SOCIAL PROTECTION AND JOBS

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Social Protection & Jobs

Real-Time Skills Monitoring in Malaysia

New Sources of Labor Market Information for
Better Matching, November 4, 2019

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Jobs, Labor & Migration Course

Malaysia uses the Critical Occupations List (COL) to monitor skills gaps and occupational shortages

Malaysia faced several challenges

- The workforce development system lacked information about labor market demand

- There were insufficient links between education and training providers and employers

The COL responds to these challenges

- The COL is a list of the most sought-after and hard-to-fill occupations in key economic sectors

- Combines quantitative "top down" evidence from survey and administrative data and qualitative "bottom up" evidence from private sector consultations

- The COL is used to coordinate education, training, and immigration interventions

The use of online job posting data arose from needs identified in developing the COL

The COL faced several challenges that the *timeliness* and *granularity* of online job postings could help overcome

1) **Lack of detailed vacancy survey data** → online job postings can proxy for vacancies

2) **Administrative vacancy data was not available** → online job postings can proxy for vacancies

3) **Skill requirements of occupations not known** → online job postings have free text fields where employers describe their needs

We evaluated the suitability of using online job postings data before incorporating it into the COL

Three questions needed to be answered before using the online job postings data

1) Is online job search common in Malaysia?
    - ➢ Survey research shows that online recruitment and job search is common
    - ➢ Many online job search websites (JobStreet, LinkedIn, Monster, Skootjobs, JobsMalaysia, etc.)

2) Can structured data be extracted from online job postings?

3) How representative are online job postings of the labor market in Malaysia?

Can online job postings be processed at the occupation level?

Semi- and unstructured text needs to be processed into a structured dataset

Field	Contents
Job title	Network Operation Analyst
MASCO code	2522
MASCO title	Systems Administrators
Date posted	11/21/2016
Job location	N/A
Employer name	Hewlett-Packard
Employer industry	WHOLESALE AND RETAIL TRADE
Minimum education	Polytechnic diploma
Maximum education	Bachelor's degree or equivalent
Minimum experience	2
Maximum experience	3
Skills required	Detail-Orientated; JNCIA; Communication Skills; Change Management; Troubleshooting; Written Communication; Service Improvement; Juniper Networks; Junos; Transmission Control Protocol / Internet Protocol (TCP / IP); Virtual Private Networking (VPN); English; ITIL; Traffic Management; CheckPoint; Juniper Security/VPN; Cisco; Root Cause Analysis
Certification required	IT Infrastructure Library (ITIL) Certification; Cisco Certified Network Associate (CCNA); Cisco Certified Security Professional; ITIL Certification; Juniper Networks Certified Internet Associate; Check Point Certified Security Expert

Can online job postings be processed at the occupation level?

Two main challenges arise in processing online job postings

1) Standardize job titles into 4-digit occupations
   - ➢ Initial machine learning classification approach was developed internally to establish proof of concept
   - ➢ Specialized consultancy firm implemented final strategy

2) Extract skill requirements from free text
   - ➢ Initial text matching approach was developed internally
   - ➢ Specialized consultancy firm implemented final strategy

How representative are online job postings of the labor market in Malaysia?

Online job postings capture a subset of vacancies that is biased to highly skilled jobs

- The online job posting data presents a better picture of vacancies than existing data sources for more highly skilled jobs (ISCO 1-digit occupation codes 1, 2, 3, and 4)

