Emerging occupations

How new skills are changing Australian jobs

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Introduction

The way we work is changing. We are more connected than ever before – able to work, negotiate and trade with people across the country and the globe. Technology is also continuously advancing – changing the way we do business, introducing global competition, and automating or altering parts of our jobs.

As the way we work changes, skill requirements also evolve.

The National Skills Commission (NSC) has developed a data-driven approach to identify emerging occupations within Australia. By identifying emerging skills and looking at how these skills change existing jobs, we are able to identify emerging or new jobs in the labour market.
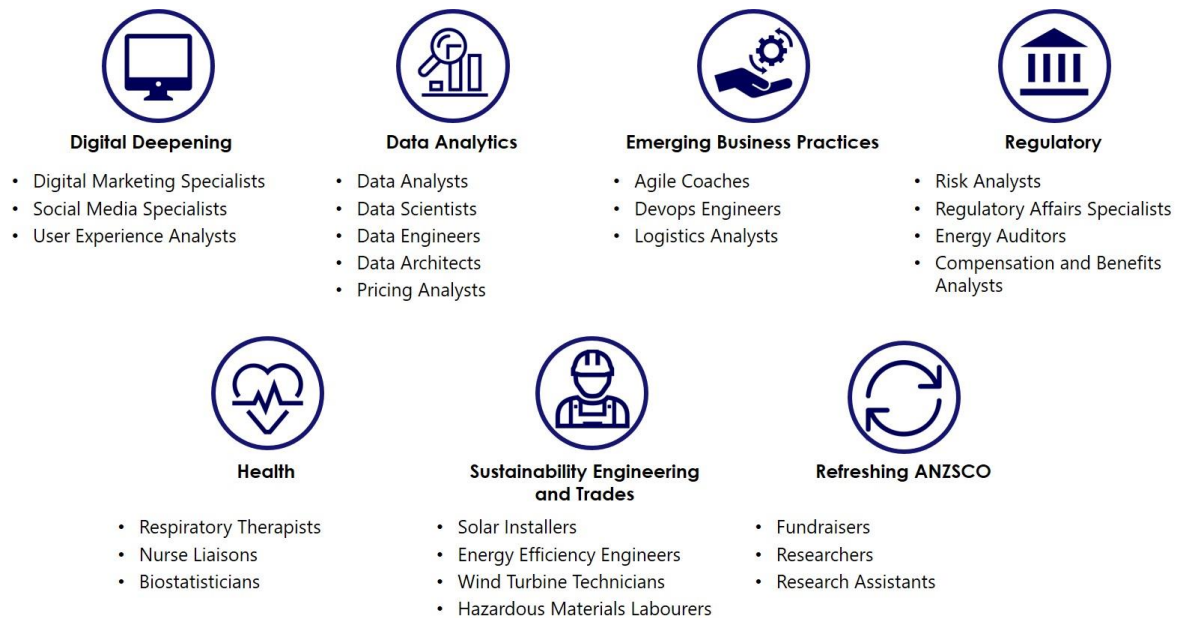
By monitoring emerging jobs along with other information sources on Australia's labour market, the work of the NSC can help ensure Australians are equipped with the right tools and skills for emerging jobs, and help build the skilled, resilient and adaptable workforce we need now, and for years to come.

What are emerging occupations?

Emerging occupations are defined as new, frequently advertised jobs which are substantially different to occupations already defined in the Australian and New Zealand Standard Classification of Occupations (ANZSCO) – such as data scientist and data analyst. As such, to compile our list we considered data from the time period following the last ANZSCO review in 2013.

The NSC has identified and validated 25 emerging occupations within seven categories in the Australian labour market (Figure 1). This list is not considered exhaustive, and the NSC will continue to monitor and analyse emerging trends. An advantage of our approach is access to real time internet job advertisement data using Burning Glass Technologies, which will allow us to pick up occupations in emerging fields like blockchain, nanotechnology, quantum computing and the internet of things as soon as the employer demand for these skills increases.

Figure 1: Emerging occupations identified by the National Skills Commission

Digital Deepening
- Digital Marketing Specialists
- Social Media Specialists
- User Experience Analysts

Data Analytics
- Data Analysts
- Data Scientists
- Data Engineers
- Data Architects
- Pricing Analysts

Emerging Business Practices
- Agile Coaches
- Devops Engineers
- Logistics Analysts

Regulatory
- Risk Analysts
- Regulatory Affairs Specialists
- Energy Auditors
- Compensation and Benefits Analysts

Health
- Respiratory Therapists
- Nurse Liaisons
- Biostatisticians

Sustainability Engineering and Trades
- Solar Installers
- Energy Efficiency Engineers
- Wind Turbine Technicians
- Hazardous Materials Labourers

Refreshing ANZSCO
- Fundraisers
- Researchers
- Research Assistants

Source: Burning Glass Technologies, NSC analysis

How do emerging occupations arise?

