

# CHAPTER 14

## FUTURE DIRECTIONS



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This report is a snapshot of Australia's STEM workforce in 2011. In presenting that picture it inevitably opens the question: what should that workforce be tomorrow? We know that STEM skills are critical to Australia's future prosperity.

How can we progress from where we are to where we need to be, in line with our national goals?

It is a challenge with many facets, which will continue to be pursued as a priority by many investigators.

Some of the key emerging themes are highlighted below.

### 1 Doctorate holders working in the private sector

This report shows that a significantly lower proportion of doctorate holders work in the private sector than do graduates with bachelor qualifications. Should research training play a greater role in preparing doctoral students to seek positions—and succeed—in the private sector?

### 2 The gender pay gap

The pay gap between men and women across the STEM workforce remains substantial. Why does the gap remain, and what measures are needed to address it?

### 3 STEM skills in Vocational Education and Training

The VET sector makes a critical contribution to Australia's STEM skills base, a contribution yet to be fully reflected in the evidence base for policy development. What is known of the employment outcomes of VET graduates across STEM disciplines, and how can this knowledge be integrated with this report's analysis of outcomes from the university sector?

### 4 Business ownership in STEM

The data in Chapter 4 shows that STEM-qualified graduates, particularly doctorates, had low rates of business ownership compared to Non-STEM-qualified graduates. How can graduates be encouraged to harness their skills in building or leading businesses, particularly high-tech start-ups with global potential? The Office of the Chief Scientist has been investigating the ways in which universities can encourage STEM students to become entrepreneurs (Boosting High-Impact Entrepreneurship in Australia—A role for universities, Spike Innovation, 2015).

### 5 Education and employability

- ▶ How can the data be used to better align education and training with the skills and capabilities demanded by employers in a range of industry sectors?

- ▶ What are “STEM skills” and in particular what STEM skills are used in the workforce? A recent paper by the Office of the Chief Scientist “STEM skills in the workforce: what do employers want?” identifies a set of higher order STEM skills that employers seek (Office of the Chief Scientist, 2015).

- ▶ What is the difference between STEM-skilled and STEM-qualified?

- ▶ Is there a useful concept of “STEM understanding” that indicates skills to understand/manage/utilise/integrate STEM without being an expert practitioner?

### 6 STEM skills in “non-STEM” courses

In a technology-led economy the distinction between ‘STEM’ and ‘non-STEM’ jobs is increasingly blurred. More and more workers will be expected to have some degree of technological literacy, as well as the capacity to work effectively with STEM specialists. We can expect growing demand for STEM components in non-STEM courses as a consequence. How can we take account of the STEM skills of non-STEM graduates, as defined in this report; and should that definition be revisited?

### 7 What should our STEM workforce look like?

- ▶ How can we use this data to help in predicting and preparing the future Australian STEM workforce—particularly with regard to changing workforce needs
- ▶ Research by the ABS has shown that STEM jobs have grown at 1.5 times the rate of Non-STEM jobs (ABS, 2014) however, results in this report show that the STEM qualified population has grown at 15 per cent compared to 26 per cent of Non-STEM. Is this the right balance?
- ▶ How do the STEM workforce characteristics in Australia compare to similarly qualified workforces internationally?
- ▶ To what extent do STEM-qualified people engage with and contribute to Australia's industry growth sectors? This is being investigated by the Office of the Chief Scientist and will be published in a forthcoming report.

### 8 The direction of change

This report presents a largely static snapshot of the STEM workforce as at 2011, the latest year for which the necessary data exists. New datasets, including the 2016 Census, will allow important analysis of trends over time.