial and insurance/takaful activities. The job titles nominated reflect mostly the need for information technology managers, followed by creative multimedia managers.
- ii. The majority of companies have reported that vacancies within this occupation group are for middle level candidates with at least 5 years working experience. In addition, too few or no applicants, applicants lack relevant job experience and required technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 2 to 3 months. Most companies have also reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. Majority of the respondents have resorted to expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.) and raising wages, however, quite a significant number of respondents highlighted they opted hiring less well qualified applicants and increasing workers training in addressing the talent shortages.
- v. Based on the MDEC Digital Talent Report 2017, information technology managers and information technology business development managers have been nominated as top trending jobs in the information and communication sector.
- vi. With high nomination of bottom-up against top-down evidence and additional evidence from MDEC talent report, therefore, we recommend that this occupation to be included in the COL.



**Occupation: CHEMISTS**

**MASCO 2013 (4-Digit Code):** 2113

**MASCO 2013 (6-Digit Code):** 2113-15; 2113-16; 2113-36

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Chemist, Analysis; Chemist (Research and Development);  
Petrophysicist

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 6 indicators
<b>Bottom-up CfE survey</b>	3 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> <li>Pharmaceutical Manufacturing Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 4 nominations from 4 companies in 2 sectors, which are manufacturing; and mining and quarrying. The job titles nominated reflect mostly the need for chemists (research and development), followed by chemists (analysis) and petrophysicists.
- ii. The applicants lack the required technical or occupational skills, too few or no applicants, and applicants lack relevant job experience are the most-cited reasons behind the occupation being hard-to-fill. Although the most common time to fill for this occupation reported is more than 6 months, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition, respondents opted to hire experienced candidates rather than fresh graduates.
- iv. Most of the companies have resorted to raise wages and increase worker trainings, and they responded to expand the local recruitment effort as their strategies to address the talent shortage.
- v. The Pharmaceutical Manufacturing Environmental Scan also mentioned that pharmaceutical chemist is observed to be critical occupation. This position was required in the formulation process and typically filled by expats from India, and could indicate a need to groom local talent to fill this role. In addition, Chemical and Petrochemical Environmental Scan have cited chemists as one of the critical occupations in the chemical, petrochemical and oleochemical subsectors. The average time to fill vacancies, according to their respondents, is around 5 to 9 months, with a minimum qualification of a bachelor's degree and certification from Chemicals Commission.
- vi. The FMM Salary, Benefits and Employment Conditions Survey in the Manufacturing Sector 2017/2018 highlighted that this occupation is in short supply within the industry. Malaysian Gas Association (MGA) also provided further input where they indicated that petrophysicists are hard to employ due to small pool of local experienced candidates with niche skills.
- vii. With strong additional evidence from the environmental scans and consultation as well as the occupation passed the top-down shortage threshold in overall, this shows that this occupation facing a widespread shortage. Therefore, we recommend it to be included in the COL.



## Occupation: GEOLOGISTS AND GEOPHYSICISTS

**MASCO 2013 (4-Digit Code):** 2114

**MASCO 2013 (6-Digit Code):** 2114-06; 2114-07; 2114-09; 2114-29; 2114-36; 2114-37; 2114-41; 2114-50; 2114-51

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Geophysicist; Geologist; Geologist (Mining); Hydrologist; Petroleum Geoscientist; Geoscientist; Reservoir Geologist; Geomechanic; Sedimentologist

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 6 indicators
<b>Bottom-up CfE survey</b>	6 nominations
<b>Consultation</b>	8 nominations
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	No	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 14 nominations from 7 companies in 2 sectors, which are the mining and quarrying; and water, supply, sewerage, waste management and remediation activities. The job titles nominated reflect mostly the need for geologists and geophysicists.
- ii. Majority of respondents reported that vacancies within this occupation group are for junior and middle level positions. However, too few or no applicants, applicants lack the required technical skills, and other required skills (e.g. time management and problem solving) are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is between 3 to 6 months. Evidently, companies have also reported that this occupation has become harder to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence (CfE) survey.
- iv. To address the shortage, companies have reported resorting to raising wages, expanding local recruitment efforts, increasing worker training, and hiring temporary or contract workers.
- v. Based on our consultation with the Malaysian Chamber of Mines (MCOM), they have highlighted the challenges to find geologists with a good knowledge on the types of rocks and minerals who are willing to work in the minefields. This is in line with a CfE survey respondent's feedback, which mentioned the need for experienced geologists in the nature of ores in mining industry.
- vi. Consultation with Malaysian Gas Association (MGA) nominated this occupation as critical as well. Currently, the pool of local experienced candidates with niche skill or specialisation is small, in which subject to intense recruitment competition amongst major oil and gas companies. Hydrologists and geologists also have been highlighted as critical by Waste Management Association Malaysia (WMAM), whereby they are facing issues on retaining this pool of talent.
- vii. Therefore, given the strong top-down evidence with well elaborated bottom-up evidence, there is strong evidence this occupation does point to a widespread shortage. We recommend that this occupation to be included in the COL.





**Occupation: MATHEMATICIANS, ACTUARIES AND STATISTICIANS**

**MASCO 2013 (4-Digit Code):** 2121

**MASCO 2013 (6-Digit Code):** 2121-26; 2121-27; 2121-30; 2121-34; 2121-35; 2121-36; 2121-41

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Data Scientist; Data Analyst; Data Modeller; Appointed Actuary; Pricing Actuary; Valuation Actuary; Big Data Engineer

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 1 out of 6 indicators
<b>Bottom-up CfE survey</b>	20 nominations
<b>Consultation</b>	6 nominations
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	No	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	No	Wage premium growth - 1 year	NA
Foreign workers – 3 years	No	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 26 nominations from 22 companies in 10 sectors, with the top two sectors being the financial and insurance/takaful activities; and information and communication. The job titles nominated reflect mostly the need for data scientists, data analysts and appointed actuaries.
- ii. Companies have reported that vacancies within this occupation group are diversified from junior to middle level applicants. Additionally, the most-cited reason behind the occupation being hard-to-fill are applicants lack the required technical skills, and credential or certification as well as too few or no applicants. The most common time to fill up the vacancies is within 3 to 6 months. Majority of companies have reported this occupation has become neither more nor less hard to fill, nevertheless, some companies have stated this occupation harder to fill as compared to a year ago.
- iii. Almost all vacancies listed by respondents in our Call-for-Evidence survey required a minimum of bachelor's degree. In addition to this, some respondents reported that applicants need particular professional certifications, qualifications or membership to qualify for appointed actuaries such as:
  - a) Certified Public Accountant (CPA)
  - b) Chartered Certified Accountant Qualification
  - c) Approved Actuaries Certification
  - d) Fellow of the Society of Actuaries
- iv. To address the shortage, the companies have resorted to expanding local and international recruitment efforts as well as partnership with education or training providers.
- v. Consultation with Malaysian Association of Hotel Owners (MAHO) and Malaysian Association of Retail Management (MARM) indicated a need for data analysts in accommodation and retail trade industry respectively. One of the large aviation companies in Malaysia also reported that they are looking for qualified data scientists as the company intends to move into the digital space. Additionally, MDEC Digital Talent Report have highlighted these both occupations as the top trending jobs in Big Data Analytics (BDA) and Internet of Things (IoT) areas.
- vi. Further input from Tech Mahindra Ltd. and Tenaga Nasional Berhad (TNB), they have noted that quality candidates for data scientists and analysts are hard to employ due to no or limited exposure to local talent in this area and gap in knowledge between curriculum in universities with the real working environment. One of the large oil & gas companies also facing difficulty in hiring data scientists in Malaysia.
- vii. We have also gathered additional insight from the Actuarial Society of Malaysia which confirms that appointed actuaries are critical in Malaysia, especially in a strong growth area (e.g. general insurance) and also there is a strong demand arising from changes occurring in the industry, e.g. IFRS 17 new accounting standard. They believe that this happen due to an insufficient supply of experienced candidates. This is further explained by the fact that Malaysian actuaries hold



internationally recognized qualifications and have strong language skills, which enabling them to be internationally mobile and work in overseas. This is consistent with additional input from Life Insurance Association of Malaysia (LIAM) which also highlighted the shortage of experienced actuaries, specifically those with specialised knowledge in general and life insurance.

- viii. This occupation is included in the COL because high number of nominations and robust bottom-up evidence which does point a widespread shortage across industries.



**Occupation: INDUSTRIAL AND PRODUCTION ENGINEERS**

**MASCO 2013 (4-Digit Code):** 2141

**MASCO 2013 (6-Digit Code):** 2141-01; 2141-03; 2141-04; 2141-07; 2141-09; 2141-10; 2141-13; 2141-19; 2141-24; 2141-33; 2141-35; 2141-36; 2141-42; 2141-43; 2141-44; 2141-45

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Automation Engineer; Industrial Engineer; Production Engineer; Systems Analyst (Except Computers); Planning Engineer; Systems Engineer (Except Computers); Industrial Efficiency Engineer; Printing Technologist; Plant Engineer; Process Development Engineer; Facilities Competent Engineer; Reliability Engineer; Automation Design Engineer; Robotic Process Automation (RPA) Expert; Business Process Automation Expert; Techno Functional Consultant

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 5 out of 14 indicators
<b>Bottom-up CfE survey</b>	28 nominations
<b>Consultation</b>	4 nominations
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> <li>Electrical and Electronics Environmental Scan</li> <li>Machinery Equipment and Advanced Engineering Environmental Scan (Phase 2)</li> <li>Medical Devices Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 32 nominations from 27 companies in 4 sectors, with the top three sectors being the manufacturing; information and communication; and transportation and storage. The job titles nominated reflect mostly the need for production engineers, followed by plant engineers, and process development engineers.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior level candidates with equivalent between 2 to 5 years working experience. In addition, the applicants lack the required technical skills and relevant job experience as well as insufficient applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 2 to 3 months. Companies have also reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants do not need any particular certifications to qualify for this occupation.
- iv. Consistent with the claim that this occupation requires a particular set of technical skills, most respondents do not report hiring less well qualified workers. Instead, the companies have resorted to expanding local recruitment efforts, and increasing worker training. Additionally, employers expand partnerships with education or training providers focusing on recruitment of graduates in their effort to address talent shortage.
- v. Consultation with Malaysian Knitting Manufacturers Association (MKMA) confirmed that industrial engineers are critical in the manufacturing sector, who are able to manage and innovate production processes to increase operational efficiency. Further consultation with Tech Mahindra Ltd. highlighted the need for industrial engineers, in which jobs related to Robotic Process Automation (RPA) and Business Process Mapping (BPM) will be highly demanded in the near future.
- vi. In addition, the Chemical and Petrochemical Environmental Scan have reported on production engineers as one of the critical occupations in chemical, petrochemical, and oleochemical; plastic products and rubber products sub-industries. The Electrical and Electronics Environmental Scan have also reported this occupation to be critical in semiconductor sub-sector. This occupation was also cited in Machinery Equipment and Advanced Engineering (Phase 2) as well as Medical Devices Environmental Scans.
- vii. Considering high nominations of bottom-up evidence with relatively strong support from 4 environmental scan reports, we recommend for this occupation to be included in the COL.



**Occupation: CIVIL ENGINEERS**

**MASCO 2013 (4-Digit Code):** 2142

**MASCO 2013 (6-Digit Code):** 2142-10; 2142-13; 2142-14; 2142-16; 2142-18; 2142-23; 2142-38; 2142-42

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Engineer; Civil Engineer; Site Engineer; Civil Engineer (Construction); Civil Engineer (Building Construction); Civil Engineer (Building Structure); Maintenance Engineer; Inspection Engineer

**This occupation appears on COL:**

2015	Yes
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 5 out of 14 indicators
<b>Bottom-up CfE survey</b>	32 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Machinery Equipment and Advanced Engineering Environmental Scan (Phase 2)</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	No	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 33 nominations from 31 companies in 6 sectors, with the top three sectors being the construction; manufacturing; and professional, scientific and technical activities. The job titles nominated reflect mostly the need for maintenance engineers and site engineers.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior engineers. However, the applicants lack relevant job experience, too few or no applicants, and applicants lack the required technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is within 3 months. In addition, companies have reported this occupation has become less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. Consistent with the claim that this occupation requires a particular set of technical skills, most respondents do not report hiring less well qualified workers. It is found that the companies have resorted to increase worker training and expand local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.) to mitigate the shortages.
- v. Input from consultation with Malaysian Association of Hotel Owners (MAHO) reported that this occupation is one of the critical occupations in the hotel industry. Furthermore, Master Builders Association Malaysia (MBAM) validated that this occupation is rather common in the construction industry with required technical competencies such as project planner and BIM modeller.
- vi. The findings from Machinery Equipment and Advanced Engineering Environmental Scan (Phase 2) cited that assistant engineers are termed as the third critical job by 76% of the Machinery and Equipment (M&E) firms and 24% of the Engineering Supporting Industry (ESI) firms respectively. There is also a demand for technologists in the industry.
- vii. Therefore, considering strong bottom-up evidence and supported by findings from the environmental scan, we recommend for this occupation to be included in the COL.



## Occupation: MECHANICAL ENGINEERS

**MASCO 2013 (4-Digit Code):** 2144

**MASCO 2013 (6-Digit Code):** 2144-01; 2144-04; 2144-05; 2144-11; 2144-19; 2144-24; 2144-37; 2144-39; 2144-41; 2144-42; 2144-43; 2144-44; 2144-49; 2144-52; 2144-53; 2144-54; 2144-55

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Engineer (Mechanical) Grade J41; Mechanical Engineer; Machinery and Tools Industrial Engineer; Heating Ventilation Air-Conditioning and Refrigeration Engineer; Mechanical Engineer (Motor and Engine); Steam Engineer; Technology Technical Engineer; Welding Engineer; Mechanical Maintenance Engineer; Rotating Equipment Engineer; Operation Engineer; Platform Superintendents; R&D Engineers; Offshore Equipment Engineer; CNC Machining Engineer; CAD/CAM Engineer; Computer-Aided Design (CAD) Design Automation Engineer

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 14 indicators
<b>Bottom-up CfE survey</b>	41 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Electrical &amp; Electronics Environmental Scan</li> <li>Machinery Equipment and Advanced Engineering Environmental Scan (Phase 2)</li> <li>Medical Devices Environmental Scan</li> <li>Chemical and Petrochemical Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 years	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 years	No
Foreign workers – 1 year	No	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	No	Wage premium growth - 3 years	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No





### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 41 nominations from 37 companies in 9 sectors, with the top three sectors being the manufacturing; mining and quarrying; and construction. The job titles nominated reflect mostly the need for mechanical engineers, followed by CNC machining engineers, and machinery and tools industrial engineers.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior and middle level candidates. In addition, too few or no applicants, applicants lack relevant job experience and the required technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation is reported between 1 to 2 months. However, companies have reported this occupation has become harder to fill as compared to a year ago as some required around 5 to 6 months to fill in that position, although majority remain neither more nor less hard to fill.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, some respondents reported that applicants do need particular certifications such as programming skills and problem-solving skills.
- iv. Consistent with the claim that this occupation has low number of applicants and requires job experiences as well as technical skillsets, the companies have resorted to raising wages, expanding local recruitment efforts, and increasing worker training as their efforts in addressing talent shortages.
- v. There are 4 talent studies in which mentioned on the criticality of this occupation. For instance, Electrical & Electronics Environmental Scan and Machinery Equipment and Advanced Engineering Environmental Scan stated on the needs for mechanical engineers and welding technologist respectively.
- vi. Therefore, considering the significantly strong number of nominations in bottom-up evidence and additional input from other studies, this does point to a widespread shortage. Thus, this occupation is recommended to be included in the COL.



**Occupation: CHEMICAL ENGINEERS**

**MASCO 2013 (4-Digit Code):** 2145

**MASCO 2013 (6-Digit Code):** 2145-04; 2145-06; 2145-15; 2145-20; 2145-29

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Chemical Engineer; Chemical Process Engineer; Food and Drinks Technologist; Rubber Technologist; Process Control Engineer

**This occupation appears on COL:**

2015	Yes
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 11 indicators
<b>Bottom-up CfE survey</b>	6 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> <li>Electrical and Electronics Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 6 nominations from 6 companies in manufacturing sector. The job titles nominated reflect mostly the need for chemical process engineers.
- ii. Companies have reported that vacancies within this occupation group are for junior candidates with 2 to 5 years of work experience. However, applicants lack relevant job experience, credential or certification and technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is varied from 3 to 6 months and some reported to have more than 6 months. In addition, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of diploma or bachelor's degree are required for vacancies listed by respondents in our Call-for-Evidence survey.
- iv. The companies have resorted to expanding local and international recruitment efforts, raising wages, as well as increasing worker training as their strategies to address the talent shortages.
- v. Based on the findings from Chemical and Petrochemical Environmental Scan, rubber technologists have been highlighted as one of the critical occupations in the rubber products sub-sector. According to the report, companies with research and development divisions have difficulty hiring this occupation due to no long-term courses on rubber polymers at education institutions and lack of short-term courses by the Malaysian Rubber Products Manufacturers Association (MRPMA) and Rubber Research Institute (RRI). Additionally, the Electrical and Electronics Environmental Scan have also noted that chemical engineers as critical occupation in the solar sub-sector.
- vi. We also received further insights from two large oil & gas companies in Malaysia. One of them indicated that mostly the challenges in finding qualified chemical engineers who can perform techno-commercial (commercial or sales) and those with specialised knowledge in specific chemical (e.g. surfactant chemical). While the other company reported difficulty in hiring senior roles for chemical engineers. This is consistent with additional input from Malaysian Oil & Gas Services Council (MOGSC) which also highlighted that this occupation is critical in the industry, specifically for experienced candidates.
- vii. Considering strong input received from various key stakeholders as well as supported by 2 environmental scans, we recommend for this occupation to be included in the COL.