Recently, the need to adapt and learn new skills has arisen quite quickly, in response to COVID-19. Manufacturers have learnt new techniques to make unfamiliar, in demand products, and restaurant owners have quickly developed or enhanced their skills in e-commerce.
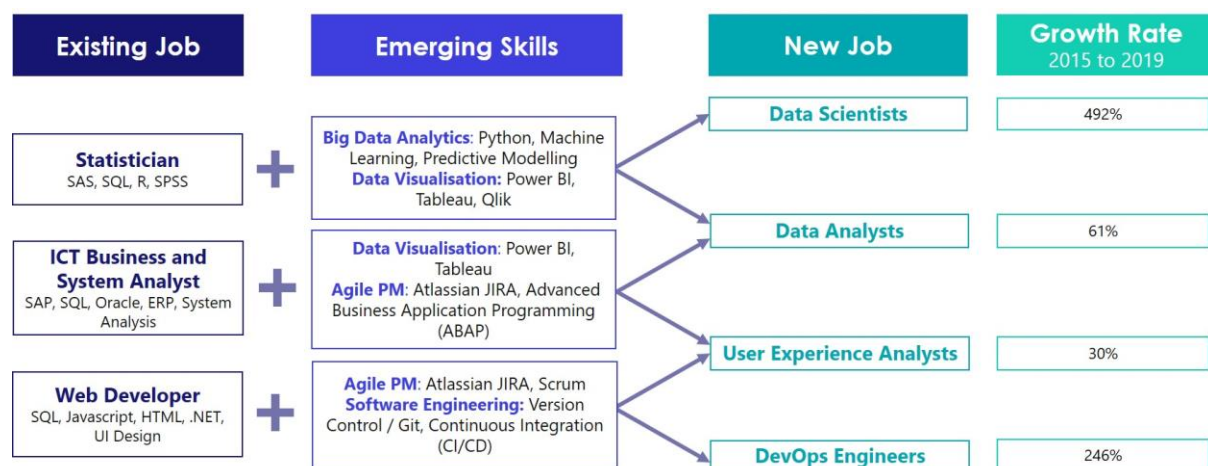
Previously, new skills have been adapted more gradually. For example, statisticians have for some time been expected to have skills using statistical tools such as SAS, SQL, R and SPSS (Figure 2). However, recently there has been increasing demand in the labour market for statisticians who also have skills using data visualisation applications as well as in big data analytics.

There are some instances where the skills required for certain jobs can change without changing the occupation fundamentally. For example, advances in the way we store and organise information mean we can more easily access a wider range of knowledge than in previous decades. As a result, librarians spend less time dealing with the physical management and transport of information, and more time assisting people to understand

how to access, understand and use that information. Libraries have become community hubs – running learning programs, promoting literacy and digital literacy, and providing resources and access to technology that give everyone a chance to succeed.

In the case of statisticians, however, emerging skills have changed the nature of some traditional statistician roles enough that the new occupations of data scientist and data analyst have emerged, growing 492 per cent and 61 per cent from 2015 to 2019, respectively (Burning Glass Technologies, NSC Analysis).

Figure 2: Emerging skills change existing occupations and create new occupations

Existing Job		Emerging Skills	New Job	Growth Rate 2015 to 2019
Statistician SAS, SQL, R, SPSS	+	**Big Data Analytics**: Python, Machine Learning, Predictive Modelling **Data Visualisation**: Power BI, Tableau, Qlik	**Data Scientists**	492%
ICT Business and System Analyst SAP, SQL, Oracle, ERP, System Analysis	+	**Data Visualisation**: Power BI, Tableau **Agile PM**: Atlassian JIRA, Advanced Business Application Programming (ABAP)	**Data Analysts**	61%
Web Developer SQL, Javascript, HTML, .NET, UI Design	+	**Agile PM**: Atlassian JIRA, Scrum **Software Engineering**: Version Control / Git, Continuous Integration (CI/CD)	**User Experience Analysts**	30%
			DevOps Engineers	246%

Source: Burning Glass Technologies, NSC analysis

Full profiles of the 25 emerging occupations, including employment numbers, earnings, and demographic information are available at www.nationalskillscommission.gov.au.

Our methodology

Insights from JEDI

The NSC utilises insights from JEDI, or the Jobs and Education Data Infrastructure project.

JEDI pioneers a new approach to skills-based labour market analysis. It does this by defining skills as the common language linking jobs to education and training. By combining traditional and near real time data using data science techniques, JEDI can identify transferrable skills and how skills are changing in the labour market.