- However, very few vacancies are captured in low-skilled occupations
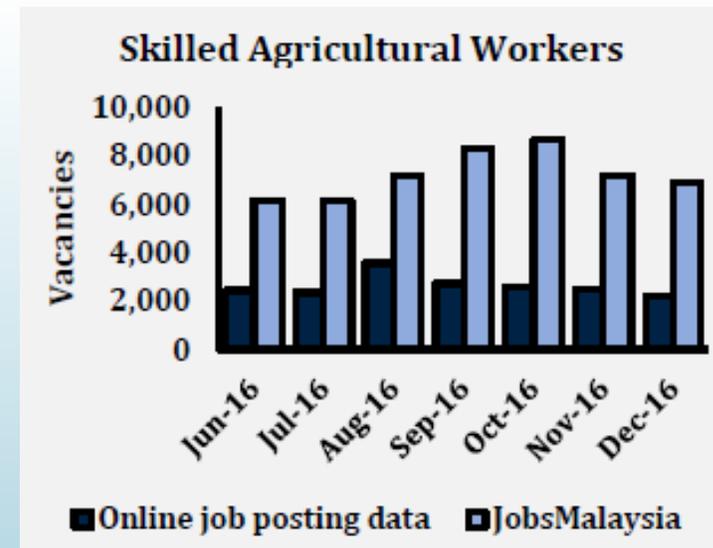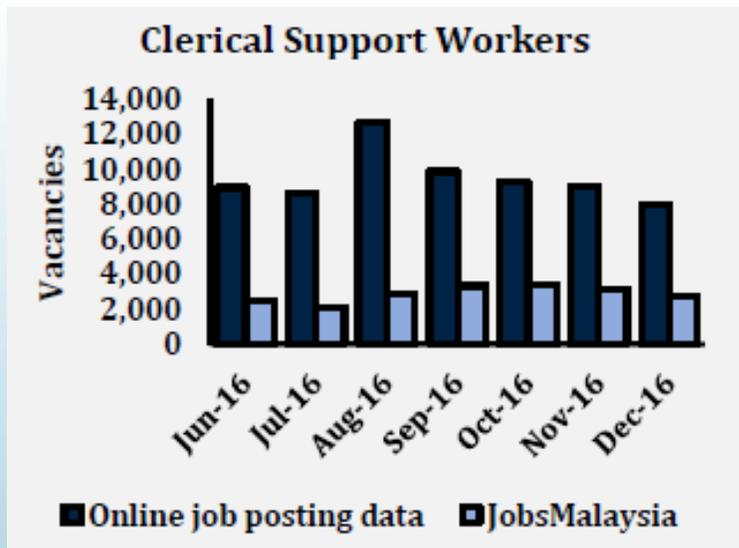
The final online job postings dataset

The final online job postings dataset has more than half a million job postings covering 2.5 years with around 8,000 different skills

- Job postings are de-deduplicated

- All job postings are classified with a 4-digit MASCO (ISCO) code

- Skills are classified into soft/hard, software, and several subgroupings

- Low-skilled occupations are dropped from the final dataset

The COL took advantage of the timeliness and granularity of online job postings data

Online job postings enhance the COL in two ways

1) Serve as an indicator of shortage in the COL
   - ➢ Postings approximate vacancies, filling a data gap in Malaysia

2) Provide detailed information for occupation profiles
   - ➢ Top skills required
   - ➢ Typical minimum/maximum experience required
   - ➢ Similar occupations (based on skills content)
   - ➢ Distinguishing skills (based on skills content)
   - ➢ Benchmark top skills from the US and Singapore

Online job postings data was used to create detailed skills profiles at the occupation level

The top 10 most demanded skills in selected COL occupations

Sales and Marketing Managers

#	Skill	Type of skill	Software skill?
1	Sales	Hard	No
2	Communication Skills	Soft	No
3	English	Soft	No
4	Marketing	Hard	No
5	Business Development	Hard	No
6	Chinese	Soft	No
7	Sales Management	Hard	No
8	Sales Goals	Hard	No
9	Planning	Soft	No
10	Teamwork / Collaboration	Soft	No

Financial Analysts

#	Skill	Type of skill	Software skill?
1	Accounting	Hard	No
2	Communication Skills	Soft	No
3	Finance	Hard	No
4	English	Soft	No
5	Microsoft Excel	Hard	Yes
6	Financial Analysis	Hard	No
7	Teamwork / Collaboration	Soft	No
8	Budgeting	Hard	No
9	Microsoft Office	Hard	Yes
10	Chinese	Soft	No