**Occupation: MINING ENGINEERS, METALLURGISTS AND RELATED PROFESSIONALS**

**MASCO 2013 (4-Digit Code):** 2146

**MASCO 2013 (6-Digit Code):** 2146-01; 2146-22; 2146-33; 2146-41; 2146-47; 2146-49; 2146-53; 2146-54; 2146-55

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Mining Engineer; Drilling Engineer; Production Technologist; Renewable Energy Engineer; Product Design R&D Engineer; Pipeline Mechanical Engineer; Blasting Expert; Radioactive Expert; Well Engineer

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 6 indicators
<b>Bottom-up CfE survey</b>	10 nominations
<b>Consultation</b>	4 nominations
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	No	Education growth - 1 year	NA
Vacancy rate	No	Education growth - 3 year	NA
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	Yes	Falling education requirements in job postings	No



## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 14 nominations from 11 companies in 3 sectors, with the top sector being the mining and quarrying. The job titles nominated reflect mostly the need for mining engineers, product design R&D engineers and drilling engineers.
- ii. Most companies have reported that vacancies within this occupation group are for middle level positions with applicants lack the required technical skills and too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. The time taken to fill for this occupation reported is between 2 to 6 months and companies have found this occupation to be harder to fill as compared to a year ago.
- iii. Most of the respondents required a minimum of bachelor's degree for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, they also required certain certifications to qualify for this occupation.
- iv. Most companies have resorted to raising wages as well as expanding local and international recruitment efforts. They also focused on expanding partnerships with education or training providers to address the shortage. The Malaysian Chamber of Mines (MCOM) shared that they have regular dialogues/seminars/conferences (once every two years) with the academia to ensure that the courses taken up by graduates are at par with the industry needs. For example, they have Human Capital Development in Mineral Industry Symposium which is coordinated by MCOM and organised by universities recently.
- v. Based on the consultation with Malaysian Gas Association (MGA), they indicated that well engineers and production technologists are hard to employ in the industry. This is due to the small pool of local experienced candidates and there is strong hiring competition among oil & gas key players for this occupation. Further input from MCOM provided additional evidence that this occupation is sought-after, specifically that of blasting and radioactive experts. They do provide courses for blasting certificate to maintain their license. Furthermore, MCOM also shared that potential reason that cause this occupation to be hard to fill is because there is insufficient supply as only one local university (Universiti Sains Malaysia) producing graduates registrable as mining engineers and one university (e.g: Universiti Malaysia Perlis) producing metallurgists. However, this metallurgy programme has been discontinued due to lack of takers.
- vi. We have also gathered additional insights from the two large oil & gas companies in Malaysia which confirmed the shortages for this occupation is common in the industry. One of them noted that mostly the challenges in finding for experienced candidates and specialists with more than 10 or 15 years of work experience. While the other company reported hiring difficulty for drilling engineers and production technologists. There is a limited pool of talent with adequate skillsets in the Malaysian market. The ones that fit the criteria would either have their own company or they



are working in the Middle East countries due to high salary. On top of the limited pool of talent, there might be some diversity and inclusion requirements that become another layer of factor in hiring candidates for these job titles. This is consistent with additional input from Malaysian Oil & Gas Services Council (MOGSC) which also highlighted that this occupation is critical in the industry, especially for experienced candidates.

- vii. With the number of nominations from our survey and supported by extensive input from associations and industries as well as the top-down evidence available does point to a shortage, there is strong evidence to justify for the inclusion of this occupation in the COL.



**Occupation: ENGINEERING PROFESSIONALS (EXCLUDING ELECTROTECHNOLOGY) NOT ELSEWHERE CLASSIFIED**

**MASCO 2013 (4-Digit Code):** 2149

**MASCO 2013 (6-Digit Code):** 2149-08; 2149-09; 2149-10; 2149-11; 2149-12; 2149-16; 2149-19; 2149-26; 2149-27; 2149-31

Only the following job titles within this occupation are included in the Critical Occupations List (COL):	Quantity Surveyor; Project Engineer; Process Engineer; Quality Assurance Engineer; Quality Control Engineer; Biomedical Engineer; Materials Engineer; Inspector (Factory and Machinery); Procurement Engineer; Inspection (QA/QC) Engineer
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**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 14 indicators
<b>Bottom-up CfE survey</b>	46 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	No
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 46 nominations from 43 companies in 8 sectors, with the top two sectors being the manufacturing and construction. The job titles nominated reflect mostly the need for quantity surveyors and process engineers.
- ii. A majority of companies have reported that vacancies within this occupation group are for junior level positions with less than 5 years working experience. In addition, most companies have also cited applicants lack relevant job experience, required technical skills, and credential or certification as the main reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is within 2 months. Companies also highlighted that this occupation has become neither more nor less hard to fill, and some reported it is harder to fill as compared to a year ago.
- iii. A minimum of a bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, companies have cited the importance of experience and knowledge for most vacancies specifically the need for inspection engineers (QA/QC) with CAM/CAD programming skills.
- iv. To address the shortage, companies have most commonly opted to expand local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.), increasing worker training and raising wages.
- v. This occupation passed the foreign worker threshold for top-down which could indicate that a number of companies are also pursuing to expand international recruitment efforts for this occupation. In addition, considering the strong bottom up evidence, we recommend for this occupation to be included in the COL.





**Occupation: ELECTRICAL ENGINEERS**

**MASCO 2013 (4-Digit Code):** 2151

**MASCO 2013 (6-Digit Code):** 2151-02; 2151-04; 2151-26; 2151-32; 2151-33; 2151-37

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Assistant Engineer (Electrical) J29; Electrical Engineer; Embedded System/ Firmware Engineer; R&D Electrical Engineer (includes Product Design); Electrical Consultant; R&D Electrical Design Engineer

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 5 out of 14 indicators
<b>Bottom-up CfE survey</b>	12 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> <li>Electrical and Electronics Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 12 nominations from 12 companies in 4 sectors, with the top three sectors being the manufacturing; construction; and professional, scientific and technical activities. The job titles nominated reflect mostly the need for electrical engineers.
- ii. The majority of companies reported that vacancies within this occupation group are for candidates who have less than 5 years working experience. In addition, the applicants lack relevant job experience, credential or certification and technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 3 months. Furthermore, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. The companies have resorted to increasing worker training and expanding their local recruitment efforts. Nonetheless, companies are also willing to hire less well qualified applicants as part of their strategies to address shortages.
- v. The Chemical and Petrochemical Environmental Scan mentioned that this occupation is considered to be as critical in the chemical, petrochemical, oleochemical subsectors. The average time taken to fill vacancies varies among positions at 3 to 6 months, with a minimum qualification of a bachelor's degree. In addition, the Electrical and Electronics Environmental Scan have also cited for electrical engineers (e.g. electrical engineers, embedded system engineer and electrical process engineer) to be critical in the light-emitting diode (LED) sub-sector.
- vi. Considering the strong evidence supported by the findings from Chemical and Petrochemical and the Electrical and Electronics Environmental Scan against the top-down evidence, we recommend that this occupation to be included in the COL although moderate nominations of bottom-up evidence.



**Occupation: ELECTRONIC ENGINEERS**

**MASCO 2013 (4-Digit Code):** 2152

**MASCO 2013 (6-Digit Code):** 2152-04; 2152-08; 2152-39; 2152-51; 2152-54

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Electronics Engineer; Electronics Engineer (Computer Hardware Design); Wirebond Engineer; Semiconductor Packaging Engineer; Electronic Component Design Engineer

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 6 out of 14 indicators
<b>Bottom-up CfE survey</b>	5 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Electrical and Electronics Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 5 nominations from 5 companies in manufacturing sector. The job titles nominated are electronics engineers, electronics engineers (computer hardware design), wirebond engineers, semiconductor packaging engineers and electronic component design engineers.
- ii. Companies have reported that vacancies within this occupation group are for junior positions, with 2 to 5 years of work experience and a bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. The applicants lack of relevant job experience and required technical skills as well as too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. The time taken to fill for this occupation reported is 5 to 6 months. Companies have also reported this occupation has become harder or neither more nor less hard to fill as compared to a year ago.
- iii. Companies have resorted to raising wages, expanding local recruitment efforts and hiring less well qualified applicants to address the shortage for this occupation.
- iv. Further Input from Electrical and Electronics Environmental Scan cited that there are challenges in hiring electronic engineers in semiconductor, electronic manufacturing services (EMS) and light-emitting diode (LED) sub-sectors whereby companies have pointed to this occupation, e.g. integrated circuit (IC) design engineers, electronics engineers and mechatronics engineers as both hard-to-fill and highly sought-after.
- v. Considering that there is evidence of growth in employment, wage premium, vacancies rate and hiring of skilled foreign workers, this indicate that skilled applicants under this occupation is in high demand. This is complemented by various nominations of this occupation by the industry. Therefore, we recommend that this occupation to be included in the COL.



## Occupation: GRAPHIC AND MULTIMEDIA DESIGNERS

**MASCO 2013 (4-Digit Code):** 2166

**MASCO 2013 (6-Digit Code):** 2166-02; 2166-04; 2166-08; 2166-09; 2166-10; 2166-18; 2166-35; 2166-39; 2166-40; 2166-42; 2166-43; 2166-44

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Web Designer; Graphic Designer; Designer Artist; Digital Artist; Animator; Creative Designer; Computer Graphics (CG) Artist; 3D Modeller; Visual Effects Artist; Creative Artist; Lighting Artist; UI Designer

### This occupation appears on COL:

2015	Yes
2016	Yes
2017	No

### Source of evidence:

<b>Top-down indicators</b>	Passes 5 out of 14 indicators
<b>Bottom-up CfE survey</b>	20 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

### Top-down data:

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	No
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 20 nominations from 17 companies in 7 sectors, with the top three sectors being the manufacturing; arts entertainment and recreation; and information and communication. The job titles nominated reflect mostly the need for graphic designers and creative designers.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior candidates. In addition, the applicants lack the required technical skills and relevant job experience as well as limited pool of talent are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is within 4 months. In addition, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. As opposed to qualification, companies also considered candidate's interest and adequate experience in the hiring processes.
- iv. To address this shortage, the companies have resorted various strategies. For examples, they hire temporary or contract workers, increase workers training and wages. Some companies also preferred to hire freelance workers for this occupation.
- v. MDEC Digital Talent Report noted that animators, digital artists, 3D modellers and graphic designers might be difficult to fill in the digital industry, specifically for Creative Content and Technologies (CCT) area.
- vi. Therefore, with high nominations from bottom-up evidence and additional support from MDEC report, we believe that this does point to a widespread shortage, thus we recommend that this occupation to be included in the COL.



**Occupation: AIRCRAFT PILOTS AND RELATED PROFESSIONALS**

**MASCO 2013 (4-Digit Code):** 2173

**MASCO 2013 (6-Digit Code):** 2173-04

Only the following job title within this occupation is included in the Critical Occupations List (COL):

Pilot

**This occupation appears on COL:**

2015	No
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 1 out of 6 indicators
<b>Bottom-up CfE survey</b>	1 nomination
<b>Consultation</b>	2 nominations
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	No	Education growth - 1 year	NA
Vacancy rate	No	Education growth - 3 year	NA
Foreign workers – 1 year	No	Wage premium growth - 1 year	NA
Foreign workers – 3 years	No	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	Yes	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 3 nominations from 2 companies in transportation and storage sector. The job titles nominated are the need for pilots.
- ii. Companies responded that they needed at least 5 years working experience pilots for advertised vacancies. They also preferred experienced applicants with minimum of 1,500 hours working flight. Furthermore, the applicants lack relevant job experience, too few or no applicants, and applicants lack the required credential or certification are the most-cited reasons behind the occupation being hard-to-fill.
- iii. Respondents reported requiring specialised certifications for this occupation, such as the Air Transport Pilot License (ATPL) or aviation licenses.
- iv. Companies have resorted to increasing worker training to tackle this talent shortage issues.
- v. Further input from one of the big airline companies stated that there is a dire need for experienced pilots and first officers for the industry. Most airline companies conduct training for fresh graduated pilots to upgrade themselves, however, most of these trainees will then shift to different airlines that offer better compensation. This is also supported by another big airline company where talent movement and migration of this occupation is also taking place internationally.
- vi. The National Aerospace Industry Coordinating Office (NAICO) also cited that this occupation is critical to the industry.
- vii. Considering strong evidence from key industry players, we believe that this does point to a widespread shortage, thus we recommend that this occupation to be included in the COL.





## Occupation: MANUFACTURING PROFESSIONALS

**MASCO 2013 (4-Digit Code):** 2182

**MASCO 2013 (6-Digit Code):** 2182-02; 2182-04; 2182-05; 2182-06; 2182-07; 2182-08; 2182-10; 2182-12; 2182-17; 2182-19; 2182-20; 2182-21; 2182-23

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Quality Assurance Executive; Quality Control Executive; Production Executive; Warehouse Executive; Store Executive; Maintenance Executive; Manufacturing Quality Controller Executive; Product Quality Controller; Manufacturing Specialist; Supply Chain/Procurement Specialist; Manufacturing Engineer; Technical Executive; Production Executive (Halal Food Manufacturing)

### This occupation appears on COL:

2015	Yes
2016	Yes
2017	Yes

### Source of evidence:

<b>Top-down indicators</b>	Passes 5 out of 14 indicators
<b>Bottom-up CfE survey</b>	31 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Medical Devices Environmental Scan</li> <li>Electrical and Electronics Environmental Scan</li> <li>Food and Beverage Environmental Scan</li> </ul>

### Top-down data:

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	No	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	Yes	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 31 nominations from 29 companies in 7 sectors, with the top two sectors being the manufacturing; and transportation and storage. The job titles nominated reflect mostly the need for quality assurance executives, quality control executives, and production executives.
- ii. The majority of companies have reported that vacancies within this occupation group are for entry-level and junior executives. The most common time to fill for this occupation reported is within 3 to 6 months. The applicants lack relevant job experience, and too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. In addition, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. Most companies responded a minimum of diploma or bachelor's degree are required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants need particular certifications such as Non-Destructive Testing (NDT) Level 3 certificate, and certificates in the area of pharmaceutical, food technology and food science.
- iv. Most respondents do not report hiring less well qualified workers. Instead, majority of companies have resorted to raising wages, increasing worker training, and expanding local recruitment efforts as their strategies to address the talent shortage.
- v. The Electrical and Electronics Environmental Scan have cited for manufacturing professionals to be critical in the industrial electronics sub-sector. The occupation was also highlighted to be critical in the Medical Devices and Food and Beverage Environmental Scans.
- vi. With high number of nominations from various companies across 7 sectors, this occupation is believed to be critical towards the industries. There is strong bottom-up evidence to support this claim, with this occupation being highlighted in 3 environmental scans as critical occupation in respective sectors. Growth in wage premium, employment and hiring of skilled foreign workers also indicates a growing demand for this occupation. Therefore, based on the overall evidence obtained, we recommend that this occupation to be included in the COL.



**Occupation: ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND HYGIENE PROFESSIONALS**

**MASCO 2013 (4-Digit Code):** 2263

**MASCO 2013 (6-Digit Code):** 2263-04; 2263-06; 2263-08; 2263-10; 2263-11; 2263-15; 2263-18; 2263-30; 2263-43

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Hazardous Waste Management Technologist; Occupational Health and Safety Officer; Environmental Safety and Health Technologist; Environmental Officer; Safety and Health Officer; Occupational Safety and Health Officer; Occupational Safety Officer; Waste Management Competence Person; Landfill Engineer

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 6 out of 12 indicators
<b>Bottom-up CfE survey</b>	18 nominations
<b>Consultation</b>	2 nominations
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 20 nominations from 20 companies in 8 sectors, with the top three sectors being the manufacturing; mining and quarrying; and water supply, sewerage, waste management and remediation activities. The job titles nominated reflect mostly the need for safety and health officers and occupational health and safety officers.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior and middle level candidates. In addition, this occupation is hard-to-fill because there are few applicants, and applicants lack the required credential or certification as well as relevant job experience. The most common time to fill for this occupation reported is 3 to 6 months. However, most of the companies have reported this occupation has become neither more nor less hard to fill, nevertheless, there are some cases of vacancies are harder to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants need a specific certification such as Certificate of Occupational Safety and Health Green Book.
- iv. Given the difficulty in filling this occupation, most companies reported expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms). Additionally, hiring less well qualified applicants and increasing worker training are also part of the strategies used to address the shortages.
- v. This occupation has been highlighted as a critical occupation in the Chemical and Petrochemical Environmental Scan. According to the report, experienced industrial safety officers - occupational safety and health are in high demand due to the limited talent supply in the market and average time taken to fill the vacancies is within 5 to 9 months. This position requires certification from Department of Occupational Safety and Health (DOSH).
- vi. Input from the Malaysian Chamber of Mines (MCOM) provided additional evidence that occupational safety and health officers are also sought-after in the mining industry. Furthermore, over time, the industry has evolved and move towards responsible mining which is more environmentally friendly. Thus, this industry also needs environmental experts who are able to understand and make sure mining is carried out in certain conditions to protect the environment.
- vii. Our consultation with Waste Management Association of Malaysia (WMAM) also reflects that there is a demand for landfill engineers. This expertise is needed to assess the effects of solid waste contamination to the groundwater in building landfills.
- viii. With the high number of nominations and strong bottom-up evidence as well as the top-down evidence that does point to widespread talent shortage, this occupation is included in the COL.



**Occupation: UNIVERSITY AND HIGHER EDUCATION PROFESSIONAL TEACHERS**

**MASCO 2013 (4-Digit Code):** 2311

**MASCO 2013 (6-Digit Code):** 2311-02; 2311-05; 2311-10; 2311-13; 2311-15

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Medical Lecturer Grade DU51P; Dental Lecturer Grade DUG51P; Lecturer; Lecturer (College); Lecturer (University)

**This occupation appears on COL:**

2015	No
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 14 indicators
<b>Bottom-up CfE survey</b>	21 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	No	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 22 nominations from 19 companies in education sector. The job titles nominated reflect mostly the need for lecturers for colleges and universities.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior positions with 2 to 5 years of work experience. In addition, the applicants lack the required education qualification, and too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is within 5 to 6 months. Therefore, companies have reported this occupation has become harder to fill in although majority remains neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's master is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. There is also a need for industrial experience for this occupation.
- iv. To address the talent shortages, the companies have resorted to hiring temporary or contract workers. Companies also planning on expanding both local and international recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.).
- v. Consistent with the claim above, The Malaysian Association of Private Colleges and Universities (MAPCU) also noted that higher education institutions are undergoing changes due to emergence of technology innovation in teaching and learning, shifting demographics and globalisation of education industry. Thus, there is a need for teaching positions in the emerging new areas of technology such as data science, forensic and cyber security.
- vi. Considering the number of nominations from the survey with an additional input from association above, we believe that this does point to a widespread shortage. Thus, it is recommended that this occupation to be included in the COL.