Guiding principles

In order to identify the emerging occupations, four guiding principles were followed:

1. **Data driven:** the NSC used Burning Glass Technologies data, O*NET (the American occupation classification) and ANZSCO to identify emerging occupations. The NSC then validated and created profiles for these emerging occupations using microdata from the Australian Bureau of Statistics (ABS) Labour Force survey and the ABS Employee Earnings and Hours survey.
2. **ANZSCO based:** the emerging occupations align with the ABS concept of an occupation and reflect occupations that are not currently part of ANZSCO.
3. **Critical mass:** the emerging occupations must occur frequently enough in job advertisements to be classified as new occupations (at least 100 job advertisements over the last 5 years).
4. **Substantially different:** the emerging occupations must not be alternate titles of existing occupations or a 'strict subset' of existing occupations. For example, a cyber-security expert shares enough similar tasks with an ICT security specialist that we consider this is an alternate title for this occupation, rather than a substantially different emerging occupation.

Complementary methods

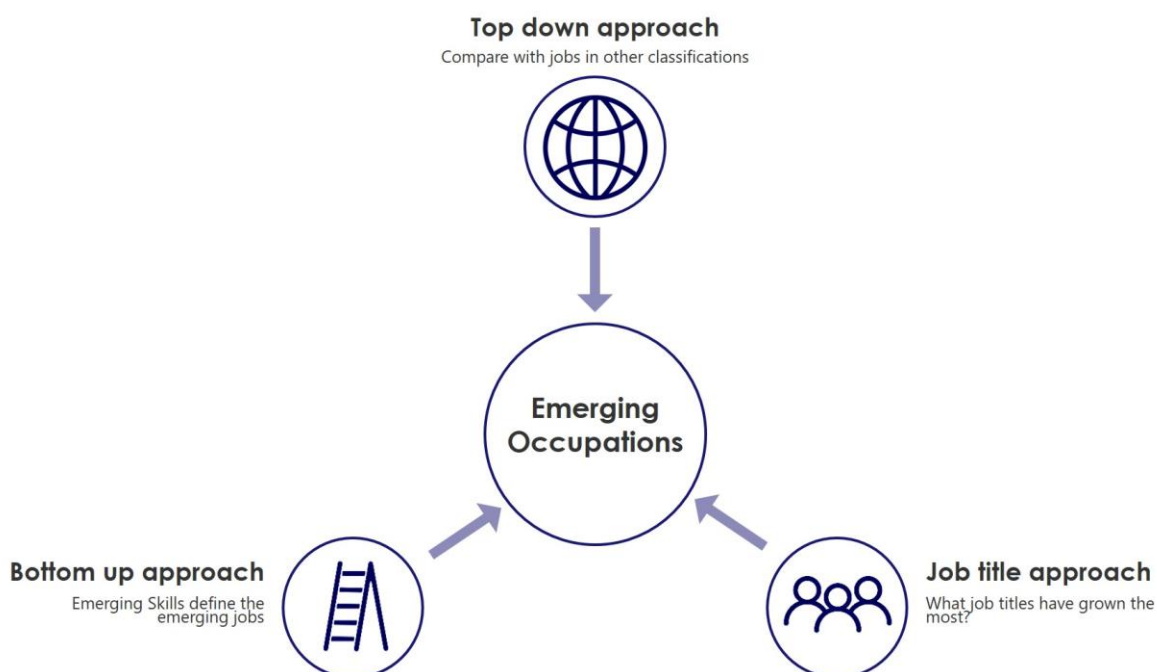No one method is sufficient to identify all emerging occupations.

The NSC has taken three complementary approaches (Figure 3), which involve:

1. Referencing skills projections produced by Burning Glass Technologies based on internet job advertisements. The NSC identified top job titles associated with high-

growth skills and manually reviewed the job titles for these to identify genuinely new roles. As the top growing skills were often technology tools, many of the top growing 'job titles' reflected that tool (for example, .Net Developer). Such titles were excluded from the analysis.

2. Analysing the linkages between Australian job advertisement data from Burning Glass Technologies and other classification systems (such as O*NET), to give an indication of acceptance of emerging occupations in other contexts. This was followed by quality assurance processes to ensure these occupations align with the guiding principles of the project.

3. Reviewing job advertisement data from Burning Glass Technologies to identify job titles that have at least doubled over the last five years. While this method was the most qualitative of the approaches, job titles are sometimes used by employers to signal a substantially new job is emerging, so we conduct this exercise for comprehensiveness.

Figure 3: Emerging occupations identified by the National Skills Commission

Validating emerging occupations

To validate emerging occupations, the NSC used unit record data from the ABS quarterly Labour Force surveys (from 2014 to 2019) to ensure that the proposed emerging occupations are understood by people in the labour market and are substantially different from existing ANZSCO occupations.