Mechanical Engineering Technicians

#	Skill	Type of skill	Software skill?
1	Troubleshooting	Soft	No
2	Preventive Maintenance	Soft	No
3	English	Soft	No
4	Mechanical Engineering	Hard	No
5	Communication Skills	Soft	No
6	Chinese	Soft	No
7	Teamwork / Collaboration	Soft	No
8	Planning	Soft	No
9	Welding	Hard	No
10	Problem Solving	Soft	No

Online job postings data was used to create detailed skills profiles at the occupation level

2141	**Industrial And Production Engineers**

7,790
job postings

Average experience required	Minimum 3.2 *years*	Maximum 4.8 *years*

	Malaysia	Type of skill	Software skill?	% of job postings	Singapore	Type of skill	Software skill?	% of job postings	United States	Type of skill	Software skill?	% of job postings
1	Quality Assurance and Control	Soft	No	33%	Quality Assurance and Control	Soft	No	44%	Communication Skills	Soft	No	36%
2	Communication Skills	Soft	No	29%	Communication Skills	Soft	No	36%	Problem Solving	Soft	No	31%
3	English	Soft	No	24%	Problem Solving	Soft	No	21%	Industrial Engineering Industry Expertise	Hard	No	26%
4	Problem Solving	Soft	No	21%	Team Work/ Collaboration	Soft	No	18%	Industrial Engineering	Hard	No	23%
5	Planning	Soft	No	17%	ISO 9001 Standards	Hard	No	15%	Planning	Soft	No	23%
6	Teamwork / Collaboration	Soft	No	16%	Troubleshooting	Soft	No	14%	Quality Assurance and Control	Hard	No	20%
7	Chinese	Soft	No	16%	Planning	Soft	No	14%	Project Management	Hard	No	20%
8	Troubleshooting	Soft	No	14%	Validation	Hard	No	12%	Microsoft Excel	Soft	Yes	19%
9	ISO 9001 Standards	Hard	No	13%	Manufacturing Engineer	Hard	No	12%	Microsoft Office	Soft	Yes	19%
10	Microsoft Office	Hard	Yes	11%	Writing	Soft	No	11%	Teamwork / Collaboration	Soft	No	17%

	3 most similar occupations	Most important skill distinguishing skill	Second most important skill distinguishing skill	Third most important skill distinguishing skill
1	Manufacturing Managers (1321)	Production Management	Manufacturing Engineering	Civil Engineering
2	Mechanical Engineers (2144)	Mechanical Engineering	Quality Assurance and Control	Mechanical Design
3	Physical And Engineering Science Technicians Not Elsewhere Classified (3119)	Troubleshooting	Preventive Maintenance	Industrial Engineering

Source: Online job posting data and Burning Glass Labor Insight™

Lessons learned were compiled in a case study on monitoring occupational shortages

1) **Collecting and processing online job posting data is cost-effective, but requires technical capacity especially for processing**
   - Collecting data is nearly costless and many text analysis packages are free
   - But processing is more difficult for non-English language job postings
   - *Partnerships with online job search websites are a good alternative*

2) **Online job postings are an excellent source of skills data, but this skills data can be challenging to interpret**
   - For example, what skills are digital skills?

3) **Analyzing job postings collected by public employment agencies is a good first step**
   - Can labor market insights be made by looking at vacancies registered with public employment agencies?
   - Can employers be encouraged to provide additional information in job postings registered with public employment agencies (e.g. about skills requirements) at low cost?

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Monitoring Occupational Shortages

Lessons from Malaysia's Critical Occupations List

Questions to course participants

1) Have you attempted to use either vacancy registrations or online job postings data as sources of labor market information?

2) Do you think that private online job search websites would be open to collaborating with your public employment services?

3) Do you see changes in how employers are advertising job openings or in how jobseekers are looking for jobs?