**Occupation: EARLY CHILDHOOD EDUCATORS**

**MASCO 2013 (4-Digit Code):** 2342

**MASCO 2013 (6-Digit Code):** 2342-01; 2342-02; 2342-03; 2342-04; 2342-05

All the following job titles within this occupation are included in the Critical Occupations List (COL):

Pre-Primary School Teacher; Kindergarten Teacher; Pre-school Teacher; Early Childhood Educator; Nursery Teacher

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 12 indicators
<b>Bottom-up CfE survey</b>	16 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 16 nominations from 15 companies in education sector. The job titles nominated reflect mostly the need for pre-school teachers and kindergarten teachers.
- ii. The level of working experience required by most companies for this occupation varies, ranging from entry (less than 2 years) to junior level position (2 to 5 years of work experience). A minimum of diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants do not need any particular certifications to qualify for this occupation.
- iii. Companies are struggling to find suitable applicants to fill this occupation because there were no or too few applicants generally. They also reported that applicants lack relevant job experience and they are expecting compensation that are beyond the market rate. The most common time to fill for this occupation reported is within 3 to 6 months. Companies also reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iv. Companies are currently raising wages, hiring less well qualified applicants as well as increasing workers training in order to address talent shortages.
- v. We have also gathered additional insight from the Early Childhood Care & Education Council Malaysia (ECCE Council) which confirms that this occupation is critical to the industry. As a background, childhood educators were not recognised in the part of national education system until year 2010, where there is a need to have proper training and education on handling infants and children to ensure their physical, social and emotion are well developed. There is a target for all childhood educators to possess diploma and proper training by year 2020. This is also aligned with the current initiatives by the Government on the importance to have proper childcare centres in Malaysia.
- vi. In addition, every child is special and the first 5 years of a child's life is the most critical period for development. Hence, it is important to have dedicated and well-trained childhood educators to ensure the growth and development of the children will be cultivated. Also, the educators be able to detect when something is amiss with a child, especially in recommending the appropriate actions to be taken by the parents.
- vii. Considering the evidence from top-down and bottom-up, which indicate how critical the early childhood educators are, therefore, this occupation is included in the COL.





## Occupation: ACCOUNTANTS

**MASCO 2013 (4-Digit Code):** 2411

**MASCO 2013 (6-Digit Code):** 2411-09; 2411-10; 2411-12; 2411-13; 2411-14; 2411-17; 2411-18; 2411-21; 2411-25; 2411-26; 2411-27; 2411-35; 2411-36; 2411-37; 2411-43; 2411-47; 2411-50; 2411-54

Only the following job titles within this occupation are included in the Critical Occupations List (COL):	Auditing Accountant; Accountant; Tax Accountant; Tax Consultant; Liquidator; Group Accountant; Management Accountant; Account Executive; Financial Controller; Account Receivable Executive; Account Payable Executive; Auditor; Audit Executive; Audit and Risk Assessment Executive; Payroll Executive; Project Accountant; Adjuster; Internal Auditor
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**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 14 indicators
<b>Bottom-up CfE survey</b>	59 nominations
<b>Consultation</b>	4 nominations
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> </ul>

### Top-down data:

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	No	Wage premium growth - 1 year	No
Foreign workers – 3 years	No	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 63 nominations from 57 companies in 12 sectors, with the top three sectors being the manufacturing; professional, scientific and technical activities; and financial and insurance/takaful.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior candidates, though a significant minority of respondents also indicated expecting to hire at the middle and senior levels as well. The three most commonly cited reasons for this occupation being hard to fill are applicants lack relevant job experience, too few or no applicants, and applicants lack the required credential or certification. The most common time to fill for this occupation reported is 2 to 3 months, though this belies considerable variation. Nine respondents reported average hiring times of less than a month, while 8 reported hiring times over 6 months. Most companies have reported this occupation has become neither more nor less hard to fill than a year ago.
- iii. A minimum of a diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey, with over half of respondents indicating that they require a least a bachelor's degree for positions under this occupation. In addition to this, some roles require specialised professional certifications such as Association of Chartered Certified Accountants (ACCA) and Certified Public Accountant (CPA) certification, and in certain positions hiring is constrained by the fact that high specialised knowledge in particular areas of auditing and accounting are needed.
- iv. The most commonly listed responses to difficulty hiring for this occupation are expanding local recruitment efforts, raising wages, and increasing workers training.
- v. Malaysian Institute of Accountants (MIA) stated that accountants are still in great demand as accountancy is a recession proof profession and there is a need to support businesses due to the changes of regulations. Nowadays, accountants are not only dealing with numbers, prepare financial report or debit/credit entry, but they are also required to make decisions, give recommendations and provide strategic advice to the management. Accountants also need to have an excellent command of language to be able interpret accounting standards correctly. Among the latest changes mentioned above include the implementation of:
  - a) Malaysian Business Reporting System (MBRS) by SSM: To key in the figure in the system, interpret the result and provide recommendation
  - b) MFRS for public listed companies and MPERS for private entities
  - c) Adoption of MFRS 15 (Revenue from contracts with customers) and MFRS 9 (Financial Instruments), which are effective this year 2018
  - d) MFRS 16 (Leases) will be effective in 2019
  - e) Integrated Report (IR)
- vi. The Association of Banks Malaysia (ABM) cited that there is limited pool of talent for specialised roles in the banking industry. For certain specific roles, the central bank requires the employees to have passed the courses outlined by them. Same feedback received from Association of Islamic Banking



Institutions Malaysia (AIBIM) where talent needs and challenges in the Islamic banking industry is similar to the conventional banking, but with additional Syariah requirements.

- vii. Input from Chemical and Petrochemical Environmental Scan highlighted that this occupation is critical in the rubber products sub-industry with average time to fill vacancies of 12 months. The Malaysian Association of Hotel Owners (MAHO) also mentioned that companies in hotel industry are also looking at hiring accountants for their internal operations.
- viii. Therefore, with high number of nominations across a wide array of job titles under this occupation and supported by strong evidence from associations and environmental scan, we recommend that this occupation to be included in the COL.



## Occupation: FINANCIAL AND INVESTMENT ADVISERS

**MASCO 2013 (4-Digit Code):** 2412

**MASCO 2013 (6-Digit Code):** 2412-05; 2412-08; 2412-09; 2412-10; 2412-12; 2412-13; 2412-14; 2412-15

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Corporate Financial Adviser; Finance Executive; Bank Executive Officer; Financial Planner; Property Executive; Sales Analyst; High-net-worth Client Advisor; Financial Adviser

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 12 indicators
<b>Bottom-up CfE survey</b>	19 nominations
<b>Consultation</b>	2 nominations
<b>Talent/Skills studies</b>	-

### Top-down data:

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	No
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 21 nominations from 19 companies in 7 sectors, with the top three sectors being the financial and insurance/takaful activities; real estate activities; and manufacturing. The job titles nominated reflect mostly the need for finance executives, bank executive officers and property executives.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior positions. However, the applicants lack relevant job experience and technical skills as well as too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 3 to 6 months. Companies also reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. To address this shortage, the companies have resorted to expanding local recruitment efforts and raising wages. Some respondents also mentioned that they are outsourcing this job function as one of their strategies to overcome the shortages.
- v. Association of Banks Malaysia (ABM) noted that personnel wealth planners and finance executives are in high demand as most of the members facing a limited talent pool, especially for those who have specialised roles or skillsets in the banking industry. Applicants normally lack credentials or experience to fit those roles. It was also mentioned that one of the strategies banks used to retain their talents is through employee bonds and contracts.
- vi. Further input by Finance Accreditation Agency (FAA) highlighted that this occupation is critical. There is a strong need for higher learning institutes and training providers to provide skillsets and knowledge of different financial products and services, with strong analytical skills based on mathematical and quantitative background.
- vii. Considering the growth of employment and number of vacancies against strong bottom-up evidence from various stakeholders, we believe that this does point to a widespread shortage. We recommend that this occupation to be included in the COL.



## Occupation: FINANCIAL ANALYSTS

**MASCO 2013 (4-Digit Code):** 2413

**MASCO 2013 (6-Digit Code):** 2413-01; 2413-03; 2413-04; 2413-06; 2413-08; 2413-10; 2413-12; 2413-13; 2413-16; 2413-21; 2413-23

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Financial Analyst; Investment Consultant; Risk Operation Analyst; Research Analyst; Investment Analyst; Equity Analyst; Risk Management Officer; Market Risk Officer; Risk Analyst; Credit Risk Management Officer; Anti-Money Laundering Specialist

### This occupation appears on COL:

2015	Yes
2016	Yes
2017	Yes

### Source of evidence:

<b>Top-down indicators</b>	Passes 2 out of 6 indicators
<b>Bottom-up CfE survey</b>	17 nominations
<b>Consultation</b>	3 nominations
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

### Top-down data:

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	No	Wage premium growth - 1 year	NA
Foreign workers – 3 years	No	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 20 nominations from 14 companies, with the top sector being the financial and insurance/takaful services. The job titles nominated reflect mostly the need for risk analysts, risk management officers and credit risk management officers.
- ii. The majority of companies have reported that vacancies within this occupation group are for middle level candidates, with 5 to 10 years of work experience. There are too few or no applicants, applicants lack the required technical skills and relevant job experience are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 3 to 6 months, and companies have found this occupation to be neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants do not need any particular certifications to qualify for this occupation, however having certification issued by Chartered Financial Analyst (CFA) is an additional advantage. There is also one company noted that they are looking for financial analysts who are able to read, write and speak international languages (e.g. Russian, German, Korea, Japan or French) fluently.
- iv. The most common strategy used to address the shortage is by expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.). Additionally, companies also reported raising wages and increasing training for workers as part of the strategies associated.
- v. Both of the consultations with Association of Banks Malaysia (ABM) and Association of Islamic Banking Institutions Malaysia (AIBIM) indicated that this occupation is critical to the banking industry. In addition, there are scarcity of talent for specialised roles in meeting the industry needs, especially of that people with the additional Syariah knowledge are sought-after in Islamic banking industry. AIBIM also shared that the tertiary curriculum modules need to be enhanced to cater the Islamic banking industry needs.
- vi. From the MDEC Digital Talent Report, financial analysts also have been highlighted as one of the top trending jobs in the digital industry. This occupation might be difficult to fill up in the near future, specifically in global business services (GBS) area.
- vii. The high number of nominations and further input from ABM, AIBIM and MDEC solidifies the evidence pointing to the shortage of this occupation, lead it be included in the COL.



## Occupation: ADVERTISING AND MARKETING PROFESSIONALS

**MASCO 2013 (4-Digit Code):** 2431

**MASCO 2013 (6-Digit Code):** 2431-03; 2431-05; 2431-08; 2431-09; 2431-10; 2431-11; 2431-12; 2431-13; 2431-14; 2431-15

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Sales Promotion Officer; Business Executive; Sales Specialist; Business Compliance Executive; Marketing Communications Specialist; Compliance Officer; Shariah Compliance Officer; Compliance Analyst; Trade Product Specialist; Business Development Engineer

### This occupation appears on COL:

2015	Yes
2016	No
2017	No

### Source of evidence:

<b>Top-down indicators</b>	Passes 3 out of 11 indicators
<b>Bottom-up CfE survey</b>	16 nominations
<b>Consultation</b>	2 nominations
<b>Talent/Skills studies</b>	-

### Top-down data:

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No





## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 18 nominations from 18 companies in 8 sectors, with the top two sectors being the financial and insurance/takaful activities; and manufacturing. The job titles nominated reflect mostly the need for compliance officers, followed by marketing communications specialists and shariah compliance officers.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior candidates. In addition, the applicants lack the required technical skills and relevant job experience as well as limited pool of talent are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 3 to 6 months. Furthermore, companies have reported this occupation has become harder to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. Most companies have resorted to expanding local recruitment efforts, increasing workers training, raising wages, and outsourcing this job function as their strategies to address the talent shortage.
- v. Specific to the Shariah compliance officers, Association of Islamic Banking Malaysia (AIBIM) stated that Islamic banking industry talent needs and challenges are similar to the conventional banking in many ways, but with the additional Syariah requirements. Although there are many universities in Malaysia that offer courses in Islamic banking, however, the relevance of course module may or may not be aligned with the current industry needs. The Association of Banks in Malaysia (ABM) also nominated business compliance officers as one of the critical occupations in the industry.
- vi. Trade product specialists are highlighted as a critical occupation by Malaysian Association of Retail Management (MARM). The lack of focus between the education system and industry collaboration are hindering the ability of workers to innovate and specialise in certain product fields, thus led to a shortage of skilled specialists in this area.
- vii. Given the high number of nominations with sufficient evidence from 3 industry associations, and increase in vacancy rate and number of vacancies, the evidence indicates that there is a growing demand and acute shortage of skilled workers for this occupation. Therefore, we recommend that this occupation to be included in the COL.



## Occupation: SYSTEMS ANALYSTS

**MASCO 2013 (4-Digit Code):** 2511

**MASCO 2013 (6-Digit Code):** 2511-06; 2511-08; 2511-18; 2511-24; 2511-25; 2511-26; 2511-27; 2511-32; 2511-35; 2511-36; 2511-39; 2511-42; 2511-56; 2511-69; 2511-75

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

IT Systems Consultant; Information Technology Business Analyst; Information Technology Security Analyst; Information Technology Specialist (.Net); Technical Specialist (.Net); Java Consultant; Java Application Consultant; Information Technology System Analyst (JDE); Application Specialist Support (Navision); System Technical Writer; Oracle E-Business Suite Consultant; System Engineer (Oracle); Security Analyst (IT); SAP Consultant; Cyber Security Analyst

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 7 out of 14 indicators
<b>Bottom-up CfE survey</b>	17 nominations
<b>Consultation</b>	2 nominations
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

### Top-down data:

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 19 nominations from 18 companies in 5 sectors, with the top three sectors being the information and communication; financial and insurance/ takaful activities; and manufacturing. The job titles nominated reflect mostly the need for cyber security analysts and information technology (IT) security analysts.
- i. The majority of companies have reported that vacancies within this occupation group are for junior candidates. In addition, the applicants lack the required technical skills and relevant job experience, as well as too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is between 3 to 6 months. In addition, companies have reported this occupation has become harder to fill as compared to a year ago.
- ii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, some respondents reported that applicants require to have in-depth understanding on computer programming language, e.g. Java to qualify for this occupation.
- iii. To address the shortage, the companies have resorted to expanding local and international recruitment efforts, increasing workers training and raising wages. Additionally, some also indicated to outsourcing this job function.
- iv. Association of Banks Malaysia (ABM) noted that the banks are facing talent scarcity which there are limited pool of talent in IT related skills such as cyber security analysts. Input from Tech Mahindra Ltd. also stated that information technology business analysts are critical in the information and communication industry. They opined this is due to the lack of proper training environments and focus in most of the information technology organisations in this respective area.
- v. MDEC Digital Talent Report mentioned that enterprise resource planning (ERP) programmer analysts (ABAP), .net consultants, java consultants, oracle consultants, peoplesoft consultants (IT), information technology system analysts (JDE) and security analysts are critical in the digital industry.
- viii. In overall, this occupation passed top-down shortage threshold and we received strong bottom-up evidence to justify for the inclusion of this occupation in the COL.



**Occupation: SOFTWARE DEVELOPERS**

**MASCO 2013 (4-Digit Code):** 2512

**MASCO 2013 (6-Digit Code):** 2512-01; 2512-03; 2512-04; 2512-05; 2512-06; 2512-08; 2512-10; 2512-14; 2512-15; 2512-16; 2512-26; 2512-27; 2512-28; 2512-30; 2512-35

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Software Developer; Software Designer; Design Engineer; .Net Developer; Application Developer (.Net); Software Engineer (.Net); C/C++ Software Engineer; Java Developer; Hypertext Preprocessor (PHP) Developer; Web Programmer (PHP); Software Design Engineer; Root Cause Failure Analysis (RCFA) Engineer; SAP IT and Finance Applications Developer; Network Security; Computer Engineer (Software)

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 6 indicators
<b>Bottom-up CfE survey</b>	50 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 51 nominations from 40 companies in 8 sectors, with the top three sectors being the information and communication; manufacturing; and administrative and support service activities. The job titles nominated reflect mostly the need for software developers, design engineers and application developers (.Net).
- ii. Companies have reported that vacancies within this occupation group are vary, ranging from entry to middle level positions. Applicants lack the required technical skills and relevant job experience, as well as insufficient applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 3 to 6 months, and in a few extreme cases of more than 6 months. A third of companies have reported this occupation has become neither more nor less hard to fill with another third found that this occupation is harder to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. However, some companies preferred candidates who have additional qualification of master or PhD. In addition to this, respondents reported that applicants need particular certifications such as SMART/400 programming and Life/Asia, Microsoft, IOS, and Android-based application qualifications.
- iv. To address hiring difficulties for this occupation, the companies have resorted to expanding local and international recruitment efforts, raising wages, and increasing worker training.
- v. Further consultation input by one major company in the aviation sector indicates that software developers, specifically with skills and knowledge in Python are highly sought-after. Software engineer and programmer/developer are highlighted as one of the top trending jobs by surveyed companies of MDEC Digital Talent Report.
- vi. In overall rating, this occupation did pass the top-down shortage threshold. Additionally, there is a strong bottom-up evidence from high nominations by companies from various industries. we recommend that this occupation to be included in the COL.