The NSC considered the survey's text fields for occupation title, task and industry, in combination with text mining techniques to search for titles, alternative titles and skills. The outcome was then qualitatively reviewed to ensure that the data sample described the occupation properly.

Text mining and statistical analysis of the Labour Force microdata (2014 to 2019) and Employee Earnings and Hours microdata (2018) outputs were used to create occupation profiles for each emerging occupation, showing employment size and other demographic characteristics. Burning Glass Technologies job advertisement data was used to determine in-demand skills. In order to produce reliable and representative occupation profiles, we required the data sample size to be at least 30 unit records for ABS microdata, and at least 100 job ads for Burning Glass Technologies data. We also used a two-year moving average method to smooth employment size data over time.
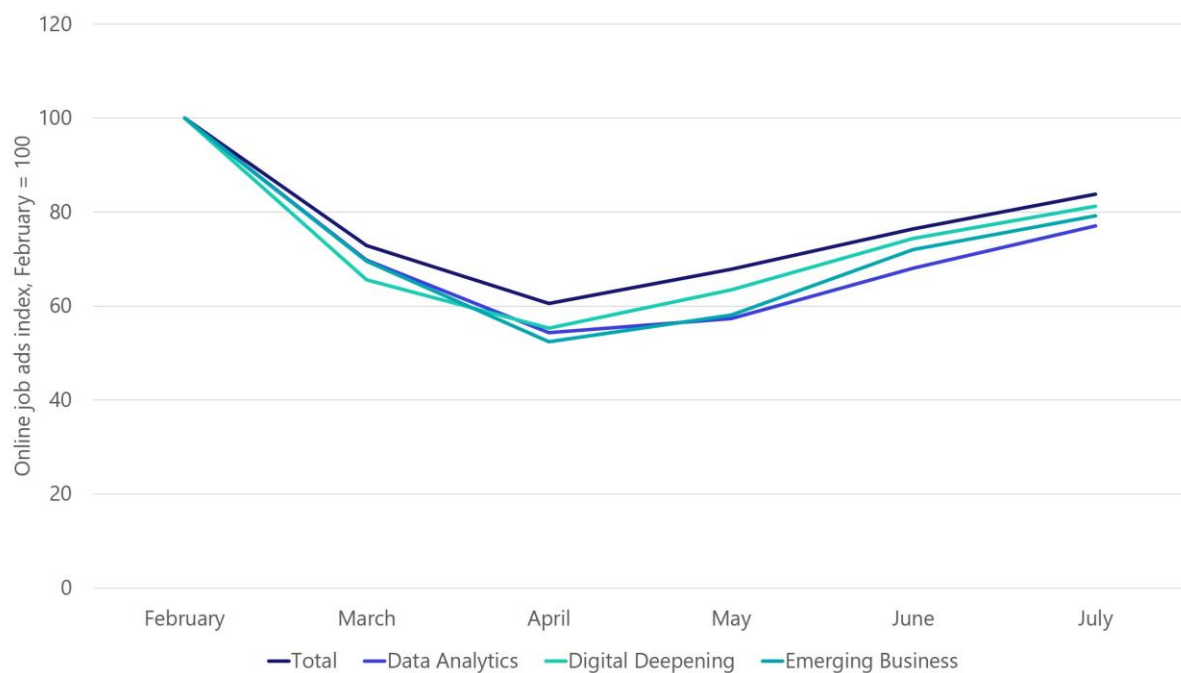
Impact of COVID-19 on emerging occupations

The current COVID-19 pandemic has increased the need for businesses to change their service offerings and adapt to new technology to keep them connected, working safely, and operational. For example, restaurants are now selling ingredients online; gyms have introduced on-demand fitness apps; and distilleries and manufacturers have changed from their usual production to make essential items like hand sanitiser, medical equipment and PPE.

The NSC has been monitoring the impacts COVID-19 has had on emerging occupations and found they were not immune to economic shock.

From February to July 2020, emerging occupations in the Data Analytics, Digital Deepening and Emerging Business categories followed a similar pattern to all job advertisements during this time (Figure 4). While these jobs are relatively more digital and could potentially be done remotely, they may be in companies and industries impacted by COVID-19 isolation regulations (for example, those that rely heavily on international trade, consumer spending, or those affected by broad industry shutdowns).

Figure 4: Impacts of COVID-19 on demand for emerging occupations

Source: Burning Glass Technologies, NSC analysis

Looking forward

These insights help us understand how skills needs in the Australian labour market are changing, and how Australian jobs are evolving as a result.

By continuing to monitor these changes, and providing detailed and timely skills analysis and information, the NSC will help ensure Australia is equipped to respond to economic changes and supply the skills that are in demand.

We need this data and evidence to shape our recovery from COVID-19, and our education and training system, to help rebuild a strong and prosperous Australia.

Acknowledgements

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