## Occupation: APPLICATIONS PROGRAMMERS

**MASCO 2013 (4-Digit Code):** 2514

**MASCO 2013 (6-Digit Code):** 2514-01; 2514-02; 2514-03; 2514-06; 2514-07; 2514-08; 2514-18; 2514-21; 2514-22

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Computer Programmer; Software Programmer; Technical Programmer; Database Programmer; Systems Programmer; Analyst Programmer; Software Programmer (.Net); Cobol Programmer; Java Programmer

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 5 out of 14 indicators
<b>Bottom-up CfE survey</b>	21 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 21 nominations from 18 companies in 5 sectors, with the top three sectors being the information and communication; manufacturing; and administrative and support service activities. The job titles nominated reflect mostly the need for software programmers, followed by computer programmers and analyst programmers.
- ii. Companies have reported that vacancies within this occupation group are varied, from entry to middle level. In addition, most have noted that there are too few or no applicants, applicants lack required technical skills and relevant job experience as the main reasons behind the occupation being hard-to-fill. The most common time taken to fill this occupation have been reported to be more than 6 months. Companies have also highlighted that this occupation has been neither more nor less hard to fill, nevertheless, some companies have stated this occupation harder to fill as compared to a year ago.
- iii. A minimum of a bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, some respondents reported that applicants need particular certifications or skills such as Microsoft certificates, CAD/CAM programming skill or other professional certificates related to IT to qualify for this occupation.
- iv. A variety of strategies have been adopted by companies in addressing this shortage. For example, they resort to raising wages, hiring temporary or contract workers, expanding local recruitment efforts and outsourcing this job function. One company have also reported that they organising annual programming competition to find talented programmers.
- v. Additionally, further input from the National Aerospace Industry Coordinating Office (NAICO) have provided evidence that this occupation is critical in aviation industry. The Digital Talent Report from Malaysia Digital Economy Corporation (MDEC) have also highlighted information technology programmers as one of the top trending jobs in digital industry.
- vi. With the high number of nominations point to the fact that many employers are experiencing challenges to fill these positions, and supported by evidence from two associations which indicate that this occupation is in demand, therefore, it is included in the COL.



**Occupation: SOFTWARE AND APPLICATIONS DEVELOPERS AND ANALYSTS NOT ELSEWHERE CLASSIFIED**

**MASCO 2013 (4-Digit Code):** 2519

**MASCO 2013 (6-Digit Code):** 2519-01; 2519-07; 2519-08; 2519-10; 2519-15

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Software Tester; Test Engineer (IT); Solution Architect (IT); Application Security Engineer (IT); Internal Auditor (IT)

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 6 indicators
<b>Bottom-up CfE survey</b>	11 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	No	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 11 nominations from 10 companies in 4 sectors, mainly from information and communication. Other sectors divided equally between financial and insurance/takaful activities; professional, scientific and technical activities; and manufacturing. The job titles nominated reflect mostly the need for solution architects (IT), software testers, and test engineers (IT).
- ii. The majority of companies have reported that vacancies within this occupation group are for junior and entry level positions with a minimum of bachelor's degree. In general, most companies cited that they required around 3 to 6 months to fill in. However, some companies have reported this occupation has become harder to fill as they required more than 6 months to fill the occupation although majority of the companies remains to believe that this occupation is neither more nor less hard to fill as compared to a year ago.
- iii. Main reason behind this occupation being hard-to-fill includes too few or no applicants. Despite the issue of applicants' expected compensation is beyond the market rate and companies cannot afford to pay the market rate for the applicants, another reason cited by one of the companies is the level of interest of the applicants.
- iv. There is evidence that there is some gap in specialised qualification and technical skills such as computer sciences job experiences or participated in any computing competition as cited by one of the respondents is needed in order to qualify for this occupation.
- v. Consistent with the claim that this occupation has too few numbers of applications from potential applicants, the companies have resorted to expand both local and international recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.) and increase the wages.
- vi. MDEC Digital Talent Report also mentioned that there is critical need for this occupation specifically for software QA engineers (IT), solution architects (IT) and application assurance engineers.
- vii. Considering strong supporting evidence above, both from bottom-up and top-down evidence as well as MDEC report, we believe that this does point to a significant widespread shortage. Therefore, we recommend this occupation to be included in the COL.



**Occupation: SYSTEMS ADMINISTRATORS**

**MASCO 2013 (4-Digit Code):** 2522

**MASCO 2013 (6-Digit Code):** 2522-09; 2522-12; 2522-13; 2522-15; 2522-16; 2522-19; 2522-28; 2522-30; 2522-32; 2522-33; 2522-36; 2522-38; 2522-47; 2522-52; 2522-55

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Information System Officer; Information Technology Support Officer; Systems Administrator; Information Technology Executive; Project Coordinator (IT); System Engineer (IT); Information System Executive; System Support Specialist; Cloud Computing Solution Architect; Web and Mobility Developer; IT Architect; Cloud Technology Specialist; Infrastructure Specialists (IT); User Experience Engineer; Systems Engineer

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 14 indicators
<b>Bottom-up CfE survey</b>	19 nominations
<b>Consultation</b>	5 nominations
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	Yes	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	No	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	No	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 24 nominations from 22 companies in 8 sectors, with the top two sectors being the information and communication and financial and insurance/takaful activities. The job title nominated reflect mostly the need for project coordinators (IT).
- ii. The majority of companies have reported that vacancies within this occupation group are for both junior and middle level positions. The applicants lack the required technical skills is the most-cited reason behind the occupation being hard-to-fill. Additionally, companies also cited applicants lack relevant job experience and certification. The time to fill for this occupation is varying, some respondents reported they take less than 3 months, some take 4 to 6 months and a few extreme cases of more than 6 months. Half of companies have reported this occupation has become neither more nor less hard to fill with another half found that this occupation is harder to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, they did not offer any particular certifications needed to qualify for the occupation. The companies have resorted to expanding local and international recruitment efforts, raising wages and increasing worker training to mitigate the shortage.
- iv. Consultation with the Association of Banks Malaysia (ABM), nominated middle and senior level positions for information technology architects, information technology support officers and information system executives as critical. Consistent with evidence received from our survey, ABM also highlighted that there is limited pool of talent for those specialised roles in the banking industry and applicants normally lack credentials or experience to fit the role.
- v. Association of Islamic Banking Institutions Malaysia (AIBIM) provided further input, indicating that information technology executives with the additional Syariah knowledge are sought-after in Islamic banking industry. Tech Mahindra Ltd. also reported the need for cloud technology specialists in the industry.
- vi. MDEC Digital Talent Report identified project coordinators (IT) and technical support engineers as trending jobs in digital industry.
- vii. Top-down evidence indicates there are growth in wage premium and employment levels for this occupation, in which implies that there is a demand to hire skilled and experience workers for this occupation. In addition, considering the strong bottom up evidence that does point to a widespread shortage, therefore this occupation is included in the COL.



**Occupation: COMPUTER NETWORK PROFESSIONALS**

**MASCO 2013 (4-Digit Code):** 2523

**MASCO 2013 (6-Digit Code):** 2523-03; 2523-04; 2523-05; 2523-06; 2523-10

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Network Administrator; Network Infrastructure Administrator; Network Engineer; Network Systems Engineer; IT Network System Engineer

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 6 indicators
<b>Bottom-up CfE survey</b>	7 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	No	Wage premium growth - 1 year	NA
Foreign workers – 3 years	No	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	Yes	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 7 nominations from 6 companies in 2 sectors, which are information and communication; and administrative and support service activities. The job titles nominated reflect mostly the need for network engineers.
- ii. The companies have reported that vacancies within this occupation group are for candidates with at least 2 years of working experience. In addition, the applicants lack the required technical skills, credential or certification and relevant job experience are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is within 3 to 6 months. Plus, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. Consistent with the claim that this occupation requires a particular set of technical skills and more experienced workers are needed, most respondents do not report hiring less well qualified workers. Instead, the companies have resorted to raising wages, hiring temporary or contract workers and increasing worker training.
- v. MDEC Digital Talent Report also mentioned that network engineer is nominated as top trending jobs in digital industry. This occupation might be difficult to fill up in the near future, specifically in cloud/datacentre area. With this claim, it provides strong justification for fair and moderate nomination of bottom-up evidence. Additionally, in overall, top-down evidence also does point to the shortage of this occupation and lead it to be included in the COL.



**Occupation: DATABASE AND NETWORK PROFESSIONALS NOT ELSEWHERE CLASSIFIED**

**MASCO 2013 (4-Digit Code):** 2529

**MASCO 2013 (6-Digit Code):** 2529-02; 2529-03; 2529-04

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Cyber Security Executive; Digital Forensic Specialist; Security Specialist (IT)

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 4 indicators
<b>Bottom-up CfE survey</b>	5 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	NA	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 5 nominations from 3 companies in 2 sectors, with the sectors being the information and communication; and professional, scientific and technical activities. The job titles nominated were cyber security executives, digital forensic specialists, and security specialists (IT).
- ii. Companies have reported that vacancies within this occupation group are middle level positions. Applicants lack the required technical skills, lack the relevant job experience, and too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 3 to 6 months. Companies have also reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants do not need any particular certifications to qualify for this occupation.
- iv. To address shortage for this occupation, most respondents have reported expanding international recruitment efforts, hiring less well qualified workers, and raising wages.
- v. According to MDEC Digital Talent Report, cybersecurity has been identified as one of the specific skills shortages in the near future. Security specialist has been highlighted by companies as one of the jobs that might be difficult to fill up in 2020. Additionally, as reported by the study's respondents, the top three skills shortages up to 2020 is risk assessment and management, cyber laws, as well as data loss prevention software.
- vi. Based on the top-down evidence, growth in number of vacancies and vacancy rate somewhat indicate that this occupation is high in demand. This is supported by a strong input on growing demand of cybersecurity jobs from MDEC Digital Talent Report. With this claim, it provides a solid justification for fair and moderate nomination of bottom-up evidence. Thus, we recommend that this occupation to be included in the COL.



## Occupation: CIVIL ENGINEERING TECHNICIANS

**MASCO 2013 (4-Digit Code):** 3112

**MASCO 2013 (6-Digit Code):** 3112-08; 3112-09

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Clerk-Of-Work; Technician

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 6 out of 12 indicators
<b>Bottom-up CfE survey</b>	19 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Machinery Equipment and Advanced Engineering Environmental Scan (Phase 2)</li> </ul>

### Top-down data:

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	Yes
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	Yes





## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 19 nominations from 19 companies in 6 sectors, with the top three sectors being the manufacturing; wholesale and retail trade, repair of motor vehicles and motorcycles; and administrative and support service activities. The job titles nominated reflect mostly the need for technicians.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior and entry level with working experience is less than 5 years. In addition, too few or no applicants, applicants lack relevant job experience and technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is varied from less than 2 months to more than 6 months. However, this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. Majority of companies have resorted to raising wages, increasing worker training, and hiring less well qualified applicants as their strategies to address the talent shortage for this occupation. Although companies are not pursuing any related professional certificates from applicants, however it is highlighted that relevant work experience in specific niche areas is important.
- v. This occupation is highlighted in Machinery Equipment and Advanced Engineering Environmental Scan (Phase 2) study as one of the top critical occupations in the machinery and equipment, and engineering supporting industries. Consistent with the input from the CfE survey, the lack of technical skills/competencies, and small supply pool of talent with highly specialised knowledge are the key challenges faced by companies.
- vi. With the support of the environmental scan study's key findings, complementing with strong evidence from the top-down and high number of nominations from bottom-up analyses, we believe that this does point to a widespread shortage. Therefore, this provides a strong case for this occupation to be included in the COL.



**Occupation: ELECTRICAL ENGINEERING TECHNICIANS**

**MASCO 2013 (4-Digit Code):** 3113

**MASCO 2013 (6-Digit Code):** 3113-02; 3113-07; 3113-12; 3113-14; 3113-16

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Electrical Engineering Technician; Electrical Supervisor; Car Electrical Technician; Electrical Technician; Debug Technician

**This occupation appears on COL:**

2015	No
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 1 out of 12 indicators
<b>Bottom-up CfE survey</b>	9 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Electrical and Electronics Environmental Scan</li> <li>Medical Devices Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	No	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 9 nominations from 9 companies in 5 sectors, with the top sector being the manufacturing. The job titles nominated reflect mostly the need for electrical technicians.
- ii. Companies have reported that vacancies within this occupation group are for entry and junior level positions with most-cited reason behind the occupation being hard-to-fill are applicants lack of required technical skills and credential or certification. The most common time to fill for this occupation reported is 3 to 6 months. In addition, companies have highlighted that this occupation has become harder to fill as compared to a year ago.
- iii. A minimum of diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. The companies have resorted to expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.) and increasing worker training to address this shortage.
- v. Input from Electrical and Electronics Environmental Scan indicated that this occupation is critical to the light-emitting diode (LED) sub-sector. According to the report, most companies reported that minimum qualification required for electrical engineering technicians is Sijil Kemahiran Malaysia (SKM) 1 to 2. Additionally, Medical Devices Environmental Scan have also noted that this occupation is highly sought-after and hard-to-fill in the surgical/medical gloves sub-sector.
- vi. With the strong bottom-up evidence from 2 environmental scan reports which provide strong justification for fair and moderate nomination in our survey, we believe that this does point to a shortage, therefore this occupation is included in the COL.



**Occupation: MECHANICAL ENGINEERING TECHNICIANS**

**MASCO 2013 (4-Digit Code):** 3115

**MASCO 2013 (6-Digit Code):** 3115-06; 3115-07; 3115-08; 3115-12; 3115-27; 3115-29; 3115-30; 3115-34; 3115-35; 3115-40; 3115-43; 3115-44; 3115-45

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Mechanical Engineering Technician; Mechanical Engineering Technician (Industrial Machinery and Tools); Mechanical Engineering Technician (Motors and Engines); Refrigeration and Air-Conditioning System Engineering Technician; Machinery Technician; CNC Technician; Welding Technician; Mechanical Technician; CNC Supervisor; CAD/CAM Technician; Spinning Technician; Knitting Technician; Weaving Technician

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 12 indicators
<b>Bottom-up CfE survey</b>	24 nominations
<b>Consultation</b>	3 nominations
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Electrical and Electronics Environmental Scan</li> <li>Medical Devices Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 27 nominations from 22 companies in 6 sectors, with the top sector being the manufacturing. The job titles nominated reflect mostly the need for mechanical technicians, machinery technicians and CNC technicians.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior and middle level positions. In addition, applicants lack relevant job experience and technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is between 3 to 6 months, though a significant number reported longer time to fill as well (more than 6 months). Furthermore, most companies found this occupation to be harder to fill compared to one year ago.
- iii. A minimum of a diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants would need to have vocational related certifications.
- iv. Most companies have resorted to increasing worker training, hours or overtime, raising wages, and expanding local recruitment efforts as well as establishing or expanding partnerships with education or training providers focused on recruitment of graduates. Nevertheless, some companies also reported hiring less well qualified applicants in order to address the shortages.
- v. The Electrical and Electronics Environmental Scan mentioned that this occupation (e.g. test technicians, CNC technicians, machinery technicians) is highly sought-after and hard-to-fill in the industrial electronics sub-sector. This occupation also has been highlighted as a critical occupation in the Medical Devices Environmental Scan (e.g. machinery technicians, maintenance technicians), with requirement of at least a bachelor's degree or diploma.
- vi. Input from the Malaysian Knitting Manufactures Association (MKMA) provided additional evidence that spinning technicians, knitting technicians and weaving technicians are critical in textile and apparel industry. They opined that the supply of skill workers become challenging because of the people's perception towards this industry as sunset industry in Malaysia and young candidates feel that working in factory is not a professional job.
- vii. Considering evidence of growth in employment and availability of vacancies in top-down with strong evidence from two environmental scans and input from association as well as high nominations from our survey, we believe that this does point to a widespread shortage, thus, this occupation is included in the COL.



**Occupation: PHYSICAL AND ENGINEERING SCIENCE TECHNICIANS NOT ELSEWHERE CLASSIFIED**

**MASCO 2013 (4-Digit Code):** 3119

**MASCO 2013 (6-Digit Code):** 3119-07; 3119-14; 3119-20; 3119-24; 3119-27; 3119-31; 3119-34; 3119-36; 3119-37; 3119-47; 3119-48; 3119-49

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Quantity Surveying Technician; Engineering Technician, Production; Robotics Technician; Maintenance Technician; Quality Control Technician; Industrial Technician; Production Technician; Moulding Technician; Equipment Technician; Dyeing Technician; Finishing Technician; Printing Technician

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 12 indicators
<b>Bottom-up CfE survey</b>	26 nominations
<b>Consultation</b>	3 nominations
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Machinery Equipment and Advanced Engineering Environmental Scan (Phase 2)</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 29 nominations from 23 companies in 7 sectors, with the top two sectors being the manufacturing; and professional, scientific and technical activities. The job titles nominated reflect mostly the need for maintenance technicians, followed by production and moulding technicians.
- ii. The majority of companies have reported that vacancies within this occupation group are for entry level candidates with less than 2 years of working experience. Most common time to fill for this occupation is less than 3 months, and it is reported that this occupation has become neither more nor less hard to fill as compared to a year ago. However, the occupation is being hard-to-fill due to the lack of applicants, applicants lack relevant job experience and technical skills.
- iii. A minimum of a diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, one respondent reported that applicants need particular certifications such as License Radiographer Operator for industrial radiographer technician.
- iv. Consistent with the claim that this occupation requires a particular set of technical skills, the companies have resorted to increasing worker training and raising wages. Plus, companies also responded to expanding local recruitment efforts to address the talent shortage.
- v. Consultation with Malaysian Knitting Manufacturers Association (MKMA) stated that job titles such as dyeing technicians, textile finishing technicians and printing technicians are critical in the textile and apparel industry. The industry faces high turnover resulting the supply of manpower become challenging.
- vi. Further input from Machinery Equipment and Advanced Engineering Environmental Scan (Phase 2) also shows that robotics technicians are critical in the industry.
- vii. Therefore, considering high nominations from our survey with relatively strong support from the environmental scan and association above, we recommend for this occupation to be included in the COL.



## Occupation: MANUFACTURING SUPERVISORS

**MASCO 2013 (4-Digit Code):** 3122

**MASCO 2013 (6-Digit Code):** 3122-01; 3122-02; 3122-08; 3122-14

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Manufacturing Supervisor; Production Supervisor; Sawmill Supervisor; Quality Control Inspector

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 8 indicators
<b>Bottom-up CfE survey</b>	22 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> <li>Medical Devices Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA





## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 23 nominations from 21 companies in 4 sectors, with the top sector being the manufacturing. The job title nominated reflect mostly the need for production supervisors.
- ii. The majority of companies have reported that vacancies within this occupation group requires candidates with 5 to 10 years working experience. In addition, too few or no applicants, applicants lack relevant job experience and technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 2 to 3 months and companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago. However, there are some cases of vacancies that take up more than 6 months to fill.
- iii. A minimum of diploma or Sijil Pelajaran Malaysia (SPM) is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, although respondents reported that applicants do not need particular certifications to qualify for this occupation, applicants with relevant work experience and technical background are highly preferred.
- iv. Given the difficulty in filling this occupation, most companies reported raising wages, expanding local recruitment efforts, and increasing worker training as part of their strategies used to address the shortage of this occupation.
- v. The Medical Devices Environmental Scan reported that employers in medical non-consumables segment faced difficulties in recruiting manufacturing supervisors and indicates this occupation as critical for their operation and business growth.
- vi. This occupation also been highlighted as a critical occupation in the Chemical and Petrochemical Environmental Scan. According to the report, manufacturing supervisors are in high demand at plastic products and rubber products sub-industry. The average time taken to fill the vacancies varies between 4 to 24 months.
- vii. Consultation with Malaysian Furniture Council (MFC) provided additional evidence, indicating that experienced and knowledgeable production supervisors are highly sought-after in the furniture industry.
- viii. Top-Down evidence indicates there are growth in wage premium levels for this occupation, in which implies that there is a demand to hire skilled and experience workers for this occupation. This is relatively consistent with respondents' strategy to address this shortage via raising wages. Also, considering the bottom-up evidence as well as significant additional input from consultation and 2 environmental scan studies that points to a shortage, we recommend that this occupation to be included in the COL.



**Occupation: OTHER SUPERVISORS NOT ELSEWHERE CLASSIFIED**

**MASCO 2013 (4-Digit Code):** 3129

**MASCO 2013 (6-Digit Code):** 3129-03; 3129-04; 3129-05; 3129-06; 3129-07

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Facilities Supervisor; Supervisor; Logistic Supervisor; Store Supervisor; Shift Supervisor

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 12 indicators
<b>Bottom-up CfE survey</b>	14 nominations
<b>Consultation</b>	2 nominations
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Machinery Equipment and Advanced Engineering Environmental Scan (Phase 2)</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 16 nominations from 16 companies in 8 sectors, with the top three sectors being the manufacturing; arts, entertainment and recreation; and transportation and storage. The job titles nominated reflect mostly the need for supervisors.
- ii. The majority of companies have reported that vacancies within this occupation group are across all levels from junior to senior level of working experience. In addition, too few or no applicants and applicants lack the required credential or certification as well as relevant job experience are the most-cited reasons behind the occupation being hard-to-fill. The most common time taken to fill for this occupation have been reported to be within 1 to 3 months. Companies have also reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of a diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, some companies have highlighted the need for specific knowledge related to the company's industry. For example, a shipping company has specifically mentioned the need for knowledge or certificate in shipping for supervisors.
- iv. The most common strategies used by the companies in addressing this shortage include increasing worker training and raising wages.
- v. The Machinery Equipment and Advanced Engineering Environmental Scan (Phase 2) have cited a few occupations under the job title of supervisor such as fabrication supervisors, fabrication supervisors (pressurised equipment), senior welding inspectors and welding coordinators to be critical in both machinery and equipment (M&E) and engineering supporting industry (ESI).
- vi. Consultation with Federation of Malaysian Freight Forwarders (FMFF) reported that the industry faces difficulties in hiring logistics supervisors with middle level experience. Further input from Waste Management Association Malaysia (WMAM) highlighted that supervisors as critical occupation in waste management industry. WMAM also shared that companies are facing difficulties in filling this position in major cities, e.g. Johor, whereby most local talents would prefer to work in Singapore due to higher salary.
- vii. Considering the number of bottom-up nominations as well as there is strong evidence from related study and input from two consultations, therefore, this occupation is included in the COL.



**Occupation: COMMERCIAL SALES AGENTS**

**MASCO 2013 (4-Digit Code):** 3322

**MASCO 2013 (6-Digit Code):** 3322-01; 3322-02; 3322-04; 3322-05; 3322-08; 3322-13; 3322-14; 3322-15; 3322-17; 3322-20; 3322-22; 3322-24; 3322-26; 3322-27; 3322-28; 3322-29; 3322-30; 3322-35

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Salesperson; After Sales Service Adviser; Sales Representative; Salesperson (Travel); Technical Sales Agent; Sales Executive; Marketing Executive; Business Development Executive; Product Brand Executive; Pre-Sales Support; Salesperson (Car); Salesperson (Motorcycle); Regional Sales Executive; Offshore Sales Executive; Sales Engineer; Marketing Engineer; Technical Sales Engineer; Digital Marketing Executive

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 6 out of 14 indicators
<b>Bottom-up CfE survey</b>	69 nominations
<b>Consultation</b>	2 nominations
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 71 nominations from 68 companies in 15 sectors, with the top three sectors being the manufacturing; information and communication; and wholesale and retail trade. The job titles nominated reflect mostly the need for sales executives, marketing executives, sales engineers, and sales representatives.
- ii. The majority of companies have reported that vacancies within this occupation group are for entry to junior positions. In addition, applicants lack relevant job experience, too few or no applicants, and applicants lack the required technical skills are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 3 to 6 months. Companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, there are a few respondents preferred applicants with qualification or certification related to their industry such as insurance and tourism.
- iv. To address shortage for this occupation, most respondents have reported expanding local recruitment efforts. The companies have also resorted to hiring less well qualified applicants, raising wages, and increasing worker training.
- v. Consultation with Malaysia Retail Chain Association (MRCA) highlighted that this occupation is critical. Skilled local salespersons are hard to retain, as the industry experiences high turnover rate every 2 to 3 years. Marketing executives are also nominated by Malaysian Association of Hotel Owners (MAHO) as a critical occupation. Experienced marketing executives is essential for the hospitality industry to promote their product and service offerings.
- vi. Top-down evidence indicates there are growth in employment, number of vacancies, and wage premium. Growth in foreign workers also corroborates with insights from our consultation with MRCA and MAHO that skilled local salespersons and marketing executives are hard to find. High number of nominations from various sectors does point to a widespread shortage. Therefore, based on overall evidence, we recommend that this occupation to be included in the COL.



**Occupation: CHEFS**

**MASCO 2013 (4-Digit Code):** 3641

**MASCO 2013 (6-Digit Code):** 3641-07; 3641-05; 3641-03; 3641-13; 3641-11

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Chef; Chefs De Partie; Executive Chef; Kitchen Coordinator; Pastry Chef

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 6 out of 12 indicators
<b>Bottom-up CfE survey</b>	8 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Food and Beverage Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	Yes
Vacancy rate	Yes	Education growth - 3 year	Yes
Foreign workers – 1 year	No	Wage premium growth - 1 year	NA
Foreign workers – 3 years	No	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 9 nominations from 9 companies in accommodation and food service; and manufacturing sectors. The job titles nominated reflect mostly the need for chefs and pastry chefs.
- ii. Companies have reported that vacancies within this occupation group are for entry and junior level candidates. In addition, too few or no applicants, applicants lack the required technical and relevant job experience are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 3 to 6 months. In addition, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of diploma or Sijil Pelajaran Malaysia (SPM) is required for all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. To address this shortage, the companies have resorted to expanding international and local recruitment efforts as well as raising wages.
- v. The Malaysian Association of Hotel Owners (MAHO) mentioned that hotel industry suffers an issue of misconception on career path and job prospects (e.g.: 3D: dangerous, dirty and demeaning jobs). This is prevalent among local students, where they do not want to continue working professionally after their internship ends. Hiring foreign workers is the current solution as they are willing to work in all type of available jobs and interested to develop their career path. This is supported by input from Professional Culinaire Association (PCA), where they remarked that the discontinuation of local workforce in this industry is due to lower pay scale, ranging from RM900 to RM1,600 monthly.
- vi. The Food and Beverage Environmental Scan indicated that chefs are critical and highly demanded especially for accommodation and food service sector.
- vii. Therefore, considering sufficient evidence from bottom-up and the top-down evidence with additional input from environmental scan and association above, we believe that this does point to a widespread shortage, thus we recommend that this occupation to be included in the COL.



## Occupation: RECEPTIONISTS

**MASCO 2013 (4-Digit Code):** 4224

**MASCO 2013 (6-Digit Code):** 4224-01; 4224-05; 4224-06; 4224-10; 4224-11; 4224-13

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Receptionist; Front Office Receptionist; Front Office Assistant; Hotel Receptionist; Hotel Front Desk Clerk; Reservation Supervisor

### This occupation appears on COL:

2015	No
2016	No
2017	No

### Source of evidence:

<b>Top-down indicators</b>	Passes 2 out of 8 indicators
<b>Bottom-up CfE survey</b>	12 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	-

### Top-down data:

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA



## Bottom-up evidence:

This occupation is included in the COL.

- i. We received 13 nominations from 13 companies in 3 sectors, with the top three sectors being the accommodation and food service; professional, scientific and technical activities; and human health and social work activities. The job titles nominated reflect mostly the need for front office assistants, receptionists, and hotel receptionists.
- ii. Companies have reported that vacancies within this occupation group are for entry to junior level positions. In addition, too few or no applicants, applicants lack of relevant job experience, and applicants' expected compensation is beyond the market rate are the most-cited reasons behind the occupation being hard-to-fill. The time taken to fill for this occupation reported is within 6 months and companies found that this occupation has become harder to fill as compared to a year ago.
- iii. A minimum of diploma or Sijil Pelajaran Malaysia (SPM) is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. To address shortage for this occupation, most respondents have reported increasing worker training, raising wages, hiring temporary or contract workers and less well qualified applicants.
- v. Consultation with the Malaysian Association of Hotel Owners (MAHO) indicated that this occupation is critical. Local hotel owners are willing to hire locals for jobs under this occupation. However, due to lack of interest and unattractiveness of working in this particular service industry, hotel owners resorted to hire foreign workers to fill up vacancies for this occupation.
- vi. Further input by Malaysian Association of Hotels (MAH) highlighted the importance of this occupation for the hotel industry. This job requires strong communication skills, especially in English, and strong literacy in computer and technology competencies. Growth in this industry had contributed to an increasing demand of talent in this area.
- vii. Given that there is growth in employment and wage premium, and high nominations from the accommodation and food service sector, these findings corroborate with additional consultation evidence obtained from MAHO and MAH. Therefore, we recommend that this occupation to be included in the COL.



## Occupation: WELDERS AND FLAME CUTTERS

**MASCO 2013 (4-Digit Code):** 7212

**MASCO 2013 (6-Digit Code):** 7212-03; 7212-10; 7212-11

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Welder; Metal Welder; Gas Pipe Welder

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 1 out of 8 indicators
<b>Bottom-up CfE survey</b>	11 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA

### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 11 nominations from 11 companies in 5 sectors, with the top sector being the manufacturing. The job titles nominated reflect mostly the need for welders.
- ii. Companies have reported that vacancies within this occupation group are for candidates with less than 2 years (entry level) or 2 to 5 years of working experience (junior level). In addition, too few or no applicants and applicants lack the required technical skills are the most-cited reasons behind the occupation being hard-to-fill. Some companies have also reported that this occupation is hard to hire because not many people are willing to work in uncomfortable environments (e.g. dusty, noisy) and applicants' salary expectations are beyond companies' compensation policies.
- iii. Generally, this occupation takes up to 4 months to fill and companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago. However, there are extreme cases of companies taking 5 to 6 and more than 6 months to fill up vacancies and they found that this occupation to be harder to fill compared to last year.
- iv. A minimum of Sijil Pelajaran Malaysia (SPM) is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants need a trade and industrial certification of welding to qualify for this occupation.
- v. To address the shortage, companies have resorted to raising wages, outsourcing this job function, hiring less well qualified applicants and increasing worker training.
- vi. Based on the FMM Salary, Benefits and Employment Conditions Survey in the Manufacturing Sector 2017/2018, 19 employers have pointed that welders are short in supply. We have also gathered additional insight from the Welding Institute Malaysia (WIM) which confirms that the shortage in this occupation is common in the industry. They also shared that this may be due to several reasons:
  - a) Relatively low pay depending on their skill levels and industries they are working in
  - b) Many prefer to work overseas (Singapore, Middle East) mainly due to the higher pay/benefits
  - c) Many people perceive it as a 3D job – dirty, dangerous and difficult
  - d) Not enough recognition by government and public that welding is a skilled profession
  - e) Automation in welding is still low as compared to the developed countries
- vii. This occupation did not pass the top-down shortage overall threshold. However, with the number of nominations, at 11, which is relatively high and additional input from associations, we believe that this does point to a widespread shortage. Thus, this occupation is included in the COL.



**Occupation: AGRICULTURAL AND INDUSTRIAL MACHINERY MECHANICS AND REPAIRERS**

**MASCO 2013 (4-Digit Code):** 7233

**MASCO 2013 (6-Digit Code):** 7233-01; 7233-09; 7233-14; 7233-15

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Machinery Mechanic; Farm Machinery Repairer; Industrial Machinist; CNC Machinist

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 1 out of 8 indicators
<b>Bottom-up CfE survey</b>	23 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 23 nominations from 22 companies in 4 sectors, with the top two sectors being the manufacturing as well as agriculture, forestry and fishing. The job titles nominated reflect mostly the need for CNC machinists.
- ii. A majority of companies have reported that vacancies within this occupation group are for junior level positions, with 2 to 5 years of work experience. The applicants lack the required technical skills and relevant job experience as well as too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is between 5 to 6 months, though there are also some cases of vacancies take up to more than 6 months to fill. In addition, companies have reported this occupation has become harder to fill as compared to a year ago.
- iii. A minimum of a diploma or Sijil Pelajaran Malaysia (SPM) is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, one of the respondents prefer to have candidates with CAD-CAM programming skills.
- iv. To address the shortage, companies have commonly taken up the strategies of increasing worker training, expanding international recruitment efforts, raising wages and establishing or expanding partnerships with education or training providers focused on recruitment of graduates. Nevertheless, some companies also reported hiring less well qualified workers.
- v. The FMM Salary, Benefits and Employment Conditions Survey in the Manufacturing Sector 2017/2018 also noted that 16 respondents nominated CNC machinists are short in supply.
- vi. This occupation is included in the COL because high number of nominations and strong bottom-up evidence which does point a widespread shortage.



**Occupation: ELECTRICAL MECHANICS AND FITTERS**

**MASCO 2013 (4-Digit Code):** 7412

**MASCO 2013 (6-Digit Code):** 7412-04; 7412-07; 7412-09; 7412-23

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

High Voltage Restriction Chargeman; Wireman; Foreman (Electrical); Chargeman

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 8 indicators
<b>Bottom-up CfE survey</b>	31 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA

### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 31 nominations from 27 companies in 9 sectors, with the top two sectors being the manufacturing and construction. The job titles nominated reflect mostly the need for chargemen and wiremen.
- ii. A majority of companies have reported that vacancies within this occupation group are for junior and middle level positions. However, companies have cited that the main reasons behind the occupation being hard to fill are there are insufficient applicants, applicants lack the required credential or certification, and companies cannot afford to pay the market rate for the applicants. The most common time taken to fill for this occupation reported is within 3 to 6 months. In addition, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of a diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. Apart from that, most companies have emphasised the need for certified chargemen. In Malaysia, chargemen have to obtain certification from the Energy Commission such as:
  - a) PJ1, PJ2, PJ32, PJ3 and PJ4 certificates for low voltage system chargemen (Categories AO, A1, A4-2, A4-1 and A4)
  - b) PJ52, PJ5, PJ6, PJ7, PJ8 certificates for high voltage system chargemen (Categories BO-2, BO-1, BO, B1 and B4)
- iv. Companies have resorted to expanding local recruitment efforts, increasing workers training and raising wages as their strategies to address the shortage.
- v. The Chemical and Petrochemical Environmental Scan have cited high voltage restriction chargemen as critical in plastic product, chemical, petrochemical and oleochemical sub-industries. The two minimum required qualification are diploma and chargeman certificate from Energy Commission. The time taken to fill vacancies based on their findings is 4 to 6 months on average. It was reported by their respondents that one of the main reasons this occupation is hard to fill is because there is a limited supply of talent in the market.
- vi. According to FMM Salary, Benefits and Employment Conditions Survey in the Manufacturing Sector 2017/2018, there are inadequate supply of chargemen, fitters, wiremen and foremen with strong technical skills.
- vii. Therefore, considering strong bottom-up evidence with additional support from environmental scan and FMM survey as above, we suggest for this occupation to be included in the COL.



**Occupation: BAKERS, PASTRY, PASTA AND CONFECTIONERY MAKERS**

**MASCO 2013 (4-Digit Code):** 7512

**MASCO 2013 (6-Digit Code):** 7512-01; 7512-02

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Baker; Pastry Baker

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 8 indicators
<b>Bottom-up CfE survey</b>	3 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Food and Beverage Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA





### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 3 nominations from 3 companies for bakers and pastry bakers in 2 sectors, which are manufacturing; and accommodation and food service.
- ii. Companies reported that vacancies within this occupation group are for entry level position with a minimum qualification of Sijil Pelajaran Malaysia (SPM). Limited number of applicants is the most-cited reason behind the occupation being hard-to-fill. Another reason is applicants lacking the required technical skills where companies are looking for the applicant that have good understanding on the products with food presentation skills instead of basic baking skills only. The common time to fill for this occupation reported is 2 to 4 months. Companies also found this occupation has become harder and neither more nor less hard to fill as compared to a year ago.
- iii. To mitigate the shortage, companies resorted to expand international recruitment efforts and hire temporary or contract workers.
- iv. According to Professional Culinaire Association (PCA), there are sufficient of talent pool from public and private colleges for this occupation, however they are being paid at lower pay scale from minimum of RM900 to RM1,600 monthly. This deters the continuation of local workforce in this industry.
- v. The Food and Beverage Environmental Scan have stated that for the need of bakers, pastry, pasta and confectionery makers is crucial in overall food and beverage Halal industry.
- vi. Though evidence from bottom-up is limited, the additional input from association and environmental scan above do point reasonable insights as well as this occupation did pass the top-down shortage threshold, thus we recommend it to be included in the COL.



**Occupation: TAILORS, DRESSMAKERS, FURRIERS AND HATTERS**

**MASCO 2013 (4-Digit Code):** 7621

**MASCO 2013 (6-Digit Code):** 7621-02; 7621-03; 7621-08; 7621-09; 7621-10

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Tailor; Dressmaker; Operator (Sewing); Sewer; Worker (Sewing)

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 8 indicators
<b>Bottom-up CfE survey</b>	12 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA

### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 12 nominations from 12 companies in manufacturing sector. The job titles nominated reflect mostly the need for tailors and sewing workers.
- ii. The majority of companies reported that vacancies within this occupation group are for junior level positions. In addition, fewer or no applicants, applicants lack relevant job experience and technical skills are the most-cited reasons behind the occupation being hard-to-fill. The time taken to fill for this occupation reported varies, between 3 to 6 months and more than 6 months. Companies have reported this occupation has become neither more nor less hard to fill, although, some stated it is harder to fill as compared to a year ago.
- iii. A minimum of Sijil Pelajaran Malaysia (SPM) is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, companies do highlight the importance of sewing skills and interest level rather than qualifications, as an important hiring criterion of applicants.
- iv. To address shortage for this occupation, most respondents reported hiring temporary or contract workers, hiring less well qualified applicants, and raising wages.
- v. Further input by Malaysian Knitting Manufactures Association (MKMA) indicates that this occupation is critical and hard to fill in the textile and apparel industry. A key reason on why this occupation is hard to fill is because it is being perceived as 3D jobs (dirty, dangerous, and difficult), with long working hours, less conducive working environment, low wages, and mainly filled by foreign workers. MKMA opined that this misconception should be addressed, in which TVET occupations should be promoted as an alternative career pathway to white collar jobs.
- vi. Considering there are growth of wage premium, this corroborates with respondents' concern on lack of suitable applicants and their strategies to address shortage for this occupation. Supported by additional findings from MKMA, we believe that this points towards a growing shortage. We recommend that this occupation to be included in the COL.



## Occupation: RUBBER PRODUCTS MACHINE OPERATORS

**MASCO 2013 (4-Digit Code):** 8141

**MASCO 2013 (6-Digit Code):** 8141-09

Only the following job title within this occupation is included in the Critical Occupations List (COL):

Rubber Products Machine Operator

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 8 indicators
<b>Bottom-up CfE survey</b>	3 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>• Chemical and Petrochemical Environmental Scan</li> <li>• Medical Devices Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 3 nominations from 3 companies in the manufacturing sector. The job title nominated reflect the need for rubber products machine operators.
- ii. Companies reported that vacancies for this occupation are for entry level position with a minimum qualification of Sijil Pelajaran Malaysia (SPM) or below. Fewer or no applicants is the most-cited reason behind the occupation being hard-to-fill. Additionally, one company reported their hires are not willing to work in an uncomfortable environment, in which the workers prefer to work under airconditioned environment. The most common time to fill for this occupation reported is 3 to 6 months. Respondents are split in their assessment of whether this occupation is more or less hard to fill than a year ago.
- iii. To address shortage for this occupation, companies reported that they have been increasing worker training, raising wages, increasing worker hours or overtime, and hiring temporary or contract workers.
- iv. Based on the Chemical and Petrochemical Environmental Scan, in the rubber product sub industry, companies have nominated that rubber products machine operators, such as: rubber milling machine operators, rubber extruding machine operators and rubber moulding machine operators, as a critical occupation. They stated that harsh factory environment has resulted in fewer local applicants interested in applying for the role of operators.
- v. According to the Medical Devices Environmental Scan, companies in surgical/medical gloves manufacturing also highlighted the need for this occupation with minimum qualification of Sijil Pelajaran Malaysia (SPM) or Sijil Tinggi Pelajaran Malaysia (STPM).
- vi. Considering that there is evidence of growth in wage premium, this indicates that applicants for this occupation is in high demand. With the exception of low number of nominations of the occupation, additional evidence from 2 environmental scan reports do support that there is a shortage for this occupation. Therefore, we recommend that this occupation to be included in the COL.



## Occupation: STEAM ENGINE AND BOILER OPERATORS

**MASCO 2013 (4-Digit Code):** 8182

**MASCO 2013 (6-Digit Code):** 8182-02; 8182-05; 8182-09

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Boilerman; Steam Boiler Plant Operator; Engine Driver

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 6 indicators
<b>Bottom-up CfE survey</b>	12 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	Yes
Foreign workers – 1 year	NA	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 12 nominations from 10 companies in 2 sectors, which are manufacturing and agriculture, forestry and fishing. Most nominations were from the manufacturing sector. The job titles nominated reflect mostly the need for boilermen.
- ii. Companies reported that vacancies within this occupation group are across all levels from entry to middle level of working experience. Additionally, there were insufficient applicants, and applicants lacked the required credential or certification, as well as they expected compensation beyond market rates are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 3 to 6 months and majority of companies found this occupation to be neither more nor less hard to fill. Nevertheless, some companies reported that it has become harder to fill as compared to a year ago.
- iii. A minimum of Sijil Pelajaran Malaysia (SPM) is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents have highlighted that applicants need particular certifications to qualify for this occupation such as boilerman grade 1 or 2 and steam engine driver certifications from Department of Occupational Safety and Health (DOSH).
- iv. Companies have resorted to overcome this shortage by raising wages and increasing worker training.
- v. The FMM Salary, Benefits and Employment Conditions Survey in the Manufacturing Sector 2017/2018 also noted that boilermen are short in supply with technical skills.
- vi. Considering this occupation did pass the top-down shortage threshold, and with the number of nominations received as well as additional support from the manufacturing survey also provide the corroborating evidence necessary to include this occupation in the COL.



**Occupation: STATIONARY PLANT AND MACHINE OPERATORS NOT ELSEWHERE CLASSIFIED**

**MASCO 2013 (4-Digit Code):** 8189

**MASCO 2013 (6-Digit Code):** 8189-01, 8189-02, 8189-03, 8189-10

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Machine Operator; Production Operator; Equipment & Machine Operator; Line Leader

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 8 indicators
<b>Bottom-up CfE survey</b>	33 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>A Study of the Workforce in the Timber Industry</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA





### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 34 nominations from 33 companies in 4 sectors, with the top sector being the manufacturing. The job titles nominated reflect mostly the need for production operators and machine operators.
- ii. The majority of companies reported that vacancies within this occupation group are for entry level positions. In addition, fewer or no applicants, applicants lack of other required skills (e.g. time management) and applicants' expected compensation is beyond the market rate are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 3 to 6 months, with companies have reported this occupation has become harder to fill as compared to a year ago.
- iii. A minimum qualification of Sijil Pelajaran Malaysia (SPM) or below is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents also preferred applicants who are willing to work at outdoor and open space environment.
- iv. Companies have resorted to expanding local recruitment efforts, raising wages and increasing workers training to address the shortage of this occupation.
- v. Input from Malaysian Knitting Manufacturers Association (MKMA) indicated the need for line leaders, as they are critical for supervision and operation management of production processes. According to the Study of the Workforce in the Timber Industry, line leaders have been listed as an occupation in which requires additional workforce in the furniture and plywood sector.
- vi. Therefore, considering the high number of nominations and additional feedback received from the bottom-up evidence, we believe that this does point to a widespread shortage. We recommend that this occupation to be included in the COL.



**Occupation: HEAVY TRUCK AND LORRY DRIVERS**

**MASCO 2013 (4-Digit Code):** 8332

**MASCO 2013 (6-Digit Code):** 8332-01; 8332-05; 8332-06; 8332-07

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Lorry Driver; Truck Driver; Tanker Driver; Tow Truck Driver

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 8 indicators
<b>Bottom-up CfE survey</b>	19 nominations
<b>Consultation</b>	3 nominations
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 22 nominations from 21 companies in 6 sectors, with the top three sectors being the transportation and storage; manufacturing; and wholesale and retail trade sector. The job titles nominated reflect mostly the need for lorry drivers, truck drivers, and tanker drivers.
- ii. The majority of companies have reported that vacancies within this occupation group are for entry to junior level positions. Lack of applicants, and companies cannot afford to pay the market rate for the applicants are the most-cited reasons behind the occupation being hard-to-fill. The time to fill for this occupation reported varies between 2 to 6 months and more than 6 months. Companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum qualification of Sijil Pelajaran Malaysia (SPM) is required for all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. To address shortage for this occupation, most respondents reported raising wages, expanding local recruitment efforts, hiring less qualified applicants and temporary or contract workers.
- v. Further nomination by the Federation of Malaysian Freight Forwarders (FMFF) and Waste Management Association of Malaysia (WMAM) indicate that this occupation is critical to the respective industry.
- vi. Top-Down evidence indicates there are growth in wage premium levels for this occupation, in which implies that there is a demand to hire workers for this occupation. This is relatively consistent with respondents' strategy to address this shortage via raising wages and with additional insights from associations above. Therefore, we recommend that this occupation to be included in the COL.



## Occupation: MOBILE FARM AND FORESTRY PLANT OPERATORS

**MASCO 2013 (4-Digit Code):** 8341

**MASCO 2013 (6-Digit Code):** 8341-01; 8341-02; 8341-05

Only the following job titles within this occupation are included in the Critical Occupations List (COL):

Operator (Motorized Farm Equipment); Driver (Farm Tractor); Operator (Harvester)

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 1 out of 8 indicators
<b>Bottom-up CfE survey</b>	20 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	No
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA



### Bottom-up evidence:

This occupation is included in the COL.

- i. We received 21 nominations from 19 companies in 3 sectors, with the top sector being the agriculture, forestry and fishing. The job titles nominated reflect mostly the need for harvester operators.
- ii. The majority of companies reported that vacancies within this occupation group are for entry and junior level candidates. Fewer or no applicants, applicants lack the required technical skills and relevant job experience are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is more than 6 months. Additionally, half of the companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago. However, the other half of companies reported that this occupation has become harder to fill over the same time period.
- iii. A minimum qualification of Sijil Pelajaran Malaysia (SPM) or below is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that this occupation is categorised as dirty, dangerous and difficult (3D), whereby a lot of manual work is required.
- iv. Companies have resorted to hiring temporary or contract workers, outsourcing this job function, increasing workers training, expanding international recruitment efforts and raising wages to address the shortage of this occupation.
- v. Input from Malaysian Palm Oil Board (MPOB) indicated that harvester operators are critical for the palm oil industry. Currently, the industry is facing a shortage of workers in this area, as local workers refuse to work in 3D jobs. Furthermore, this occupation is considered as a skilled profession, whereby skills to collect fruits of palm oil requires an extensive hands-on experience.
- vi. Although there is insufficient top-down evidence, growth in employment might signalled as an indication to a growing shortage. This corroborates with high nomination from respondents and supporting evidence from MPOB. Therefore, we recommend that this occupation to be included in the COL.



## DOVETAILING REPORTS OF OCCUPATIONS EXCLUDED FROM THE 2018/2019 CRITICAL OCCUPATIONS LIST

The following occupation reports are based from evidence provided by companies. However, after further review, these occupations were not included for the following reasons:

- i. Insufficient/inconclusive evidence
- ii. Evidence against shortages
- iii. Contradictory evidence

The CSC produces these reports for the following respective reasons:

- i. To encourage the participation of companies or industry associations through our survey or consultation sessions.
- ii. To ensure a transparent process whereby all evidence is taken into account for consideration.
- iii. To recommend companies or industry participation to provide us with additional insights or reasons in order to consider the inclusion of the occupation.

CSC continues to update the Critical Occupations List annually to keep it relevant. Therefore, we welcome constructive comments and feedback throughout the year.



**Occupation: SUPPLY, DISTRIBUTION AND RELATED MANAGERS**

**MASCO 2013 (4-Digit Code):** 1324

**MASCO 2013 (6-Digit Code):** 1324-13; 1324-15

Only the following job titles within this occupation are nominated:

Logistics Manager; Electrical Manager

**This occupation appears on COL:**

2015	No
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 5 out of 12 indicators
<b>Bottom-up CfE survey</b>	9 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Chemical and Petrochemical Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- ii. We received 9 nominations from 9 companies in 5 sectors, with the top two sectors being the transportation and storage and manufacturing. The job titles nominated were for logistics managers and electrical managers.
- iii. The majority of companies reported that vacancies within this occupation group are for junior to middle level positions. Furthermore, companies cited that applicants lack relevant job experience and other required skills as well as there are small number of applicants as the main reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is within 3 months, with a few extreme cases of more than 6 months. However, companies reported that this occupation has become neither more nor less hard to fill as compared to a year ago.
- iv. A minimum requirement of a bachelor's degree is needed for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants do not need any particular additional certifications to qualify for this occupation.
- v. The common strategies used by companies to tackle the shortage are raising wages and expanding local recruitment efforts. A few also have noted to be hiring less well qualified applicants.
- vi. The Chemical and Petrochemical Environmental Scan have stated supply managers and warehouse managers to be critical in the plastic products sub-industry. On average, they have found that these occupations take an average of 3 months to fill, with a minimum qualification requirement of a bachelor's degree or equivalent.
- vii. Considering moderate nominations of bottom-up against the top-down evidence, we believe that this does not point to a widespread shortage and that this occupation is not included in the COL.





**Occupation: PRODUCT AND GARMENT DESIGNERS**

**MASCO 2013 (4-Digit Code):** 2163

**MASCO 2013 (6-Digit Code):** 2163-03; 2163-06; 2163-11; 2163-12

Only the following job titles within this occupation are nominated:

Fashion Designer; Garment Designer; Plastic Mould Designer; Product Designer

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 8 indicators
<b>Bottom-up CfE survey</b>	6 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	NA	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 7 nominations from 7 companies in 2 sectors, which are manufacturing, and wholesale and retail trade; repair of motor vehicles and motorcycles. The job titles nominated reflect mostly the need for plastic mould designers and garment designers.
- ii. The majority of companies have reported that vacancies within this occupation group are for applicants with industry experience of 5 years or more with low number of vacancies. It is reported that this occupation has neither more nor less hard to fill and the common time to fill for this occupation reported to be less than 4 months. The reason of this occupation is hard-to-fill because of fewer or no applicants, applicants lack of required credentials, and relevant job experience.
- iii. A minimum of diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. However, there are strong indication from the companies that require applicants with industrial experiences such as filtering system product designers.
- iv. Companies have resorted to expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.), increasing wages, and partnerships with education and training providers although majority of them expanding international recruitment efforts in order to address the talent shortage issues.
- v. Input from Malaysian Knitting Manufacturers Association (MKMA) reported that there is a significant demand for garment designer in sports and casual attire in the future.
- vi. With the low number of nominations from bottom-up and this occupation did not pass the top-down shortage threshold overall, we believe that this does not point to a widespread shortage and it is excluded in the COL.



**Occupation: TRANSPORT CONTROLLERS NOT ELSEWHERE CLASSIFIED**

**MASCO 2013 (4-Digit Code):** 2179

**MASCO 2013 (6-Digit Code):** 2179-02; 2179-03

Only the following job titles within this occupation are nominated:

Shipping Executive; Logistic Executive

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 4 indicators
<b>Bottom-up CfE survey</b>	4 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	No	Education growth - 1 year	NA
Vacancy rate	No	Education growth - 3 year	NA
Foreign workers – 1 year	NA	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	Yes	Falling education requirements in job postings	Yes



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 4 nominations from 4 companies in 2 sectors, which the sectors being the transportation and storage; and water supply, sewerage, waste management and remediation activities. The job titles nominated reflect mostly the need for logistic executives.
- ii. Companies have reported that vacancies within this occupation group are for entry level positions, with less than 2 years of work experience. In addition, too few or no applicants, applicants lack relevant job experience, and the required credential or certification are the most-cited reasons behind the occupation being hard-to-fill. The time taken to fill the occupation reported is less than 3 months. However, companies have found that this occupation is harder to fill compared to one year ago.
- iii. A minimum of diploma or Sijil Pelajaran Malaysia (SPM) is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants do not need any particular certifications to qualify for this occupation.
- iv. To address the shortage for this occupation, companies have resorted to expanding local recruitment efforts, hiring less well qualified applicants and increasing worker training.
- v. Additional input from Malaysian Shipowners Association (MASA) shared that they do not received any feedback from the industry indicating these administrative jobs, e.g. shipping and logistic executives are critical. Furthermore, there are sufficient supply of talent, where shipping and logistics management courses are being offered widely by public and private universities to serve the industry.
- vi. Even though this occupation passed the top-down shortage threshold, insufficient evidence from bottom-up and input from MASA does not indicate a strong case that this occupation has a shortage. Thus, we recommend that this occupation to not be included in the COL.



**Occupation: GENERALIST MEDICAL PRACTITIONERS**

**MASCO 2013 (4-Digit Code):** 2211

**MASCO 2013 (6-Digit Code):** 2211-04; 2211-10

Only the following job titles within this occupation are nominated:

Medical Doctor; Medical Doctor (Cardiology)

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 6 out of 14 indicators
<b>Bottom-up CfE survey</b>	16 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	No	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	Yes	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 16 nominations from 16 companies in human health and social work activities sector, where medical doctors are the highest nomination from the survey.
- ii. Respondents noted this occupation being hard-to-fill because there were insufficient applicants, applicants' expected compensation beyond the market rates and companies cannot afford to pay them. The most common time taken to fill the occupation have been reported to be within 3 to 6 months. Although, at the same time, companies have also highlighted that this occupation has been neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. A variety of strategies have been adopted by companies in addressing this shortage. For example, they resort to expanding local recruitment efforts, hiring temporary or contract workers, raising wages and increasing worker hours or overtime.
- v. There is no evidence that there a gap in specialised skills, but rather more of getting the right applicants that meet overall expectations of employers. In particular, there seems to be a mismatch of salary expectations. Further insight from Association of Private Hospitals Malaysia (APHM) have pointed that it can be influenced by geographical factor, e.g. Klang Valley hospitals, where employers are able to pay more to candidates, hence they attract more doctors to work with them.
- vi. The top-down evidence does not point to a widespread shortage and the weight of bottom-up evidence also does not support inclusion of this occupation.



**Occupation: SPECIALIST MEDICAL PRACTITIONERS**

**MASCO 2013 (4-Digit Code):** 2212

**MASCO 2013 (6-Digit Code):** 2212-10; 2212-14; 2212-17; 2212-36; 2212-40; 2212-50

Only the following job titles within this occupation are nominated:

Cardiologist; Obstetrician and Gynaecologist (Fertility); Surgeon; Paediatrician; Paediatrician (Nephrology); Physician (Nephrology)

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 6 indicators
<b>Bottom-up CfE survey</b>	8 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	No	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 8 nominations from 6 companies in human health and social work activities sector. The job titles nominated reflect mostly the need for physicians (nephrology), paediatricians, and paediatricians (nephrology).
- ii. The majority of companies have reported that vacancies within this occupation group are for senior and middle level candidates with equivalent to more than 5 years working experience. In addition, too few or no applicants, applicants lack relevant job experience, and applicants' expected compensation is beyond the market rate are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is more than 6 months. Furthermore, companies have reported this occupation has become harder to fill as compared to a year ago.
- iii. A minimum of bachelor's master or PhD is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. Companies have resorted to outsourcing this job function, raising wages, and expanding local recruitment efforts to address the shortage for this occupation.
- v. Consultation with the Neurosurgical Association of Malaysia (NAM) shows that the main issue is related to availability of resources. They outlined the key challenges for the profession is insufficient capital, infrastructure to accommodate increasing number of trainings for neurological service. Expansion in number of neurosurgeons produced must be parallel with the expansion of equipment or infrastructure in order to fully utilise neurosurgeon's services. This is because neurosurgical health industry is resource-intensive where it is diagnosis specific, which requires specific treatment or equipment, not labour-intensive medical specialities. To address this issue, NAM suggest to focus on development of existing services which to enhance current facilities and subsidise to upskill local talent.
- vi. Additional input from Association of Private Hospitals Malaysia (APHM) mentioned that only paediatrician (nephrology) is critical to the industry.
- vii. Top-down evidence indicated a case that this occupation is undergoing a shortage. However, taking the bottom-up and consultation evidence into account, this does not point to a widespread shortage. We recommend that this occupation not to be included in the COL.





**Occupation: NURSING PROFESSIONALS**

**MASCO 2013 (4-Digit Code):** 2221

**MASCO 2013 (6-Digit Code):** 2221-03; 2221-04; 2221-08; 2221-10; 2221-11; 2221-12; 2221-14; 2221-15; 2221-16; 2221-17; 2221-21

Only the following job titles within this occupation are nominated:	Professional Nurse; Clinical Nurse; Nurse Practitioner; Specialist Nurse; Nurse Instructor; Nurse; Nurse (Public Health); Matron; Operation Theatre Nurse; Specialized Nurse; Occupational Health Nurse
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**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 1 out of 12 indicators
<b>Bottom-up CfE survey</b>	33 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	No
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 33 nominations from 27 companies in 2 sectors, mostly from the human health and social work activities sector. The job titles nominated reflect mostly the need for clinical nurses, specialist nurses, operation theatre nurses, and specialised nurses.
- ii. Companies have reported that vacancies within this occupation group are varied, from entry to senior level positions, with majority of them noted that they intend to hire for entry and junior candidates. Yet, this occupation is hard-to-fill because applicants lack relevant job experience. There are also too few or no applicants and applicants lack the required credential or certification. The most common time to fill for this occupation reported is more than 6 months. However, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of a diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants need particular requirements such as post-basic training in any fields and nursing annual practising certificate to qualify for this occupation. To mitigate the shortage, most respondents have resorted to raising wages, increasing worker training and increasing worker hours or overtime.
- iv. Further validation with Association of Private Hospitals Malaysia (APHM) provided additional context to the issue of shortage in this occupation. They have expressed that there is enough supply of nurses, however, the shortage is more on experienced nurses with post-basic trainings (e.g. midwife, operation theatre, dialysis). On top of that, there are limited placement and facilities for these trainings in the public healthcare sector.
- v. Despite the high number of nominations, it seems that there are issues of specific skills required by companies which they have begun to respond by providing training. In addition, the top-down evidence also does not point to an overall shortage, in order to justify for the inclusion of this occupation in the COL.



## Occupation: PHARMACISTS

**MASCO 2013 (4-Digit Code):** 2262

**MASCO 2013 (6-Digit Code):** 2262-03; 2262-04; 2262-05

Only the following job titles within this occupation are nominated:

Pharmacist; Industrial Pharmacist; Retail Pharmacist

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 1 out of 12 indicators
<b>Bottom-up CfE survey</b>	6 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

### Top-down data:

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	No	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	No
Foreign workers – 3 years	NA	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 6 nominations from 6 companies in 4 sectors. Half of the respondents are in the human health and social work activities sector, and one each was in the wholesale and retail trade, transportation and storage, and professional, scientific and technical activities sector. We received nominations for three job titles namely pharmacists, retail pharmacists and industrial pharmacists.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior candidates. Fewer or no applicants, applicants lack the relevant job experience, and cannot afford to pay the market rate are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is within 3 to 6 months. Most companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. All available positions listed by respondents require a bachelor's degree. An additional certification or license is also often required to practice this occupation.
- iv. In response to difficulty finding qualified applicants, no companies reported to hiring less well qualified workers. Instead, companies resorted raising wages and expanding local recruitment efforts to mitigate this issue.
- v. The Pharmacy Board of Malaysia (PBM) stated that there are difficulties in employing experienced and skilled pharmacists, especially in the industrial or manufacturing pharmacy where pharmaceutical products are highly regulated industry. Another concern is the salaries paid to the fresh graduates especially in the retail or community pharmacy. Furthermore, pharmacists in Malaysia have been fighting hard for their rights on dispensing separation (DS) of medicines which has been well practiced in developed countries. The job opportunities for pharmacists especially in the retail or community pharmacy would be hardly improved if rights on DS does not resolved. In addition, the average yearly output of pharmacy graduates in Malaysia from local and abroad universities is around 1,200 – 1,500 graduates.
- vi. Further insights from the Pharmaceutical Association of Malaysia (PhAMA) include growing career opportunities in the pharmaceutical industry such as regulatory affairs, clinical research, pharmacoconomics and pharmacovigilance (PV).
- vii. Additional input from Association of Private Hospitals Malaysia (APHM) cited that graduates prefer to work in the public hospitals due to higher wages and low hours of work.
- viii. Considering low nominations from bottom-up against top-down evidence, and issues highlighted from the associations above also do not point to a shortage of supply, therefore this occupation is not included in the COL.



**Occupation: VOCATIONAL TRAINING OFFICERS**

**MASCO 2013 (4-Digit Code):** 2381

**MASCO 2013 (6-Digit Code):** 2381-01; 2381-02

Only the following job titles within this occupation are nominated:

Vocational Training Officer Grade DV41; Skill Training Trainer

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 8 indicators
<b>Bottom-up CfE survey</b>	12 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA

### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 12 nominations from 9 companies in 3 sectors, with the top sector being the education. The job titles nominated were skill training trainers and vocational training officers (grade DV41).
- ii. Companies have reported that vacancies within this occupation group are diversified from entry to senior level positions. In addition, applicants lack the required credential or certification and technical skills as well as there are insufficient applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is more than 6 months. Furthermore, companies found this occupation to be harder to fill compared to a year ago.
- iii. A minimum of diploma qualification is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. Applicants with bachelor's or master's degree qualification are also preferred. Additionally, respondents reported that applicants are required to have certain certifications to qualify for this occupation such as:
  - a) Vocational training officer (VTO) certification
  - b) Malaysian skills certificate level 3 (SKM level 3)
  - c) Occupational safety and health certification from National Institute of Occupational Safety and Health (NIOSH).
- iv. Given the difficulty placing this occupation, most companies have reported hiring temporary or contract workers. Some companies have also resorted to expanding local recruitment efforts and raising wages as strategies to address this issue.
- v. Through our validation with the Centre for Instructor and Advanced Skill Training (CIAST) under Department of Skills Department (JPK) of MOHR, there are enough supply of vocational training officers, where as of now, there is about 23,000 vocational training officers (excluding in private sector) in Malaysia. They opined that the main issue faced by the industries is about specialisation, the need of talents who specialise in specific areas of training. They also indicated that the main reason of why this occupation is hard-to-fill is may be due to low pay in the private sector, in which is consistent with some respondents' feedback, highlighted that they cannot afford to pay the market rate for the applicants.
- vi. The limited top-down evidence available does not point to an overall shortage, even though this occupation does pass on some indicators, especially those related to the growth in wage premium levels for this occupation. This is relatively consistent with respondents' strategy to address difficulty hiring via raising wages. In addition, the bottom-up evidence does not corroborate the shortage of talent, in order to justify for the inclusion of this occupation in the COL.



**Occupation: PERSONNEL AND CAREERS PROFESSIONALS**

**MASCO 2013 (4-Digit Code):** 2423

**MASCO 2013 (6-Digit Code):** 2423-03; 2423-09; 2423-17; 2423-19

Only the following job titles within this occupation are nominated:

Human Resource Executive; Career Adviser; Human Resource Coordinator; Talent Management Specialist

**This occupation appears on COL:**

2015	Yes
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 5 out of 14 indicators
<b>Bottom-up CfE survey</b>	19 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	No
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 19 nominations from 19 companies in 10 sectors, with the top three sectors being the manufacturing; financial and insurance/takaful activities; and information and communication. The job titles nominated reflect mostly the need for human resource executives.
- ii. Majority of the companies have reported to have vacancies for junior candidates within this occupation group although there is a significant number of respondents reported to have no vacancies at the moment. In addition, applicants lack of other required skills (e.g. time management), relevant job experience, and the required credential or certification are the most-cited reasons behind the occupation being hard-to-fill. Most common time to fill for this occupation reported only within one month, thus, consistent with the majority responds by the companies cited that this occupation being neither more nor less hard to fill as compared to a year ago.
- iii. There is a strong need for industrial experience with a minimum of diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants do not need particular certifications to qualify for this occupation.
- iv. To address shortage, companies have resorted to increase existing workers training as supported by some of the respondent opt to adhere some tasks to existing workers as well as train their workers to be able to multitasked. Some agreed to hiring less well qualified applicants or raise wages as they emphasise more on the needs for job experience and technical skills which can be address through workers training.
- v. Based on our validation input from ROOTS Public Relations, it shows that there is no significant issue to recruit HR professionals, as they encounter high number of applicants for this occupation.
- vi. Therefore, although the number of nominations is high, there is significantly low number of job vacancies for each respective company. There is still insufficient top-down evidence and we believe that this does not point to a widespread shortage of talent, in which supported by validation input. Hence, we recommend that this occupation not to be included in the COL.





**Occupation: RESEARCH AND DEVELOPMENT PROFESSIONALS**

**MASCO 2013 (4-Digit Code):** 2426

**MASCO 2013 (6-Digit Code):** 2426-01; 2426-08

Only the following job titles within this occupation are nominated:

Research Officer Grade Q41; Agriculture Biotech Researcher

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 11 indicators
<b>Bottom-up CfE survey</b>	2 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Medical Devices</li> <li>Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	Yes	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	No	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	No	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	Yes	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 2 nominations from 2 companies in 2 sectors, being the agriculture, forestry and fishing; and water supply, sewerage, waste management and remediation activities. The job titles nominated were research officer grade Q41 and agriculture biotech researcher.
- ii. Companies reported that vacancies within this occupation group are for junior candidates, with 2 to 5 years of work experience. There are fewer or no applicants and applicants lack the required credential or certification are the reasons behind the occupation being hard-to-fill. The time taken to fill the occupation reported is between 3 to 5 months and companies found this occupation to be neither more nor less hard to fill compared to a year ago.
- iii. A bachelor's or master's degree qualifications are required for vacancies listed by respondents in our Call-for-Evidence survey. In some extend, the companies encourage the applicants to pursue in postgraduate doctoral degree (PhD) to be the subject matter of expert in specific areas.
- iv. The companies have resorted to expanding local recruitment efforts (e.g. wider distribution of job openings, increased presence at career fairs, increased use of recruitment firms, etc.) as strategy in addressing difficulty hiring of this occupation.
- v. The Medical Devices Environmental Scan cited this occupation as critical in manufacturing of another medical consumable segment. However, feedback from the SIRIM Berhad indicated that this occupation is not critical to the industry as there is sufficient talent pool for research and development professionals.
- vi. With weak bottom-up evidence and the occupation did not pass the top-down shortage threshold, this occupation is not included in the COL.



**Occupation: PUBLIC RELATIONS PROFESSIONALS**

**MASCO 2013 (4-Digit Code):** 2432

**MASCO 2013 (6-Digit Code):** 2432-07; 2432-09; 2432-13; 2432-14; 2432-15; 2432-16; 2432-19

Only the following job titles within this occupation are nominated:

Customer Service Executive; Corporate Communication Executive; Tourism Officer; Customer Service Officer; Customer Care Coordinator; Customer Relations Executive; Front Office Officer

**This occupation appears on COL:**

2015	No
2016	No
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 5 out of 12 indicators
<b>Bottom-up CfE survey</b>	15 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	Yes
Foreign workers – 1 year	NA	Wage premium growth - 1 year	No
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 15 nominations from 14 companies in 6 sectors, with the top two sectors being the manufacturing and administrative and support service activities. The job titles nominated reflect mostly the need for customer service executives and customer relations executives.
- ii. The majority of companies have reported that vacancies within this occupation group are for entry and junior candidates. Yet, they reported that applicants lack relevant job experience as the most-cited reason behind the occupation being hard-to-fill. In addition, there are also fewer or no applicants and applicants' expected compensation is beyond the market rate. The most common time to fill for this occupation reported is 2 to 3 months, though a significant number of companies reported shorter and longer times to fill as well. Furthermore, companies found this occupation has not become harder to fill as compared to a year ago.
- iii. Most positions require a bachelor's degree, though a significant minority of companies report open positions requiring a diploma or below. One mentioned that they accept candidates without a bachelor's degree when they have relevant previous experience and candidates with high proficiency of English language are preferred.
- iv. The most common cited strategies for addressing difficulty hiring are expanding recruitment, followed by increasing worker training and automating job tasks.
- v. Through our validation with ROOTS Public Relations, they noted that there is a certain stigma on the customer service industry, which make it hard to find candidates with excellent soft skills in dealing with complaint and servicing people. They also shared that the main reason of industry facing difficulty in hiring for this occupation is due to candidates do not have an excellent English spoken language.
- vi. While the number of nominations point to the fact that many employers are experiencing challenges to fill these positions, the bottom-up evidence appears to be more consistent with the demand of this occupation at entry and junior level positions which are not hard to fill. Moreover, the top-down evidence does not point to shortage overall. Therefore, this occupation is not included in the COL.



## Occupation: WEB AND MULTIMEDIA DEVELOPERS

**MASCO 2013 (4-Digit Code):** 2513

**MASCO 2013 (6-Digit Code):** 2513-01; 2513-05; 2513-06

Only the following job titles within this occupation are nominated:

UX/UI Front End Developer; Website Developer; Website Administrator

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 4 indicators
<b>Bottom-up CfE survey</b>	3 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	NA	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 4 nominations from 4 companies in 3 sectors, being the information and communication; transportation and storage; and real estate activities. The job titles nominated reflect mostly the need for UX/UI front end developers, website developers, and website administrators.
- ii. Companies have reported that vacancies within this occupation group are in between middle to senior level positions. Applicants lack the required credential or certification and required technical skills, as well as too few or no applicants are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is up to 3 months. Companies also reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. Most respondents have resorted to expanding international and local recruitment efforts, raising wages, and partnerships with education or training providers.
- iv. According to MDEC Digital Talent Report 2017, web development is a top trending technical skill under the e-commerce category. Furthermore, this skill alongside with web analytics and web administration has been highlighted by companies as skills shortages under the same category in the near future. Consultation with one of the Malaysia's large airlines also indicate that there is a lack of such talent for UX/UI developer, in which they are looking to hire masters or PhD graduates from overseas universities.
- v. Number of growth of vacancies and vacancies rate indicates that jobs under this occupation are high in demand. This is in line with evidence provided from consultation and MDEC Digital Talent Report 2017. However, minimal number of nominations from respondents does not support the point of a widespread shortage. Therefore, we recommend that this occupation not to be included in the COL. However, in the near future, stronger reasons and evidence have to be obtain from the industry in order to consider the urgency of inclusion of this occupation in the COL.



**Occupation: AUTHORS AND RELATED WRITERS**

**MASCO 2013 (4-Digit Code):** 2831

**MASCO 2013 (6-Digit Code):** 2831-11; 2831-16; 2831-18

Only the following job titles within this occupation are nominated:

Copywriter (Advertising); Script Writer; Editor

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 4 indicators
<b>Bottom-up CfE survey</b>	6 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>MDEC Digital Talent Report 2017</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	Yes	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	NA	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No

### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 6 nominations from 6 companies in 2 sectors, namely information and communication; and arts, entertainment and recreation. The job titles nominated reflect mostly the need for editors and script writers.
- ii. The majority of companies have reported that vacancies within this occupation group are for junior candidates. Fewer or no applicants, applicants lack relevant job experience and the required credential or certification are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 2 to 3 months, though half of respondents reported times to fill beyond 5 months.
- iii. A minimum of a diploma is required for half of the nominated positions. A bachelor's degree is needed for the other half. Even within the specific job titles nominated, required education levels vary. For instance, of the three companies that nominated the position "editor," two require a bachelor's degree and one require a diploma.
- iv. The common strategies to address shortage include outsourcing the job function, hiring temporary and contract workers, and raising wages. This appears to indicate that companies are both seeking to attract candidates for internal positions with higher wages while at the same time relying on other firms and individuals to supply the talent needed to do the work. With the evidence available, it's not clear whether relying on contract, freelance and specialized firms to provide the talent meets firm's needs, or if it is a second-best option only being pursued due to the scarcity of qualified workers.
- v. Based on MDEC Digital Talent Report 2017, this occupation was included in the list of trending jobs, providing some evidence that labour demand is growing.
- vi. The limited top-down evidence points to shortage based on an increase of vacancy rate and number of vacancies. MDEC Digital Talent Report 2017 have found that companies list this occupation as among the ones they feel are important to operations and difficult to fill. However, low number of nominations and contradicting bottom up evidence does not provide a strong case that this occupation is facing a widespread shortage. Hence, we recommend that this occupation not to be included in the COL.





**Occupation: FILM, STAGE AND RELATED DIRECTORS AND PRODUCERS**

**MASCO 2013 (4-Digit Code):** 2844

**MASCO 2013 (6-Digit Code):** 2844-03; 2844-05; 2844-11; 2844-12

Only the following job titles within this occupation are nominated:

Animation Producer; Motion Picture Director; Motion Picture Producer; Film and Video Editor

**This occupation appears on COL:**

2015	No
2016	Yes
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 6 indicators
<b>Bottom-up CfE survey</b>	4 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	No	Education growth - 1 year	NA
Vacancy rate	Yes	Education growth - 3 year	NA
Foreign workers – 1 year	Yes	Wage premium growth - 1 year	NA
Foreign workers – 3 years	Yes	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	Yes	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 4 nominations from 3 companies in 3 sectors which are the information and communication; arts, entertainment and recreation; and administrative and support service activities. The job titles nominated reflect the need for animation producers, motion picture directors, motion picture producers and film and video editors.
- ii. Companies have reported that vacancies within this occupation group are for junior level, with 2 to 5 years of work experience. In addition, the most-cited reason behind the occupation being hard-to-fill is the applicants lack relevant job experience. The time taken to fill this occupation reported is within 6 months. However, companies have reported that this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of a diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants do not need any particular certifications to qualify for this occupation. Moreover, based on our survey, respondents have highlighted the importance of relevant work experience despite low minimum qualification.
- iv. Companies mostly resorted to outsourcing these job functions as a way to fill in vacancies. This also supported by evidence from Media Prima Berhad, where they will hire third parties for projects or assignments with regards to this area.
- v. The limited top-down evidence available points to a shortage. However, because lack of nominations and insufficient bottom-up evidence, which does not corroborate that the shortage of talent potentially indicated by the top-down evidence. Therefore, this occupation is not included in the COL.



**Occupation: ELECTRONICS ENGINEERING TECHNICIANS**

**MASCO 2013 (4-Digit Code):** 3114

**MASCO 2013 (6-Digit Code):** 3114-08

Only the following job title within this occupation is nominated:

Electronics Technician

**This occupation appears on COL:**

2015	Yes
2016	Yes
2017	Yes

**Source of evidence:**

<b>Top-down indicators</b>	Passes 0 out of 12 indicators
<b>Bottom-up CfE survey</b>	2 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>Electrical &amp; Electronics Environmental Scan</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	No	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	No
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 2 nominations from 2 companies in manufacturing sector for electronics technicians.
- ii. Companies reported that vacancies for this occupation are for the entry and junior level positions with a minimum qualification of diploma. The applicants lack the required certification and applicants' expected compensation beyond the market rate are the reasons behind the occupation being hard-to-fill. It takes less than 1 month to fill the position and companies have noted this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. To mitigate the shortage, companies reported expanding local recruitment efforts, increasing worker training, hiring temporary or contract worker as well as establishing partnerships with education or training providers focused on recruitment of graduates.
- iv. Based on the Electrical & Electronics Environmental Scan, they also cited that electronics engineering technicians are sought-after in semiconductor, industrial electronics, electronic manufacturing services (EMS) and light-emitting diode (LED) sub-sectors. However, we were not able to gather any additional information regarding the shortage of this occupation to support the nominations received through our Call-for-Evidence survey.
- v. While considerable qualitative evidence was received from the Electrical & Electronics Environmental Scan, the low number of nominations and top-down evidence did not point to a widespread talent shortage, thus it did not provide us with sufficient assurance to include the occupation in the COL.



<b>Occupation: AIRCRAFT TECHNICIANS</b>			
<b>MASCO 2013 (4-Digit Code):</b> 3151			
<b>MASCO 2013 (6-Digit Code):</b> 3151-07			
Only the following job title within this occupation is nominated:		Aircraft Maintenance Technician (Engines)	
<b>This occupation appears on COL:</b>			
	2015	No	
	2016	Yes	
	2017	Yes	
<b>Source of evidence:</b>			
	<b>Top-down indicators</b>	Insufficient data	
	<b>Bottom-up CfE survey</b>	1 nomination	
	<b>Consultation</b>	-	
	<b>Talent/Skills studies</b>	-	
<b>Top-down data:</b>			
Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	NA	Education growth - 1 year	NA
Vacancy rate	NA	Education growth - 3 year	NA
Foreign workers – 1 year	NA	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 1 nomination from 1 company in transportation and storage sector. The job title nominated were aircraft maintenance technicians.
- ii. The majority of companies reported that vacancies within this occupation group are for junior to middle level positions. In addition, lack relevant job experience and lack other required skills (e.g. time management, ability to get along with others, teamwork, creativity, problem solving, reading, writing, speaking, maths and logic, etc.) are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 2 to 3 months and has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of advance diploma is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. The company has resorted to raising wages to mitigate this shortage.
- v. Additional input from National Aerospace Industry Coordinating Office (NAICO) stated that this occupation is crucial in the industry while one of the airline companies mentioned that there is sufficient talent pool from training skills institutions.
- vi. Therefore, considering low bottom-up evidence against the top-down evidence, we believe that this does not point to a widespread shortage. Thus, this occupation is not included in the COL.



**Occupation: SECURITIES AND FINANCE DEALERS AND BROKERS**

**MASCO 2013 (4-Digit Code):** 3311

**MASCO 2013 (6-Digit Code):** 3311-06; 3311-09; 3311-10

Only the following job titles within this occupation are nominated:

Foreign Exchange Dealer; Treasury Dealer; Treasury Analyst

**This occupation appears on COL:**

2015	Yes
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 10 indicators
<b>Bottom-up CfE survey</b>	4 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	Yes	Employment growth - 1 year	Yes
Working hours growth - 3 year	Yes	Employment growth - 3 years	No
Number of vacancies	No	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 5 nominations from 4 companies in the financial and insurance/takaful sector. The job titles nominated reflect mostly specialised jobs within this occupation such as foreign exchange dealers, treasury dealers, and treasury analysts.
- ii. Companies reported vacancies requiring at least two years of experience. The reasons behind the occupation being hard-to-fill include applicants lacking relevant experience and technical skills. The time taken to fill for this occupation between 1 to 3 months and respondents reported that this occupation is neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of a bachelor's degree is required for all vacancies listed by respondents in our Call-for-Evidence survey. Several respondents reported that this occupation require specialised certifications, for example, *Pasaran Kewangan Malaysia* Certificate Modules 1 to 4 and Securities Industry Development Corporation (SIDC) Examination Module 6 and 7.
- iv. Expanding local recruitment efforts is the only strategy listed by respondents to our survey. Pursuing recruitment over training could make sense when the duration of training needed to earn the required certifications are long, and the number of employees needed in these roles is limited, as reported by respondents.
- v. The Association of Banks Malaysia (ABM) reported that upskilling employees is also one of the strategies being employed by other employers in the industry. Bursa Malaysia shared that the listing of job titles mentioned are basically related to financial market, mainly commercial banks. The roles of foreign exchange dealers and treasury dealers are important to ensure smooth functioning of the financial system as well as provide conducive ecosystem for transparent and reliable price discovery mechanism.
- vi. There is insufficient top-down and bottom-up evidence in order to justify the inclusion of this occupation in the COL.





**Occupation: ACCOUNTING ASSOCIATE PROFESSIONALS**

**MASCO 2013 (4-Digit Code):** 3313

**MASCO 2013 (6-Digit Code):** 3313-07; 3313-11; 3313-26

Only the following job titles within this occupation are nominated:

Financial Supervisor; Accounts Assistant; Accounting Technician

**This occupation appears on COL:**

2015	Yes
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 4 out of 12 indicators
<b>Bottom-up CfE survey</b>	2 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	-

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	Yes	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 3 nominations from 3 companies in 3 sectors, which are construction; professional, scientific and technical activities; and wholesale and retail trade. The job titles nominated reflect the need for accounts assistants, financial supervisors and accounting technicians.
- ii. The occupation being hard-to-fill because applicants lack the required technical skills and companies cannot afford to pay the market rate for the applicants. They have noted that this occupation is harder to fill as compared to a year ago and time to fill the occupation is 5 to 6 months. None of companies have reported any strategies to address the shortage.
- iii. A minimum of Sijil Pelajaran Malaysia (SPM) or diploma is required for the candidates.
- iv. From our consultation with Malaysia Institute of Accountant (MIA), they have reported that accounting technicians are still in great demand as accountancy is a recession proof profession and there is a need to support businesses due to the changes of regulations. There is also growth of Shared Services Center (SSC), which accounting technicians are required to perform work that specialise on certain accounting functions. The SSC has also seen a shift to Global Business Services (GBS) where accounting technicians, to some extent, are also performing work at a higher proficiency level.
- v. However, considering the low number of nominations and insufficient top-down evidence, we believe that this does not point to a widespread shortage, we recommend that this occupation to not be included in the COL.



<b>Occupation: INSURANCE AGENTS</b>			
<b>MASCO 2013 (4-Digit Code):</b> 3321			
<b>MASCO 2013 (6-Digit Code):</b> 3321-02; 3321-04; 3321-06			
Only the following job titles within this occupation are nominated:		Insurance Broker; Insurance Consultant; Claim Underwriter	
<b>This occupation appears on COL:</b>			
	2015	Yes	
	2016	Yes	
	2017	Yes	
<b>Source of evidence:</b>			
	<b>Top-down indicators</b>		Passes 4 out of 12 indicators
	<b>Bottom-up CfE survey</b>		3 nominations
	<b>Consultation</b>		-
	<b>Talent/Skills studies</b>		-
<b>Top-down data:</b>			
Working hours growth - 1 year	Yes	Employment growth - 1 year	No
Working hours growth - 3 year	No	Employment growth - 3 years	Yes
Number of vacancies	Yes	Education growth - 1 year	No
Vacancy rate	No	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	No	Falling education requirements in job postings	No



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 3 nominations from 3 companies in financial and insurance/takaful activities sector. The job titles that were nominated are insurance brokers, insurance consultants and claim underwriters.
- ii. Companies have reported that vacancies within this occupation group are diversified from entry to middle level positions. Applicants lack the required credential or certification and relevant job experience are the most-cited reasons behind the occupation being hard-to-fill. The time taken to fill for this occupation reported is 2 to 6 months. However, companies have reported this occupation has become neither more nor less hard to fill as compared to a year ago.
- iii. A minimum of bachelor's degree is required for all vacancies listed by respondents in our Call-for-Evidence survey. In addition to this, respondents reported that applicants need particular requirements to qualify for this occupation such as Associateship of the Malaysian Insurance Institute (AMII) or similar level of certifications.
- iv. To address a shortage of this occupation, most respondents have reported hiring less well qualified workers.
- v. Furthermore, an additional input from Life Insurance Association of Malaysia (LIAM) reflected that claim underwriters are not critical, however the industry is looking for insurance specialists.
- vi. The top-down evidence available does not point to a shortage. Additionally, lack of nominations from the survey which indicated that the bottom-up evidence also does not corroborate the shortage of talent. Therefore, this occupation is not included in the COL.



**Occupation: WOODWORKING-MACHINE TOOL SETTERS AND OPERATORS**

**MASCO 2013 (4-Digit Code):** 7613

**MASCO 2013 (6-Digit Code):** 7613-02; 7613-05; 7613-06; 7613-07

Only the following job titles within this occupation are nominated:

Wood Products Machine Operator; Operator (Wood Machine); Precision Woodworking Sawyer; Furniture Production Machine Operator

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Insufficient data
<b>Bottom-up CfE survey</b>	4 nominations
<b>Consultation</b>	1 nomination
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>A Study of the Workforce in the Timber Industry</li> </ul>

**Top-down data:**

Working hours growth - 1 year	NA	Employment growth - 1 year	NA
Working hours growth - 3 year	NA	Employment growth - 3 years	NA
Number of vacancies	NA	Education growth - 1 year	NA
Vacancy rate	NA	Education growth - 3 year	NA
Foreign workers – 1 year	NA	Wage premium growth - 1 year	NA
Foreign workers – 3 years	NA	Wage premium growth - 3 year	NA
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA

### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 4 nominations from 4 companies in 2 sectors, which are the manufacturing; and arts, entertainment and recreation. The job titles nominated reflect mostly the need for wood products machine operators, wood machine operators, and furniture production machine operators.
- ii. Companies have reported that vacancies within this occupation group are for entry to middle level positions. There are insufficient applicants and applicants lack the required technical skills as well as other required skills (e.g. time management, ability to get along with others) are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is 2 to 3 months. Additionally, companies have reported this occupation has become harder to fill as compared to a year ago.
- iii. A minimum of Sijil Pelajaran Malaysia (SPM) qualification is required for almost all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. Most respondents have reported increasing worker hours or overtime, raising wages and hiring less well qualified workers to address the shortage.
- v. According to A Study of the Workforce in the Timber Industry by the Malaysian Timber Industry Board (MTIB), additional workers for sawyers are needed in the sawmilling sector of the timber industry.
- vi. Consultation with the Malaysian Furniture Council (MFC) indicated that the industry faces difficulties in getting operators, where it is not local's favourable job and they intend to hire foreign workers in order to ensure sustainable development in the furniture industry. MFC also shared that they have collaboration with VTAR Institute in organising the Furniture Technology Certification Course, which is conducted using the National Dual Training System (NDTS) under the purview of the Department of Skills Development. The graduates will be awarded a Sijil Kemahiran Malaysia (SKM) - SKM 2 and SKM 3 after completed the training. They also will be provided the job placement. However, the attrition rate of employees is high.
- vii. Although the reasons of this occupation being hard-to-fill correlates with the strategies used to address the shortage as well as additional input from association and MTIB's report provide some indication that this occupation is going through a growing shortage. However, due to lack of strong evidence, we recommend that this occupation not to be included in the COL.



**Occupation: WOOD PROCESSING PLANT OPERATORS**

**MASCO 2013 (4-Digit Code):** 8172

**MASCO 2013 (6-Digit Code):** 8172-01; 8172-02

Only the following job titles within this occupation are nominated:

Sawmill Operator; Sawing Operator

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 3 out of 8 indicators
<b>Bottom-up CfE survey</b>	2 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>A Study of the Workforce in the Timber Industry</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	Yes
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 2 nominations from 1 company in manufacturing sector for sawmill and sawing operators.
- ii. There are insufficient applicants is the reason that this occupation being hard-to-fill. Respondent reported that applicants do not need any particular certifications, instead they need experienced workers to qualify for this occupation. However, company found that this occupation is less hard to fill as compared to a year ago.
- iii. Company has reported raising wages and increasing worker training to address the shortage.
- iv. According to A Study of the Workforce in the Timber Industry by Malaysian Timber Industry Board (MTIB), they noted that plywood making operators are critical and it was found that the foreign workers out-numbered the locals by four times. They also highlighted the need of sawing operators in timber industry.
- v. However, considering insufficient evidences from our survey and top-down, we believe that this is not point a widespread shortage. Therefore, this occupation is not included in the COL.





**Occupation: PACKING, BOTTLING AND LABELLING MACHINE OPERATORS**

**MASCO 2013 (4-Digit Code):** 8183

**MASCO 2013 (6-Digit Code):** 8183-03; 8183-05; 8183-07

Only the following job titles within this occupation are nominated:

Packer; Machine Operator (Packing); Machine Operator (Press)

**This occupation appears on COL:**

2015	No
2016	No
2017	No

**Source of evidence:**

<b>Top-down indicators</b>	Passes 2 out of 8 indicators
<b>Bottom-up CfE survey</b>	4 nominations
<b>Consultation</b>	-
<b>Talent/Skills studies</b>	<ul style="list-style-type: none"> <li>A Study of the Workforce in the Timber Industry</li> </ul>

**Top-down data:**

Working hours growth - 1 year	No	Employment growth - 1 year	Yes
Working hours growth - 3 year	No	Employment growth - 3 years	No
Number of vacancies	NA	Education growth - 1 year	No
Vacancy rate	NA	Education growth - 3 year	No
Foreign workers – 1 year	NA	Wage premium growth - 1 year	Yes
Foreign workers – 3 years	NA	Wage premium growth - 3 year	No
Falling experience requirements in job postings	NA	Falling education requirements in job postings	NA



### Bottom-up evidence:

This occupation is not included in the COL.

- i. We received 4 nominations from 4 companies in 2 sectors, which are manufacturing; and agriculture, forestry and fishing. The job titles nominated reflect the need for packers, machine operators (packing) and machine operators (press).
- ii. Companies have reported that vacancies within this occupation group are for entry level candidates. Fewer or no applicants and applicants' expected compensation is beyond the market rate are the most-cited reasons behind the occupation being hard-to-fill. The most common time to fill for this occupation reported is up to 1 month. In addition, companies have reported this occupation has become less hard to fill as compared to a year ago.
- iii. A minimum of Sijil Pelajaran Malaysia (SPM) is required for all vacancies listed by respondents in our Call-for-Evidence survey.
- iv. To address shortage, most respondents have reported hiring less well qualified workers, expanding international recruitment efforts, increasing worker training, and increasing working hours or overtime.
- v. According to the Study of the Workforce in the Timber Industry, packing operators are considered as an on-demand occupation that require additional workforce in the plywood sector of the timber industry.
- vi. Top-down evidence indicated 1-year growth for employment and wage premium for this occupation. However, low number of nominations and lack of other compelling bottom-up evidence does not point towards a widespread shortage. We recommend that this occupation not to be included in the COL.